SROCC Second Order Draft Government and Expert Review Compiled Comments (Summary for Policymakers)

Comment id	From page	From line	To page	To line	Comment	Reviewer	Affiliation	Country	Response
104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
106	1	36	1	36	Either "people" or "HUMAN societies".	Alexandre MAGNAN	IDDRI	France	this text is removed and replaced with the new start up box
108	1	42	1	42	"sea-level rise": no hyphen used in the rest of the SPM (same in Ch01, Ch04 and CCB7: no hyphen).	Alexandre MAGNAN	IDDRI	France	Editorial - copyedit to be completed before publication
110	1	43	1	43	Why nature-based solutions in particular? The SROCC adopts a broader perspective (e.g. in Ch04 and CCB7). Maybe replace by: "adaptataion options are also assessed, including THEIR RELEVANCE for climate-resilient development pathways".	Alexandre MAGNAN	IDDRI	France	Noted - this text was removed from the final draft.
112	2	8	2	8	Modify: "…play a key role in the state of the GLOBAL climate" and remove "AT THE GLOBAL SCALE"	Alexandre MAGNAN	IDDRI	France	Taken into account - text revised
114	2	8	2	8	Add: "and REGIONAL TO LOCAL impacts on ecosystems and…"	Alexandre MAGNAN	IDDRI	France	No longer applicable - statement modified
116	2	19	2	19	Remove ")." at the end of the sentence.	Alexandre MAGNAN	IDDRI	France	No longer applicable - text modified
118	2	23	2	23	Maybe add "…to acidify in response to ATMOSPHERIC carbon dioxide uptake".	Alexandre MAGNAN	IDDRI	France	No longer applicable - sentence removed
120	3	5	3	5	Maybe simplify the first sentence of A1.5 by saying "DUE TO SUBSTANTIAL WARMING, the extent and duration of snow cover…".	Alexandre MAGNAN	IDDRI	France	No longer applicable - sentence modified
122	4	0	4	0	Fig. SPM.1 - Very useful figure.	Alexandre MAGNAN	IDDRI	France	Many thanks.
124	4	0	4	0	Fig. SPM.1 - Global Mean temperature change: the [2026-2035] and [2047-2056] distinction is difficult to read. Maybe use two barometers, on for each timespan?	Alexandre MAGNAN	IDDRI	France	Overall graphical approach has been changed in order to ease understanding.
126	4	0	4	0	Fig. SPM.1 - Ocean heat content change: for a non-academic audience, using °C instead of J would make more sense.	Alexandre MAGNAN	IDDRI	France	Noted: We considered this, but have retained the units used in the chapter. We have however added a panel for sea surface temperature with units in oC that addresses the comment of the reviewer.
128	4	0	4	0	Fig. SPM.1 - Global Marine animal biomass: why both bars and stylized fishes? Maybe only use stylized fishes (and vertical instead of horizontal).	Alexandre MAGNAN	IDDRI	France	Overall graphical approach has been changed.
130	4	0	4	0	Fig. SPM.1 - Coral Reefs: the use of blue and purple colors is misleading as the temperature thresholds mentioned are not reflecting RCP2.6 and RCP8.5 means stricto sensu. Also: mention that this refers to global mean air temperature (to avoid confusion with ocean temperature).	Alexandre MAGNAN	IDDRI	France	Colour palette has been changed.
132	5	20	5	23	Does the confidence statement refers to the observed impacts or to the effectiveness of adaptation?	Alexandre MAGNAN	IDDRI	France	Noted: This general statement was not clearly worded and has been removed from the revised SPM. Instead, more specific information on observed impacts and adaptation that has already occurred is given in SPM sections A4-A9.
134	5	25	5	25	Simplify: "cryosphere-related risks and impacts" rather than "cryosphere-change-related risks and impacts".	Alexandre MAGNAN	IDDRI	France	Noted. The SPM structure has been revised. This is now addressed with relevant detail in A7
136	5	29	5	29	Maybe "animal and plant communities" rather than "populations"; because risk of understanding "human population" by readers not used to deal with natural sciences language (e.g., policy-makers).	Alexandre MAGNAN	IDDRI	France	Accepted: revised text in A4
138	5	41	5	41	Not clear what "scope" and "fragmented" means. Maybe: "However, adaptataion measures in agriculture, hydropower, tourism and other sectors are generally limited in SPACE / in THEIR GEOGRAPHICAL scope, short-term and NOT CONSISTENT WITH EACH OTHER" ?	Alexandre MAGNAN	IDDRI	France	Noted. This text is removed and section C gives details
140	5	48	5	48	Hyphen nt at the right place --> "risk of climate change-related impacts…"	Alexandre MAGNAN	IDDRI	France	Accepted - corrected
142	6	8	6	13	The qualitative listing on impacts/risks doesn't look very new. Maybe quantifying them (based on Ch05; and if possible) would help highlighting the novelty of the SROCC on this.	Alexandre MAGNAN	IDDRI	France	There are not numbers for all of them and examples are very local
144	6	14	6	16	SPM.2 - Remove " to the biosphere and society"; the figure is self-evident…	Alexandre MAGNAN	IDDRI	France	Accepted - Suggestion applied.
146	6	21	6	22	Would it make sense to insist also on the 21st century timescale, e.g. by saying "DUE TO PAST-TO-PRESENT GLOBAL GREENHOUSE GAS EMISSIONS, ocean heat and carbon uptake, glacier and ice sheet loss, and sea level rise CAN ONLY BE SLOWED OVER THE COURSE OF THE 21st CENTURY, AND are irreversible on timescales of centuries and beyond" -- But more broadly, aren't we already on the projection side (i.e. SPM. B) with this sentence?	Alexandre MAGNAN	IDDRI	France	Taken into account - the revised A3 is now focused on historical SLR aspects and B3 on projected
148	7	21	7	21	Section 4.3.3.5. also deals with impacts on ecosystems.	Alexandre MAGNAN	IDDRI	France	Accepted - reference to section included
150	7	26	7	26	Medium or HIGH confidence? There is increasing amount of scientific literature suggesting that CC impacts are detrimental for livelihoods, ecosystem services etc., and so for sustainability; if that's what you want to say, so this is HIGH confidence. However, the attribution of such direct/indirect impacts to CC remains challenging; in that case, this is indeed MEDIUM Confidence.	Alexandre MAGNAN	IDDRI	France	Accepted. The original statement has been changed during the course of the revisions. In other places of the SPM addressing the risk for sustainable development from CC change in the O&C, the confidence level has been changed to high.
152	11	27	11	29	Needs clarification: are you talking about greenhouse gas emssion mitigation or about risk mitigation strategies (including precautionary maganement practices)? I guess that's the second, and so that would be better (to avoid confusion) to use another term than "mitigation" ("adaptation" looks to be the right one…).	Alexandre MAGNAN	IDDRI	France	Taken into account - this part has been restructured and revised for more clarity. The part in question is now included under B5
154	11	27	11	32	These two sentences look relatively similar and hence redundant: "Future risks for linked human systems 28 depend on the level of mitigation and especially the responsiveness of precautionary management approaches (medium confidence)" and "Specific impacts will depend on the level of global warming and on the strategies employed to manage the effects on stocks and ecosystems".	Alexandre MAGNAN	IDDRI	France	Taken into account - this part has been restructured and revised to be more clear, focused and concise. The part in question is now included under B5
156	8	0	12	8	There is huge uncertainty about the potential effectiveness of future adaptation (depending on the scale, forms, feedback loops, etc.). So here, associating "becomes" with "high confidence" looks problematic; a better option would be "IS EXPECTED TO become ... (high confidence)".	Alexandre MAGNAN	IDDRI	France	Noted - the SPM has been revised substantially

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
158	15	6	15	6	Again, the use of the term "mitigation" is confusing here. Do you talk about (1) GHG emissions mitigation, or (2) risk mitigation? If (1), it doesn't make sense to have this in the sentence as the future risk levels are estimated against various end-century warming scenarios, and hence various levels of GHG emissions mitigation. If (2), "risk reduction strategies and societal adaptation" is suffiscient (not to say only "societal adaptation", as the core goal of adaptation is to reduce vulneraibilty and risk).	Alexandre MAGNAN	IDDRI	France	Noted - mitigation is removed from the revised fig (SPM.5)
160	15	14	15	14	"COUNTRY" and not "county"?	Alexandre MAGNAN	IDDRI	France	Caption has been rewritten and checked for accuracy.
162	16	22	16	22	Remove "In the future" as you alredy use "will be".	Alexandre MAGNAN	IDDRI	France	Taken into account - reworded
164	17	0	17	0	Fig. SPM.5, panel A. Very interesting/useful figure. Suggestion : for "Increasing size = more exposed population", can you provide order of magnitude, e.g. from very little circles to the biggest ones? Same for the assets part (i;e. order of magnitude from light to dark color) + Is is possible to include the 2016 and 2017 years becaues big hurricanes/cyclones occurred and it can be powerful fo dissemination to decision-makers aneras and beyond.	Alexandre MAGNAN	IDDRI	France	Figure SPM.5 was removed in revision
166	18	0	18	0	Fig. SPM.6: the map on the background is useless as no direct correlation with all the geographies addressed in the graphs (e.g. Pacific and W. America).	Alexandre MAGNAN	IDDRI	France	Overall graphical approach, including the usefulness of the map, has been reworked to ease comprehension.
168	19	8	19	8	Maybe "POSSIBLE" instead of "feasible"? "Feasible" looks like we already have in hand the right panel of relevant adaptation pathways, and so limits to adaptataion will help selecting among them. That is not really the case, adaptataion pathways still need to be invented, including by considering the emerging limits to adaptation.	Alexandre MAGNAN	IDDRI	France	Taken into account. Term "feasible" removed, and bullet has been revised.
170	19	29	19	29	Remove "for this approach"?	Alexandre MAGNAN	IDDRI	France	Taken into account. The bullet has been revised.
172	19	34	19	34	CCB-7 on Low-lying islands and coasts also suggest the usefulness of combining approaches (see especially fig. CCB7.2).	Alexandre MAGNAN	IDDRI	France	Noted - section C has been revised. C4 (enablers) brings in coordination
174	20	4	20	4	Maybe "Low regret" is better than "No regret", because chosing an option is almost always at the detriment of other things (e.g., restoring mangroves or beach-dune systems instead of building a new hotel that could generate jobs and profits). Another option is "no regret from a climate perspective", but it adds 4 words...	Alexandre MAGNAN	IDDRI	France	Taken into account. The bullet has been revised.
176	20	25	20	25	Maybe "but are not efficient to address the global scale problem" instead of "but are only efficient at the local scale"?	Alexandre MAGNAN	IDDRI	France	Noted. Bullet has been revised.
178	21	5	21	8	Is it possible to be more specific? As it stands, it looks too generic to be convincing. Another option is to remove C3.6 as there are some overlap with C4.1 and C4.2 especially.	Alexandre MAGNAN	IDDRI	France	Noted. C3.6 serves as a bridge between C3 overall, which includes a number of specific statements, and C4. which also provides greater specificity. Granted space limits in the SPM, these earlier statements in C3 were not repeated here.
180	1	0	1	0	A synthesis figure showing, in a simplified way, the various processes at work (e.g. Fig. 1, box 1.1 in Chapter 1) would be very helpful to guide non-experts in understanding the links, e.g., between wraming/acidifcation and eoxygenation.	Alexandre MAGNAN	IDDRI	France	Thanks for this useful suggestion. Due to strict page limitations, we unfortunately can not include such a figure in the FD SPM, however, we instead have included the suggested synthetic figure in the FD of the Technical Summary (see Figure TS.2).
184	5	13	5	17	The implications for international transport and trade are not expelled in the substatements. What the sign and how large are these impacts?	Mustafa babiker	Saudi Aramco	Saudi Arabia	Noted - transport and trade now in A8
186	0	0	0		Include a statement on knoweledge gabs and their implications	Mustafa babiker	Saudi Aramco	Saudi Arabia	Noted - the SPM has been revised substantially and limits to knowledge identified where appropriate
518	1	1	21	41	I have made comment on the key messages in the various chapters that will, if they are taken into consideration, affect the key messages of the SPM. I assume there is no need to repeat the comments in the SPM at this point.	Cecilie Mauritzen	Norwegian Meteorological Institute	Norway	Thank you, these will be given attention
520	2	5	0		While anthropogenic contributions are mentioned in several of the A subsections, the quanitification of changes to each piece should be put in historical context when possible such that meaning, not just confidence, is given to the estimates provided.	Jenna Pearson	Brown University	United States of America	Agreed, Figure SPM.1 provides historical and projected changes. Where possible quantification is included
818	3	14	3	17	In the SPM it is written: "A1.6 In situ measurements in the European Alps, Scandinavia and the Tibetan Plateau show that permafrost has undergone warming and thaw in the past two decades (high confidence). The observed rates of change in the 21st century are higher than in the late 20th century (medium confidence). Other mountain regions lack in-situ observations to assess trends. ... {2.2.4, 3.4.1; 3.4.2; 3.4.3}". .In Section 2.2.4, author team may want to consider publications on Central Asian permafrost, see the list in comment 2, and to alter the Executive Summary and SPM correspondingly.	GRIGORY INSAROV	INSTITUTE OF GEOGRAPHY OF THE RUSSIAN ACADEMY OF SCIENCES	Russian Federation	Taken into account. Changes made in Chapter 2, however, regional patterns are not elevated into SPM.
820	4	4	0		Note error in SPM1 - last column - should be 2100 not 2010.	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Correction applied.
822	7	19	0		Add "over-exploitation of marine resources.	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Taken into account - "over-exploitation" not specifically mentioned but indirectly now included in revised version which says "…with adverse effects from human activities on ocean and land…"
824	10	44	0		Available literature indicates that dynamite fishing is also important as is the overexploitation of key functional groups (e.g. parrotfish and of the grazers). At a few words to complement these two examples.	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Not applicable - sentence removed in revision
826	15	19	0		I think it is important to reflect that many if not all of these approaches do not scale to the level of reefs everywhere. I think you should add a few words on the questionable nature of these fixes being scalable.	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Accepted - this is removed from the caption and addressed in the new SPM fig 5 panel c
840	4	4	4	4	Note error in SPM1 - last column - should be 2100 not 2010.	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Correction applied.
842	7	19	7	19	Add "over-exploitation of marine resources.	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Taken into account - "over-exploitation" not specifically mentioned but indirectly now included in revised version which says "…with adverse effects from human activities on ocean and land…"
844	10	44	10	44	Available literature indicates that dynamite fishing is also important as is the overexploitation of key functional groups (e.g. parrotfish and of the grazers). At a few words to complement these two examples.	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Not applicable - sentence removed in revision
846	15	19	19	19	I think it is important to reflect that many if not all of these approaches do not scale to the level of reefs everywhere. I think you should add a few words on the questionable nature of these fixes being scalable.	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Accepted - this is removed from the caption and addressed in the new SPM fig 5 panel c

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
860	4	4	4	4	Last column mislabelled 2010 when it should be 2100	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	Correction applied.
862	2	23	2	23	rewrite as follows: increased carbon dioxide uptake by the ocean	Ove Ove Hoegh-Guldberg	University of Queensland	Australia	No longer applicable - sentence removed
1091	9	31	9	36	Should not CH4 release from permasfrost and potential CO2 release be added here?	George Burba	University of Nebraska / LI-COR Biosciences	United States of America	Taken into account, this is now contained in B4.3.
1819	10	32	10	34	indicate if changes in global biomass assumes steady state fisheries catch, increasing fisheries catch scaled by population increase, or whether estimates are based on species without considering biomass changes by fisheries	Lydia Kapsenberg	CSIC Institute of Marine Sciences, Barcelona	Spain	Taken into account - text revised 'across the foodweb and the maximum catch potential of fisheries' - see B.5.1
1821	10	43	10	45	use of refuge is unclear, since shallow coral reefs protected from direct human impacts such as trawling and nutrient enrichment would still be subject to global change (temperature, acidification, sea level rise), these reefs are not climate change refugia. It is unclear what is meant here. Is the point that local damages should be reduced?	Lydia Kapsenberg	CSIC Institute of Marine Sciences, Barcelona	Spain	Not applicable - sentence removed in revision
1823	11	12	11	12	Shellfish aquaculture is also sensitive to warming. Mediterranean sea aqucultures have shifted harvesting dates to avoid mass mortalities that occur during warm temperatures in August (e.g., aquaculture in the Ebro river delta in Spain)	Lydia Kapsenberg	CSIC Institute of Marine Sciences, Barcelona	Spain	Noted with thanks
1825	19	43	19	49	Relying on ecosystems that are extremely sensitive to climate change for carbon storage, such as seagrass beds, seems counterproductive and an inefficient mitigative option. One could include a note here that there is a significant or unknown risk associated with relying on blue carbon ecosystems that are senstive to climate change in and of themselves	Lydia Kapsenberg	CSIC Institute of Marine Sciences, Barcelona	Spain	Noted - blue carbon is retained in C.2.5 . A statement on mitigation potential is added. Risks to vegetated coastal ecosystems are in Section B
1827	20	3	20	5	In my opinion, the "no regrets" language should be avoided in recommendations of climate change mitigation. "no regrets" is not based on evidence, and it implies that there are no regrets, which may not be the case. It is virtually certain that limited resources will be available for local management of global change. If these efforts (time, funding, resources) are placed in blue carbon projects that do not provide a good return on investment (e.g., restoration fails, ecosystem deteriorates due to other climate stressors, etc.), and they could have instead been invested in other more effective carbon storage strategies, that could be a considerable regret. 'No regrets' ignores the cost-benefit analysis and targeted goal development that local communities should do when deciding where to invest in meaningful mitigative actions (e.g., is the goal carbon storage or ecosystem protection?). I do not think that the highest level climate change report (IPCC) should label one specific action as "no regrets" as it detracts from other more effective strategies. My recommended edit is: "However, the protection and enhancement of coastal blue carbon is essential for maintaining current carbon stocks and other natural resouces and services that these ecosystems provide (e.g., coastal protection, nursery habitats, etc.)." This demonstrates the importance of these ecosystems for climate change management independent of their role in carbon storage.	Lydia Kapsenberg	CSIC Institute of Marine Sciences, Barcelona	Spain	Taken into account. The bullet has been revised.
2049	2	37	2	38	Compared to thermal expansion of sea water, it is overstated that 'glaciers and polar ice sheets are now the "dominant" source of sea level rise'. Use a more appropriate word.	Akio Kitoh	Japan Meteorological Business Support Center	Japan	Due to constrains on the word limit this has been removed in the final version we give the numbers of ice sheet and glaciers mass loss in SLR equivalent (section A 1.1 of SPM FD)
2053	16	24	16	26	This assessment of "there is low confidence in futute frequency changes for tropical cyclones collectively at the global scale" is different from the SR15 assessment that showed "we assess that under 3 to 4 °C of warming it is more likely than not (medium confidence) that the global number of tropical cyclones would decrease whilst the number of very intense cyclones would increas" in page 3-47 of SR15. There are no new findings since AR15 in Chapter 6.3.3.1.	Akio Kitoh	Japan Meteorological Business Support Center	Japan	Noted text and confidence adjusted
2055	1	34	1	34	CO2 emissions correlate to 363 not the cause of CO2 increase. Burning of amazon rain-forest is the cause. http://cctruth.org/index.php/presentations/ (high confidence)	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2057	2	12	2	13	Sea level rise has not acellerated in the past decades. The data shows otherwise. http://cctruth.org/index.php/ocean-data/ (high confidence)	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2059	2	23	2	25	The diffusion in air of CO2 is 2 cm/month toward the exosphere. Furthermore the corelation of ocean CO2 to air CO2 is at 285ppm of air co2. The ocean is not a sink for atmospheric CO2. (high confidence)	Dave White	Climate Change Truth Inc.	United States of America	Rejected - the ocean has been documented to be accumulating carbon from the atmosphere. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2061	4	2	4	5	Projections are just possibilities. Please use this word instead. Otherwise the media takes it as fact like projecting a winner in an election.	Dave White	Climate Change Truth Inc.	United States of America	projection is the accepted terminology and is used throughout this report and other IPCC reports. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
2063	5	45	5	54	There is no sea level rise. Increased evaporation due to warming oceans and less salty oceans is taking care of it. Furthermore 90% of glacier is under water. Water expands when frozen and contracts when melted. This reduces ocean level. A tide gauge in gulf of alaska shows decreasing sea level. (high confidence)	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2065	10	6	10	9	The warmer the ocean the more evaporation. Latent heat of evaporation cools the ocean surface. (high confidence)	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2067	10	18	10	19	The cause of ocean CO2 increase is decay of polluted rivers and human waste from curise ships. (high confidence)	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2071	12	11	12	17	Delete this lie.	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2073	12	30	12	36	There exists zero correlation between SLR and emissions. (high confidence)	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2079	12	11	12	17	We have had 50 years of warming and zero increase in rate of rise since 1870. What this paragraph says is very low confidence. Most of page 12 is pure conjecture.	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2081	13	1	13	56	Most of page 13 is pure conjecture.	Dave White	Climate Change Truth Inc.	United States of America	Please note that the SPM reflects the main findings in the assessment. " The IPCC is committed to preparing reports that aim for the highest standards of scientific excellence, balance, and clarity, please see https://www.ipcc.ch/about/preparing reports/. The IPCC's reports are comprehensive and balanced assessments of the current state of knowledge on topics related to climate change."
2113	2	12	2	13	Table 4.1 also shows an increase since the mid-20th century in the SLR contributions from glaciers and ocean heat content.	Robert Kopp	Rutgers University	United States of America	Agreed, this is now shown in A.3.1
2115	2	17	2	17	Is the "steady rate" consistent with the increasing rate of global mean thermal expansion (Table 4.1)?	Robert Kopp	Rutgers University	United States of America	Noted see revised text in A2.1 and A3.3 and redesigned Figure SPM.1
2117	4	1	4	1	Uncertainty needs to be more clearly communicated in this Figure. What about population uncertaintry? OHC uncertainty? Why the focus on the medians of the likely ranges of SLR? (and there is no indication that these are likely ranges).	Robert Kopp	Rutgers University	United States of America	Uncertainty data has been added to each panel.
2119	6	21	6	21	None of the subpoints of A3 address sea-level rise substantively.	Robert Kopp	Rutgers University	United States of America	Taken into account - the revised A3 is now focused on SLR aspects
2121	9	38	9	45	Given stakeholder interest, it would be helpful to have some context as to the associated CO2 and methane release, and associated climate feedback.	Robert Kopp	Rutgers University	United States of America	Section text revised, this is now contained in B1.3; the scale of the models is such that only total carbon is tracked rather than carbon dioxide and methane separately. More detailed information on the two greenhouse gases is provided within chapter 3
2123	12	19	12	28	Are both 2080-2099 and 2100 numbers needed for the SPM? This key message would be less cluttered if only the 2100 numbers were used.	Robert Kopp	Rutgers University	United States of America	Taken in account - 2100 used
2125	12	26	12	26	Why no uncertainty on 2100 rate?	Robert Kopp	Rutgers University	United States of America	Taken in account - added
2127	12	42	12	43	This is a weak statement, coming right after discussion of >1 m rise in the 21st century.	Robert Kopp	Rutgers University	United States of America	Taken into account - text adjusted
2129	16	37	16	37	The basis for restrictimng this statement to RCP 8.5 is not clear from the supporting analysis in chapter 4. Fig 4.10 shows this is also true in RCP 2.6.	Robert Kopp	Rutgers University	United States of America	This had been modified in B3.3., where the sentence now reads: "Under all future emissions scenarios, many low-lying megacities and small islands at almost all latitudes will experience such events annually by 2050".

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
2461	0	0	0		The SPM gives a good overview of the climatic evolution since 1850. Figure SPM.1 shows this well as it commences only at the beginning of the industrial era. The Special Report and SPM fails when it comes to embedding these results in the long-term palaeoclimatic pre-industrial context. I am particularly surprised that this has not happened because the first author of the SPM is an experienced palaeoclimatologist. It is well accepted in the climate sciences that the anthropogenic component of climate change can only be properly inerpreted once the natural variability and its natural climate drivers are fully understood. This report offered the unique chance to systematically integrate pre-industrial with the industrial climate change. Special Report planners seem to have agreed to ignore pre-industrial climate. This is a missed chance and weakens any attribution and interpretations discussed in this Special Report. Considering the lack of integration with pre-industrial climate variability and lack of such documentation, the usefulness of this Special Report will be rather low, I am afraid. I hope that these basic principles will be better followed in the future. The production of such a report involves significant funding and time spent by researchers. It is unclear to me how such basic shortfalls can happen. I personally suggested the inclusion of pre-industrial climate change in this report at our national IPCC meeting and everybody in the room seemed to have supported this. Something must have gone terribly wrong in the planning stage...	Sebastian Luening	Institute for Hydrography, Geoecology and Climate Sciences	Portugal	Noted - this will be covered in the WGI Assessment Report.
2515	12	14	0		More than tens of millions live in the LECZ	John Church	University of New South Wales	Australia	This has been removed from the revised SPM.
2603	1	0	21		In my opinion overall the Summary for Policymakres is clearly written and need no more modifications.	Pushp Raj Tiwari	University of Hertfordshire	United Kingdom (of Great Britain and Northern Ireland)	Thank you
2823	18	1	18	10	Extremes and their climate change generally feature significant regional features. It would be much better to include more global distribution maps (like Figure SPM.6) of future climate change of different extreme events in this report, which would make the report more significant for the policy makers.	Baoshu Yin	Institute of Oceanology Chinese Academy of Sciences	China	Noted - Figure SPM6 has been updated (see revised SPM.5) and maps added to Figure SPM.5
2855	2	23	2	24	The statement is somewhat misleading. Perhaps, the ocean uptakes the EQUIVALENT of 25% of total anthropogenic emissions. Is it just about CO2? About net-emissions? These is to specify.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Accepted - this text has been modified and clarified
2857	2	42	2	43	What particular temperature is assessed? Surface air temperature? Surface water and land temperature? Clarify, please.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - revised SPM says 'surface air temperature'
2859	2	45	2	45	June is not a spring month.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	No longer applicable - statement modified
2861	3	9	3	9	Suggestion: use 'rate of mass loss' instead 'mass loss'	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	No longer applicable - sentence removed
2863	3	19	3	22	Yes, the potential of boreal permafrost to enrich the atmosphere with CO2 and CH4 is high, but just in the case of complete thaw. Is it the case for the 21st century? What percentage of the potential can be actually emitted in the 21st century?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account. This section (now A1.4 in the SPM SOD) is about observations and assesses carbon storage. Projected release of GHG from permafrost is assessed in B1.3.
2865	3	29	3	30	A qualifier to 'influenced' would be appropriate here: substantially, slightly, everywhere, spotty, etc. An uncertainty statement would be also helpful.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - sentence reworded and confidence level added
2867	4	2	4	5	In Fig. SPM.1, it is also expedient to indicate +2C line relative to 1850-1900 in view of the importance of this threshold for the Paris agreement implementation.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted: the temperature information has been updated and is now represented as time series for RCP2.6 and RCP8.5, relative to 1986-2005. The caption also gives information from AR5 on the assessed amount of warming from pre-industrial to the 1986-2005 reference interval.
2869	5	15	5	15	Heat and carbon uptake cannot be considered as SERVICES. Ocean heat is not withdrawn from the Earth's climate system. More warm ocean emits infrared radiation and modifies the land climate. CO2 uptaken by the ocean can be re-emitted. Some editing is needed.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - text has been completely revised
2871	5	16	5	17	Why trade and transport are eliminated or degraded under climate change? If they are just modified, perhaps, those modifications are positive?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - "trade and transport" are mentioned in headline statement A8 and also referred to in underlying bullet A8.3
2873	5	56	6	4	Spatial scale and magnitude of such changes should be characterized. A statement on the consistency of observations and model responses is always important for researchers, but how can it be used by policy-makers?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted - the SPM has been revised for clarity
2875	6	6	6	6	Suggestion: replace 'in climate regulation' with ' in the climate system'	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	The text in this bullet has been completely revised and the phrase "in climate regulation" does not exist anymore
2877	6	16	6	18	Nothing about mudflows?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Figure has been redrawn. Mud flows are not specifically distinguished to keep the number of categories reasonable.
2879	6	21	6	22	Regarding CO2 uptake: if it is about appr. 90 GtC/year from the atmosphere to the ocean, it is reversible, because ocean-atmosphere flux is also appr. 90 GtC/year. Or it is about net-flux? The process should be clarified.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted - the section is substantially revised - see A2.6 20-30% of total anthropogenic carbon since the 1980s.
2881	6	28	7	2	It is not a policy relevant statement from science, it is a narrative. Suggestion: to omit.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - sentence removed
2883	7	51	8	1	The footnote on page 7: it should be 'global net anthropogenic cumulative emissions', not just 'cumulative emissions'	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	No longer applicable - sentence rephrased
2885	8	1	8	2	Why just 'due to increasing air temperature'? May be due to increasing back infrared radiation flux from the atmosphere resulting from anthropogenic enhancement of the greenhouse effect due to enrichment of the atmosphere with GHGs.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted. Although other factors can have an effect, air temperature has been shown to be the main driver for the observed change
2887	8	5	8	13	Time horizon for the changes should be specified. Editing is needed, since the whole B1.4 is a bit vague.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - statements were sharpened, numbers provided, and time horizon added where possible (now B4.1-B4.3)
2893	8	40	8	41	Nothing is absolutely constant around us. Therefore, 'are projected to change discernibly' would be more appropriate.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - The entire bullet has been completely revised to become more clear and specific
2895	8	43	8	43	Suggestion: replace 'for climate regulation' with ' for its function in the climate system'. 'Climate regulation' is ambiguous.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - text has been revised and the term "climate regulation" has been removed from the SPM

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
2897	8	50	9	2	Policy prescriptive narrative: strongly suggest to delete.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted - the text is revised instead see A.8.3
2899	9	4	9	29	The statements should be supported by some quantitative information (percentage, etc.).	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - quantitative information is added throughout SPM where possible
2901	10	15	10	15	Please, specify that the ocean oxygen trend is assessed, not the atmospheric one.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - ocean added
2905	10	43	10	45	Is ' nutrient enrichment' really a factor of shallow reefs degradation?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Not applicable - sentence removed in revision
2907	11	5	11	5	changes ... on grows': editing is needed	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Editorial – copyedit to be completed prior to publication
2911	11	32	11	35	It is a narrative, not an assessment.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - the statement has been revised in C2.3
2913	11	37	11	41	Risks for human health and conflicts of political entities are too different things to couple them in one statement. Suggest to omit political part. And does CO2 affect pathogens? Suggestion: to assess the warming effects separately.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	They are in two different sections about health (54211 and 54212) and one about conflicts (54213). We have avoided the political conflict because it is not clearly related to CC in the ocean.
2915	12	11	12	11	Do existing scenarios describe climate over centuries and millennia?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	This is the case for sea-level rise. See section B3.4 in the revised SPM.
2917	12	41	12	43	If it is ' deeply uncertain', how can it be of 'medium confidence' ?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - text adjusted
2919	13	16	13	16	Please, avoid jargon: 'holding-the-line'	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - the entire bullet has been re-written for more clarity and the expression "holding-the-line" removed
2921	13	11	13	41	High quality text, but perhaps too many details are given.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - the entire part has been revised to be more clear, focused and concise
2923	14	15	14	16	Suggestion: delete 'political marginalization', because it is unclear in this context.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Accepted the term is removed
2925	14	16	14	17	What means 'empirically-based literature'? Is it 'white' or 'grey' in the IPCC sense?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Accepted the term is removed
2927	15	2	16	2	The use of geography in plural ('geographies') is somewhat confusing. The use of burning embers for the purpose of this report can be misleading. Yes, additional risk can be detectable and attributable, but SMALL! Why do the authors present this in RED and PURPLE?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Embers on geographies have been now taken into a separate figure to be dealt in more detail.
2929	15	2	15	2	Risk scenarios' is misleading here. Suggestion: to replace with 'Risks under different levels of warming'	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Label has been rewritten.
2931	16	16	16	18	MHW will be one-in-three days event? Where? Globally? In some regions? It should be rewritten in more clear manner.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	No longer applicable - not in revised SPM
2933	16	30	16	32	This is not an assessment of literature. Suggestion: delete.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - sentences removed
2935	16	44	16	44	In turn, reduction in coastal vegetation will lead to decrease in herbivory that partly offset the effect. Editing is needed.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted - sentence has been removed
2937	18	2	18	10	The adopted definition of an extreme sea level is the one having 1/100 frequency or lesser. If this level is occurred more frequent with time, this can be either due to mean sea level upward trend or due to an increase in the variance. What is implied here remains unclear. This point should be clarified.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	The overall graphical approach, including the y-axis label, has been reworked to ease comprehension. An additional introductory panel has been added to ease the comprehension of these terms.
2939	18	26	18	26	'tipping element' is jargon: avoid, please.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - term not used in revised SPM
2941	19	3	19	5	The language is too heavy for policy-makers: simplify, please.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account. The language has been revised for the final draft.
2943	19	6	19	8	Adaptation is about consequences, not about causes: editing is needed.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	noted - text changed - see C 2 and C 3.1
2945	19	3	19	23	The whole section C1 is rather a philosophical discourse than policy relevant assessment.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into consideration. The section has been revised fundamentally and is now more specific.
2947	20	36	20	40	The text is unclear, should be more focused and based on the evidence.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	taken into account. More focus, evidence provided I C4.1, C4.2, C4.5
2949	20	52	20	53	It is not expedient to mention concrete international political agreements. The text should be politically neutral.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted. Text has been revised in a more neutral manner.
2953	3	10	3	12	It is highly recommended to supplement the “total mass loss” results for the mentioned glacierized mountain regions, considering that it is easy for stakeholders to misunderstand that the glacier ablation is not significant in High Mountain Asia at all. In this sentence, the data presented are based on absolute changes, and the results may be different if the relative values were calculated, i.e., compared to the total mass loss over all mountain regions.	Pengling WANG	Division of Climate Change, National Climate Center,China Meterological Administration	China	Noted The text was revised for more clarity, see section A1 and Figure SPM.1 panel g
2959	5	51	5	53	The sentence "Attribution of local impacts to sea level rise, however, remains difficult due to the combined influence of non-climatic drivers and local processes unrelated to sea level rise" acknowledges limitations in current knowledge, as previously stated in AR5 WG2 Ch18. I wonder why a "medium confidence" statement is assigned to this sentence. Furthermore, this seems to depend very much on how 'impact' is defined: for example, the figure SPM.4 indicates that impacts of sea level rise are detecteable and attributeable to climate change with at least medium confidence in cities with no to moderate adaptation (applies also page 12 lines 53 and following). I suggest rephrasing.	Goneri Le Cozannet	BRGM	France	Noted - the sentence is removed - and SPM revised for clarity e.g. see A.3.5
2961	14	21	14	22	The whole chapter 4 suggests that there is not only 1, but 2 ingredients to reducing SLR risks, the first one being mitigation of climate change (to reduce the risks of acceleration of sea level rise) and the second, building resilience as stated in B5.6	Goneri Le Cozannet	BRGM	France	Noted - mitigation Is acknowledge but not assessed as the SROCC is WGI-WGII
2963	15	1	15	1	In the legend (colorbar): the white and yellow colors seem to indicate risks and impacts deteactible or attributeable to climate change OR SEA LEVEL RISE	Goneri Le Cozannet	BRGM	France	This distinction is now clear given that we now have two separate figures.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
2965	17	1	17	1	It seems that panel A in SPM5 is not commented in the text, although this figure raises questions, especially looking at the Indian ocean and southern atlantic ocean results	Goneri Le Cozannet	BRGM	France	Figure SPM.5 was removed in revision
2967	18	1	18	1	I wonder if it is useful to superimpose the results over a map. If maintained, an arrow linking the panel Scandinavia to the region might be usefgul (note that the panel for Scandinavia is superimposed over Russia and the Middle East now)	Goneri Le Cozannet	BRGM	France	The overall graphical approach, including the usefulness of the map, has been reworked to ease comprehension.
3317	2	12	2	12	permafrost degradation and thaw means the same thing so just need to say one or the other	Sharon Smith	Geological Survey of Canada, Natural Resources Canada	Canada	No longer applicable - statement modified
3319	3	17	2	20	Need to specify that this statement refers to the Arctic and not mountain regions which are mentioned at the start of the paragraph. Also revision is suggested "…..decade for cold continuous permafrost." (the last part of the sentence is unnecessary. You might also consider giving the range and mention that in warmer permafrost change in temperature has been smaller but phase change occurring (i.e. permafrost thawing)	Sharon Smith	Geological Survey of Canada, Natural Resources Canada	Canada	Taken into account. Section A1.4 is explicit in referring to mountain and polar areas. The effect of phase change is discussed in Chapters 2 and 3 and not elevated into the SPM.
3321	8	47	8	50	Impacts on other infrastructure besides transportation?	Sharon Smith	Geological Survey of Canada, Natural Resources Canada	Canada	Noted - the SPM has been restructured and revised - infrastructure included e.g. in B7.2
3323	9	43	9	44	This statement implies that permafrost will completely thaw in these areas by 2050 which is not the case. Models used are not transient (don't consider timing of change or lag effects) and project equilibrium conditions which may be some time in the future (see comments on Ch 3). A better statement would be to refer to "areas of significant increases in thaw depth". Note that this statement also does not consider that all infrastructure in this area will be affected as the impact will depend on both the ice-content of the underlying sediments and the design of the infrastructure (see comments on Ch 3)	Sharon Smith	Geological Survey of Canada, Natural Resources Canada	Canada	The statement including the term "circumpolar infrastructure" has been removed from the latest version of the SPM
3325	9	44	9	45	Note that this isn't really done anymore especially in northern Canada and probably elsewhere. There are a number of reports and publications that acknowledge that climate change needs to be considered in design of major infrastructure and there have also been guidelines and standards developed in Canada (and also used by others) that deal with incorporation of climate change - see comments on Ch 3.	Sharon Smith	Geological Survey of Canada, Natural Resources Canada	Canada	Accepted - sentence removed
3327	9	14	9	16	Fig. 2.6 in Ch 2 indicates that there are limited sites with data prior to 2000. The confidence level regarding observed rates of permafrost temperature change in 21st century compared to 20th century seems to be a bit high as this is largely based on data from one site that has a record starting in late 1980s. Note section 2.2.4 in Ch 2 does state limited evidence.	Sharon Smith	Geological Survey of Canada, Natural Resources Canada	Canada	error in page or line number
3467	1	42	1	44	I wonder if providing a bit of information about what a nature-based solution is, perhaps a few additional words to clarify, would help policy makers to better understand the summary? I know the language is calibrated for IPCC, but I think it might help the reader.	Katherine Bishop-Williams	University of Guelph	Canada	Noted - this text was removed from the final draft.
3469	4	1	4	5	I find the use of two dark colours a bit difficult to read. In particular, the red and blue in overlays, such as the circles of ocean heat content, or in stacked bars, such as the Arctic summer sea ice. I recommend using hashed backgrounds to differentiate or using a lighter and darker tone to help the reader.	Katherine Bishop-Williams	University of Guelph	Canada	Colour palette has been optimized.
3471	6	15	6	20	The blue images are difficult to see on the darker blues of the mountain ranges. If possible, another colour should be chosen. All other colours are realtively clear to differentiate.	Katherine Bishop-Williams	University of Guelph	Canada	Taken into account - Overall graphical approach has been changed to ease comprehension.
3473	7	37	7	37	The term "adequate" feels somewhat value laden and non-descript. Is there another word that could be used, such as substantial, that might imply more to do with amount of change?	Katherine Bishop-Williams	University of Guelph	Canada	Accepted - the term "adequate" has been removed and the entire statement has been rewritten
3475	10	4	10	5	When refering to the increased health risks, the term "negative" should be inserted ahead of "health," as there is a clear signal that the health implications of these changes will be negative.	Katherine Bishop-Williams	University of Guelph	Canada	Taken into account - risks to human health have been included in B8 (and underlying bullets) and clarified
3477	11	45	11	45	The term "marginalized" is increasingly scrutinized as it adds judgement and value to the population who has been disenfranchised. It may be worth considering alternate language here. In place of marginalized, which can convey ideas of being "out of the mainstream," externalized, or unimportant, terms such as minority and underrepresented, may be more appropriate.	Katherine Bishop-Williams	University of Guelph	Canada	Accepted - the statement has been revised and term "marginalized" has been removed from the SPM
3479	16	7	16	9	The sentence could benefit from examples of "cascading impacts and compound risks," as a way to help policy-makers understand the key points in this box.	Katherine Bishop-Williams	University of Guelph	Canada	Cascading impacts and compound events and compound risks are defined in the glossary
3481	18	1	18	10	While the captin provides information about what is meant by "frequency" in the figure, it is quite unclear in the figure itself. Adding a few words to clarify may be valuable. Perhaps changing "Frequency" to "Frequency of large-scale events" would help to clarify here.	Katherine Bishop-Williams	University of Guelph	Canada	Suggestion acknowledged. An additional introductory panel has been added to ease the comprehension of these terms.
3581	8	51	8	51	“exploitation of natural resources” can be added to the word “transportation”.	Vladimir Ryabinin	IOC od UNESCO	France	Rejected - bullet focused on ice cover and transport
3583	8	51	8	51	An explicit reference to emerging “Polar Code” as regulating element may be warranted here.	Vladimir Ryabinin	IOC od UNESCO	France	Noted. The SPM is written at a high level of generality, so it does not include detail on specific codes. It signals the importance of organizations such as the Antarctic Treaty System in C4.1 "Regional cooperation, treaties and conventions in the polar regions, and in some mountain areas and transboundary river basins can support adaptation action; however, the extent to which into regional policy frameworks is currently limited (high confidence)." The Antarctic Treaty System is one of the few organizations to receive lengthy treatment (multiple paragraphs) in SROCC (3.5.3.2.1 Formal arrangements: polar conventions and institutions).
3585	8	52	8	52	Even with regulation there will be risks, also for people on ships and platforms, a solid regulation regime is required to manage and reduce the risks.	Vladimir Ryabinin	IOC od UNESCO	France	Accepted. The sentence has been deleted due to overall revisions.
3587	8	53	8	53	Suggest removing words “in exposed regions”.	Vladimir Ryabinin	IOC od UNESCO	France	Accepted. The sentence has been revised completely - see A8.3

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
3589	9	2	9	2	A reference to the Antarctic Treaty System is more than relevant here.	Vladimir Ryabinin	IOC od UNESCO	France	Noted. The SPM is written at a high level of generality, so it does not include specific detail. It signals the importance of organizations such as the Antarctic Treaty System in C4.1 "Regional cooperation, treaties and conventions in the polar regions, and in some mountain areas and transboundary river basins can support adaptation action; however, the extent to which into regional policy frameworks is currently limited (high confidence)." The Antarctic Treaty System is one of the few organizations to receive lengthy treatment (multiple paragraphs) in SROCC (3.5.3.2.1 Formal arrangements: polar conventions and institutions).
3591	13	19	13	19	I am not sure that rising sea level impedes reef resilience on a global level while all other factors undoubtedly do.	Vladimir Ryabinin	IOC od UNESCO	France	Comment taken into account.
3593	18	21	18	21	It is not clear what “a decrease in the Asian summer monsoon” entails (total cumulative precipitation?).	Vladimir Ryabinin	IOC od UNESCO	France	Taken into account - text adjusted to South Asian summer rainfall
3595	19	3	19	22	Adaptation in ocean matters should involve mainstream management approaches such as maritime spatial planning, coastal zone management, use of coastal hazards warning systems, marine protected areas, use of environmental impact assessments, etc. This section lacks good guidance and needs to be strengthened. There is a mention of MSP in C3.5 but only in relation to UNCLOS.	Vladimir Ryabinin	IOC od UNESCO	France	Taken into consideration. The section has been revised fundamentally. Mainstream management approaches are now stressed in section C2 ("options")
3611	4	1	4	1	In Figure SPM.1, the years for [End-of-Century] have a typo. It must be 2081-2100, not 2081-2010.	Nam SungHyun	Seoul National University	Republic of Korea	Correction applied.
3921	2	37	0		‘Glaciers and polar ice sheets …’, suggest to separate the effects of these two, i.e., which one is more dominant.	Zhaomin Wang	Hohai University	China	That is not possible because it is the sum of glaciers and polar ice sheets. In the FD numbers are mentioned to clarify this. in the final version we give the numbers of ice sheet and glaciers mass loss in SLR equivalent (section A 1.1 of SPM FD)
3923	2	42	0		‘Arctic sea surface temperature has increased at approximately twice the rate of average global temperature (very high	Zhaomin Wang	Hohai University	China	Accepted - this was a typographical error (erroneous inclusion of word "sea"). We have clarified our meaning in the revised version.
3925	2	42	0		confidence).’ is a wrong statement. ‘sea surface temperature’ should be ‘surface air temperature’; see	Zhaomin Wang	Hohai University	China	Accepted - revised SPM says 'surface air temperature'
3927	2	42	0		https://www.arcus.org/witness-the-arctic/2018/1/article/28403?utm_source=wtav22i1&utm_medium=email&utm_campaign=wta	Zhaomin Wang	Hohai University	China	Noted - useful contextual information.
3929	12	19	0		use ‘show’ instead of ‘demonstrate’, as these models have biases.	Zhaomin Wang	Hohai University	China	No longer applicable - sentence revised
3945	4	2	4	5	The dark blue and black color look the same. It might be easier to distinguish if the blue was lighter shade.	Aakash Sane	Brown University	United States of America	Colour palette has been optimized.
3947	4	2	4	5	This figure is great and clear to understand but it can be replaced by just one table because each section in the figure has just 3 data points. A simple table with 3 or 4 columns would be easier to read I think.	Aakash Sane	Brown University	United States of America	Overall graphical approach has been changed in order to ease understanding and make better use of space.
3949	18	1	18	5	Using four colors is confusing beacuse it makes it look as if there are four RCP scenarios, instead of two RCP scenarios. Can it be simplified a bit?	Aakash Sane	Brown University	United States of America	The overall graphical approach, including the colour palette, has been reworked to ease comprehension.
4029	2	12	2	13	The acceleration of sea level rise is not only affected by contribution from ice sheets, but also from other factors such as ocean thermal expansion. So I suggest replacing "due to" with "mainly due to" and checking related contents in SOD to confirm whether the words are accurate.	Kexiu Liu	National Marine Data and Information Service	China	No longer applicable here - statement modified. Taken into account elsewhere in SPM.
4031	10	12	10	13	Whether the "reducing heat and carbon uptake" is in contradiction with other parts of the report which indicate increased heat and carbon uptake such as figure 1 in page 4? "This trend reduces surface exchange with the deep ocean, reducing heat and carbon uptake, as well as reoxygenation of the ocean, affecting nutrient cycles." Please provide confidence level assessment. Is it also "very likely"?	Kexiu Liu	National Marine Data and Information Service	China	Noted - the entire SPM has been revised for clarity
4137	1	33	1	33	The authors said :"They are closely connected with the whole climate system."; it'll be more appropiate to say that "They are two majors components of the climate system."	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	The text has been revised to say "The ocean and cryosphere support unique habitats, and are interconnected with other components of the climate system through global exchange of water, energy and carbon.'
4139	1	47	1	47	"published 2013/2014" ; please, not need to add this precision at all!	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	Agreed- deleted
4141	3	9	3	9	(shown in Figure SPM.2); the figure SPM2 is very far… You have to moveup to page 6 to see it!	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	Taken into account - Figures have been distributed throughout the text to fit the SPM's storyline.
4143	5	13	5	17	Instead of writing "A2. Ecosystems and people depend directly or indirectly on the multitude of services provided by the ocean and cryosphere. The local- to global-scale services supported by the ocean and cryosphere include heat and carbon uptake by the ocean, food and freshwater supplies, renewable energy generation, trade and transport, recreation, culture and well-being. These services are modified, degraded or eliminated under climate change (high confidence). {1.1, 1.5}", please write "A2. Ecosystems and people depend directly or indirectly on the multitude of goods and services provided by the ocean and cryosphere. The local- to global-scale goods and services supported by the ocean and cryosphere include heat and carbon uptake by the ocean, food and freshwater supplies, renewable energy generation, trade and transport, recreation, culture and well-being. These goods and services are modified, degraded or eliminated under climate change (high confidence). {1.1, 1.5}"	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	The text in this headline statement has been completely revised
4145	7	4	7	10	Regarding A3.2, is tit possible to add more more precisions about the most affected oceans by MHWs?	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	MHWs impact all areas of the ocean, hence this is not really possible (see A6.3)
4147	7	39	7	39	Authors wrote "[…] projected to increase, exceeding average global warming rates […]"; it would be better to know more about the rates or the values of this increase; is it possible to give a range of increase? Statistics should be put in brackets...	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	Taken into account. The statement was thoroughly revised, with a stronger focus on changes in the cryosphere and corresponding impacts and risks.
4149	7	39	7	39	"average global warming rates"; please if statistics are available from AR5, please remind them in brackets	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	No longer applicable - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
4151	14	21	14	21	Authors wrote "[…] and remains elusive in many localities […] " The question if they they're elusive due to uncertainties, why we cannot write in that way " […] and remains elusive due to uncertainties in many localities[…] "	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	Noted - the text is revised and a clear discussion given in C3 section
4153	15	1	15	27	Figure SPM.4. It would be better to change the orientation this figure; please put in landcape orientation	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	Embers have been reduced to a single panel, allowing for a better use of space.
4155	17	1	17	6	Please, if possible change the orientation of this figure SPM.5 and put it in landscape; this will allow you to increase the size for better visibility.	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	Figure SPM.5 was removed in revision
4157	20	2	20	3	Instead of writing "The maximum global mitigation benefits of cost-effective coastal wetland restoration is unlikely to be more than 2% of current total emissions from all sources.", please write "The maximum global mitigation benefits of cost-effective coastal wetlands restoration is unlikely to be more than 2% of current total emissions from all sources."	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	Taken into account. The bullet has been revised and shortened (see C2.5)
4159	21	5	21	8	Instead of writing "C3.6 Transformative governance and climate resilient development pathways require alternative political/legal/institutional frameworks and participatory stakeholder integration that addresses combined climate change mitigation and adaptation goals, and disaster risk reduction imperatives (medium confidence). {6.9}", please write "C3.6 Transformative governance and climate resilient development pathways require alternative political/legal/institutional frameworks and participatory stakeholder integration that addresses combined climate change mitigation and adaptation goals, embedded climate services and disaster risk reduction imperatives (medium confidence). {6.9}"	JACQUES-ANDRE NDIONE	Centre de Suivi Ecologique	Senegal	Taken into account. The bullet has been revised (see C5)
4357	2	5	2	5	The SPM.A, as it stands, does not address any changes in stratification (including changes in salinity) and associated changes in ocean circulation (AMOC, AABW, gyre circulation, ENSO, PDO, etc). I think this should be adressed in SPM.A.	The UBern Team Group Review	University of Bern	Switzerland	Agreed - AMOC is now addressed in A2.8 and stratification in A2.4
4359	2	25	2	25	Maybe change 'anthropogenic pH signal' to 'anthropogenic pH decrease'	The UBern Team Group Review	University of Bern	Switzerland	Taken into account - now says "ocean acidification signal"
4361	2	25	2	25	Is this true? Did the anth. pH signal also emerge in the permanent sea-ice covered ocean, where only limited observations are available? Maybe specify that the statement relates to non-permanentely sea-ice covered ocean regions.	The UBern Team Group Review	University of Bern	Switzerland	Taken into account - these statements have been modified and clarified
4363	2	26	2	26	oxygen minimum zones have expanded': Here, it is stated that the OMZs have expanded, but below it is stated that there is low confidence. Maybe add here already that we have low confidence. As it reads, it may not be clear to policymakers that the tropical ocean hosts the OMZs.	The UBern Team Group Review	University of Bern	Switzerland	Accepted - OMZ now in A.2.7 specifying "notably in the tropical oceans"
4365	2	42	2	43	Does this statement also applies to winter-time SSTs? If not, please specify if that only applies to annual mean SST (or summer SSTs).	The UBern Team Group Review	University of Bern	Switzerland	Taken into account - there was a typographical error here (erroneous inclusion of word "sea"). We have clarified our meaning in the revised version.
4367	4	1	4	1	Clarify that 'global mean temperature change' relates to 'global mean atmospheric surface temperature change'	The UBern Team Group Review	University of Bern	Switzerland	Labels have been revised for accuracy.
4369	4	1	4	1	Why is there no population estimate for end-of-century?	The UBern Team Group Review	University of Bern	Switzerland	Data set has been updated.
4371	4	1	4	1	Why is there no ocean heat content estimate for near-term? The same applies for the global mean sea level rise, mountain glaciers mass reductions, mountain snow cover, arctic summer sea-ice extent, global marine animal biomass,	The UBern Team Group Review	University of Bern	Switzerland	Data set has been updated.
4373	5	15	5	15	Heat and carbon uptake are not discussed in A2, but under A1.	The UBern Team Group Review	University of Bern	Switzerland	Taken into account - text has been completely revised
4375	6	21	6	21	Ocean carbon uptake is, in principle, reversible under net negative carbon emission scenarios. Not sure though if that needs to be clarified here.	The UBern Team Group Review	University of Bern	Switzerland	Noted
4377	7	20	7	20	Marine heatwaves should be two words not three.	The UBern Team Group Review	University of Bern	Switzerland	Editorial – copyedit to be completed prior to publication
4379	8	42	8	43	Polar ocean regions are changing more rapidly than the global ocean..' This is not true for sea surface temperature in the Southern Ocean, for example.	The UBern Team Group Review	University of Bern	Switzerland	Taken into account - the section has been completely revised
4381	9	5	5	8	As it stands, it is not clear in which direction things are changing (i.e. longer/shorter duration o NPP?).	The UBern Team Group Review	University of Bern	Switzerland	Noted - the SPM has been revised substantially - regional details are given in e.g. B.5.2
4383	10	15	10	15	Is there any uncertainy estimate for the 3.5% O2 decline?	The UBern Team Group Review	University of Bern	Switzerland	Noted - Sentence removed from revised SPM - see B2.4 and B2.6
4385	10	18	10	18	Specify that 'carbon' emissions are the most important control	The UBern Team Group Review	University of Bern	Switzerland	No longer applicable - sentence removed
4387	10	41	10	41	70%' seems not to be consistent with Figure 1 in the SPM.	The UBern Team Group Review	University of Bern	Switzerland	Taken in account - we note the confusion here (Fig SPM1 refers to 70-90% range) - the corals are removed from revised Figure SPM1
4389	12	20	12	20	by the end of the century': it is not clear which century.	The UBern Team Group Review	University of Bern	Switzerland	Noted, but this phrase is widely used to refer to the end of this century.
4647	8	40	9	54	Suggest to increase/enrich the projection result on the polar cryosphere in section B2	botao zhou	Nanjing University of Information Science and Technology	China	Noted - the SPM has been revised substantially - see new B1 and following sections
5125	2	19	2	19	Delete the second bracket and the full stop.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	No longer applicable - text modified
5127	2	26	2	26	What is the magnitude of this expansion?	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Accepted see quantification now in A.2.7
5129	2	31	2	34	Quantifying these changes will aid in conveying the message to the policymakers. Just simply stating that there is an increase/decrease does not convey useful information for policy response.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Numbers of mass loss are mentioned in the FD. Done - see A 1.1 and A 3.1 of SPM FD
5131	3	5	3	5	What is meant by 'substantial warming'? This phrase can be very confusing to policymakers as what is considered 'substantial' is left to the subjective interpretation of individual policymakers. To avoid any ambiguity, it is important to quantify the change.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account. Note however that mountain warming is specifically dealt with in detail in Chapter 2, but not elevated to FD TS and SOD SPM. Focus is placed on cryosphere changes and their impacts.
5133	3	6	3	6	How many mountain regions are there? Is it not better to be explicit about how many regions are affected by this change?	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account. The Startup Box provides information on how high mountain regions are defined, more specific information is provided in Chapter 2.
5135	3	22	3	22	Global relevance in terms of mitigation scenarios? It is not clear what is meant by "global relevance"	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	No longer applicable - sentence removed
5137	5	13	5	17	Do these systems not also play a role in regulating the global climate/weather system?	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account. A statement on the interconnectedness of ocean, cryosphere and other parts of the climate system is contained in the Startup Box of the SPM SOD.
5139	5	35	5	43	The knowledge presented in this bullet needs to be assessed in terms of the calibrated confidence language.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Accepted. The content of this bullet was considerably revised and recast in the revised structure of the SPM SOD, along with corresponding confidence statements.
5141	6	6	6	13	Some key messages are packed into this point. However, without quantifying the impacts, the message seems lost	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	It is impossible to quantify all the impacts according to literature

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
5143	6	21	6	24	Assessment required for this headline statement in terms of the calibrated confidence language	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account
5145	7	34	7	38	Assessment required for this headline statement in terms of the calibrated confidence language	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Accepted. The material was considerably revised for the SOD SPM, and more focused headline/bullets have been developed, where the confidence language has been applied consistently.
5147	8	23	8	23	Specify what is meant by major changes (e.g. global tourism is expected to record a loss of xxx).	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account - The entire bullet has been completely re-written and changes specified wherever possible
5149	10	1	10	5	Assessment required for this headline statement in terms of the calibrated confidence language	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account - the SPM has been completely revised and use of uncertainty language checked
5151	10	46	10	47	Is this true for all RCP scenarios?	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Noted - text revised
5153	2	1	0		Please check the SPM and ensure that acronyms (e.g. SLR, ESL, etc.) are not used alongside the full meaning of the acronyms in multiple instances.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Accepted - this was checked for the Final draft
5155	16	25	16	26	What is the magnitude of the increase? Is there a difference between low and high emission scenarios?	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account - text revised to be clearer - greater increase in average intensity under RCP8.5 compared to RCP2.6
5157	21	28	21	28	If possible, quantify the number of people that will be affected.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Noted - sentence removed. The startup box gives a number of the people in low-lying coastal areas
5159	20	5	20	5	What is not clear is the amount of emission reduction that is required is order to avoid dangerous and irreversible changes to the oceans and the cryosphere. In addition, it is important to consider adding a timeline for attainment of this emission reduction.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Noted - the SPM has been revised and content added throughout. The new summary section C5 unscores risk reduction and benefits of a low emissions pathways
5197	0	0	0		There needs to be an attempt to link the risk narrative more strongly to the solutions options e.g. through an evolved burning embers diagram as discussed at LAM3	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account - see Figure SPM.5
5199	0	0	0		Remains too generic - need SPM to pull through figures on impacts, responses and costs.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account - see revised figures
5201	0	0	0		Nothing re: SDGs or NDCs pulled through	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Noted, SDGs are referred to in the startup box
5203	0	0	0		Governance (and the need for changes therein and the importance of local government) is a central message in virtually all chapters but does not come through strongly in SPM	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account - particularly in section C and figure SPM.5
5205	0	0	0		Assessment calls out the strong problems in implementation, but this does not come through strongly enough in the SPM.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Taken into account - particularly in section C and figure SPM.5
5207	0	0	0		A clear urban message does not yet exist in the SPM and therefore thought should be given to a bullet point which focuses policy makers on the threats from water shortages, infrastructure loss, disasters, SLR, etc that the report calls out in a varierty of places. This would also enable the point on local goverment and its importance to be strengthened in the SPM.	Debra Roberts and Durban Team	EThekwini Municiplaity	South Africa	Noted - this has been strengthened in the SPM text and with figures SPM.4 and 5
5275	2	35	2	35	Why happen this - " Because of a lack of long-term mass-change observations in both polar regions" in the era of satellites, advanced equipment for monitoring, drones, early warnings systems, and so	CRISTOBAL FELIX DIAZ MOREJON	Environmental Directorate/Ministry of Science, Technology and the Environment	Cuba	There are only reliable data for polar regions since the start of the century so no long-term observations, e.g. gravitational measurements by satellite were not yet available in 2000. We do not discuss attribution in the final version of SPM (see section A 1.1)
5277	3	14	3	22	Maybe mentioned the permafrost in the Siberian tundra that is suffering a thaw process too, and have a big exdtension.	CRISTOBAL FELIX DIAZ MOREJON	Environmental Directorate/Ministry of Science, Technology and the Environment	Cuba	Taken into account. This is assessed in Chapter 3 although regional details are not elevated to the SPM.
5279	5	20	5	23	I suggest include: " Observed changes in the cryosphere have been exerting considerable impacts on agriculture, fisheries, hydropower, stream flows and their incidence over drink water and irrigation, tourism and recreation activities and other sectors since the mid-20th century, while evidence on the long-term effectiveness of adaptation responses remains uneven and limited (medium confidence).	CRISTOBAL FELIX DIAZ MOREJON	Environmental Directorate/Ministry of Science, Technology and the Environment	Cuba	Noted: This generalised sentence has been removed from the revised SPM. Instead, more specific information on observed impacts and adaptation that has already occurred is given in SPM sections A4-A9.
5281	10	15	10	16	Please explain, becouse the following phrase isn´t clear - "Over the next century oxygen declines of 3.5% by 2100 are predicted globally (medium confidence), with low confidence at regional scales, especially in the tropics " Which is the next century, the XXII century ? If we have uncertainties in the XXI century how will be in XXII century?	CRISTOBAL FELIX DIAZ MOREJON	Environmental Directorate/Ministry of Science, Technology and the Environment	Cuba	Noted - Sentence removed from revised SPM - see B2.4 and B2.6
5283	15	1	16	2	Figure SPM.4: maybe usuful to show not only Urball atoll reef islands but too the situation of the rest of small islands, including those the have low height in relation with sea level.	CRISTOBAL FELIX DIAZ MOREJON	Environmental Directorate/Ministry of Science, Technology and the Environment	Cuba	Rejected - see revised figure SPM.5 - the four illustrative geographies are supported by real-world case studies - three for urban atoll islands. It is not possible to add more geographies
5609	4	0	0		Figure SPM.1 Top right, Énd-of-Century should read [2081-2100] not [2081-2010]	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Correction applied.
5611	5	16	5	17	"Each of" should be inserted before "These services"	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	The text in this headline statement has been completely revised
5613	8	10	8	16	"confidence" not in italics	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Editorial – copyedit to be completed prior to publication
5615	10	34	0		Why does it say 'standard deviation' in parentheses but after other similar numeric citings (e.g. SPM-7 line 48) it does not?	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Accepted - "(standard deviation)" has been removed
5617	11	17	0		"Figure:" missing before "SPM.3"	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Correction applied.
5619	13	54	0		Should be 'protective' not 'protect'; should be 'accommodative' not 'accommodate'	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Editorial – copyedit to be completed prior to publication
5621	15	4	0		Does '2000's' refer to '2000 to 2099'? The latter seems more clear than '2000's' which is vague.	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Reference to present day has been made more accurate (= 2006-2015).

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
5623	18	0	0		Page number missing	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Thanks - corrected in FD
5625	16	16	0		Consider replacing 'one-in-hundred' with 'one-in-a-hundred'	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	No longer applicable - not in revised SPM
5627	19	31	0		Remove 'for'	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Editorial – copyedit to be completed prior to publication
5629	19	43	0		Namely' should replace 'such as' since these three are specifically referred to as blue carbon ecosystems - they are not examples	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Taken into account.
5631	20	28	0		Remove 'the' from 'the attention' or is the sentence incomplete?	Nina Hunter	School of Life Sciences, University of KwaZulu-Natal	South Africa	Taken into account. Sentence revised.
7125	2	12	0		Instances where "Sea level" is mention - clarification on whether this "Global Sea Level" or otherwise is needed. Indeed, e.g on page SPM-12 Line 11, this is clarified. The remainder of the SPM also need to be(more) precise in this matter.	Jonathan Durgadoo	GEOMAR Helmholtz Centre for Ocean Research Kiel	Germany	Agreed. More care has been taken in the FD to be clear
8555	8	36	8	36	Please change "sectoral" to "sectorial"	Marco Turco	Barcelona Supercomputing Center	Spain	Rejected - the term used (cross-sectoral) is correct
8625	2	17	2	26	It is clear from the context of cited text that used terms "Ocean" and "Global sea" related to the same object. So using both terms simultaneously is not correct and confuse readers.	Vladimir Konovalov	Institute of geography, Moscow	Russian Federation	No longer applicable - statements modified
8629	2	37	2	38	(a)"attribution of mass loss from ice sheets to human-induced climate change is currently not possible". The sense of this declaration contradict to the mainstream of IPCC report, which devoted to describe and quantify namely the change of human induced climate. (b) "Glaciers and polar ice sheets are now the dominant source of sea level rise (very high confidence), and increasing losses from polar ice sheets are resulting in increasing rates of sea level rise. Anthropogenic forcing has been the dominant cause of global mean steric sea level rise since 1970 (high confidence)". There are many errors in the declaration (b). Particularly, all glaciers, excluding Greenland and Antarctic, have to be divided in three maim groups taking into account peculiarities of their hydrological regime:	Vladimir Konovalov	Institute of geography, Moscow	Russian Federation	The attribution statement has been removed. a) we do not discuss the attribution in the final version of SPM; b) rejected: no space in SPM for discussing these details.
8631	2	37	2	38	(i). Glaciers and ice caps terminating at the shoreline and having direct water inflow or contact with the ocean. (ii). Continental glaciers located in the upstream parts of basins whose rivers flow into the ocean. (iii). Continental glaciers located in the upstream parts of closed river basins that do not drain to the ocean. The population of such glaciers prevail in EurAsia. Example of long-term water inflow to the Arctic Ocean illustrate Fig.5. As one may see this inflow is nearky constant. It means that variability of glacier runoff have no influence on water inflow and consequently on level of Arctic Ocean.	Vladimir Konovalov	Institute of geography, Moscow	Russian Federation	See answer to 8629 (first part of this comment by reviewer)
8633	2	37	2	38	Estimation of the glacial meltwater contribution to the long-term fluctuations of WOL (World Ocean Level) is based on three evident postulates. P1. Glacier runoff is a part of the total river runoff and has to be included in the water balance equation for the whole basin. P2. The annual accumulation and ablation of seasonal snow on the glacier surface have to be considered as components of the water balance for the whole river basin. P3. Glacier runoff contributes a certain volume of water, which is forming by melting of perennial ice and firn and not related to the basin water balance in the current year. A consequence of adopting the last two postulates is the inadmissibility of glacier mass balance as an index of glacier runoff in the annual water balance of the river basin. This is so because mass balance combines the annual accumulation and ablation of seasonal snow with the ablation of perennial ice and firn. Adopting all three of the postulates is a new approach, which provides the possibility of independent quality control for calculations of glacier runoff. This could not be done in the framework of the "mass balance approach".	Vladimir Konovalov	Institute of geography, Moscow	Russian Federation	Taken into account. Not clear what the reviewer wants to say here, but as I understand the contribution of glaciers to sea level rise is simply calculated from the reduction of their mass. Probably needs a comment from Regine.
8635	2	37	2	38	According to (Malinin, 2009; see reference in supplement) the interannual variations of WOL represent as the sum of the eustatic, steric and deformation components. The eustatic components include the components of water and ice balances: evaporation, precipitation, river water inflow, iceberg runoff, etc. The steric variations are due to changes in seawater density caused by temperature and salinity variations. The deformation variations are those accompanied by redistribution of water masses within the basin (sea, ocean), such that the volume of water remains constant and the level rises in some regions and drops in others. The problem of WOL change is thoroughly treated in Malinin, 2009 and this work have to be cited in SROCC and included in the list of references.	Vladimir Konovalov	Institute of geography, Moscow	Russian Federation	Taken into account
8637	3	9	3	12	Comparison of data for samples contained different number of data, i.e. 20 and 10 years, is statistically not correct.	Vladimir Konovalov	Institute of geography, Moscow	Russian Federation	Noted The text was revised for more clarity, see section A1 and Figure SPM.1 panel g
8639	3	24	3	28	These not widespread conclusions related only to upstream of river basins. The significance of glacier runoff is neglible in the downstream parts and mouth of rivers.	Vladimir Konovalov	Institute of geography, Moscow	Russian Federation	Noted - sentence revised see A.1.3
9213	10	40	10	47	The catastrophic mass coral mortality and bleaching affecting the Great Barrier Reef (and other world regions) during unprecedented marine heat waves in 2016 and 2017 should be adequately covered in the SPM. For details, see the related comment on Section 5.3.3.6.	Hans-Martin Füssel	European Environment Agency	Denmark	Noted - the revised A.6.3 notes the frequency of large-scale bleaching events has inreased sine 1997-1998 without calling out a specific year. Observed regional impacts on corals are also included on Figure SPM.2
9295	1	32	1	32	The distinction between ice, glaciers and ice-sheets is not clear. Should ice categories be specified, sea-ice, lake ice and river ice should be included.	Government of France	Ministère de la Transition écologique et solidaire	France	The introduction was shortened and this text removed and revised in the added startup box

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
9297	1	32	1	32	What is the difference between frozen soil and frozen ground?	Government of France	Ministère de la Transition écologique et solidaire	France	The introduction was shortened and this text removed and revised in the added startup box
9299	2	5	2	5	We suggest to replace "illustrate" with "put in light".	Government of France	Ministère de la Transition écologique et solidaire	France	The title has been completely revised for the FD to "Observed changes and impacts"
9301	2	9	2	10	We suggest to add salinity to the list of "ongoing changes".	Government of France	Ministère de la Transition écologique et solidaire	France	Section A is now restructured. A1 focus on cryosphere, and A2 on ocean. A2.5 address stratification and freshening
9303	2	17	2	17	Specify on which period it increases at a steady state.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted see revised text in A2.1 and A3.3 and redesigned Figure SPM.1
9305	2	20	2	21	We suggest to specify that the heat uptake corresponds to an energy sink of 0.42W/m2 with respect to the Earth surface area.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted - this has been removed and the text revised for clarity see A.2.1
9307	2	23	2	23	It is worth to have two different paragraphs to describe acidification and deoxygenation as two different phenomena. Both need more editing.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - now separated in A.2.6 and A,2,7
9309	2	37	2	40	We suggest to specify that it is « The contribution from glaciers and polar ice sheets » which is the dominant source of SLR.	Government of France	Ministère de la Transition écologique et solidaire	France	No longer applicable - sentence modified
9311	2	43	2	50	Artic sea-ice changes are expressed as % while Antarctic ones are expressed in km2/yr. Please choose a unique way for both.	Government of France	Ministère de la Transition écologique et solidaire	France	No longer applicable. Revised bullet states there is no statistically significant trend in Antarctic sea ice extent.
9313	2	50	3	3	Do we need this regional resolution of Antarctic trends ?	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted; we have removed this level of detail.
9315	3	2	3	3	We suggest to specify whether meridional wind trends are attributable or not to climate change.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account; we have removed information at this level of detail.
9317	3	14	3	14	Should not it be mountain regions permafrost?	Government of France	Ministère de la Transition écologique et solidaire	France	No longer applicable - sentence removed
9319	3	17	3	17	Make it clear that it is for non mountain regions.	Government of France	Ministère de la Transition écologique et solidaire	France	No longer applicable - sentences rewritten
9321	3	18	3	19	Is it possible to specify how the decade are calculated since, since 2000 there has been only 18 years (one decade) ?	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account. The statements are now specific in time and supported by quantitative examples. SPM SOD A1.4
9323	3	19	3	19	Which are those "colder sites" ?	Government of France	Ministère de la Transition écologique et solidaire	France	No longer applicable - sentence removed
9325	3	21	3	22	This is not a finding and thus can be deleted from the SPM.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - sentence removed
9327	3	28	3	32	2.2.3.2 is not the right reference, it is 2.3.1.2. A mention to the the contribution of permafrost thaw to mercury release should be added {3.4.3.2.3}. There are no findings about the mercury polar cycle in Chapter 3 though litterature exists on this important issue. Please try to incorporate such findings in Chapter 3 and summarize it in the SPM if relevant.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - Callout updated and a sentence about heavy metal release added in the new B7.4
9329	3	28	3	32	Changes in salinity are an important driver for the ecosystems and they are not mentioned in the SPM, though it is quite important for the Mediterranean sea. Please try to incorporate in the SPM a summary of the findings of Chapter 5 on changes in salinity.	Government of France	Ministère de la Transition écologique et solidaire	France	The findings on stratification and density from Chp 5 executive summary are included in the SPM - see A2.5
9331	3	30	3	30	Would it be possible to specify which contaminants are concerned?	Government of France	Ministère de la Transition écologique et solidaire	France	No longer applicable - sentence rewritten
9333	4	0	0		2081-2010 should be replaced by 2081-2100.	Government of France	Ministère de la Transition écologique et solidaire	France	Correction applied.
9335	4	0	0		Why is Carbon Dioxyde projection represented as a continuous curve while other key findings are represented discretly over chosen intervals ? When possible, we suggest to plot continuous representation of key phenomena.	Government of France	Ministère de la Transition écologique et solidaire	France	Suggestion applied.
9337	4	0	0		Why do the grey strips (Pre-Industrial & End-of-Century) stop in the middle of the figure ?	Government of France	Ministère de la Transition écologique et solidaire	France	This aspect has been modified.
9339	4	0	0		Why population's evolution projection stops in 2100 while UN projected 11,2 billions people at this term.	Government of France	Ministère de la Transition écologique et solidaire	France	Data set has been updated.
9341	4	0	0		To represent the threat that mean sea level rise is, a curve can present the number of people who will be affected by this consequence of the global climate warming. The IPPC SR1.5 provides figures including different scenarios.	Government of France	Ministère de la Transition écologique et solidaire	France	New figures have been added to the SPM and the regional aspects of sea level rise are specifically addressed in SPM.4 and SPM.5
9343	4	0	0		We suggest to add an estimation of the GMSLR at the Near term [2031-2050].	Government of France	Ministère de la Transition écologique et solidaire	France	Suggestion applied.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
9345	4	0	0		The reduction of the cartographic representation of glaciers is difficult to see. Reducing the size of the whole mountain will be easierly understood by humain eyes.	Government of France	Ministère de la Transition écologique et solidaire	France	Overall graphical approach has been changed in order to ease understanding.
9347	4	0	0		Consider adding data on deoxigenation.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted: we considered adding this aspect, however it could not be accommodated in the space constraints. Deoxygenation regionally in the ocean is now indicated in SPM.2
9349	5	4	5	5	The way the RCP8,5 scenario is qualified should be the same throughout the SPM. For example in figure SPM4 it is qualified as 'business-as-usual high emissions scenario' whereas here it is 'a high emissions/weak mitigation future'.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted: RCP8.5 is now referred to as a high emission scenario (RCP8.5) or directly as RCP8.5.
9351	5	19	5	20	Where does this high number comes from? This depends of the definition of high mountain regions. Which one is used?	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted: Details of the definition of low elevation coastal and high mountain regions have been added as footnotes to the start-up box text.
9353	5	29	5	30	We suggest to specify which species or provide examples.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account. Revised text in A4.1 and A4.2 provides some species and examples (limited number due to space limitations at SPM level).
9355	5	31	5	33	Would it not be more relevant in a SPM to mention the impacts on reindeers which are a key component of Arctic population lifestyle?	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account: see A4.2
9357	5	42	5	43	We suggest to specify which are the mentionned constraints.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account. The content of this bullet was considerably revised, made more concrete, de recast in the revised structure of the SPM SOD, along with corresponding confidence statements.
9359	6	2	6	2	We suggest to clarify "biological events" by using "seasonal biological events"	Government of France	Ministère de la Transition écologique et solidaire	France	The text in this bullet has been completely revised and the phrase "biological events" does not exist anymore
9361	6	12	6	12	Why are educational opportunities under a threat ? This is unclear and should be explained or removed from the SPM.	Government of France	Ministère de la Transition écologique et solidaire	France	In 54214, one paragraph mentions education but it does not clarify why it is threatened by climate change. It says how education is important to deal with CC, so I agree to remove it
9363	6	0	0		We suggest to homogeneize the location of pictograms on the figure (they are all located down to the correponding label except for Japan or Australia, which should be fixed).	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - The overall graphical approach has been modified, allowing the locations references to pointed with a line.
9365	6	0	0		We suggest to refine the Figure by adding different zones for African cryosphere (which was already studied in publications).	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - Reference to the African location (Low Latitude) is now depicted.
9367	6	0	0		We suggest to move the « LOW LATITUDE » label in order to cover all the concerned areas. As it is, it seems to concern only Central America and is somehow confusing.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - Suggestion applied.
9369	6	0	0		The graphic legend should precise the notion of culture (cultural site ? Cultural heritage?).	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - Suggestion applied, using the term Cultural Services.
9371	6	0	0		Why are they two pictograms to represent « tourism » ? If there is a notable difference between both, they should be placed on different lines.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - Suggestion applied.
9373	6	0	0		Among the drivers, « snow » could be renamed « snow cover ».	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - The figure's message and content has been refined and the concept of drivers removed.
9375	6	28	7	2	Why is it necessary to specify "committed impacts"? Current impacts already contribute to initiate adptation measures.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - sentence removed
9377	7	6	7	8	The term 'unprecedented' could be specified. Is it in terms of temperature, of area ?	Government of France	Ministère de la Transition écologique et solidaire	France	No longer applicable - statement removed
9379	7	20	7	21	Storm could be removed as they are not mentionned in the referenced chapters.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - "storms" has been removed from the text
9381	7	37	7	37	It is not sure that efficient enough adequate adapatation measures exist for each of the risks listed above, therefore, we suggest to replace "if adequate adaptation measures are not taken" with "if efficient enough adequate adaptation measures do not exist or are not taken".	Government of France	Ministère de la Transition écologique et solidaire	France	The sentence including the term "adequate" has been removed and the entire headline statement has been rewritten
9383	7	38	7	38	Add a reference to Figure SPM.1 which illustrates some of the projected changes.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted. Reference to Figure SPM.1 has been added to the LoS of Headline Statement B1 in the FD SPM.
9385	7	48	7	50	Confidence assessment is missing.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account. Likelihood language used.
9387	8	22	8	25	We suggest to rephrase this sentence as following : "Agriculture, hydropower and tourism activities related to the mountain cryosphere are projected to undergo major changes in the 21st century as a result of cryospheric change (high confidence); however changes in, inter alia, socio-economic, technological, policy, institutional and legal aspects on access, mobility and governance of resources may also modify them."	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account. The material was revised and unpacked into several bullets with specific confidence language attached.
9389	8	25	8	27	This important finding should be consolidated by more material in Chapter 2 than a reference to 2 examples (snowmaking and irrigation systems). Furthermore it seems that the 2°C threshold for adaptation is explicitely mentioned in Chapter 2 for snowmaking only.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted. The statements were "unpacked" and more focused bullet points were developed with relevant information for each sector and component.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
9391	8	33	8	34	We suggest to replace « promotes » by « conducts to ».	Government of France	Ministère de la Transition écologique et solidaire	France	The entire bullet has been completely re-written and this statements doesn't exist anymore
9393	8	42	8	44	What does "Polar ocean regions" means exactly. Would not "Polar oceans" be more adequate, especially since the sentence statrs with a comparison with the global ocean?	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - the section has been completely revised
9395	9	2	9	2	The assessment of confidence is missing.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted. The sentence has been deleted altogether due to overall revisions.
9397	9	27	9	29	This sentence is not clear and we suggest clarifying it.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - the entire bullet has been re-written for clarity
9399	9	48	9	54	This sentence is too long and not clear enough. We suggest rephrasing it.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted - sentence deleted
9401	10	6	10	9	It could refer to Figure SPM.1.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted - reference to figures is updated throughout
9403	10	6	10	9	It could be useful to add an illustrative value of the theoretical temperature increase of the first 700m of the ocean resulting of such a heat intake.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - a footnote (#6) has been added providing such illustrative values.
9405	10	18	10	20	Consider expanding the description of the effects of pH on oxygen levels.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted - the SPM is revised substantially - see B2
9407	10	20	10	21	We suggest to clarify the « parallel changes » affecting deep ocean.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted - the SPM is revised substantially - see B2
9409	10	41	10	42	We are not talking about "losses" but "impacted coral reef". Taking this remark into account, the impacted reefs under RCP8.5 have to be mentioned.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted - substituted losses with decline
9411	10	45	10	47	We didn't find any mention of deep-water coral reefs in the referenced sections. We suggest correcting it or removing this assessment from the SPM.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - see revised B5.4 on cold water corals
9413	11	17	11	17	We suggest to give more detail about Figure SPM.3 in the footnotes.	Government of France	Ministère de la Transition écologique et solidaire	France	Figure has been extended to include additional projections and the caption provides details.
9415	11	17	11	17	The unit (%) should be specified.	Government of France	Ministère de la Transition écologique et solidaire	France	Units have been now added to the colour bars and the caption has been rewritten and checked for accuracy.
9417	11	24	11	27	The sentence is unclear and we advice rephrasing it.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account - the bullets under what is now B5 has been revised to be more clear, focused and concise
9419	11	29	11	32	We suggest to detail what "regional renewable resource economies" are in this context.	Government of France	Ministère de la Transition écologique et solidaire	France	noted - there is a lack of space for this
9421	12	12	12	15	We suggest to rephrase as following : "These changes are projected to impact with disruptive consequences, both directly and indirectly, coastal ecosystems, associated livelihoods and infrastructures (e.g., in towns and cities) that tens of millions of people in the low elevation coastal zone (elevation <10 m) depend upon, with consequences for all humankind, e.g., through displacement."	Government of France	Ministère de la Transition écologique et solidaire	France	Headline statement B4 has been completely re-written
9423	12	47	12	47	We suggest to provide examples of "subsidence caused by human activities".	Government of France	Ministère de la Transition écologique et solidaire	France	not applicable text revised
9425	13	19	13	21	We suggest to add that the effects of these measures are not straightforward.	Government of France	Ministère de la Transition écologique et solidaire	France	Such a caution has been included in several parts of the SPM, especially A9.2, C3.1 and C3.2.
9427	13	44	13	44	We suggest to specify "coastal diverging world"	Government of France	Ministère de la Transition écologique et solidaire	France	This sentence has been removed from the SPM
9429	13	44	13	46	We suggest to rephrase as following: "A likely impact of sea level rise (SLR) will be a diverging world, with some areas and populations able to adapt while others struggle to cope with SLR impacts…"	Government of France	Ministère de la Transition écologique et solidaire	France	The entire bullet has been re-written and this statement does not exist anymore
9431	13	48	13	49	We suggest to add exemples of "income generated by newly created land", otherwise remove it from the SPM.	Government of France	Ministère de la Transition écologique et solidaire	France	This sentence has been removed from the revised SPM.
9433	13	49	13	51	We suggest to add exemples of migration and relocation positive impacts. It should be better introduced in the SPM.	Government of France	Ministère de la Transition écologique et solidaire	France	length constrains limited our ability to develop further on this point. Note that the integrative cross-chapter box 9 and section 4.4 of chapter 4 slightly touch on this.
9435	14	16	14	18	The notions of community-based adaptation and community development efforts are not distinct enough and therefore a bit confusing. They should be more clearly defined or at least better distinguished.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted, the text is revised and included in C4 enablers

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
9437	14	21	14	26	We suggest to rephrase the sentance as following : A key ingredient to reducing SLR risk and building resilience is the engagement stakeholders from government, civil society, the private sector and the scientific community, in an authentic process of deliberation and conflict resolution to address the complex interplay of socio-political, economic, environmental, technical, administrative and ethical trade-offs that are inherent in adapting to climate change at the coast (medium confidence).	Government of France	Ministère de la Transition écologique et solidaire	France	Noted the sentence is adjusted in C3.3 - figure SPM.5 also provides further insight
9439	15	0	0		As in the IPCC SR1.5, Coastal ecosystems, Physical phenomena and Local (hotspot) geographies should all be ranked in order of importance.	Government of France	Ministère de la Transition écologique et solidaire	France	In SPM3, we have now incorporated the risk assessment diagram for different types of ecosystems (coastal and open ocean) that illustrates the different levels of risks under contrasting greenhouse gas emission scenarios for the major marine ecosystem types. New figure SPM.5 consider different geomorphologies
9441	15	0	0		We suggest to define "compound events" in the Figure's footnotes.	Government of France	Ministère de la Transition écologique et solidaire	France	The embers on physical phenomena have been removed after technical discussions.
9443	15	0	0		Acronyms used in Figure SPM.4 should be explained.	Government of France	Ministère de la Transition écologique et solidaire	France	All acronyms have been spelled out in each figure and/or explained in the captions.
9445	15	0	0		The Figure's legend is very long and should be reduced as possible.	Government of France	Ministère de la Transition écologique et solidaire	France	An effort was made to reduce it to the extent possible without losing important details.
9447	15	26	15	26	It refers to (C) bar in Panel C.	Government of France	Ministère de la Transition écologique et solidaire	France	Caption has been rewritten and checked for accuracy.
9449	16	7	16	7	"Common" is not a very scientifically objective term. We suggest to replace it with a more accurate notion.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted common was retained for B3.3 with respect to SLR as it is understood widely - Figure SPM.4 provides detail
9451	16	28	16	30	The link between "poleward shift" and the difficulty for "EW and evacuation procedures" implementation is not clear enough. As it is not referenced in the underlying chapters, this should be rephrased.	Government of France	Ministère de la Transition écologique et solidaire	France	Noted - text removed
9453	16	52	16	53	The sentence does not add anything to the paragraph, it should be developped or removed.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - has been removed
9455	17	0	0		Figure SPM.5 is unclear and we did not understand what it was supposed to demonstrate. We suggest to remove it from the SPM.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - Figure SPM.5 removed
9457	18	0	0		We suggest to clarify Figure SPM.6 whether by dividing it into two panels (one for frequency, one for height) or by developping it further. The regional composition should be clearly explained.	Government of France	Ministère de la Transition écologique et solidaire	France	Overall graphical approach has been reworked to ease comprehension.
9459	19	1	19	1	We suggest to add a paragraph about education on section C : it is a long term adaptation issue, linked with our capacity of future decision making.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted. The SPM now contains a section C4 on enablers for adaptation, in which the important role of education is stressed.
9461	20	2	20	3	Is it not in contradiction with "Successful implementation of measures to maintain and promote carbon storage in coastal ecosystems could significantly assist some countries in reaching national net zero emissions targets (high confidence)" in C2.3?	Government of France	Ministère de la Transition écologique et solidaire	France	Noted - sentence deleted from revised SPM and replaced with assessment of mitigation potential (C.2.5)
9463	20	26	20	28	The end of the sentence is missing: "require the attention of decision-makers". Moreover, we suggest to replace "ready society" by "prepare society".	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account. Sentence revised.
9465	20	24	20	30	The paragraph should clearly state that coastal and mountainous areas, most affected by changing environmental conditions, must integrate the physical impacts as well as the impacts on human resources in their local to global adaptation approach.	Government of France	Ministère de la Transition écologique et solidaire	France	Accepted - text changed see section C 1.2 and 1.3
9467	20	32	20	40	This paragraph mostly applies to the Arctic region. To add a small summary of section 3.5 (chapter 3 on polar regions) on Antarctic governance would lead to a more balanced text. Indeed, the governance in Antarctic is very different from the Arctic: only at an international level and very few fora - mostly ATCM, CCAMLR, CCAS and ACAP (not fragmented).	Government of France	Ministère de la Transition écologique et solidaire	France	accepted - text changed - see section C1.1, 1.2 and 1.3
9469	20	34	20	36	The assessment is not so true for the Antarctic, we suggest to replace « in the polar regions » by « in the Arctic ».	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account. Sentence revised.
9471	20	52	21	3	We suggest to develop further paragraph C3,5 as legislation is essential to coordinated governance.	Government of France	Ministère de la Transition écologique et solidaire	France	Taken into account: legislation and the related topics of regulation and planning are discussed in C1.2, C2.3, C3.3, and C4.1
9887	0	0	0		There is an excess of European researchers (7); US-Canada 3; Australia-NZL 3; Africa 2; Asia 3; the Caribbean 1, and nobody from Latin America. This bias in the selection of the participants is represented in the Report, where Europe is often analysed with detail, Africa and Latin America almost forgotten, and Asia with most of the population and physical space is not sufficiently integrated in the Report. Russia with an important territorial share in the Artic is not present and the existing studies from this country are missing.	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Taken into account - additional authors were added
9889	0	0	0		The ENSO phenomenon is not taken into account and has crucial impacts on the global climate, which is further changing due to climate change. There is also a greater weight on the physical processes and often interlinks with impacts, adaptation and resilience-building are only mentioned, but not analysed. These shortcomings limit the reach of the whole Report.	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Noted - the SPM has been substantially revised

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
9891	6	15	0		Missing cyclones or hurricanes or typhoon among Hazards, which are more serious than flood. They affect: East Asia, Madagascar, the Caribbean and the Middle Pacific are highly exposed to	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	The figure has been redrawn, however, only impacts due to cryosphere changes are shown for the mountain areas.
9893	7	49	0		The Andeas are much more exposed than some European country and the high affected population are indigenous due to the loss of clean water.	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Taken into account. Changes in water availability for human use are assessed and dealt with in section B7.
9895	13	47	0		include Early Warning Systems	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Now included in C3.2
9897	14	7	0		Community-based adapation must be better developed	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Unsure of the point the reviewer makes
9899	16	32	0		Cyclones are moving slower due to climate change, thus these extreme events have the capacity to suck more water from the ocean and increase the category of the cyclone together with higher storm surges. These oblige the authorities to evacuate preventively the people, but there are high impacts in infrastructure and patrimony of the coastal populations.	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	See revised B3.2 "An increase in the average intensity of tropical cyclones, and the associated average precipitation rates"
9901	17	13	0	16	AMOC is one phenomenon and ENSO is another one impacting more globally	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Figure SPM.5 was removed in revision
9903	19	10	19	15	Economic and technical limits in developing countries may avoid an integrated resilience-building, especially when the available resources must be used for disaster attention and rebuilding. DRR and DRM are processes which function better in countries with private insurance and not in developing countries, where people and often also governments lack an insurance.	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	accepted - text changed - see C 4, C 4.2 and C 4.4
9905	21	5	21	8	Transformative governance is a complex theme. As it is treated it cannot be understood by policy makers. It is too short and put out of context thus it must be better developed to be useful for Policy Makers.	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Noted. Following IPCC policies, terms are defined in the glossary; governance receives attention also in Cross-Chapter Box 3: Governance of the Ocean, Coasts and the Cryosphere under Climate Change, located in in Chapter 1.
9945	5	35	5	43	Missing the cultural impact of new crops in the food culture.	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Taken into account. Changes to cultural values and food security are addressed in the SPM SOD in section A7, but the cultural impact of new crops is not specifically elevated to the SPM.
9947	5	50	5	54	Sea level rise may oblige people to leave some small islands and coastal regions and migrate to another country. These people are losing their patrimony and also their nationality and they will get converted into environmental migrants without any legal representation in the host country.	Úrsula Oswald Spring	UNAM, National Autonomous University of Mexico	Mexico	Noted - see revised fig SPM.5c
10155	2	20	2	21	Suggest also providing the global energy imbalance for the same period for comparison.	SAI MING LEE	Hong Kong Observatory	China	Noted - this has been removed and the text revised for clarity see A.2.1
10157	2	24	2	25	Suggest providing the current and historical pH values of the global ocean for comparison.	SAI MING LEE	Hong Kong Observatory	China	Rejected, these are mentioned in the chapter text
10159	2	31	2	40	Suggest providing the rates of ice loss of the Greenland and Antarctic Ice Sheets for different periods of time, similar to Section B.3 of AR5 SPM, so that readers can appreciate the accelerated ice loss.	SAI MING LEE	Hong Kong Observatory	China	Numbers are provided in the FD. Done - see A 1.1 and A 3.1 of SPM FD
10161	2	42	2	42	It should be "Arctic surface temperature" instead of "Arctic sea surface temperature". Please double check.	SAI MING LEE	Hong Kong Observatory	China	Accepted - revised SPM says 'surface air temperature'
10163	2	42	2	46	Suggest including the projected timing of vanishing of summer sea ice and spring snow cover under different RCP scenarios.	SAI MING LEE	Hong Kong Observatory	China	Accepted - sea ice projections bullet in the SPM final draft now includes probabilistic information on the likelihood of sea ice free summers under different scenarios
10165	3	7	3	8	According to World Glacier Monitoring Service (https://wgms.ch/faqs/), the global cumulative mass change of glaciers has been negative since late 1970's. Saying that glaciers have lost mass in the last two decades sounds quite conservative.	SAI MING LEE	Hong Kong Observatory	China	Taken into account. The text was revised for more clarity, now included in SOD SPM in section A1.1 and figures SPM.1 and SPM.2
10167	3	9	3	12	The units of mass loss don't match. Should it be kg m2 or kg/m2 ?	SAI MING LEE	Hong Kong Observatory	China	No longer applicable - sentence removed
10169	3	9	3	12	Suggest the mass loss unit be given in Gt, if possible, to facilitate the comparison of ice losses from glaciers and ice sheets.	SAI MING LEE	Hong Kong Observatory	China	No longer applicable - sentence removed
10171	3	14	3	16	Suggest providing the estimated area of permafrost that has thawed and the associated carbon emissions, if possible.	SAI MING LEE	Hong Kong Observatory	China	Taken into account. A model result of area thawed in contained in Figure SPM.1. Global observations of thawed area and emissions are not available.
10173	7	46	7	50	What is the baseline of the projection?	SAI MING LEE	Hong Kong Observatory	China	Noted - see revised B1.1
10175	9	38	9	39	Suggest providing the projection figures.	SAI MING LEE	Hong Kong Observatory	China	Section text revised, this is now contained in B1.3.
10177	10	15	10	15	What is the baseline of the projection?	SAI MING LEE	Hong Kong Observatory	China	Noted - Sentence removed from revised SPM - see B2.4 and B2.6
10179	10	41	10	42	What is the baseline of the projection?	SAI MING LEE	Hong Kong Observatory	China	Noted - sentence removed - see SR15
10181	11	15	11	20	Re: Figure SPM.3. What is the projection period and the baseline of projection?	SAI MING LEE	Hong Kong Observatory	China	Reference to the projection period has been added.
10183	12	19	12	28	In this Special Report, the Antarctic Ice Sheet's contribution to global sea level rise in 2081-2100 under RCP8.5 is updated to 0.18 metres, almost five times given by AR5. Suggest highlighting this significant increase.	SAI MING LEE	Hong Kong Observatory	China	Taken into account - in B3.1
10185	12	19	12	28	Need to include the updated projections for RCP6.0 to inform adaptation actions.	SAI MING LEE	Hong Kong Observatory	China	Rejected - the SPM provides RCP2.6 and RCP8.5 - RCP4.5 can be found in Chp 4, fig 4.9
10187	17	0	17	8	Re: Figure SPM.5. Should "West Pacific Ocean" read "western North Pacific Ocean" and "East Pacific Ocean" read "eastern North Pacific Ocean" if there is no overlap with South Pacific Ocean?	SAI MING LEE	Hong Kong Observatory	China	Figure SPM.5 was removed in revision

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
10779	0	0	0		Several important issues seem to be missing in SPM. For example, how one could deal with projections' uncertainties, particularly at regional and local scales? Which factors determine the uncertainty range, can it be narrowed and are there natural limits for it? This is important for making decisions on decadal to multi-decadal time scales.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted - the SPM has been revised substantially and ranges and uncertainty language applied where appropriate
10781	0	0	0		What about seasonal sea ice cover in the Arctic expected in 3-4 decades? This is a crucial point for Arctic people and industry.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken in account - see revisions to Fig SPM.1 and B.2 in the FD
10783	0	0	0		A role of methane hydrates in permafrost regions and Arctic shelfs in accelerating the global warming is not highlighted.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into account - see revised B1.3
10785	0	0	0		What is happening, expected to happen with and what will be the consequences of permafrost degradation over the Northern Euarasia? More quantitative assessment is needed in B2.6.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Noted - further details are added to revised B4.3 and B7.2 and C1.3 - quantitative information was not available
10787	0	0	0		Too little attention is given to ENSO and related issues in SPM.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Rejected - the SPM is focused on key issues
10789	1	33	1	36	The sentence is ambiguous: either global warming is due to human activity only or only human induced global warming is associated with "very clear and in some cases irreversible changes...". Editing is needed.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Agree - the text has been revised in the added start up box "The responses of the ocean and cryosphere to past and current human-induced greenhouse gas emissions and ongoing global warming include changes over decades to centuries that cannot be avoided, thresholds of abrupt change, and irreversibility.'
10791	2	2	8	50	In SPM.A section, neither specific information on SLR, nor about changes in the ocean circulation is presented. What about sea ice thickness (A1.3)?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	The final drafts contains more specific information on SLR, and sea ice including sea ice mass loss, extent and age.
10793	2	2	46	48	Indeed, there is low confidence in specific teleconnection patterns associated with sea ice loss, but there is a high confidence that such a loss leads to considerable atmospheric circulation changes.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Accepted: text regarding potential impacts of sea ice loss on midlatitude weather was revised.
10795	4	4	0		The figures is difficult to read and interpret. These thermometers, circles, triangles, fishes etc. look like a puzzle.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Overall graphical approach has been changed in order to ease understanding.
10797	6	6	0		Coastal erosion, particularly in the Arctic, is worth mentioning.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	This is addressed in B9
10799	9	9	38	39	"substantial losses" and "lower losses" are very vague terms, need to be specified.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Accepted Quantification added
10801	15	15	0		Figure SPM.4 refers to section B5. However, physical phenomena indicated in the figure are not discussed in that chapter.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	The embers on physical phenomena have been removed after technical discussions.
10803	17	17	0		Figure SPM.5 A: a puzzle again.	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Figure SPM.5 was removed in revision
10805	19	19	3	22	This section is totally general. The formulations used can be applied to absolutely any adaptation pathways. What is specific about it in relation to the ocean and cryosphere?	Government of Russian Federation	Institute of Global Climate and Ecology	Russian Federation	Taken into consideration. The text has been substantially revised with revised confidence statements and cross-references to concrete examples presented in the main report that point to specificities in the ocean and cryosphere contexts
10845	0	0	0		A point on MISI and MICI on the West Antarctic Ice Sheet from 4.2.3.1.2 is missing in the SPM. This section in chapter 4 is well-balanced and captures well the research front. Since this theme has huge implications for future SLR and we may possibly soon be approaching the tipping point for WAIS if sustained warming continues, this matter clearly deserves its space in the SPM. If you need to remove material to fit this in, the B7 part on AMOC is a contender in my opinion.	Ola Kalén	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - see revised A3.2
10867	0	0	0		Congratulations to a well written, highly relevant SPM, I appreciate in particular the clear, quantified and referenced messages and also the inclusion of socio-economic aspects and data and some focus on solutions. I remain of course deeply concerned about the impacts we and in particular future generations will have to deal with. I will limit my comments to the figures / infographics since this is my field of specialization.	otto otto simonett	zoï environment network	Switzerland	Noted with thanks
10869	0	0	0		While I very much welcome the use of figures, maps and infographics, I am afraid that for the average policy makers (assume this is the target audience) some of the figures are way too complex. While I understand the efforts of the IPCC to be comprehensive integrating all possible elements and data into the illustrations this leads to overcongestion making many of the infographics difficult to read. I would recommend to IPCC to take some additional efforts at least in the summary report beyond 'uptaking' visuals from the full report. IPCC has a considerable downstream impact in its information including infographics being reused and recycled, this comes in my opinion with a responsibility to invest into high-standard, understandable visuals.	otto otto simonett	zoï environment network	Switzerland	Taken into account. All figures have been carefully revised in the SPM FD to reduce complexity and improve clarity and readability.
10871	4	0	0		Figure SPM.1 The ilustration of the key findings is good and understandabble, clearly organizing and visualizing all the elements (drivers, impacts, timeline, scenarios), Only drawback is the too small text at times.	otto otto simonett	zoï environment network	Switzerland	Overall layout has been reworked to allow the use of a bigger font size to ease readability.
10873	6	0	0		Figure SPM.2 The combination of the world map, icons and legend is very hard to read. I would suggest to display the drivers and impacts in an tabular infographic without the world map (should geographic attribution be necessary, this could be done with a very small world map with numbers à coté)	otto otto simonett	zoï environment network	Switzerland	Taken into account - Overall graphical approach has been changed to ease comprehension.
10875	11	0	0		Figure SPM.3 Ok. Could of course be bigger....	otto otto simonett	zoï environment network	Switzerland	Additional content has been added.
10877	15	0	0		Figure SPM.4 The 'ember' (vividly remember IPCC's history with ember graphics) figure may be good for scientists but it is too complex and too dense for decision-makers. Ecosystems, phenomena, geographies PLUS temperature (RCPs) PLUS adaptation capacity PLUS white-red-purple-yellow PLUS very long caption. As a solution I would propose to generalize: 'weed' the pillars shown; 'divide' them more clearly and even if it may be hard for a scientist make the ember scale more discrete: moderate, high, very high, and in the local hot spot drop the ABC adaptation scenario, kind of obvious	otto otto simonett	zoï environment network	Switzerland	Graphic approach has been streamlined to ease comprehension.
10879	17	0	0		Figure SPM.5 A is excellent! (make it bigger though) B is less clear, not sure whether it makes sense to connect the data points (introduces a lot of noise), exactly what was well done in A.	otto otto simonett	zoï environment network	Switzerland	Figure SPM.5 was removed in revision

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
10881	18	0	0		Figure SPM.6 Ok, but as in SPM.2 the world map may actually be obsolete	otto otto simonett	zoï environment network	Switzerland	Overall graphical approach, including the usefulness of the map, has been reworked to ease comprehension.
10993	4	0	0		For the mountain glacier mass reduction, can the sizes of the icons change?	Karen Cameron	Aberystwyth University	United Kingdom (of Great Britain and Northern Ireland)	Overall graphical approach has been changed.
10995	6	1	6	1	Can you specifiy what type of species? Fish? Also in B2.3	Karen Cameron	Aberystwyth University	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - "species" have been specified throughout the SPM
10997	10	18	10	18	would it not be more more accurate to say "changes in biodiversity,…" rather than "decreases"	Karen Cameron	Aberystwyth University	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
11005	1	1	21	57	the text of the SPM is much more ambitious in terms of identifying and addressing challenges -such as for megacities- and of identifying viable and available solutions , particularly as regards to the adoption of Nature-based and hybrid solutions, Marine spatial planning, than the chapter on chapter VI where these issues should be carefully addressed and where the exisiting scientiifc basis should be provided.	Urbano Fra.Paleo	University of Extremadura	Spain	Taken into account - the SPM has been revised substantially
11007	6	6	6	6	and water security particularly due to changes in freshwater ecosystems	Urbano Fra.Paleo	University of Extremadura	Spain	the SPM has been substantially revised - water supply is in A7
11009	8	25	8	26	not just to water quantity variation, there are also evidences of other adjustments, such as change in the farming practices and crops Manandhar, S., Vogt, D.S., Perret, S.R. et al. Reg Environ Change (2011) 11: 335. https://doi.org/10.1007/s10113-010-0137-1 Gentle, P., & Maraseni, T. N. (2012). Climate change, poverty and livelihoods: Adaptation practices by rural mountain communities in Nepal. Environmental Science and Policy, 21, 24-34. https://doi.org/10.1016/j.envsci.2012.03.007	Urbano Fra.Paleo	University of Extremadura	Spain	Noted
11011	11	45	11	46	and migration	Urbano Fra.Paleo	University of Extremadura	Spain	This has been removed from the revised SPM.
11013	12	6	12	7	This hybridization of the multiple infrastructures to decrease vulnerability should be sustained with evidences in chapter VI	Urbano Fra.Paleo	University of Extremadura	Spain	Cross-references to chapter 4 have been added.
11015	13	15	13	15	the use of the term continuum conveys a lack of compatibility when this is not the case since in many cases the solutions are hybrid	Urbano Fra.Paleo	University of Extremadura	Spain	Taken into account - the entire bullet has been re-written for more clarity and the term "continuum" removed
11017	13	21	13	22	and communicate a false perception of security favoring future development and increase of exposure and vulnerability	Urbano Fra.Paleo	University of Extremadura	Spain	Limits related to these options are now discussed in A9.2, C3.1 and C3.2; and more in detail in chapter 4 section 4.4..
11019	16	30	16	31	Continuing observation and monitoring of natural processes that allow early warning and more effective evacuation, is not operational or working in developing countries for the lack of uninterrupted financial resources, or required expertise	Urbano Fra.Paleo	University of Extremadura	Spain	Noted - text removed
11021	19	24	19	24	hybrid solutions are supported	Urbano Fra.Paleo	University of Extremadura	Spain	Noted. The text has been revised. - clarity given "but little is known about 38 their cost and effectiveness " see A.9.2
11023	20	48	20	48	transparency and accountability are requirements to gain trust. Reliability does not come from citizens but from the quality of outputs from institutions	Urbano Fra.Paleo	University of Extremadura	Spain	Taken into account: issues of accountability, transparency and trust are included. participation and conflict resolution are discussed in C3.3, , coordination in C4.1 and C4.4, and public deliberation in C4.5
11025	20	55	20	56	and approaches such as Integrated Coastal Zone Management (ICZM), almost absent in the whole report	Urbano Fra.Paleo	University of Extremadura	Spain	Noted - coordination and cooperation is highlighted
11175	2	42	2	43	I strongly disagree that we have „very high confidence" that the Arctic is warming at twice the rate of the global average. Data coverage is very sparse, so I actually find we can have rather limited confidence in any quantitative assessment of Arctic warming. We will most likely not share this level of confidence in AR6.	Dirk Notz	Max Planck Institute for Meteorology	Germany	Taken into account: wording revised in the SOD. While surface observations are sparse across the Arctic, there are multiple lines of evidence from reanalysis, model simulations, etc. which provide strong evidence for Arctic amplification of surface temperature.
11177	2	43	2	45	These numbers on the specific trends of sea ice and snow must be qualified with uncertainty information. Otherwise we cannot have „high confidence" that they are correct.	Dirk Notz	Max Planck Institute for Meteorology	Germany	Accepted: Arctic sea ice trend estimates now include uncertainty estimates.
11297	5	15	5	16	A.2.(BOX): The second sentence should include the word 'biodiversity'. Otherwise this sentence fails to include the many thousands (millions?) of non-human, non-domesticated species on earth that very much depend on the cryosphere, and provide ecosystem services to humans.	L. Scott Mills	University of Montana	United States of America	Agree the SPM has been restructured and this is now addressed in the new A4
11299	5	21	5	21	A2.1. In the second sentence, the word 'fisheries' should be changed to 'fisheries and wildlife'. Otherwise this sentence fails to include the many terrestrial animal species which are both affected by the cryosphere and of reverberating interest to policymakers globally.	L. Scott Mills	University of Montana	United States of America	Noted. The SPM structure has been revised. There is now separate bullets for cryosphere-ecosystem (A4) and ocean-ecosystem (A5) which resolves this comment
11301	5	32	5	33	A.2.2. The phenologic mismatches between snow and biological timing events is one of the strongest and most general consequences of a changing cryosphere (with 'high confidence'). This is included in the marine section (A.2.5), and should be here as well. Space could be saved by omitting the wolverine example, which is actually only a 'medium confidence' effect (see section 2.3.3). Specifically, I suggest as an edit to change the last sentence of A.2.2. to: Multiple interacting cryosphere-related challenges for plants and animals include survival under a shallower and denser snowpack, mismatches between seasonal snow and timing of biological events, and compromised foraging and reproduction due to ice buildup and loss of snow (high confidence).	L. Scott Mills	University of Montana	United States of America	Taken into account: revised text in A4.1 and A4.2, with references to section 2.3.3 and Box 3.4.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
11303	8	6	8	9	B.1.4. In the second sentence, several problems: First, the first phrase implies that upslope migration and timing changes are limited to only 'plant growth'. Second, the phrase "shifts in the characteristic traits" is vague and would be opaque to policymakers. I suggest that second sentence be changed to the following (which is also considerably shorter than the current version): Key future shifts for multiple species under a changing cryosphere may include upslope migration of lower elevation species; timing mismatches between cryosphere conditions and species seasonal changes such as plant growth and hibernation emergence; altered movement and migratory patterns; and increased disturbance (e.g. fire and landslides) that could alter movements, migration, and geographic range.	L. Scott Mills	University of Montana	United States of America	Taken into account - the entire Headline statement (now B4) including the underlying bullet points has been re-written for more clarity
11525	2	31	2	39	This passage, and all references to the Antarctic Ice Sheet in the report as whole, need to better distinguish between the West Antarctic Ice Sheet and East Antarctic Sheet. Though this passage notes correctly that overall AIS mass loss is dominated by the WAIS, it should note that uncertainties in the sign of the EAIS mass balance mean the data available allow for a positive mass balance for the EAIS. Also that projections suggest parts of the EAIS may see increasing accumulation under near-term warming: e.g. Zwally, H. J., J. Li, J. W. Robbins, J. L. Saba, D. Yi, and A. C. Brenner (2015), Mass gains of the Antarctic ice sheet exceed losses, J. Glaciol., 61(230), 1019-1036, doi:10.3189/2015JoG15J071. Shepherd, A., et al. (2018), Mass balance of the Antarctic Ice Sheet from 1992 to 2017, Nature, 558(7709), 219-222, doi:10.1038/s41586-018-0179-y. Frieler, K., P. U. Clark, F. He, C. Buizert, R. Reese, S. R. M. Ligtenberg, M. R. van den Broeke, R. Winkelmann, and A. Levermann (2015), Consistent evidence of increasing Antarctic accumulation with warming, Nature Clim. Change, 5(4), 348-352, doi:10.1038/nclimate2574.	William Howard	Australian National University	Australia	It is specified that it is dominated by West-Antarctica, so there is no problem with the sentence. Rejected. We do not have enough space to discuss these details here, so we limit discussion to the observed changes: Antarctic ice sheet is loosing mass, and this process is dominated by WAIS outlet glaciers acceleration. More details could be found in the main report.
11527	6	12	6	12	How will the impacts described here result in 'loss of educational opportunities'?	William Howard	Australian National University	Australia	In 54214, one paragraph mentions education but it does not clarify why it is threatened by climate change. It says how education is important to deal with CC, so I agree to remove it
11529	11	9	11	10	This sugggests *all* people who depend on fisheries and seafood industries will experience decline in the their incomes. The other related text around the issue of fisheries notes *Some* fisheries will be affected by climate change. B3.4 implies high-latitude oceans may see higher productivity (higher organis carbon production). So the point should be a bit more nuanced to reflect the likely redistribution of ocean productivity.	William Howard	Australian National University	Australia	Taken into account - the text is substantially revised
11531	1	1	21	43	There is no mention in the SPM of how sea level rise is likely to affect coastal and (especially) small-island aquifers. In some cases seawater intrusion is likely to be another effect on the habitability of some low-lying coastal environments in addition to direct inundation, so this is a crucial issue.	William Howard	Australian National University	Australia	Noted while not directly mentioned, indirectly in e.g. B9
11583	1	37	1	38	change "unprecedented environments and hazards" to "unprecedented environmental conditions and hazards"	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Noted - this text was removed from the final draft
11585	2	23	2	23	Change carbon dioxide uptake to "carbon dioxide intake"	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Rejected - 'uptake' is the standard term used.
11587	4	2	5	10	The explanation of Figure SPM.1 result confusing due to its location in the text. It's not clear if the part located on page 5 is part of the explanation or a continuation of the previous text in page 3	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Noted: the figure caption is now more clearly arranged within the formatted SPM document.
11589	5	13	5	13	Change directly or indirectly to "directly and indirectly"	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Taken into account - text has been completely revised
11591	5	56	5	56	Change "are driving" to "are generating"	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Taken into account - text has been completely revised and the term "driving" removed
11593	5	57	5	57	It would be advisable to include one specific example of the impacts on biodiversity and ecosystems function to ilustrate the adverse effects rather than several general and untangible ones	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Noted - the SPM has been revised for clarity and sentence removed. See A4-A6 for revised statement of impacts on ecosystems including examples and also Figure SPM.2
11595	6	8	6	9	In page 5 line 57 it is stated that biodiversity and ecosystems functions loss has high confidence and in this lines it's said that it has medium confidence (double check it)	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Noted - revised text is checked
11597	7	21	7	21	it would be helpful to elaborate on the changes in kelp forest otherwise an inexperienced reader wo't be appealed by this. Considering that this section will be read by policymakers it needs to express more tangible examples.	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Taken into account - the SPM is revised and the sentence replaced see section A6.1
11599	19	48	19	48	Change "significantly assist" to "significantly help"	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Noted. Bullet has been revised.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
11601	20	2	20	5	It would be more promessing to a PM to depict the "no regret" advantages rather than mentioning the discouraging benefits of NBS	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Noted - sentence deleted from revised SPM and replaced with assessment of mitigation potential (C.2.5)
11603	20	28	20	28	Remove "the" from "require the attention"	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Taken into account. Sentence revised.
11605	1	1	21	43	The discussion on water security or availability for human consumption beyond the needs of crops is missing, it should play a major role in the SPM if not in all of the report	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Taken into account - the SPM has been revised substantially
11607	4	18	131	13	Standardize the use of "Sea Level Rise" and SLR	Government of Mexico	Directora General del Instituto Nacional de Ecologia y Cambio Climatico	Mexico	Noted
11713	0	0	0		The issue of Loss and Damage is insufficiently dealt with in the report. The report covers key areas causing Loss and Damage in SIDS including slow onset events like sea level rise or ocean acidification as well as extreme weather events like tropical cyclones or marine heat waves. These require much more attention. The 1.5SR provided a good starting point to assess the issue of Loss and Damage and limits to adaptation in a Cross-Chapter Box. Such a box, maybe even in the SPM is warranted for this report. We note that there is plenty of information on such limits in the current SPM.	Government of Saint Kitts and Nevis	Department of Environment - Ministry of Agriculture, Marine Resources, Cooperatives, Environment and Human Settlements	Saint Kitts and Nevis	Rejected - it is not possible to add a box to the SPM due to space. As you say key areas are covered and in the underlying report the cross chapter box 9 overs aspects
11715	13	26	13	42	Please provide more information about the needs and costing of these adaptation measures, in particular in relation to small island economies. Furthermore, please reflect on mitigation being a critical adaptation enabler by limiting future sea level rise and in particular the speed of rise to a manageable level.	Government of Saint Kitts and Nevis	Department of Environment - Ministry of Agriculture, Marine Resources, Cooperatives, Environment and Human Settlements	Saint Kitts and Nevis	Noted - limits to adaptation are mentioned throughout
11719	20	24	20	25	Confusing, measues are implemented at local scale and the sentence is given as "but are only efficient at the local scale"	Maheswor shrestha	Water and Energy Commission Secretariat	Nepal	Accepted - text changed - see section C5.1 that elaborates on adaptation co-benefits
11721	0	0	0		Climate change in the framework of river basin planning is missing.	Maheswor shrestha	Water and Energy Commission Secretariat	Nepal	Noted - high mountain cryosphere and risks from changes in this is included
11781	8	40	8	46	This statement does not emphasie the global importance of ecosystem health for its intrinsic values. Rather the emphasis here revolves around human use of the natural ecosystems The wording in B1 includes the risks to ecosystems and biodiversity by themselves not just for the services they bring to humans. The second sentence could be adjusted accordingly.	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Taken into account - see revised SPM B4-B6
11783	10	1	10	5	This statement is confined to anthropogenic impacts for human use of the environment. Natural systems have a value of their own as well. The text needs to be adjusted accordingly.	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Taken into account - the SPM is restructured and B4-B6 focus on ecosystems
11785	12	11	12	17	The prescence of cascading impacts could be added to this statement after "humankind" add cascading impacts after "through displacement"	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Taken into account - cascading impacts in revised text B.9.1
11787	13	8	13	13	This text uses the word "advance" which is not commonly used rather "avoid " is used to reduce further exposure to climate risk.That option is missing. If "advance" means beach renourishment for example then this is a soft "protect" strategy and is a subset of protect, that is too detailed to mention here.	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Noted - definition for advance is in A9.2
11789	13	15	13	16	Avoidance strategies are missing from this sentence. Please add as they are important for reducing entrenchment of risk and creating new legacy effects.	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	This is a good point that is addressed in chapter 4 (section 4.4) and in the integrative cross-chapter box on Low-lying Islands and coasts (CCB9). Due to length constrains in the SPM, we put the emphasis on the "adaptation option" (but recognizing that avoidance strategies are part of adaptation strategies).
11791	13	38	13	40	This sentence will mislead decision makers because it avoids consideration of possible failure under changed conditions. If hard structures and renourishment (advance?) are to be used their limitations both in generating erosion at the structure toe and instiling a false sense of safety will lull communities into thinking they have nothing to worry about. Hence it needs a big caveat added. But investing in structures and infrastructure that can last 100 years under non-climate change scenarios does not anticipate the risk adequately and can create stranded assets. Many countries will not have the resources to armour their coasts with structures and encouraging other options in a staged manner will reduce the social disruption and ultimately cost less. The authors will have access to much literature on this issue.	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Noted the SPM text has been revised. The new figure SPM.5 which assesses options

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
11793	13	48	13	50	This statement is ludicrous and unsustainable as an option. I am totally amazed to find it this report!! In a risk-based decision framework which appears elsewhere in this report, creating future lecgacy effects which increases residual risk is not precautionary and a dangerous strategy for communities and assets that live there. The statement is also inconsistent with the thrust of the report and should be removed from the SPM and where it appears elsewhere in the report. There are many other ways of raising finance for investment in adaptation measures that are sustainable.	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Taken into account - the sentence is deleted. An assessment of advance e.g. o-benefits, drawbacks is given in the added Figure SPM.5
11795	16	6	16	6	The term "sea level events" is used. This would be better expressed as" extreme storm surge on top of rising seas" or similar. Noting that in the latter part of the century these will be inundation events rather than erosion Ref Le Cozannet et al. (2015).	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Noted - sea level events was retained however the addition of Figure SPM.4 provides explanation
11797	16	10	16	11	The following statement is a bit confusing " ...because they are composed of sequences of individual events" A compound character may also manifest in concurrent events and by sequences I think the meaning is sequences of events that leave little time to recover between them? If the latter is teh case this text should be clarified and the concurrent events also added.	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Noted the text is removed
11799	19	21	19	22	The last sentence detracts from the rest of C1 which is nicely crafted. Progress is being made using DMDU tools so suggest you amend the last sentence as follows " Realising the potential of these techniques is underway and will require good case examples to be widely disseminated for ongoing uptake." This construction is less negative and gives a way of advancing uptake.	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Taken into account. Bullet has been revised and moved under C2.
11801	21	10	21	14	The last sentence could give a solution or at least one key enabler to achieving profound societal transformations (whatever that means= is it defined somewhere?). For example you could add at the end of the sentence" ....through leadership at all levels of governance and through participatory processes."	Judy Lawrence	NZ Climate Change Research Institute, Victoria University of Wellington, New Zealand	New Zealand	Taken into account - the section has been revised and C4 is now focussed on enablers with examples. See also added figure SPM.5
11983	4	0	4		Figure SPM.1 With the ocean heat content change shown with circles the relative difference between RCP 8.5 and 2.6 seems rather small. Maybe it would show better using bars instead as with temperature change or sea level rise.	Erik Engström	Swedish Meteorological and Hydrological Institute	Sweden	Overall graphical approach has been changed.
11989	21	19	22	14	The most impactful result here is A2.4 and the section should lead with this. I suggest that A2.4-A2.6 are moved ahead of A2.1-A2.3 in this section	Nicholas Hardman-Mountford	Commonwealth Secretariat	United Kingdom (of Great Britain and Northern Ireland)	The entire SPM has been restructured and revised for more clarity
11991	21	19	22	14	Impacts of increased storm frequency and intensity fuelled by higher sea surface temperatures are not mentioned. These have had huge impacts, particularly on SIDS, in recent years, effectively wiping out multiples of national GDP in a single event. I suggest a paragraph on the impacts of storm frequency and intensity to coastal populations is added.	Nicholas Hardman-Mountford	Commonwealth Secretariat	United Kingdom (of Great Britain and Northern Ireland)	The entire SPM has been restructured and revised for more clarity - this is captured in Sections A and B e.g. A.3.4
12025	0	0	0		1. In the SPM, there are many inconsistencies between the captions and the notes to the figures and tables that are too fragmented and simple, which are suggested to be carefully reprocessed and redesigned to comprehensively reflect the findings and conclusions of the chapters of SROCC with an improved readability. 2. The SPM, which should reflect the core conclusions of the chapters of the underlying report in a balanced manner, fails to do so fully. (e.g. the absence of such key elements as changes in ocean heat content (OHC) in Chapter 5). So it is suggested to make an addition. 3. It is necessary to keep consistent the confidence levels of the assessed conclusions in the SPM and the underlying report. 4. The core concepts like "cryosphere", "high mountain region" and "snow line" that appear in the SPM should be clearly defined or explained in the report, and be even made consistent with what has been achieved and understood in the early stages of the IPCC.	Government of China	China Meteorological Administration	China	Noted - the SPM has been revised substantially and checked. The added startup box defines cryosphere and other terms are in the glossary
12027	1	32	1	32	The definition of cryosphere here is inaccurate. So it is suggested to further improve it in accordance with what is defined by AR4 & AR5 WG1. For example, 'Cryosphere is consist of glacier (mountain glacier, ice cap and ice sheet), frozen ground (permafrost and seasonal frozen ground), snow cover, lake and river ice, sea ice, ice berg, ice shelf, and ice in atmosphere. Moreover, it is also suggested that an entry of "Cryosphere" be added to the glossary.	Government of China	China Meteorological Administration	China	The introduction was shortened and this text removed and revised in the added startup box
12029	2	13	2	13	The accelerated sea level rise results from not only the melting glaciers, but also supposedly from other factors like thermal expansion of seawater. So it is suggested to add "mainly" before "due to".	Government of China	China Meteorological Administration	China	No longer applicable here - statement modified. Taken into account elsewhere in SPM.
12031	2	17	2	21	Some of the lengthy descriptions or assessments in the underlying report, such as the changes in ocean heat content in Chapter 5 (which is a direct manifestation of the energy imbalance in the Earth system, contributing to one third of sea level changes), the variation in deep ocean heat, the potential acceleration of ocean warming, and the spatial variability of the changing thermal content, are not adequately reflected in the current SPM. So it is suggested that they be supplemented.	Government of China	China Meteorological Administration	China	Agreed - see revision of A2

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12033	2	42	2	42	'Arctic sea surface temperature has increased at approximately twice the rate of average global temperature (very high confidence).' is a wrong statement. "sea surface temperature" should be "surface air temperature". So it is suggested that the author check whether it is "sea surface temperature SST" or "surface air temperature SAT" that is stated in the sentence. Please also check whether this conclusion in the SPM is consistent with what is formulated in the underlying report.	Government of China	China Meteorological Administration	China	Accepted - revised SPM says 'surface air temperature'
12035	2	46	2	48	As understood, many studies have revealed the impact of Arctic sea ice on weather and climate in the middle and high latitudes. So please check the accuracy of the expression of "low confidence" in this conclusion that "There is low confidence associated with the teleconnections between Arctic sea ice loss and changes in atmospheric circulation affecting weather patterns in mid-latitudes."	Government of China	China Meteorological Administration	China	Accepted: text regarding potential impacts of sea ice loss on midlatitude weather was revised. This specific low confidence statement no longer appears.
12037	3	7	3	7	What's the definition of "snow elevation"?	Government of China	China Meteorological Administration	China	No longer applicable - sentence removed
12039	3	10	3	12	"The values in this sentence is based on absolute changes, and the results may be different if the relative values were calculated, i.e., compared to the total mass in each region.", a conclusion that is suggested to be checked to avoid misleading readers.	Government of China	China Meteorological Administration	China	Noted sentence removed
12041	4	1	4	1	In Figure SPM.1, mountain glaciers mass reductions" should be "mountain glaciers mass" since the corresponding values are shown in negative. So, accordingly, "coral reef degradation" should be changed to "coral reef".	Government of China	China Meteorological Administration	China	Labels have been revised for accuracy. Panels have been updated with a more suitable selection of variables.
12043	4	1	4	5	Figure SPM.1: "mountain glaciers mass reductions" is too complex and fragmented to judge the reduction of glacier mass or the extent of the pattern. So it is suggested to redesign the figure.	Government of China	China Meteorological Administration	China	Panels have been updated with a more suitable selection of variables. Data set has been updated.
12045	6	15	6	18	Is the 'regions' in the "in 11 high mountain regions" in line 14 in captioned Figure SPM.2 conceptually consistent with the 'areas' in the "in all high mountain areas" in line 17? Please check for consistency in wording. At the same time, it is suggested that the definition be made by reference to the WMO concept in this connection as follows: "High mountain regions shall be defined as mountain areas where seasonal or perennial cryosphere is present and poses potential and serious risks to society related to water scarcity and disaster resilience."	Government of China	China Meteorological Administration	China	Taken into account - the entire figure has been revised and caption and legend rewritten. References other than to SPM figures or sections of the report are not allowed in the SPM.
12047	8	40	8	40	It is suggested to add a projected change in the polar cryosphere to B2.	Government of China	China Meteorological Administration	China	Taken into account - see revision in B1
12049	17	1	17	5	Figure SPM.5 assumes 'increasing size=more exposed population', which is too simple. So it is suggested to use the number or magnitude of landing typhoons as an indicator of the exposed population. In Figure SPM.5b, the time series shows no significant long-term trend. The authors are requested to consider the reasonableness and representativeness of using the figure to indicate the effects of climate change. As such, it is suggested to reconsider and redesign Figure SPM.5.	Government of China	China Meteorological Administration	China	Figure SPM.5 was removed in revision
12051	18	1	18	1	It is suggested that the title use "extreme sea levels" instead of "extreme water levels".	Government of China	China Meteorological Administration	China	Suggestion acknowledged. The title has been rewritten.
12143	10	37	15	4	"greenhouse gas emission scenarios" (p.12, Lines 8-9), "carbon emission scenarios" (p.10, Line 37), and "CO2 emissions scenarios" (p.15, Line 4) should be used exactly and consistently with distinguished meanings of "greenhouse gas", "carbon", and "CO2".	Wenjie Liao	Sichuan University	China	Taken into account - this was checked throughout SPM
12145	12	22	12	26	"0.39 m (0.26-0.52 m, likely range)" can be changed to "0.39 ± 0.13 m (likely range)"; the same type of change can be made to other expressions of uncertainty ranges in these lines.	Wenjie Liao	Sichuan University	China	Rejected
12475	0	0	0		In order to get the messages of the part C of the SPM across and to increase its weight against the parts A and B, we suggest to add a figure into part C. This would help to visualize the suggested improvements to manage the risks and to move forward towards climate resilient pathways (e. g., Cross-Chapter Box 1, Figures 1, 2 or 3, Figure 1.2, or Cross-Chapter Box 3, Figure 1, or derivates). This would also help to make the link to the SR1.5 (consistency).	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - Figure SPM.5 added
12477	0	0	0		The SPM provides a good compilation of results, whereas some key findings are missing from the detailed reports. Yet still quite lengthy and the standardized language does not foster mind-catching political messages at all time. Please consider to explore additional formats of presentation to make essential messages avail to be broad public (e.g. web-based animation of scenarios).	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted with thanks
12479	0	0	0		The current headline statements often provide very general information that does not fully represent the more detailed findings in the underlying sections. When revising the SPM, please make sure that the headline statements contain factual information and highlight those findings that are of most eminent concern to policymakers. The headlines statements, taken together, should provide a summary of the key messages of the SROCC in a conclusive narrative. We would appreciate if the authors could find a way to put some more emphasis on the specific risks pertaining to the Oceans and the Cryosphere even under lower emission scenarios, as these encompass some of the systems most vulnerable to climate change, including early and irreversible losses, committed long-term changes, such as sea-level, and risks from abrupt change.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - the SPM has been revised substantially

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12481	0	0	0		Please revise language in the SPM to avoid technical terminology and expert lingo that is not accessible to policy makers. This problem is especially prominent in the Oceans' sections of the SPM. It may be the case that policymakers are generally less familiar with Oceans than with land-based processes, but this has to be taken into account when drafting the SPM. Example in the SPM: "global mean steric sea level rise", "microclimate refugia", "benthic communities"…	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - the SPM has been revised substantially and use of jargon removed
12483	0	0	0		The SPM Section C states "Improvements in credibility, trust and reliability in institutions and scientific information on unexpected extremes and abrupt changes are crucial for countries to prepare for such uncertainties and enhance resilience" - yet the SPM has very few references to abrupt change and does not even mention tipping points. We'd strongly suggest to consider a more comprehensive and concise representation of current knowledge on tipping elements discussed in the report, including the collapse of marine based ice sheets, permafrost feedback, AMOC slowdown and halt, if possible in form of a box or a separate section that also allows for some context explaining (deep) uncertainty.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - tipping elements are included e.g. AMOC in A.2.8 and B.2.8 deep uncertainty is defined in the annex and in a box in ---chp 1 of the underlying report
12485	0	0	0		SPM Structure: The SPM provides a wealth of very useful information, however it currently lacks a compelling narrative, forces the reader to look for information on specific topics in several places and also fails to draw out some of the most eminent issues into the headline statements. Some of the subsections are very long, and in consequence the headlines statements are limited to a very general list of topics addressed, instead of conveying clear findings. While we do see that part of this challenge is inherent with the very wide scope of the report, we see two pragmatic ways forward here: one would be to revert from the current structure of "observations-projections-decision-making" to a more topic-centered structure, where one area is being discussed in the same section for all dimensions, and then provide a summary section with overarching figures. It may be possible to define topic areas in a way that combine findings from different chapters, to provide some level of integration and reduce length. A second, less invasive way to change the current structure would be to at least allow for a more granular substructure with more headline statements for sections A and B, where currently most headline statements summarize 7 to 11! subsections. We'd also encourage the author team to consider the introduction of a standalone section for extreme events and tipping points/abrupt change.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. The SPM has been thoroughly revised for more clarity and the use of icons to allow the reader to find information on e.g. Mountain cryosphere has been added
12487	1	42	1	42	"…issues of sea-level rise, extremes and abrupt events…" a definition of "extremes" as well as for "abrupt events" should be given in the glossary and a consistent wording (extremes or weather extremes) should be followed.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Agreed - climate extreme (extreme weather or climate event) is in the glossary as is abrupt climate change
12489	2	11	2	21	The metric "energy imbalance" (0.42W/m^2) does not properly reflect the significance of OHC. Any ZJ figure is hard to conceive. I suggest to provide a more graspable equivalent such as dT/yr for a 10m world ocean slab.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Agreed. However, ZJ is used in the FD as a standard unit
12491	2	17	2	21	To underline the anthropogenic forcing of ocean warming it is proposed to substitute the para A1.1 by text from the ES: The ocean is warming as a direct result of anthropogenic changes to the radiative properties of the atmosphere and the heat budget of the Earth (very likely)(as at p:5-9; l:7-8), continuing the multi-decadal ocean warming trends documented in the IPCC Fifth Assessment Report (AR5)(as at p: 5-3; l:8-9). The increase in ocean temperature corresponds with an uptake of about 93% of the excess heat accumulated in the Earth system over this time. The ocean heat uptake of 274 ZJ during 1970-2010 is equivalent to an energy imbalance of 0.42 W/m² (as at p: 5-9; l: 9-12).	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Agreed - see revision of A2
12493	2	17	2	21	"increasing at a steady rate" (17) & "1970-2010 … 0.42W/m2" (20). Resplandy et al. 2018 provide in their Fig.1b various DOHC estimates for periods starting ~1990 and ending ~2015. These trends vary between 9 and 12 ZJ/yr or 225 and 300ZJ in 25 years. 0.42W/m^2 is based on 274ZJ for the period 1970-2010 (cf. Chp. 5.2.2.2.1, p.9, line 11-12). By comparison, 0.42W/m^2 appears much too low, or the heat gain rate is not steady (time-invariant), or both. Resplandy et al., Nature 536, 105-108,2018. Note that the Authors are correcting their own estimate: http://www.realclimate.org/index.php/archives/2018/11/resplandy-et-al-correction-and-response/	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - see trends provided in revised Figure SPM.1 panel h and A.2.1. the term steady state is removed
12495	2	20	2	20	If statement is kept as is, pls. insert: …uptake of 274 ZJ during….. (quantification of oceans heat uptake as given on p: 5-9 l:11)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - the text is substantially revised for clarity see A.2.1
12497	2	20	2	21	Can there a confidence assessment be added to the statement "The ocean heat uptake during the period 1970-2010 is equivalent to an energy imbalance of 0.42 W m-2 (with respect to the Earth surface area)."?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - this has been removed and the text revised for clarity see A.2.1

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12499	2	24	2	24	pls. replace: …past two decades…, by …past three decades…(…since the mid 1980s…p: 5-22; l:3)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - Revised A2.5 says 'since the 1980s'
12501	2	24	2	25	To quantify the extent of acidification please insert: it is virtually certain that the open ocean pH is declining by about 0.02 pH-units per decade where time series observations exist.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Accepted - see revised A.2.6 (very likely range of 0.017 to 0.027 pH units per decade since the late 1980s.) and redesigned Figure SPM.1
12503	2	26	2	26	pls. add: …have expanded (high confidence). (as mentioned on p:5-27; l: 24)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - see revisions in A.2.7
12505	2	27	2	27	pls. insert: …observed in the Arctic Ocean, Southern Ocean,…(as mentioned at p:5-26; l:42)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - sentence removed from FD. See redesigned Figure SPM.2 for regional ocean
12507	2	29	2	29	pls. add: …5.2.2, 5.2.3, Box 5.1) (the information in A1.2 results also from these added sources)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Accepted - see revised A.2.6 and A.2.7
12509	2	33	2	33	to highlight the difference of dominating processes of mass-reduction at polar ice-sheets pls insert: in line 33:.., dominated by atmosphere induced surface melt (high confidence). (p:3-4; l:25-26)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	This is not possible because for Antarctica the dominant process is not increased surface melt, for Greenland surface melt is explicitly added in the FD. see A 1.1 of SPM FD
12511	2	35	2	35	to highlight the difference of dominating processes of mass-reduction at polar ice-sheets pls insert: in line 35:.., driven predominantly by ocean-induced under-ice melting, enhanced glacier flow and grounding line retreat (high confidence). (p:3-4; l:22-23)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	The SOD is more specific on the processes underlying the changes, - see A 1.1 of SPM FD
12513	2	35	2	37	A text comparable to the statement, that attribution of mass loss from ice sheets to human-induced climate change is currently not possible is neither presented in the SPM of the IPCC-AR5 WGI (B3, B4) nor in the Executive Summary or text of the IPCC-AR5 WGI Chapter 4. Please check the consistency.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	We do not discuss attribution in the final version of SPM (see section A 1.1)
12515	2	42	2	42	'Arctic sea surface temperature' is here incorrect, pls use the term 'Arctic surface air temperature' (p:3-9; l:11, Box 3.1)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Accepted - revised SPM says 'surface air temperature'
12517	2	46	2	48	There is substantive new research indicating a strong influence of the Polar-mid let temperature gradient (with sea Ice being an important factor) on persistent weather conditions, summer and winter extremes in Northern mid-latitudes (see, e.g., https://www.nature.com/articles/s41467-018-05256-8 for a recent review, or http://advances.sciencemag.org/content/4/10/eaat3272, https://www.nature.com/articles/srep45242 more specifically). While the exact nature of these non-linear interactions is not well quantified, they provide potential high-impact risks for society and should therefore be included in the summary for policymakers. The current statement is factually correct, but it misses out on highlighting a potential high impact process. Please consider rephrasing here (e.g. along the following lines "there is emerging/increasing evidence supporting teleconnections with potentially high impacts, but confidence is low ..) and/or include some more substantive language in other sections of the SPM.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Accepted: text regarding potential impacts of sea ice loss on midlatitude weather was revised.
12519	3	3	3	3	Pls give a hint, that there is currently inadequate understanding of the mechanisms that have determined the observed changes and trends in the Antarctic Sea Ice (p:3-100; l:26-28)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account; we have greatly revised this message to emphasize that Antarctic sea ice extent does not have a statistically significant trend over the satellite era.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12521	3	19	3	19	Pls add:…at colder sites, and between 0.1°C and 0.2°C for warmer discontinuous permafrost.(p:3-61; l:30)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	No longer applicable - sentence removed
12523	3	21	3	22	Can there a confidence assessment be added to the statement "Quantifying potential future greenhouse gas emissions (primarily carbon dioxide and methane) from thawing permafrost soils thus has global relevance"? It would also be helpful to give at least an order of magnitude for the expected Carbon Cycle feedback from Permafrost under different warming scenarios (cf. also IPCC SR1.5 which estimates uncertainties from permafrost feedback until the end of the century in the context of the carbon budget discussion).	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. This section (now A1.4 in the SPM SOD) is about observations and assesses carbon storage. Projected release of GHG from permafrost is assessed in B1.3.
12525	3	22	3	22	"global relevance" sounds like an understatement. This process, while deeply uncertain, has the potential to lead to "run away" climate change. Please consider to use stronger wording.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - sentence removed
12527	3	28	3	31	Can there a confidence assessment be added to the statement "Runoff changes from mountain glaciers have caused significant shifts in downstream nutrients (dissolved organic carbon, nitrogen, phosphorus) and influenced water quality through increases in heavy metals, particularly mercury and other contaminants that persist in the environment."	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - Callout updated and a sentence about heavy metal release added in the new B7.4 account - sentence removed. Now in B.7.4
12529	3	29	3	29	"influenced" sounds euphemistic. "and spoiled/negatively affected water quality" seems to be more appropriate regarding contamination with heavy metals.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - reworded
12531	3	31	3	31	pls add following reference chapters …, 2.2.3.1, 2.3.1.2, FAQ 2.1)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. A1 HS and underlying bullets have been revised and relevant chapter sections added to the LoS on the FD SPM. FAQs are not to be referred to in the SPM.
12533	4	1	4	1	Figure SPM.1: a figure of global mean ocean temperature is missing.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Panels have been updated with a more suitable selection of variables.
12535	4	1	4	1	Figure SPM.1: Titled Changes in Ocean … should provide information on global mean SST change in addition to global mean temperature change.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Panels have been updated with a more suitable selection of variables.
12537	4	1	4	1	Fig. SPM1 fonts are too small	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Overall layout has been reworked to allow the use of a bigger font size to ease readability.
12539	4	1	4	1	Figure SPM.1 This is a very helpful figure that should be kept and developed further. It would be helpful to clarify the temperature-levels for RCP2.6 (cf our 2nd comment below), in order to avoid the impression that RCP2.6 is a 1.5C scenario. Please also consider to show the 66% instead of the median line, corresponding to the probability levels chosen in SR1.5 for the 1.5C and 2C stabilization in 2100 (and quite customary for policy). It may also help to include ranges for T in the graphic around the single line. Else this will seemingly be conflicting with SR1.5 and very confusing for policymakers. Also, the blue and red mountain symbols should be smaller, consistent with the representation of other features. When revising the symbol for the mountains, please also consider to include a measure that is more representative of regional/distributed change than overall mass loss until 2100. To our knowledge, with warming above 1.5-2C, most of the world's Glaciers below ~6000 m are bound to disappear, including all tropical glaciers. This kind of information should be added to the figure. Similarly, the effect on global marine biomass could be amended by information of, e.g., the shift in catch potential from the tropics poleward. Sometimes the global aggregate does not portray the associated risk adequately.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Panels have been updated with a more suitable selection of variables. Uncertainty data has been added to each panel.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12541	4	1	4	1	Figure SPM.1 Please verify whether the 2100 temperature values given for RCP2.6 (1.5C+/0-7C) are correct. SR1.5 and AR5 report 1.6° median warming for RCP2.6 ("Based on the CMIP5 ensemble, RCP2.6, provides a better than two-in-three chance of staying below 2°C and a median warming of 1.6°C relative to 1850–1900 in 2100 (Collins et al., 2013)".SR1.5 Chapter 1 p.62 in CC Box 1), while RCP1.9 is mainly used to derive information on pathways compatible with 1,5C warming in 2100. If this estimation has been updated, it should be clearly stated in the SPM, with reference to SR1.5/AR5, else needs to be corrected. It would be unfortunate to create the impression that RCP2.6 is a 1.5C-warming scenario, unless that is what CMIP6 models tell us, in which case it is a major change from both AR5 and SR1.5 and needs to be highlighted, along with the uncertainties surrounding those estimates. You may also consider to show 66% instead of median values, as for mitigation scenarios 2100 temperature limits are mostly based on a 66%-probability. Please also ensure that values given here and in Figure SPM.4 are consistent.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted: the temperature information has been updated and is now represented as time series for RCP2.6 and RCP8.5, relative to 1986-2005. The caption also gives information from AR5 on the assessed amount of warming from pre-industrial to the 1986-2005 reference interval. In addition a new cross chapter box (CCB1) was added to chapter 1 giving details of projections of GMSAT change, and this has been checked against AR5. RCP1.9 is not used in SROCC, and for consistency with other parameters in SPM.1 we have decided to show the mean and uncertainty, rather than the 66% estimate.
12543	5	13	5	17	The text "are modified….under climate change" is not clear in its temporal reference. Does it mean modifications are already happening/being observed, or is it a more general statement that this can or will happen under climate change. AS we assume A2 refers to observations only, this should be made explicit, e.g. by adding "are already being modified..."	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - the temporal reference has been clarified in A7 and A8
12545	5	35	5	43	Can there confidence assessments be added to the passage?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Accepted. The content of this bullet was considerably revised and recast in the revised structure of the SPM SOD, along with corresponding confidence statements.
12547	5	38	5	40	Artificial snowmaking usually has a large energy and water footprint and increases GHG emissions, and should therefore not be considered a silver bullet even for short term adaptation. Consider to add sth along the lines of "—but may have other negative sustainable development impacts" after "amounts" in ln 40.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted. A7.5 now reads 'Artificial snowmaking has been effective in many places as an adaptation measure for sustaining ski tourism (medium confidence).' with the details in chp 2 section 2.3.5
12549	5	40	5	41	It is unclear if the statement refers to the adaptation measures in place or the measures that are available in principle. If the latter is the case (which the current wording suggests) the sentence lacks a qualifier as potential limits of adaptation measures strongly depend on the climate scenario and context-specific risk tolerance.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. The content of this bullet was considerably revised and recast in the revised structure of the SPM SOD, along with corresponding confidence statements. Note, however, that limits to adaptation fur future climate conditions are covered in section B about future changes.
12551	6	12	0		It is unclear what the term "loss of educational opportunities" refers to. Is this really an effect that is considered equally important with the other items in this list (loss of carbon stocks, indigenous knowledge…)? Suggest to remove this for clarity, space and balance.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - removed in revision
12553	6	14	6	18	Figure SPM.2: in the caption confidence levels are mentioned, but the different levels aren't clear enough in the figure.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - The overall graphic approach has been changed adding more clarity to confidence levels.
12555	6	15	0		In AR5 WGII Chapter 18 (Cramer et al., 2014), a similar graphic on observed impacts showed localized impacts in Eastern Africa (Kilimanjaro Region). Has this assessment been overturn? If not, please consider to include an icon on Glacier/Snow Changes, also to avoid the impression of regional imbalance.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - Overall graphical approach has been changed to ease comprehension. Reference to the African location (Low Latitude) is now depicted.
12557	6	21	6	24	the formulation "…hazards that exacerbate environmental risks faced by many ecosystems…" seems a little convulated and slightly at odds with the definition of risk as a combination of hazard, vulnerability and exposure - if the environmental hazards increased due to climate change, is it really necessary to qualify the resulting risk as "environmental risk"? Also the term multiple hazards could mean either various hazards or compound hazards. Please find a clearer expression for this important headline statement, that refers more clearly to the content of the following sections that mostly deal with extreme events and their impacts.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - 'environmental risks' and 'multiple hazards' no longer used. Sentence replaced by more specific statements.
12559	6	26	6	28	This is an extremely important finding that should be a key message of the report, rather than a second-level line that is kind of oddly placed in section A on observations. Please consider to lift these lines to headline level and move them to a more appropriate place in the future risk section.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	The SPM has been restructured. Agree this finding was in the wrong place. It is now in section B on projected changes and risks. Also see the redesigned figures SPM.3 and SPM.5

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12561	7	4	7	4	"Marine heatwaves" need to be defined in glossary	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Marine heatwaves is defined in the glossary
12563	7	8	7	10	Can there a confidence assessment be added to the statement ?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - Sentence revised (see A.6.3) and confidence added
12565	7	12	7	16	Could you please add some spatial specification to these statement, in order to make clear whether this applies globally, and how well observed those phenomena are. In its current form, it appears very general, which is somewhat at odds with the knowledge gap statement in ES of Chapter 2 (p 5 ln 55 ff) on data scarcity in remote areas. Para A3.3 describes very important processes that have become more apparent over the last years, and should be as robust as possible.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. The language has been revised for clarity, and only the most prominent and significant elements are now elevated at SPM level. Specifically for this point, the revised material is found in A1.3 of the SPM SOD.
12567	7	15	7	16	Has exposure increased due to higher number of people living in (the same) area, or due to more intense hazards over the same area/hazards over a larger area, or to both? Please specify.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - the SPM has been rewritten and a more nuanced assessment can be found in A7
12569	7	18	7	21	Please use the term contamination instead of pollution and give more details on the type of contaminant.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - the SPM is revised and the sentence removed
12571	7	23	7	28	This section seems misplaced in a section on observations, as it is referring to expected/future developments.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Accepted. The SPM has been restructured with clear differentiation between section A observed and B projected
12573	7	34	7	38	B.1 Please revise ln 37ff in order to make clear that risk are projected to increase even with adaptation in place. The current formulation gives the impression that adaptation could (under all emission scenarios?) abate all risk, which is certainly not the case, as pointed out in other parts of this SPM.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Accepted. The material was considerably revised for the SOD SPM, and more focused headline/bullets have been developed, where specific information about limits to adaptation are explicitly assessed.
12575	7	47	7	47	pls. insert: ….in regions dominated by smaller glaciers with relatively…..(as written at p:2-16; l:26)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Rejected - authors prefer the current formulation
12577	7	50	7	50	pls. check: …mass by 2100 under RCP 8.5. (because RCP 8.5 is here not explicitly mentioned in the original text; p: 2-16; l:27	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - 'RCP 8.5' removed
12579	8	1	8	5	This is a good example for the point we made about the new impact definition: "consequently impact human communities" should be changed to "…put at risk" or "increase environmental hazards that may impact". "Impacts include" should be changed to "potential impacts include", or the whole sentence rewritten in a risk-perspective. On a side note, the headline statement as a whole sounds very matter-of-fact and is ambiguous concerning its temporal reference. It could be read as relating to both the present and the future. Given this is a section on projected changes, you may wish to change the verb in a way that clearly conveys these processes are projected to happen in the future.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - wording revised. 'Risk of impacts' phrase used in the revised SPM
12581	8	15	8	16	This statement seems a bit odd. How would freshwater related risk NOT increase in areas that are highly dependent on snow- and glacier melt run-off under climate change by the end of the century? Please try to find a formulation that is more specific.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - the entire bullet has been completely revised to become more clear and specific

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12583	8	15	8	20	B1.5 This statement that freshwater related risk are likely to increase only by the end of the century in particularly vulnerable regions seems very cautious, and partly in contradiction with statements that impacts on water resources have already been observed (e.g. Chapter 2 p 3 ln 35-41) and material in the underlying report (e.g. Figure 2.7) showing drastic change (peak water) occurring already in the first half of the century in some regions, and adaptation already under way (e.g. Box 2.3). Please consider to revise this statement to better reflect the temporal variation and early onset of freshwater related risk in e.g. semi-arid low latitude regions or Central Asia. If confidence is low for global assessment due to shortcomings of hydrological models, this should be made clear. Also, is the term likely in the first line meant to express IPCC uncertainty?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. Future impacts and risks related to changes in water resources due to cryosphere changes are addressed in several sectoral bullets, although the high regional heterogeneity makes it difficult to sum up in a compact SPM statement.
12585	8	18	8	20	Why are these model capacities limited? Please add a qualifier (due to…)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	The entire bullet has been completely re-written and this statements doesn't exist anymore
12587	8	25	8	27	It is unclear if "existing local adaptation measures" refers to those in place or those available in principle. Please clarify.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - The entire bullet has been completely revised to become more clear and specific
12589	8	34	8	36	The current wording lacks a qualifier as potential limits of local adaptation measures strongly depend on the climate scenario and context-specific risk tolerance. It is also unclear what "socio-economic sectors" refer to.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. Clearer, more concrete and less general statements were made in the SOD SPM.
12591	9	27	9	29	The current wording lacks a qualifier as potential limits of adaptation measures strongly depend on the climate scenario and context-specific risk tolerance.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. The material was thoroughly revised and, when possible, specific information related to limits to adaptation under specific climate scenarios and time frames were added.
12593	9	31	9	36	Please provide more detail on the magnitude of the permafrost feedback under different scenarios.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Section text revised, this is now contained in B1.3.
12595	9	38	9	38	Please quantify “substantial loss”.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Section text revised, this is now contained in B1.3.
12597	10	6	10	9	Where does the part of the statement "about 3 and 6 times" refer to? Please rephrase to improve clarity.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - statement rephrased for clarity
12599	10	11	10	13	Does this mean that far less than the 90+% of the EEI is going to be stored in the ocean. Or that the same relative amount is going to be stored (largely) in the upper ocean?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - heat gain in upper and lower ocean specified now in A.2.1
12601	11	11	11	14	Can there confidence assessments be added to the passage?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - the SPM has been checked for application of uncertainty language
12603	11	12	11	14	The increased risk of exposure to diseases is not limited to farmed animals (aquaculture), but will also affect wildlife. This may influence fisheries.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - see revised text in B8.2

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12605	11	15	11	16	Please specify units for the color bar in Fig. SPM3	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Suggestion applied.
12607	11	37	11	46	Please consider to separate the statement on human health and food security from the statement on regional conflict and unrest. The current form suggests a very strong causal link between the two that is not substantiated in the underlying chapter	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into acount - text deleted. A more nuanced presentation of health and conflict is included in revised section b
12609	12	14	0		"tens of millions" seems like a very low number for people affected from [E]SL in very low elevation coastal areas given the number of megalopolis at coastal/riverine sites . Does this number consider, e.g., transport infrastructure threatened by storm surges that serves commuters and similar assets that are crucial to non-resident people? For example, recent news report that parts of Amtrak's Northeast Corridor route, which carries 12 million people each year between Boston and Washington, face "continual inundation" by mid-century (https://www.bloomberg.com/graphics/2018-amtrak-sea-level/). Please specify more clearly what is meant here.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	This has been removed from the revised SPM.
12611	12	30	12	30	Please add the following sentence (Source: Ch. 4, Ex. Summary, l: 17-18): "Human activity has been the dominant cause of global mean sea level rise since 1970 (high evidence)." Rationale: The additional sentence underpins the responsibility of SLR, particularly in the context of impacts and vulnerabilities in the face of other factors influencing coastal development.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Rejected not necessary
12613	12	30	12	30	SLR as abbreviation needs to be added in the glossary on page 24	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - SLR will go in the report's acronym list.
12615	12	33	12	35	ESL as abbreviation needs to be added in the glossary on page 24	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - ESL will go in the report's acronym list.
12617	12	38	12	41	It is maintained here that ice sheet models are unrealistic and collapse physics insufficiently understood such that SLR beyond 2100 is deeply uncertain. How can their be any confidence about SLR rise in the current century under these premises?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - see revised B.3.1 for confidence in projections to 2100. B3.4 now provides uncertainties around ice sheet stabilities for beyond 2100
12619	12	38	12	44	There seems to be a contradiction in the passage "deeply uncertain" vs "medium confidence". Can this be made clearer?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - see revised B.3.1 for confidence in projections to 2100. B3.4 now provides uncertainties around ice sheet stabilities for beyond 2100
12621	12	38	12	44	It was our impression that long-term multi meter SLR / SLR beyond 1.4 m under high emission scenarios is not deeply uncertain, it is merely the timing that is not clear (cf. IPCC AR5 Church et al,, 2013, Levermann et al., 2013 PNAS 110:13745–50). Please revise the entire paragraph to clarify this important difference. Also, it seems that the last sentence understates the current knowledge about multi-millennia SLR. Please ensure the underlying chapter adequately represents the literature examining long term SL commitment (cf. Clarke et al., https://www.nature.com/articles/nclimate2923)	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - see revised B.3.1 for confidence in projections to 2100. B3.4 now provides uncertainties around ice sheet stabilities for beyond 2100
12623	13	48	13	49	Please clarify: What should be understood by "advance measures"? Please add one or two examples in brackets.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	This point has been clarified in A9.2

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12625	15	1	15	1	The grey lines indicating RCP2.6 must be misplaced, as GMST in 2100 is expected to be 1.6+/-x °C (median) and 1.8 (66% probability), not (as indicated here) sth close to 1°C. Please show a range rather than the median line, and make sure representation is consistent with AR5 and SR1.5. RCP 4.5 is missing from the caption. Also, it is unclear to us why the RCPs are introduced into the RFC figure - the generic format of the RFC does refer to absolute temperature levels, not emission pathways. The resulting ambiguity concerning the impacts of different warming trajectories has always been an issue, however it would constitute a major deviation from former practice if the RFC diagram were to inform about risk levels in the year 2100, as suggested by referencing 2100 - stabilization levels of different RCPs instead of temperature ranges (e.g., 1.5 C, 2 C...). Should the authors plan to make this change, context must be added to Figure SPM.4 explaining why this step was made, how it changes the traditional representation, and whether e.g. the representation in AR5 SYR and WGII SPM and SR1.5 SPM is considered consistent with this representation or not. We'd advice against such a change to the iconic format of the RFC, as limiting its applicability beyond the year 2100 seems ill-advised.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	The temperature scale has been checked for accuracy.
12627	15	1	15	1	Y-axis of A) and B): "Global mean surface temperature change" - compared to which reference period? Please specify clearly.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Reference to the projection period has been added.
12629	15	1	15	1	Panel C of Figure SPM.4 portrays RFC for specific hot spots, assuming several levels of adaptation. While it is generally of interest to policymakers how much of the risk can be mitigated by adaptation measures, we do not consider the format suggested here helpful. Any extension or change of the well-established format of the RFCs needs to be very carefully designed and scientifically justified. In addition, the current representation raises many questions, both conceptually and contentwise. First of all, the RFCs lack a temporal dimension, while for adaptation, the rate of change is crucial. Then more specifically, the category "limits to adaptation" in bar C is incomprehensible, even if the very long and complicated caption is read carefully. Removing all people (and assets?) from an island can not seriously be depicted as a "zero risk" option, ignoring the material and immaterial losses of such a measure. Also, for the first category, we'd doubt that highly vulnerable low-lying (and sinking) megacities (e.g. Jakarta) would consider their risk level moderate under a 1.5m GMSL rise. Ignoring the cost of adaptation / defense options and their likely equality and sustainability implications conflicts with the general approach of the IPCC during its 6th assessment cycle to improve integration across multiple dimensions of sustainable development. Given the extreme complexity involved in assessing effective adaptation against certain measures of climate change at a meta-level, and the unsolved issue of cost and sustainable development implications, we'd strongly advise to reconsider the idea of adding bars B and C in Panel C. Else you may run the risk of weakening SPM.4 as a whole, especially since the underlying assessment is not available for expert review.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - Figure SPM.4 panel. Is now part of Figure SPM.5. While indeed the embers do not have a temporal aspects they are an important representation of risks by temperature level. Panel b - new brings in temporal view. The added table in panel c draws out the aspects around potential - response options
12631	15	1	15	1	Figure SPM.4: The temperature scale on panel A and B is wrong, both in absolute and relative terms. Such major flaws in central graphics should not be presented during government review.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	The temperature scale has been checked for accuracy.
12633	15	1	15	1	SPM.4 B: It seems conflicting with recent literature- (that a slow-down of the AMOC can be detected in historical data (cf. Caesar et al, 2018 www.nature.com/articles/s41586-018-0006-5) - that the onset of moderate risk for AMOC slowdown is set at the level of 2C in 2100; adding to this impression is the mis-placement of the RCP - temperature-lines. also it is not entirely clear whether the AMOC RFC refers to a collapse or also a slowdown. Please re-evaluate/revise.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	The embers on physical phenomena have been removed after technical discussions.
12635	15	1	15	1	The explanation of the C bar for Figure SPM.4 panel C is not convincing. With limits to adaptation defined as the point where an actor's objectives cannot be secured from intolerable risks through adaptive actions, it is neither intuitive nor convincing to characterize limits to adaptation as free of risk (white coloring). While the caption tries to explain the idea behind this (rather than eradicating risks, relocation entails shifting risks to destination areas), the graphical representation is not able to convey this idea. To the contrary, by showing that there are ways (even if undesirable) to reduce the risks substantially, it questions the very concept of limits to adaptation.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Geographies are now dealt in a separate figure and more detail on adaptation is provided. The number of bars have been reduced in all embers.
12637	16	5	16	11	Please specify that the increase in extremes, while happening across scenarios, will be more pronounced for higher warming (levels and rates).	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Accepted - included in B1-B3
12639	16	22	16	32	Assuming that higher intensity is referring to wind speeds and not the amount of precipitation carried by a cyclone, we miss information on the trends concerning the latter. To our knowledge, the destructiveness of tropical cyclones increases with the intensity of precipitation and resulting inundations and flooding. Please provide information on this relationship here or elsewhere in the SPM.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - the text is revised in B.3.2 - precipitation added

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12641	16	23	16	23	The term "resilience plan" is barely used in practice. Is this referring to adaptation plans, DRR strategies or contingency plans? The paragraph should also cover risk finance options that are able to make disaster response more effective both through rapid pay-outs as well as through combination with risk reduction efforts, embedded in a comprehensive risk management approach.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Not applicable - text removed
12643	16	34	16	36	pls. Insert a specific bullet-point regarded to El Nino-/La Nina events by using information as available at p: 6-3; l:37-39 and p: 6-30; l:9-11; Extreme El Nino and La Nina events are likely to occur more frequently in the future,….	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - in revised B2.7
12645	16	34	16	40	B6.3 this seems to be an extremely alarming finding which could be incorporated more clearly into the headline statement of B6 to help specify what ""increasingly common" refers to. It is, however, somewhat contradictory that in the ES of Chapter 4 it's clearly stated that by mid century, expected differences between RCPs are small, yet here the impression is given that the ESL-events will only occur under RCP8.5. It would be appreciated if authors could clarify how the ESL-consequences described differ from those of lower forcing scenarios. If small differences in mean SL still translate into large impacts concerning ESL, this should be made clear.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - new fig SPM.4 added showing RCP2.6 and RCP4.5
12647	16	37	16	40	Can there confidence assessments be added to the passage?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - the whole SPM has been checked for application of uncertainty language
12649	17	1	17	6	We can not find this figure or the underlying analysis in Chapter 6 or elsewhere in the underlying report. There is no reference providing line-of-sight, we can therefore not assess the relevance and validity of this figure. Without further context, the insight provided by Figure SPM.5 seems to be limited. We suggest to remove it from the SPM and integrate it into Chapter 6.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Figure SPM.5 was removed in revision
12651	18	13	18	31	Sections B7.1 and B7.2 do not substantiate the headline statement B7, but discuss additional aspects that are not captured in the headline statement. Please add a paragraph that details more clearly the expected behavior of the AMOC over the 21st century and beyond, differentiating between slowdown and collapse. Please also consider to add in ln 14 after scenarios ", leading to widespread impacts superimposed on the global warming signal".	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account - the SPM has been restructured for a clearer narrative. Historical observations of AMOC are an A.2.8 and projections with implications in B.2.8. SPG text is removed from the SPM
12653	19	3	19	22	We welcome very much that sequenced decision-making facing uncertain risks, the duality of short- and long-term focus as well as the combination of analytical methods with community based action is prominently highlighted here.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted. Thank you.
12655	19	8	19	8	Sounds a bit tautological. What is the key finding here? Please also add a confidence level	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted- text changed - see C 1.3
12657	19	17	19	19	This is the only mention of "deep uncertainty" in the SPM. While the concept is discussed in the report, policy makers who only read the SPM might be confused about its meaning here. We'd suggest to rephrase the statement along the following lines: Adaptation can proceed by applying decision-analytical methods in combination with participatory approaches, community visioning and consensus building, taking into account deep uncertainty about long-term future mean and extreme sea levels. You may consider to rather avoid the term all together and replace it by something like "...uncertainty about future mean and ESL increasing over time"	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into consideration. The text has been substantially revised to draw attention to processes that support and enable decision-making.
12659	19	43	20	5	Please revise the phrase "should significantly assist", as it is not at all clear what is meant here. Also, para C2.3 needs to be better aligned with the following para that clearly spells out the overall very limited mitigation potential of blue carbon, e.g. by adding ".., albeit total area is small" to the end of ln 46. Currently, it is hard to figure out what the message of the two combined paragraphs is. If it is that blue carbon approaches provide no-regret options with multiple co-benefits, yet are limited in total mitigation potential, maybe some of the detail of the first paragraph, such as the entire second sentence, can be omitted?	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account. The bullets have been revised and shortened (see C2.5)
12661	19	43	20	10	The information given in C.2.3 on the potential of coastal blue carbon systems is very important in the light of the messages provided in the SR1.5 on the need to use CDR methods in line with the SDGs to reach the needed CO2 reductions. However, the message is very hidden. Thus, we suggest to make this information more distinct also in the C2 headline, or to create a special headline for the mitigation related aspects of those ecosystem-based approaches.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted - blue carbon is retained in C.2.5 . A statement on mitigation potential is added

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
12663	20	12	21	9	We welcome very much that the SROCC builds upon SR1.5 and further develops the approaches to act. Section C3 provides a very good summary of the new knowledge and practical experience gained in the last years, in particular in adaptation to climate change.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Thank you.
12665	20	24	20	30	This para is convoluted and has several logical shortcomings. In the first line, what is meant by "measures implemented at local scale….are only efficient at the local scale"? Global climate change mitigation is obviously the sum of local mitigation measures. How would a locally efficient mitigation project be globally inefficient? Are the authors trying to address whether locally adapted small solutions can be scaled up sufficiently fast to be effective? Or is this addressing cost-efficiency? Or hinting at emissions-trading regimes? Similarly, the second phrase is very cryptic in what a "combination of global and local response options" might be? The third sentence is incomplete "...requires the attention."...to what? of whom? In the last phrase, it should be made clearer what exactly "these challenges" refer to. Please revise the paragraph.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted: text changed - please look at C 3.5
12667	20	28	20	30	We welcome that the report highlights the innovation of observation systems that include a diversity of knowledge from multiple scales.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Noted. Thank you.
12669	20	54	20	56	Please consider to add a reference to Marine Spatial planning here, along the following lines: "in particular, Marine Spatial Planning (MSP) plays a crucial role as a precautionary instrument in finding a balance between the spatial requirements of off-shore wind energy facilities, fishery, ship transport, marine mining and the protection of biodiversity." Please make sure that the underlying chapters 4 and 5 extend their discussion of instruments and policies to include marine spatial planning. See for the European example: Janssen, Gerold: Meeresraumordnung nach dem novellierten ROG 2017 und weiteren raumplanungsrechtlichen Vorschriften, In: EurUP - Zeitschrift f. Europäisches Umwelt- u. Planungsrecht 16 (2018) 2, S. 220-228.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany	Taken into account: the SPM adopts a high level of generality. C4.2 mentions "the engagement of knowledge-holders, practitioners, and stakeholders in adaptive governance systems and planning frameworks with close linkages to policy processes." MSP is one such framework.
12879	18	13	18	24	I think it is very important to add here that the AMOC very likely already weakenedsince the mid of the 20th Century.	Levke Caesar	Potsdam Institute of Climate Impact Research	Germany	Taken into account see A.2.8 "Modern observations, climate simulations and paleoclimate reconstructions suggest that the Atlantic Meridional Overturning Circulation (AMOC) has weakened since the preindustrial (medium confidence)"
13203	2	35	2	37	Wording “not possible” implies zero confidence in causality, rather than what is actually true: there is a high likelihood, but no full certainty	Larissa van der Laan	Bavarian Academy of Sciences and Humanities	Germany	In order to circumvent confusion there is no mentioning of attribution in the FD with respect to this point. (see section A 1.1)
13205	3	25	3	28	Add future consequence of runoff reduction for glaciers now experiencing higher runoff; causing societies to have to prepare for separate critical problems related to too high and too low amounts of runoff.	Larissa van der Laan	Bavarian Academy of Sciences and Humanities	Germany	Taken into account. Future consequences are dealt in Part B. Section B1.5 in SPM SOD is dealing specifically with future changes in runoff.
13207	7	42	7	44	Ratio snowfall/ rainfall would be helpful in relation to citing of increase, whether this is likely to be snow or rain.	Larissa van der Laan	Bavarian Academy of Sciences and Humanities	Germany	Taken into account. The statement was thoroughly revised, with a stronger focus on changes in the cryosphere and corresponding impacts and risks. Future changes in winter snow cover are assessed and included in the SPM, but not the precipitation itself (which is covered in Chapter 2).
13209	8	31	8	38	Mention of tourism would create important context, as it's one of the most impacted sources of income in alpine regions, especially in central europe	Larissa van der Laan	Bavarian Academy of Sciences and Humanities	Germany	Taken into account. Impacts on and risks to tourism and cultural assets, due to future cryosphere changes, and explicitly dealt with in a specific bullet in the SOD SPM (B7.5).
13211	9	21	9	29	Lacks information pertaining specifically to mass balance of ice sheets – accumulation and ablation governing processes such as snowfall and ocean warming are mentioned separately but not their critical value for ice sheet stability	Larissa van der Laan	Bavarian Academy of Sciences and Humanities	Germany	Taken into account. Note however, that this section deals with direct impacts on human societies of changes in the cryosphere, and not secondary impacts through sea level rise. Changes in mass balance of ice sheets are addressed in earlier bullets of section A (physical changes).
13213	21	5	21	7	Mention of migration would be crucial in this section	Larissa van der Laan	Bavarian Academy of Sciences and Humanities	Germany	Noted. Human migration is discussed in several chapters of SROCC, which recognize the importance of the topic, but also the wide range of forms of migration and the unevenness of the peer-reviewed literature which make it difficult to produce broad and well-supported generalizations about the topic.
13239	0	0	0		GENERAL COMMENT: As a general point, a lot of the SPM is highly technical in nature and would be beyond the understanding of a typical policymaker, especially in section B which contains a lot of superfluous information, not simply the distilled key findings. Every effort to try and simplify it should be pursued, and the widespread jargon and technical terms should either be defined, explained, or rephrased and removed. These terms include ocean minimum zones, steric sea level rise, anthropogenic forcing, radiative forcing, teleconnections, albedo, megacities, blue carbon ecosystems, microclimate refugia, taxa, primary production vs. secondary production, trophic levels, bottom trawling, 'intensified bio-erosion of the non-living matrix', subsidence, relative sea level, herbivory and tipping element.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The entire text has been thoroughly revised for more clarity and the use of jargon/technical terms reduced where possible.
13241	0	0	0		There is a tendency throughout the SPM for the shaded "Headline statements" to downplay or ignore some key messages. Possibly the headline statements are bland because they attempt to summarise findings from different geographical areas.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The SPM has been thoroughly revised for more clarity including the narrative in the headline statements and numbers added were appropriate
13243	1	32	1	38	This paragraph, beginning "The oceans and the cryosphere (snow….)" only serves to summarise some of the key findings of the SPM, and does not help introduce how this report came about or what it covers, and can therefore be removed.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Agree this text was removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13245	1	33	1	33	Instead of 'livelihoods' suggest 'lives' because actual life depends on the ocean/cryosphere and the word 'life' includes the idea of 'livelihoods'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The text is modified in the added start up box to say "All people on Earth depend directly or indirectly on the ocean and cryosphere." and examples given
13247	1	36	1	38	Clarity around 'unprecedented environments' would be helpful, has this taken into account past climatic change?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This text has been removed. Where unpresented environments are referred to in the SPM, baseline is added e.g. B2.6 "the ocean will experience the emergence a of new ocean climate that is unprecedented relative to preindustrial (1850-1900) climate variability"
13249	1	38	1	38	Suggest to replace 'climate-related' with 'emissions-related'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Agreed - the text is revised in the final draft in the start up box
13251	1	42	1	42	Include 'ocean acidification' in the list of issues. Also include 'and mitigation' after 'adaptation' because the ocean offers the possibilty of carbon sequestration and and renewable energy generation, which would help slow down emissions.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Agreed - the text is revised in the final draft in the start up box
13253	1	42	1	42	Include 'and mitigation' after 'adaptation' because the ocean offers the possibilty of carbon sequestration and and renewable energy generation, which would help slow down emissions.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Agreed - the text is revised in the final draft in the start up box 'This implies that, in order to manage risks 1 and avoid escalating risks, adaptation of ecosystems and societies to ocean and cryosphere change is needed, in addition to greenhouse mitigation'. Please note the SROCC is produced under the scientific leadership of Working Group I and Working Group II. In line with the approved outline, mitigation options (Working Group III) are not assessed with the exception of the mitigation potential of blue carbon (coastal ecosystems).
13255	0	0	0		GENERAL COMMENT: The headline statements still need some work to really grab attention and capture the key policy-relevant points. In the current draft, some of the messages are not very exciting (e.g. A2) and some of the messages would benefit from including some numbers (often found in the paragraphs below).	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The SPM has been thoroughly revised for more clarity including the narrative in the headline statements and numbers added were appropriate
13257	0	0	0		GENERAL COMMENT: Many of the points in this SPM (particularly relating to chapter 4 - I am less familiar with the other chapters) appear to be directly copied and pasted from the Executive Summary of the underlying chapter. Using the ES text as a basis is a good idea, but it leads to quite lengthy and sometimes overly detailed points. This could be improved by identifying the key messages that authors want policymakers to take away from the ES and summarising them in concise, non-expert friendly language.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The SPM has been thoroughly revised for more clarity including the narrative in the headline statements
13259	0	0	0		Overall, there is a significant use of Representative Concentration Pathways throughout the SPM. RCPs are too complex for a policymaker to understand, and are confusing especially given the SR1.5 talks about specific temperatures - the first question a policymaker would have about RCPs will be 'What temperature does that correspond to?' and therefore, they should not be referred to in the SPM. Instead, if different pathways need to be compared, two contrasting ones should be chosen e.g. RCP2.6 and RCP8.5, and referred to as high and low emission scenarios resulting in temperature increases of X and Y above preindustrial levels'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The SPM has been thoroughly revised for more clarity. The use of RCP is retained however with contrasting RCPs (generally RCP8.5 and RCP2.6) results given where possible - fig SPM.1 is revised to show the trends under both RCPs
13261	1	0	21		The importance of Indigenous Knowledge and Local Knowledge is flagged repeatedly in chapter 4 but is not raised in the SPM, it feels as though this should be elevated to the SPM.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Agreed - C4 is revised to include
13263	1	0	21		Chapter 4 clearly sets out that human pressures other than climate change are affecting, in particular, ecosystem ability to respond to climate change and that addressing these challenges (e.g. overfishing) provide a way of helping ecosystems cope with climate change. This could be highlighted further in the SPM.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the SPM has been revised substantially
13265	1	0	21		Recommend using colour combinations that are colour blind friendly. Red and green for example can present issues.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - different forms of colour-blindness are considered in the revision of the figures
13267	1	6	1	12	Does the author team include a TSU Communications Officer? The SPM author team for SR1.5 did so, and we would like this to become standard IPCC practice.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. Indeed the TSUs each have a communications specialist.
13269	2	5	2	6	This title is a statement, rather than a title, and doesn't seem to reflect the contents of the section. Better as: "Past and on-going changes in ocean and the cryosphere and their importance for climate, ecosystems and people"	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The title has been completely revised for the FD to "Observed changes and impacts"
13271	2	8	2	9	Presumably this first line is referring to ocean and cryosphere changes as a result of climate change? Please re-phrase this statement for clarity.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - statement modified
13273	2	8	2	9	This is quite confusing - feels like this is not the place to point out that the ocean and cryosphere has a key role in the state of the global climate. Moving that section elsewhere and focussing on the changes to the cryosphere and the resulting impacts on ecosystems and people would give a clearer message.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - Text on this has now been moved into a startup box.
13275	2	10	2	10	"unabated" isn't the best word to use here, as policy-makers may confuse the idea of abatement with policy measures, which is probably not what is meant. The word "unabated" could simply be deleted, as the sentence begins with "ongoing changes".	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - statement modified

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13277	2	12	2	13	"Sea level rise…": would be good to include a number here. How much?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Agreed, numbers are now given in A.3 - e.g. A.3.4
13279	2	14	2	14	Some of these changes are already irreversible…?' It may be helpful to clarify that we are already committed to some of the irreversible changes listed in this statement.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - the text has been removed from the FD, and details are discussed throughout the SPM at relevant points e.g. A.3.2
13281	2	17	2	21	The phrase 'with respect to the Earth surface area' is highly confusing, as it seems to imply that that the sea is warming 0.42 W m-2 faster than the land, as opposed to the desired meaning that this value is derived from the total incident energy being divided by the entire surface area of the Earth, (as opposed to just the ocean area). Given the limited use and context of this sentence, it could be removed.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - sentence removed from new SPM.
13283	2	17	2	19	This statement is a bit weak. It could be strengthened by adding when the trend in OHC started (to make it clear that this is an anthropogenic trend), or being a bit clearer about what the evidence and "further evidence" for anthropogenic forcing is. For example, 'Ocean heat content has been increasing at a steady rate since xx, largely as a result of anthropogenic greenhouse gas emissions (high confidence).' The meaning of 'forcing' may not be obvious to all. Also, what is the rate of increase?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - all these suggestions are implemented in new A2.1
13285	2	23	2	23	Do we know whether the rate of acidification is accelerating? If so, it would it be useful to indicate that here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	We do not currently have an assessment as to the rate of change in ocean acidification
13287	2	23	2	29	Ocean acidification and deoxygenation, although interrelated, are two separate issues, and so should be separated into two different paragraphs, to ensure that the reader does not confuse the two processes.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - now separated in A.2.6 and A,2,7
13289	2	23	2	29	could acidification and deoxygenation get separate paragraphs?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - now separated in A.2.6 and A,2,7
13291	2	24	2	24	Do we know whether the ocean has reached the limit of its absorptive capacity for carbon dioxide and what this means for global warming? This information would be relevant to include here if available.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Rejected - this will be addressed in WGI-WGIII AR6
13293	2	24	2	25	The sentence beginning "the anthropogenic PH signal…' isn't particularly clear, suggest to rephrase 'the signal of human activity/anthropogenic forcing on ocean pH…' Useful additions to the statement could be: "The surface pH of all areas of the ocean has already decreased outside the naturally variable range." or even better, replaced with the much starker finding from the SR1.5 that "[This has resulted] in ocean acidification and changes to carbonate chemistry that are unprecedented for at least the last 65 million years (high confidence)" (executive summary, chapter 3, SR1.5). How big is the change in ph (in %)? Could this be added too?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - these statements have been modified and clarified
13295	2	25	2	32	It's not clear from the text whether the figures in the point relate to the chapeau. Is the SLR given from both AIS and GIS [and other sources of SLR] or just AIS? Could this be clarified e.g. by the insertion of "Projections of global mean SLR from Antarctica..." (if this is the correct interpretation of the numbers!).	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - these statements have been modified and clarified
13297	2	26	2	26	Oxygen minimum zones have expanded in size and/or in number? Please specify.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - see revision in A.2.7 (are likely expanding by 3-8%)
13299	2	31	2	40	The final two sentences of A1.3 would seem to be conflicting to a non-expert, as they would be unlikely to know the definition of 'steric'. Please define or use a non-technical term here. Additionally, the way A1.3 is currently phrased does not adequetely reflect the fact the high confidence that global warming is resulting in sea level rise (while anthropogenic contibutions to steric sea level rise are mentioned, anthropogenic contributions to glacial melt as set out in Slangen et al., 2016 are overlooked). It would be helpful to replace the final two sentences with a new paragraph that states "Sea level rise is known to have a number of contributing components. The addition of extra water due to glacial and ice sheet melt is currently the dominant source of sea level rise, though a significant component comes from thermal expansion of the existing volume of water and freshwater storage on land. Human-induced climate change has been the dominant cause of the thermal expansion and glacial melt components since 1970. Due to a lack of long-term observations and limitations in ice sheet modelling, it is unknown whether ice sheet changes can be attributed to human causes." Alternatively, much of this text could be replaced with the finding from the SR1.5 which states "The relative contributions from thermal expansion, glacier and ice-sheet mass loss, and freshwater storage on land are relatively well understood (Church et al., 2013; Watson et al., 2015) and their attribution is dominated by anthropogenic forcing since 1970 (15 ± 55% before 1950, 69 ± 31% after 1970) (Slangen et al., 2016)."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The word steric is not used any longer in the FD. The different component are explained in the new Figure 1 of the FD. Comment about "steric": done. This word is not used in the final version (see A 1.1 FD SPM). The rest: rejected or taken into account. We do not discuss attribution in the final version. Sea level changes are discussed in section A3 of SPM FD.
13301	2	32	2	33	How are polar glaciers defined? It would be useful to give a quick definition here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - revised A.1.1 removes this distinction

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13303	2	37	2	37	Suggest we put 'Melting' before 'Glaciers and..' for clarity.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence modified
13305	2	42	3	3	Can we caveat the entire A1.4 by saying that despite any increase in Antarctic sea-ice extent there was an overall volumetric loss of ice from the Antarctic? These quotes can be cherry-picked to suggest Antarctic ice volume is increasing, when it isn't.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. We have clarified this statement to highlight that there is no statistically-significant trend in Antarctic sea ice. We cannot combine sea ice and glacial ice into a single ice index, since they are two separate systems that cannot meaningfully be added.
13307	2	42	2	43	Are figures available for Arctic sea surface temperature rise? Please include here if so - this would be useful information for policy makers.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - there was a typographical error here (erroneous inclusion of word "sea"). We have clarified our meaning in the revised version.
13309	2	43	2	46	The sentence is quite difficult to read. I think it is trying to put too much in brackets. Suggest it is revised to: "Arctic summer sea ice extent has declined at an average rate of 13.0% per decade between 1979 and 2017 while Arctic spring snow cover has declined by 13.6% per decade between 1967–2018 (high confidence) with consequences for the global climate system, for example through changes in albedo."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - only sea ice extent and Arctic snow cover extent are now discussed separately
13311	2	46	2	48	Suggestion that there is a consistent format for putting confidence statements in brackets throughout the SPM to avoid confusion. For example, here could you say "Arctic sea ice loss is/may be changing atmospheric circulation and affecting weather patterns in mid-latitudes (low confidence)."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Thank you for the suggestion, however, this is standard IPCC way of inserting uncertainty language
13313	2	46	2	48	Suggest rephrasing this sentence for clarity - the equivalent sentence in the Exec Summ. of C3 will work well here (Chapter 3, page 3, lines 49-50).	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - see revision of A.2.4
13315	2	47	0		teleconnections' may not be immediately understandable to non-scientists. Please define, or use simpler language	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - 'Teleconnection' no longer appears in the SPM.
13317	2	48	2	48	The figure 20.2x103 km2 yr-2 should be expressed as a percentage, or in context of the total area, as the reader currently has no way to understand whether this is a large or small amount.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - statement on this modified
13319	2	49	2	49	Does "strong negative departures" mean departures from the trend? If so I suggest rephrasing for clarity to "large negative decreases".	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - wording revised for clarity
13321	2	50	3	1	What is meant by 'near-compensating regional changes'? It is not a phrase that policy makers are likely to understand.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
13323	3	2	3	3	Can you expand on this i.e. is there an anthropogenic signal here?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account; we now emphasize that Antarctic sea ice extent does not have a statistically significant trend over the satellite era. Attribution of this is not currently possible.
13325	3	9	3	10	It is unclear why the 11 glaciated mountain regions referenced in A1.5 have been chosen to calculate the mass loss figures, and it is therefore also unclear whether or not this figure is representative of mountain regions not included, such as any found in Africa. This should be addressed within the text.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The text was revised for more clarity, see section A1 and Figure SPM.1 panel g
13327	3	10	3	12	It would be helpful to include estimates of how much the upper ocean and lower depth layers (700-2000m) have warmed over the 2004-16 period in this sentence.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - warming for 0-700m and 700-2000m now in A.2.1
13329	3	14	3	22	This paragraph is about permafrost, but it is unclear whether it is about permafrost in mountain regions only, or permafrost elsewhere as well. Please clarify.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. Section A1.4 is explicit in referring to mountain and polar areas.
13331	3	17	3	17	The sentence "Permafrost temperatures have continued to increase" should be given some context i.e. since when / relative to when?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The statements are now specific in time and supported by quantitative examples. SPM SOD A1.4
13333	3	18	3	19	The text "… - a significantly faster rate than the average global surface temperatures, which are increasing at around 0.2C per decade." should be included after the sentence ending in "…continuous permafrost monitoring at colder sites." so that the reader is able to put these rates into context.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence rewritten
13335	3	21	3	22	Is it possible to go beyond just saying that quantifying this has global relevance, and say *how* it has global relevance? For example, by showing how GHG emissions from melting permafrost affect the size of carbon budgets? Or if that's too much detail for here, perhaps just giving an indicative example of the possible magnitude of emissions and relating that to the size of annual global emissions for scale.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. This section (now A1.4 in the SPM SOD) is about observations and assesses carbon storage. Projected release of GHG from permafrost is assessed in B1.3.
13337	3	29	3	29	Add in "negatively" => "… nitrogen, phosphorus) and negatively influenced water quality"	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence rewritten

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13339	4	1	4	1	The 2006-2015 period is currently labelled as 'present day'. Given it is currently 2018, this is clearly incorrect and should be rectified, and present day given its own label.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This label has been removed.
13341	4	1	4	1	Add "atmospheric" to Carbon Dioxide (if that's correct)	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Suggestion applied.
13343	4	1	4	1	To avoid confusion we suggest that the population section is lifted out of the 'key findings' section, to the top or bottom of the figure. Otherwise the reader may interpret the figure as showing that CO2 emissions are driving population growth, rather than the other way around.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Suggestion applied.
13345	4	1	4	1	In the coral reef projections, the percentages given do not seem to match up to the RCP scenarios generated - 1.5°C warming does not necessarily correspond to RCP2.6 (which is more like a 'well below 2°C' scenario), and would better correspond to RCP 1.9, while 2C definitely does not correspond to RCP8.5. If appropriate figures that do not correspond to identical scenarios as the other statistics, then this section should be removed.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Panels have been updated with a more suitable selection of variables.
13347	4	1	4	5	SPM.1: Top of figure, 'end-of-century', should likely read 2081-2100, rather than 2081-2010. Also worth explaining what RCP stands for and is as policymakers may not know.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Correction applied.
13349	4	1	4	1	Figure SPM.1 - The attempt to make this an infographic actually makes the information less useful. The icons are unclear, espcially the mountain/snow cover one. Please cosider how things will be interpreted at first glance, if biomass is declining as the fish symbol is showing, put the lower biomass BELOW the higher biomass. having symbols side by side on a time line makes it look like they occur one after the other in time, eg, the snowflakes. See report: Enhancing the accessibility of climate change data visuals: Recommendations to the IPCC and guidance for researchers Jordan Harold, Irene Lorenzoni, Kenny R. Coventry, Asher Minns	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Overall graphical approach has been changed in order to ease understanding.
13351	5	13	5	17	The language suggests a theoretical possibility rather than real, important impacts of climate change. Suggest inserting "all being" before "modified", if this is what is meant. Better still, say which services are being degraded and which are being eliminated.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the text has been completely revised to clarify this
13353	5	17	5	17	Suggest that instead of 'under climate change' this could be rephrased to 'by the impacts of greenhouse gas emissions and other harmful human activity'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The text in this headline statement has been completely revised
13355	5	19	5	19	Almost 13% of the global population lives in the Arctic': in the Arctic Circle? How is 'the Arctic' defined here. It would be good to know.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This sentence is removed and the population information is now in the start-up box on page 2. See chapter 2 for details on the Arctic region delineation e.g. Figure 3.2
13357	5	25	5	25	are also subject to cryosphere-change-related and water resource risks and impacts.' (as one flows from the other, pardon the pun)	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. The SPM structure has been revised. This is now addressed with relevant detail in A7
13359	5	28	5	33	It would be helpful to add that shifting ranges to ecosystems mean that some species/ecosystems will ultimately have nowhere to go and so will be lost.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account: revised text in A4.1
13361	5	35	5	43	This text could be shortened such as 'Adaptation options are available for agriculture, hydropower, tourism and other sectors. However adaptation measures in these sectors are generally limited in scope, short term and fragmented'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - bullet has been split and shortened
13363	5	37	5	38	"Managers of hydropower facilities incorporate projections…" This is the exact opposite of what is said in the discussion on hydropower in Ch.2 p. 26 lines 44-45 "only a few organisations are incorporating current knowledge of climate change into their planning" However the message of chapter 2 is correctly captured on SPM p.8 lines 18-20. If this sentence is retained, please reword it to make clear whether it is referring to observed or future climate change. Currently it's confusing because although in section A it contains the word "projected".	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted. The content of this bullet was considerably revised and recast in the revised structure of the SPM SOD, along with corresponding confidence statements. The corresponding material is found in A7.4.
13365	5	41	5	43	It is unclear what this final sentence is saying. Is it trying to say that there are limited examples available with limited evaluation which constrains understanding of how acceptable options might be? Suggest this is replaced with 2 sentences, one about adaptation measures including a clear statement about limits to adaptation, ideally with examples, and the second sentence about constraints on their assessment. These are 2 quite separate subjects which shouldn't be conflated.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Agreed. This text is removed. Limits to adaptation are now given greater focus in sections B and C. e.g. B9, C1, C3
13367	5	45	5	47	A definition of coastal areas would be helpful in this first sentence.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - definition for low-lying coastal zone has been provided in the Start-up Box, Footnote#4
13369	5	49	5	54	Are the two sentences not contradictory? Please clarify, i.e. evidence is at global level but difficult of attribution at local level due to the factors listed. This will be confusing for policy makers and the key message needs to be made clearer.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted the SPM has been substantially revised see e.g. B3, B9

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13371	5	51	5	51	It is currently unclear what is meant by 'cultural and aesthetic values' and why this is important.For example, is it saying that when people see the true risks of a changing climate, they are less likely to mind about mitigation/adaptation measures being aesthetically undesirable / ugly, so long as it protects them? If so, this should be explained in simple language.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Agreed - the sentence is removed in the revision of the SPM. See B8.3 re cultural risks
13373	5	52	5	52	Suggested change - '..local impacts to global sea level rise..'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The text in this bullet statement has been completely revised, the phrase doesn't exist anymore
13375	5	56	5	56	Emergence of novel ocean conditions for marine organisms from plankton… could be simplified to "Changing conditions in marine habitats for plankton…" for clarity	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - text has been completely revised
13377	6	1	6	4	This is not immediately clear, please explain how each is 'consistent with modelled responses to climate change'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The text in this bullet has been completely revised and the statement on "modelled responses" has been removed
13379	6	6	6	13	is it possible to discuss the significance of some of these changes?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Their changes or destruction means the transformation of our society, economy and environment
13381	6	8	6	8	It may be better to say 'threatened by climate change combined with impacts of other human activity'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The text in this bullet has been completely revised
13383	6	9	6	12	I'm not sure that the first mention of coral reefs should be in connection with their attractiveness to tourists. I think coral reefs account for 0.1% of the ocean floor but provide homes for 25% of marine species. So it is their biodiversity and ecoysystem services, which are most important. So I suggest deleting 'reduced quality and quantity of tourist attractions including coral reefs' and inserting 'economic and' in front of 'educational' (line 12).	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The economic importance of coral reefs are mainly: tourism and recreational activities, coastal protection and fisheries. But there are other ES like pharmaceuticals, chemistry…
13385	6	15	6	15	It is unclear why the 11 glaciated mountain regions shown in this figure have been chosen, and not others - or indeed whether they are representative of the global situation. It also gives the impression that no effects have been seen in Africa. This should be explained.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - Overall graphical approach has been changed to ease comprehension. Reference to the African location (Low Latitude) is now depicted.
13387	6	26	6	28	It is unclear whether "1.5°C to 2°C" is referring to a general temperature somewhere in that range, or is referring to the risks accelerating at 2°C relative to 1.5°C. This should be clarified.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
13389	6	28	7	2	The sentence "Committed ocean and cryosphere changes initiate the use of adaptation measure…" does not make sense, as only humans adn other organisms initiate adaptation measure, the changes themselves do not. 'Initiate' could be changed to 'necessitate' to solve this problem. It might also be worthwhile defining (briefly) what these committed changes are.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - sentence removed
13391	7	32	18	32	It would be good to include a section in Section B that brings together the key messages on high-impact, low likelihood events, or tipping points from chpaters 1, 4 and 6. There is some information dotted around but collating this in one place would help the reader understands these risks.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - the SPM has been substantially revised and these are included in relevant sections e.g. AMOC in B.2.8 and ice sheet instabilities in B3.4
13393	7	4	7	21	Why have these particular examples been chosen to be explained here? This suggests that these are more important than other issues. These three paragraphs could be removed.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The SPM has been restructured and these examples redistributed in the SPM
13395	7	8	7	10	Could you assign a confidence statement to this sentence, please?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - Sentence revised (see A.6.3) and confidence added
13397	7	18	7	19	Can we include ocean acidification as a separate point to climate-change impacts and include overexploitation of coastal resources (eg overfishing) as another pressure that forms part of the combination?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - the SPM has been rewritten and a more nuanced assessment can be found in A5 and A6
13399	7	23	7	25	That climate change compound the risks from other hazards like pollution is a really key message which could be drawn out by elevating this point to the A3 chapeau.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The SPM has been restructured and observed compound impacts found in e.g. A3, A9
13401	7	24	7	24	Please make clear whether "climatic and other environmental hazards" refers to natural hazards or other human-induced hazards (e.g. pollution) or both.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The SPM has been restructured and observed compound impacts found in e.g. A3, A9 specifying other hazards
13403	7	28	7	28	Instead of 'territorial boundaries' suggest we say 'maritime boundaries' which would include territorial seas, Exclusive Economic Zones and Continential Shelf claims.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13405	7	34	7	38	This headline statement does not adequately capture messages in the following paragraphs about limits to adaptation. Eg p.8 line 9 refers to loss of taxa - please replace this word with one more likely to be understood by policymakers, eg "species" which is used elsewhere in the paragraph - lines 25-27 refers to the limits to existing adaptation measures and lines 34-35 mentions limits to adaptation capacity.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The SPM has been restructured and revised. Limits to adaptation are now included in B9 and underlying bullets and in Section C
13407	7	34	7	38	As currently written, B1 implies that if adequate adaptation measures are taken, there will be no hazards and risks for biodiversity, terrestrial and freshwater ecosystems, agriculture, hydropower, tourism, recreation activities and infrastructure i.e. there are no limits to adaptation. If there are limits to adaptations (as, for example, B1.6 would imply), this sentence could be amended to read '... and infrastructure. If adequate adaptation measures are not taken, these risks and hazards will be great / worse / more signficant.'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The Headline statement has been completely revised and the SPM has been restructured; Limits to adaptation are now included in B9 and underlying bullets and in Section C
13409	7	34	18	33	Section B should be integrative across systems, in the same way that sections A and C are. As it currently stands, there is a significant amount of repetition within section B. For example, B2.1 and B2.4 overlap significantly, as do B1.3, B2.5 and B2.6, and so do B2.2 and B3.4. It is also not clear from the current structure that similar impacts are happening to multiple areas, systems, and populations, which could be rectified by a different structure (such as organising by impact - having separate statements for impacts on ecosystems, human settlements, livelihoods, food security, climate feedbacks etc as different sections)	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the SPM is substantially revised and restructured for clarity
13411	7	35	7	35	projected to continue and increase? Please clarify if possible.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the entire headline statement has been rewritten to be more clear
13413	7	41	7	42	The sentence 'Elevation-dependent warming is projected to amplify in many mountain regions.' does not make sense as currently written, and should specify what the warming will amplify, or should read 'is projected to be amplified' if that is the intention.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
13415	7	41	7	42	What is 'elevated dependent warming'? This should be explained for policy makers.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
13417	7	42	7	43	Suggest this could be rephrased to 'show limited long-term changes' to 'change little over the long-term'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
13419	7	46	7	46	Glaciers in all mountain regions are project to continue to...' - I thought some haven't though, observationally. So that would mean that not ALL would CONTINUE to lose mass. Could rephrase 'glaciers in all mountain regions where mass loss has been observed are projected to continue to lose mass..'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - wording revised for clarity
13421	7	46	7	50	In B1.2, it would be helpful to specify that the mass loss from glaciers can be attributed to anthropogenic global warming, otherwise the reader could conflate this with the previous statement that ice sheet loss cannot be attributed in that way, which could lead to confusion.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Rejected: The main text details the studies that discriminate the anthropogenic part of glacier mass loss, however, only very few studies do that, so this is not elevated to the SPM. Also to keep the SPM short.
13423	8	1	8	3	It is currently unclear in B1.3 why the melting of mountain of permafrost is a concern. It should be specifically linked to some of the impacts that this would have i.e. release of methane, loss of ecosystems etc.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. This can now be found in B1.4 and B7.2.
13425	8	5	8	13	B1.4 is very verbose and difficult for a non-specialist to understand - for example, it may be difficult to understand what is meant by the 'structure and functioning' of ecosystems, 'shifts in the characteristic traits of... species', microclimate refugia. It may be easier to simplify this message to something like 'There is high confidence that terrestrial and freshwater mountain ecosystems will be affected by changing temperatures and associated hazards. This will take the form of migration of certain species, changing spatial and temporal patterns of plant growth, and population declines, particularly for large animals. Freshwater populations would be particularly at risk compared to terrestrial systems, which may be somewhat protected by localised habitats more resistant to changes in localised climates.'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account: text substantially revised for SPM final draft. This section, now B4.1, has ben simplified and reformulated.
13427	8	9	8	13	What is 'microclimate refugia'? Presumably a small area of remaining habitat for species occupying niches? Could be a clearer phrase for policy makers to understand.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the text has been completely revised and the term "microclimate refugia" removed
13429	8	11	8	13	What kind of large animals? A couple of examples would be useful.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. These examples are now included in Chapter 2 and the Technical Summary but could not be elevated to the SPM.
13431	8	24	8	24	We should not assume knowledge of latin for a reader of the SPM, thus 'inter alia' should be removed	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - term has been removed
13433	8	25	8	28	This is a key message which would be strengthened by the inclusion of a confidence statement - I note that it is assigned a "high confidence" level in the underlying chapter (p. 43 L27 Chapter 2)	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. Substantial modifications of the wording of the Chapter 2 Executive Summary in the Final Draft were used to support substantial changes in the wording of such statements here, with more focussed information in the bullet points.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13435	8	36	8	38	What is meant by 'integrated (cross sectoral) governance'? Is this a particularly defined phrase?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - The term "integrated governance" has been removed and what is meant with this statement is now explained more clearly in C1 and underlying bullets
13437	8	38	8	38	Suggested change to text - 'address long-term cryosphere change...'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - the SPM has been revised to give a more nuanced assessment
13439	8	41	8	41	Change from "Climate change will affect ecosystems and biodiversity[…]" to "Climate change will continue to affect ecosystems and biodiversity[…]" to show climate change impacts on ecosystems and biodiversity is happening now.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - the SPM has been revised substantially - and the ecosystem sections in A and B now provide this
13441	8	41	8	42	It is unclear whether the sentence 'Climate change will affect ecosystems and biodiversity, with implications for internationally important fisheries and food security.' specifically relates to polar regions, as the rest of the paragraph B2 does. This should be clarified.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the statement has been completely revised and clarified that this is not limited/specific to polar oceans only
13443	8	47	9	2	Could some confidence statements be assigned to this text?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted: text completely revised for the SPM final draft including the addition of more quantitative information.
13445	8	47	9	2	One of the key messages in this point is the need for effective regulation of commercial activities in the Arctic in order to avoid increasing environmental risks- could this point be drawn out more in B2.1? For example, "The retreat of Arctic sea ice provides opportunities for... transportation. However, expansion of shipping activities without establishment of effective long-term regulation can increase risks for... communities (confidence statement here) such as [insert example here]."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - the SPM has been restructured and revised - this sentence is removed from section B however A8.3 indicates potential opportunities and risks
13447	9	9	9	10	Is this missing the confidence of projected increase in primary production in the Antarctic?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - low confidence added
13449	9	12	9	19	B2.3 contains a lot of unnecessary information and could be simplified. For example, it is unclear why some marine sepcies would be 'ecologically important' when others would not, nor why some species have conservation value when others would not - nor does this inform the reader which species fall into which category. A simpler formulation of this sentence would be 'Climate-driven shifts in the ranges and abundance of marine species are projected to continue, and will increase competition between species. This could lead to a loss of globaly unique biodiversity on Arctic land.'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the SPM has been revised substantially
13451	9	12	9	13	Examples of ecologically important marine species would be useful. Is it just ecologically important marine species affected or most/all marine species?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - details are added
13453	9	13	9	14	some of these species have global commercial and conservation value' - can this statement be more specific/give examples/quantify the value to some extent to make the statement more useful?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - examples are added where appropriate
13455	9	18	9	18	Suggested change to text - 'by more southerly species and the limited availability of refugia' or 'places they can seek refuge'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - see revisions in B5.3
13457	9	18	9	20	Could you give an indication of the implications of this permafrost carbon loss to the atmosphere e.g. for RCP8.5 how much C compared to RCP2.6? And what might that mean in terms of further warming?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	error in page or line number
13459	9	21	9	29	Can polar bears be mentioned here? They're an iconic species of the Arctic and presumably they would continue to experience large impacts too.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Rejected. Changes in and impacts on polar terrestrial ecosystems are addressed in section A4, but does not refer to polar bears explicitly.
13461	9	21	9	24	This sentence is a repetition of B2.1 - delete one of the two.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the SPM has been completely revised
13463	9	22	9	22	disturbance regimes'? What are these? I think this may need unpacking and putting into plain English.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - however term retained in SPM due to specific meaning
13465	9	32	9	45	There is a lot of detail on permafrost which could be shortened. I would suggest the following 'The current trend of permafrost temperatures reaching record high levels is expected to continue, with consequences for the global climate system due to the release of Carbon Dioxide and methane from the microbial breakdown of organic carbon and soils. Evidence suggests substantial loss of permafrost carbon to the atmosphere by 2100 and beyond under RCP 8.5 (but lower losses with lower emissions).'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentences rewritten

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13467	9	44	9	45	This final sentence appears to be related to issues wider than permafrost and so should be in a separate paragraph.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The entire bullet has been re-written and this statement has been removed
13469	9	47	9	54	B2.7 relates to ongoing adaptation to observed impacts, not to projected changes, an therefore belongs in section A.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the entire SPM has been revised and attention paid to this point
13471	10	1	10	5	The oxygen argument is made in 5.2 but suggest this is also linked across in ecosystem implications in 5.3 where the discussion of observed impacts does not adequatley cover deoxygenation effects.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - B5 now includes deoxygen impacts
13473	10	2	10	2	Instead of 'distribution and availability of marine biological resources', suggest 'distribution and abundance of marine life'. It is a very limited perspective to simply view all biology as a resource for humans, and that the only reason to be concerned is regarding its human impact.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - The Headline statement B5 (former B3) has been completely revised, the effects have been specified, and the the term "biological resources" has been removed
13475	10	2	10	3	Suggest inserting 'all' in front of 'human', and deleting 'directly' in front of 'depend'. The entirety of the human race depends on a healthy ocean, including landlocked countries.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The Headline statement has been completely revised for clarification
13477	10	3	10	4	Should the impacts be expanded to include extreme weather events?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - included where appropriate e.g. extreme heat events in B6
13479	10	6	10	9	I would suggest that the final sentence of this paragraph containing heat levels could be removed.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Sentence instead revised for clarity
13481	10	8	10	9	what are the implications of this for ocean temperatures? How much ocean warming has the 500 x 10^21 J heat uptake lead to? If we can't say, might be helpful to explain why not and identify knowledge gaps.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - see revised A.2.1 and footnote 6
13483	10	11	10	13	Is the effect on nutrient cycles negative? If so this should be stated here and the type of impact briefly explained.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. B5.2 is revised to address sinking flux of organic carbon
13485	10	11	10	13	Again adding context here would be useful in terms of highlighting any nasty surprises that we might come across - are there estimates of the magnitude of the reduction in heat and carbon uptake? What might that mean for warming rates on land for people?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - the entire SPM has been revised
13487	10	15	10	15	Over the next century, ocean oxygen declines of 3.5% by 2100 are predicted globally' - under ALL scenarios? Or, if not, which one(s)?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - Sentence removed from revised SPM - see B2.4 and B2.6
13489	10	20	10	20	Can we define deep ocean here - e.g. below 700m depth?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
13491	10	40	10	47	what % of deep and shallow reefs?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - this refers to warm-water reefs and cold-water reefs. These have been separated in the revised SPM e.g. see B.5.4 (cold water corals) and B6.4 (warm water corals)
13493	10	49	10	56	Please indicate in brackets after 'benthic' and 'abyssal' the depths that these terms refer to.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - the term "benthic" has been removed from this bullet and depth range of "deep sea" has been provided in what is now B5.2
13495	10	49	10	56	This is a complex and detailed paragraph for the SPM. I would suggest retaining the first sentence, including a brief note on the carbon cycle changes and deleting the rest.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the entire bullet (now B5.2) has been revised to be more clear, focused and concise
13497	10	55	10	56	What about RCP2.6? It would be good to look at a low emissions scenario for comparison.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Not applicable - sentence removed in revision
13499	11	1	11	46	B3.8 - B3.10 refers to loss of fishery productivity / value. It is not as straightforward as made out. Depending upon the consistency and rate of change and replacement by which fish / shellfish species - then some new species might be more marketable and have a higher value than those replaced. So change is not necessarily economically or society bad. In the case of warming then growth & productivity may be higher. Suggest addition to statement to reflect this?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - there is not space to add all this detail however see revisions to B8 and C2 which brings in regional differentiation and management challenges

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13501	11	1	11	35	B3.8 and B3.9 are excessively long given that the key messages that need to be communicated are that seafood supplies will be impacted by climate change, which has implications for livelihoods and food security, with greater impacts on some species/areas than others, and that mcurrent management strategies may not be adequate. Details of already observed changes, the sensitivity of shellfish to acidification, and some of the detail in B3.9 is not required in a simple summary for policy makers.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the entire part has been revised to be more clear, focused and concise
13503	11	2	11	2	Suggest changing "will be" to "will continue to be" if this is something also happening now.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted
13505	11	2	11	35	This text could be reduced. I would suggest 'Fisheries catches and their composition are already affected by warming, deoxygenation and changes in primary production on growth, reproduction and survival of fish stocks (high confidence). Across the globe, seafood provision from some fisheries and aquaculture will be impacted by climate change (high confidence), reducing their revenues and influencing the livelihood of the dependent communities and food security of vulnerable people (medium confidence). Marine aquaculture is at risk under increasing carbon emissions. Shellfish aquaculture is sensitive to ocean acidification (high confidence).Farmed species will be exposed to increased risk of disease and harmful algal blooms, with adverse economic and social implications. Climate impacts on fisheries are projected to be largest in tropical and polar systems. The projected decrease in catch in the tropical ocean is very likely to be among the largest regional declines. Specific impacts will depend on the level of global warming and on the strategies employed to manage the effects on stocks and ecosystems. Some current management strategies may not sustain viable commercial fisheries under higher emission scenarios. This exemplifies the limits to the ability of existing natural resource management frameworks to address ecosystem change.'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Thank you for the suggested wording - the text has been substantially revised
13507	11	9	11	12	The text is not neutral, overall there is a decline but it is not uniform and one of the benefitting regions could be Arctic fisheries with an expansion opportunities. Suggest this is acknowledged here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the text is substantially revised - in addition see added maps in Figure SPM.3
13509	11	10	11	10	Suggest to replace "substantial" with "significant" to remain consistent with SR1.5	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - the term "substantial" has been removed from the statement and the entire bullet has been revised
13511	11	11	11	12	"Marine aquaculture is at *increased* risk under increasing C emissions"	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The statement has been removed from the SPM
13513	11	23	11	35	This is separate from health, perhaps this section can be broken into three bullets: Food Security, civil unrest, social inequalities to guide the reader.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The entire SPM has been restructured and revised for more clarity. Projected risks for the marine ecosystems including primary production, fish and krill are described in B5 and underlying bullets, where projected risks for people depending/relying on these marine resources (including health and wellbeing) are described in B8 and underlying bullets.
13515	11	23	11	23	Consider elevating this point to the chapeau - areas most at risk is really key information.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - areas most at risk (tropics) has been elevated to the headline statement B5
13517	11	27	11	27	What is 'an international fishery'? Is it species that are exploited for human consumption by more than one country? Needs unpacking, as it's not clear.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the entire bullet has been revised und the term "international fishery" removed
13519	11	28	11	28	Replace "precautionary management" with "adaptation"?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the statement has been revised an in C2.3 it now says "adaptive management"
13521	11	31	11	31	Instead of 'global warming' suggest 'acidification and warming of the ocean'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the entire part has been revised and clarified in B5 and underlying bullets
13523	11	31	11	32	This sentence is repetitive of lines 27-29 - suggest delete for brevity.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the bullet has been revised and repetition removed
13525	11	33	11	33	What's the confidence level in the statement ending on this line? Please specify.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - sentence deleted. Porjections for maximum catch ptential for fisheries are in B.5.1 and governance challenges in B8.1
13527	11	38	11	38	Would "disputes" or "tensions" be a more appropriate word here to replace "conflicts"? If so please amend the underlying chapter too, which does define the term conflicts but I am not sure that its use here is appropriate.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted- sentence deleted. Governance systems are addressed in C1.2 and for fisheries b8.1

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13529	11	40	11	40	increased prevalence' - increased by how much? Please specify.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Rejected - quantitative estimates at global scale not available
13531	11	44	11	44	Changing distribution' rather than 'redistribution' would be better here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - in B8.1 it now says "geographical shifts"
13533	11	44	11	44	Suggested change to text - 'fish stocks under climate change, alongside growing demand for marine-sourced food, will increase the risk of disputes between..'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the entire bullet has been rewritten and revised for clarity
13535	11	45	11	45	It's not clear that the high confidence statement in this line is adequately reflected in the underlying text - the assessment in underlying chapter may require reviewing, otherwise suggest changing this statement perhaps to "medium confidence"?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	ok for medium confidence
13537	12	1	12	3	Suggested rephrase: "Under low emissions scenarios, the most cost-effective ways of reducing climate risk are through managing non-climatic human stressors such as pollution, and improving the resilience of built infrastructure."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - sentence has been removed - relevant material can now be found in C2 and C3
13539	12	11	12	28	Please define the acronym SLR at the beginning of the SPM.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Rejected - use of acronyms removed instead
13541	12	12	12	12	Suggested change to text - 'will accelerate further under a high emissions scenario'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - Headline has been revised and in what is now B9 it says "high/low emission futures" and "greenhouse gas emission pathway"
13543	12	14	12	14	that tens of millions' should read 'that hundreds of millions' (more than 600 million people current live in area <10m above sea level) according to UN and others.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This has been removed from the revised SPM.
13545	12	18	12	36	Points B4.1, B4.2 and B4.3 are currently very similar/overlap significantly and messaging is a scattered. To differentiate, strenghen messages (and reduce text), I suggest the following edits: B4.1 Rephrase first sentence as "Sea level rise (SLR) by 2100 will be strongly dependent on the global emissions pathway followed, particularly as a result of Antarctica's contribution increasing with increasing emissions (high confidence). Different modelling studies demonstrate that under... end of the century (medium confidence). For the first half of the 21st century, differences between emissions scenarios are small. Including these new..." I would then remove projections for 2081-2100 and just present the mean for 2100 as it doesn't make an informative difference and will help with readability. B4.2, delete the first sentence beginning "Sea level rise (SLR...) and then draw out the messages about risks from faster SLR a little more to strengthen e.g. "Risks from sea-level rise and ESL to low-lying coastlines and small islands are significantly smaller if warming is limited to well below 2°C. However, risks are not entirely eliminated and there will still be significant impacts from SLR and ESL even at 1.5°C. Lower emissions..." Also delete the sentence "For the first half of the 21st century, differences between emissions scenarios are small." [now in B4.1 where it thematically more consistent]. B4.3 Delete sentence beginning "RCP8.5 leads to..." as it is covered in in B4.1.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - this content has been extensively reorganised and revised in the new B3
13547	12	19	12	20	It would be helpful to acknowledge the regional variation in sea level rise more explicitly - perhaps provide a low (below average) location and a high (above average) one.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - Figure SPM.4 shows regional projections for extreme SL
13549	12	19	12	28	No mention of RCP6 despite covering other pathways. Is this normal or should all pathways be covered? There are a couple of other examples of one pathway being chosen (or left out) without explanation.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Rejected - the SPM provides RCP2.6 and RCP8.5 - RCP4.5 can be found in Chp 4, fig 4.9
13551	12	19	12	28	It is unnecessary to include number for both the 2081-2100 average, and for 2100 in B4.1 - they are far enough in the future, and the uncertainties are wide enough that there is little meaningful (and no informative) difference between the two. Therefore it would be better to use the average numbers for 2100, accompanied by the interquartile range (not the likely range) in order to stay consistent with the SR1.5. Similarly, the number of scenarios shown is too much detail, as policymakers are unlikely to know the nuances between each RCP - instead just one high and one low emission scenario should be chosen (or at least those relating to a helpful range of temperatures e.g. 1.5C, 2C, BAU).	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - both time periods are retained. Information for RCP2.6 and RCP8.4 is added (see also revised fig SPM.1)
13553	12	23	12	23	Suggested change to text - 'baseline period and would contribute to a rise thereafter for hundreds of years to millenia'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Thanks for the suggestion but long-term sea level rise is addressed in the revised B3.4

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13555	12	30	12	36	B4.2 can mostly be removed - the first two sentences are implicit in the figures given in B4.1. The point relating to slower SLR leading to a wider range of adaptation options is novel, but might be better used as a broader point about a wide range of climate impacts and associated adaptation. 'For the first half of the 21st century.....are small' should be related with 'Before 2050..... are small' for clarity, and moved into B4.1, as this is directly related. The final sentence of B4.2 would be better replaced with an explanation of how higher levels of SLR could contribute towards ESL events e.g. through the compound effect of higher sea levels and storm surges.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - the SPM has been revised substantially
13557	12	36	12	36	few events have not yet been attributed to climate change' - is this because attribution in this area is difficult or because there is believed to be no link? The baseline SL is rising, so seems obvious to me that ESL are in some way linked. Also, see para B4.5. Please clarify this point.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - sentence removed
13559	12	41	12	41	It is unclear why sea levels rising above the specific level of 1.4m has been chosen here as a benchmark number.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM
13561	12	41	12	41	Unclear where the 1.4m comes from - suggest rephrase "probability and timing of multi-metre sea level rise deeply uncertain. However, the few studies available addressing century to millenial timescales indicate sea level rise of this magnitude (medium confidence)."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM
13563	12	42	12	42	Worth mentioning here that, as models have improved their representation of ice sheet physical processes, projected SLR has risen in projections. And models are continually getting better at representing these processes.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - text adjusted - see B3.1
13565	12	46	12	47	A brief overview of what 'subsidence' is in this context would be helpful, in order for policy makers to understand what this refers to.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - Anthropogenic subsidence has been defined in the glossary
13567	12	48	12	49	Please explain what is causing the change in wave height.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	B3.2 includes projections for wave heights, details are in the underlying report
13569	12	48	12	48	Suggest change of text - 'wave height and period' to 'wave height and frequency'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - wave period not mentioned in revised SPM
13571	12	48	12	48	What drives changes in wave height and period? Sounds like there is a trend here - is there? If so, what drives it? Is there an anthropogenic signal?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	B3.2 includes projections for wave heights, details are in the underlying report
13573	12	53	13	6	B4.5 relates to observed, not projected, changes and therefore belongs in section A.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - statement has been moved to become A9
13575	13	4	13	5	but many people don't have the resources or freedom to move.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - this is also captured in Figure SPM.5
13577	13	11	13	12	Community-based adaptation is more effective when included in development efforts that reduce vulnerability and exposure to climate change impacts' - aren't they equivalent? and therefore is this an obvious statement?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This is a good point. Accordingly, the section has been reworked to avoid any confusion.
13579	13	15	13	24	The example of the sea wall could be removed here, as it serves to make the text significntly longer without adding much information (and could lead to calls to include similar examples for all sections)	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This example has been removed and the panel of various options has been better explained (see A9.2).
13581	13	15	13	16	Chapter 4 refers to advancing the line which should be referenced here rather than 'holding the line'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the entire bullet has been re-written for more clarity and the expression "holding-the-line" removed
13583	13	16	13	24	This is about the combinations of measures 'and their outcomes' not just the combination of measures. Please amend text to reflect this.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The entire bullet has been rewritten and this statement doesn't exist anymore
13585	13	26	13	42	The examples are useful, but sentences are very long which makes it a bit harder to read. Please consider re-structuring for clarity.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the statement has been revised and shortened, and examples removed
13587	13	26	13	52	This section is excessively long due to the huge number of examples included throughout the text. These could be removed or separated out into some sort of figure visually illustrating the types of response measures like Figure SPM4 in the SRCCL draft	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the statement has been revised and shortened, and examples removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13589	13	26	13	42	This section could be shortened by removing the detailed examples included in brackets.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the statement has been revised and shortened, and examples removed
13591	13	40	13	40	would add to the sentence ending 'coming decades': 'but technically and economically feasible adaptation becomes increasingly difficult/costly as SL rise becomes more pronounced.'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This point has been removed here - the revised C3 provides a more nuanced assessment
13593	13	40	13	41	It is not clear from the text what is 'more effective' if built infrastructure adaptation is accompanied with nature-based and socio-institutional adaptation.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This point has been removed from the SPM.
13595	13	44	13	46	Is this outcome SSP dependent? Please clarify.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The entire bullet has been re-written and this statement does not exist anymore
13597	13	46	13	46	Helpful to have more information on what is meant by 'residual risk'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This is now developed in Cross-Chapter Box 2 (in chapter 1) on "Key Concepts of Risk, Adaptation, Resilience and Transformation"
13599	13	51	13	51	Suggested change to text - 'long-term positive and short-term negative'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The bullet has been re-written and this statement doesn't exist anymore
13601	13	54	14	2	Incremental interventions had limited discussion in chapter 4, is this therefore key for the SPM? Alternatively this should be more explicitly set out in chapter 4.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This comment has been considered when revising the SPM, and incremental actions are only mentioned in figure SPM5 legend (to frame one of the adaptation scenario considered in the risks from sea level rise assessment).
13603	14	2	14	2	Suggested change to text - 'maladaptatiion, for example locking in future exposure to SL rise risk.'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The bullet has been re-written and maladaptation is not included anymore
13605	14	4	14	4	Suggested change to text - 'SLR risk to people is increased by locating new…'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The bullet has been re-written and this statement doesn't exist anymore
13607	14	7	14	26	SLR and extreme events - implications for coastal environments are not mentioned here, i.e. shifting / retreating habitats. Adding this here would be useful.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - this is in B6 in the revised SPM
13609	14	13	14	13	Would argue against use of 'distant' here - as for some territories and under certain emissions pathways, it might be sooner. And 'distant' is quite a subject term, though I realise it's being used relative to short-term here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted the term is removed
13611	14	18	14	18	Suggested change - 'more general' to 'larger scale'?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted, the text is revised and included in C4 enablers
13613	15	1	15	1	Figure SPM.4 - the grey line labelled 'present day mean temperature' in SPM4, corresponds to 0.87C and is thus not a measure of the extent of present day warming. The Special Report on 1.5°C states that this temperature is the observed global mean surface temperature for 2006-2015, which does not correspond to present-day warming (2018). Therefore the label should either reflect the true derivation of that temperature, or the grey line should be moved upwards to 1.0C, which the Special Report on 1.5C identifies as the current level of global warming.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The temperature scale has been checked for accuracy.
13615	15	1	15	1	Figure SPM.4 - The labels RCP2.6, RCP 4.5 and RCP 8.5 are not helpful as a non expert will not undertand the concept of RCPs, and it is also not obvious what year we would hit these levels under any given RCP without reading a 29-line caption. It would be better to replace these grey lines with for example a label saying 'Year 2100 under high emissions trajectory' and one saying 'Year 2100 under low emissions trajectory'. Please also make clear that the grey bars refer to SLR at 2100 for each RCP and that SLR continues betyond 2100 - currently not clear why SLR on panel C extends beyond RCP8.5.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Reference to RCPs has been removed to reduce complexity.
13617	15	0	15		Figure SPM.4 - it would be useful to a) spell out acronyms; b) at some point in the report (although probably not space here) define them (there is detail on marine heatwaves, AMOC later on in the SPM but not some of the others)	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	All acronyms have been spelled out in each figure and/or explained in the captions.
13619	15	0	0		Figure SPM.4 - Why does panel A only plot data to 3.2°C while panel B plots to 4°C?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Suggestion applied.
13621	16	19	16	19	Suggested change - 'in reducing' to 'to reduce' - comment: can forecasts help to reduce vulnerabiilty in all cases? I'm not sure they can - only in cases where areas are closely controllable by humans that live there. May be worth acknowledging this point here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13623	16	25	16	25	It is not clear whether by "…there is low confidence in future frequency changes…" the text is meant to convey that the evidence suggests that changes do exist, but that the level of that evidence is low, or that the evidence suggests that on balance these changes do not exist. It would be better to phrase this as "Tropical cyclones at the global scale [are / are not] projected to change in frequency at the global scale (confidence level)."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - text revised to be clearer 'future frequency of'
13625	16	28	16	32	The section in B6.2 that reads "The uncertainty surrounding….some future impacts." relates to uncertainty in response, and therefore should be moved to section C.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - included in section c
13627	16	31	16	31	Suggested change to text - 'and can continue to mitigate some future impacts' to 'but cannot continue to mitigate all future impacts'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
13629	16	31	16	32	Reductions in vulnerability due to what actions? Please specify examples.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed
13631	16	44	16	44	What does 'herbivory' mean in this context? Please define or use a clearer expression here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - the bullet has been revised and the term "herbivory" removed
13633	16	50	16	53	The examples can be removed from B6.5 as they only serve to make the text longer, and do not explain wht compounding events and cascading risks are, or why some extreme event trigger them and others don't, which would be a more helpful addition to this paragraph.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Accepted - examples have been removed
13635	16	51	16	51	Could have footnote explaining what 'Coral Triangle' biodiversity is	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Examples including the term "Coral Triangle" have been removed
13637	17	1	17	1	In the heading above Figure SPM5, the text 'exceeding windspeed of 177 km/hour' should specify whether this is relating to sustained or instantaneous wind speeds.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Figure SPM.5 was removed in revision
13639	17	1	17	6	This figure (SPM.5) is related to historical data and observed changes, not to projected changes, therefore belongs in section A	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Figure SPM.5 was removed in revision
13641	17	1	17	6	Figure SPM.5: Not sure if this figure adds very much to the SPM as there aren't many clear messages coming out from it and the majority of it shows little to no trends - consider removing it? For example, the most striking part is the west pacific ocean section, which does not appear to show any trend at all (if anything, it looks like there have been fewer exposed assets over time). Similarly the North Atlantic Ocean, East Pacific Ocean, South Atlantic Oceans in part A, and the entirety of part B appears to show no trend. There is also no scale in part A making it impossible to gain a sense of quantitative scale involved. Using a different scale for each ocean may make it easier to highlight some of the changes (e.g. by making South Indian, North Indian and South Atlantic Oceans more prominent).	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Figure SPM.5 was removed in revision
13643	17	1	17	6	Figure SPM.5: In regards to the row on the South Atlantic Ocean, if the first hurricane in 1970 wasn't included due to wind speed being <177km/hour, it would be worth flagging this in the figure text. E.g. amend text from "first hurricane in the South Atlantic since 1970s" to "first hurricane in the South Atlantic since 1970s and the first hurricane into heave wind speeds measuring over 177km/hour" or something similar	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Figure SPM.5 was removed in revision
13645	18	1	18	1	It might be helpful to change the axis labels to 'Extreme events per hundred years' instead of frequency, and 'increased height of extreme events' instead of height to clarify what is being shown here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Suggestion acknowledged. The axis label has been rewritten.
13647	18	8	18	9	Is there a reason for the choices of the regions and scenarios? Please specify in text.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	The overall graphical approach, including the usefulness of the map, has been reworked to ease comprehension. Data points are no longer clustered into specific regions.
13649	18	13	18	31	A non-expert will not know what the Atlantic Meridional Overturning Mirculation, the Subpolar Gyre System, or a tipping elements is, and this should therefore be explained at some point within the B7 section, perhaps in a new contextual paragraph, else the reader will not understand why its weakening is a problem.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Partially taken into account - A definition for AMOC is provided in the glossary and the term 'tipping element' is no longer used in the revised SPM
13651	18	14	18	15	Comment: is an AMOC collapse very unlikely because models don't accurately capture this feature or is this based on other evidence? I think this needs unpacking.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the SPM has been restructured for a clearer narrative. Potential collapse of AMOC with implications as a plausible scenario is in B.2.8.
13653	18	23	18	24	Such impacts would be superimposed on the global warming signal' could be replaced with 'Such impacts would be in addition to the global effects of climate change' for clarity	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	No longer applicable - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13655	19	8	19	8	Suggested change to text - 'Economic and physical limits to adaptation…'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. The bullet has been removed since it was overly generic.
13657	19	17	19	22	It is not immediately obvious what is meant by 'decision-analytical methods' in C1.3, so it might be helpful to explain this.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into consideration. The text has been substantially revised to address lack of clarity in the term used in the FOD.
13659	19	19	19	20	This refers to costly methods of robust and flexible decision making, however chapter 4 did not seem to have costs on this. Please ensure this statement is supported by evidence in the underlying chapter.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - text deleted
13661	19	24	20	10	It is currently not clear what kinds of mitigation and adaptation response measures are available to tackle some of the impacts outlined in this report, with the exception of ecosystem-based measures mentioned in C2 and its underlying paragraphs (and these are specific to ocean changes, not to for example high mountain and polar areas). It might be helpful to give an indication of the other sorts of measures that are available to policymakers in each system.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - Section C has been substantially revised to provide more details and Figure SPM.5 provides examples for a specific case
13663	19	28	19	41	Paragraph C2.1 and C2.2 seem very similar and could be combined and shortened.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. Bullets under C2 have been revised and shortened.
13665	19	30	19	31	Suggested change to text - 'that could support for livelihoods, provide economic' to 'that could provide support for livelihoods, economic benefits and..'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. The bullet has been revised.
13667	19	38	19	38	Instead of 'ecosystem based approaches' it would be better to say 'Protecting these ecoystems'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. The reference here is explicitly to the so-called ecosystem-based approaches, or ecosystem-based adaptation.
13669	19	43	19	54	Can we delete references to 'blue carbon'? It is unnecesary jargon and the paragraph as a whole sets out the multifarious benefits of ecosystem protection and restoration for both mitigation and adaptation, with carbon storage being one benefit.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Rejected - blue carbon is retained in C.2.5 as it is a relevant term that is defined in the glossary
13671	19	43	19	54	C2.3 contains a lot of detail and could be significantly simplified to something like "ecosystems such as mangroves, salt marshes and seagrasses, can help provide a nature-based solution with multiple co-benefits in most regions of the world. They can help with mitigation strategies and net zero emissions targets, acting as much denser carbon sinks than terrestrial habitats. They can also assist with adaptation through improving critical habitats for biodiversity, enhancing local fisheries production and protecting coastal communities. Other carbon removal systems such as seaweed and non-biological marine CO2 removal methods are less effective at mitigation, or less feasible."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The bullet has been revised and shortened (see C2.5)
13673	19	46	19	46	How much more carbon stored than for terrestrial habitats? Please specify.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - sentence deleted
13675	19	52	19	54	Missing confidence statement here?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - spm has been checked for application of uncertainty language
13677	20	2	20	5	C2.4 could be reframed in a positive manner e.g. "Cost-effective coastal wetland restoration could provide mitigation benefits of up to 2% of current global emissions, and can be considered as a 'no regret option'…" The way it is currently phrased sounds like it cannot achieve much, whereas 2% of current emissions is a significant proportion, and greater than many countries.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. The bullet has been revised and shortened (see C2.5)
13679	20	4	20	4	Delete 'blue carbon'. Replace with 'ecosystems'.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. Examples have been added.
13681	20	9	20	9	What is the climate mitigation potential of these other human interventions?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - text is removed from SPM. Mitigation potential will be discussed in WGIII AR6.
13683	20	10	20	10	Suggested change to text - 'with risk of undesirable non-climatic consequences and other currently unknown knock-on impacts.'	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - text is removed from SPM.
13685	20	24	20	30	C3.2 should be reprased to remove the oxymoron 'inevitable surprises', and specifying what 'Assessing, implementing and continually refining systems of governance… require[s] the attention' of.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	accepted - word removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
13687	20	52	21	3	As written, it seems to imply that UNCLOS needs to be reopened. So suggest replacing this paragraph with the following text: "The United Nations Convention on the Law of the Sea (UNCLOS) provides the overarching legal framework under which ocean activity is carried out. To facilitate more effective responses to challenges created by climate change for the ocean, more effective implementation and development of detailed regulations in compliance with UNCLOS (e.g., fisheries management or marine spatial planning by relevant international, regional and national institutions) is requried. Climate risks can also be further reduced by shortening the lead time before implementation of these adjustments relative to the time of emergence of climate stressors and their impacts in the marine system (medium confidence)."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. Explicit reference to UNCLOS has been removed. Governance challenges are addressed in C1 and C2 amongst others.
13689	21	5	21	8	Needs to spell out what alternative is…alternative to what and what the alternative will be.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. C3.6 serves as a bridge between C3 overall, which includes a number of specific statements about these alternatives, and C4. which also provides greater specificity. Granted space limits in the SPM, these earlier statements in C3 were not repeated here.
13691	21	5	21	8	Suggest redraft of this paragraph to: "Improved ocean governance, based on UNCLOS, with participatory stakeholder integration is important to support combined climate change mitigation and adaptation goals, and disaster risk reduction imperatives (medium confidence)."	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Bullet and sentence revised. Climate-resilient development now addressed un C5.
13693	21	5	21	6	What is meant by transformative governance?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. Following IPCC policies, terms are defined in the glossary; governance receives attention also in Cross-Chapter Box 3: Governance of the Ocean, Coasts and the Cryosphere under Climate Change, located in in Chapter 1.
13695	21	26	21	28	The sentence "For example, if greenhouse…. coasts and islands" can be removed, as the impacts of climate change on sea level rise is already discussed at length in previous sections.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Taken into account. Focus is now on challenges associated with impacts, rather than the impacts themselves.
13697	21	28	21	28	Comment: any of these places will be uninhabitable so why suggest coastal adaptation would work?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	This highlights the urgency for mitigation and coastal transformation
13699	21	30	21	30	transformative coastal adaptation responses' - such as? Would be good to have an example here.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted - text removed. Transformations for CRDP are in C.5.1 and the reader is referred to recent SR15 where an assessment can be found
13701	26	45	26	47	This sentence could be more informative. Can you add in some text about how effective this approach is?	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Error in page or line number - cannot match text
13703	94	29	94	30	Current wording make these countries look like the only Arctic Council observers. It would be good add the others for completeness as well.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Error in page or line number - cannot match text
14061	1	0	224		Overall comment: While I appreciate the current structure of the SPM gives a good narrative flow, some of the key messages towards the end in section C (for example, C2 chapeau should be elevated as it's a really key point!) get a little lost in the text. It might be helpful for policymakers if a new section were to be added at the start (before section A) which gives the key headline messages from across sections A, B and C (see the SR1.5 SPM structure for an example).	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)	Noted. The SPM has been restructured
15095	1	32	1	33	Make the text easier to grasp by adding one or two examples on how the ocean and the cryosphere support human livelihoods and well-being. If possible, explain briefly how they are connected with the whole climate system (e.g. reflecting large parts of the incoming solar radiation, stabilizing energy transfers within the atmosphere and the energy budget of the climate system etc.) .	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	The introduction was shortened and this text removed and revised in the added startup box
15097	2	28	2	28	The "tropical ocean" needs to be better defined.	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	Rejected. The authors think this is clear enough in the text, so no additional explanation added.
15099	5	19	5	19	Should be "...global population live…"	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	Accepted. This sentence is removed and the population information is now in the start-up box on page 2
15101	5	47	5	47	Word missing? "…coasts across latitudes". Explain which latitudes.	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - clarified by saying "almost all latitudes" in B3.3
15103	6	8	6	8	wellbeing should be well-being	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	Editorial – copyedit to be completed prior to publication
15105	12	46	12	51	Should perhaps also mention post-glacial rebound.	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	included in A3.5
15107	17	0	17		Fig A), South Atlantic Ocean: Caption says "First hurricane in the South Atlantic since 1970's" but there is no hurricane marked out in the South Atlantic in the 1970's.	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	Figure SPM.5 was removed in revision
15109	19	3	19	5	Scentence in box is very long and difficult to comprehend.	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. The headline statement has been revised and language has been simplified

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
15111	20	28	20	28	Require the attention from..? Perhaps it "needs to be attended to" or the word "the" should be deleted from the scentence e.g. "...require (more) attention".	Sofie Schöld	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. Sentence revised.
15209	0	0	0		The current framing of the report fails to provide an adequate long-term perspective on changes in ocean and cryosphere beyond 2100 relevant for LDCs including glacier melt and sea level rise. Specifically, the report fails to communicate the fact that, according to a recent publication (Marzeion et al. 2018), more than 40% of global glacier mass will melt away in the long run. This includes most low latitude glaciers as well as sizeable parts of high-mountain Asia. Such long-term risks need to be made clear.	Government of Gambia	Department of Water Resources	Gambia	Noted. Marzeion is one of the lead authors of the report and also authored cross-chapter box 6 glacier projections. SPM B1.1 is revised for information on glacier projections
15211	0	0	0		Information on Loss and Damage is missing. Please elevate corresponding findings from the underlying Chapters to the SPM.	Government of Gambia	Department of Water Resources	Gambia	Noted - key areas of loss and damage are covered in the SPM which has been revised thoroughly
15213	0	0	0		Information on 1.5°C in high mountainous regions has been a research gap in the SR1.5. Please provide information on this here including on long term changes beyond 2100.	Government of Gambia	Department of Water Resources	Gambia	Noted - information for lower RCP2.6 is included
15215	13	0	0		This is a policy prescriptive framing about how low-lying coastal LDC countries would be left behind. It is not clear what the basis for this statement is. Rather than presenting such scenarios as 'likely' to happen, authors should spell out the needs for coastal adaptation for the most vulnerable including cost estimates to inform the need for international support to avoid such a catastrophic scenario. Furthermore, retreat should be classified as a response to 'loss and damage' not adaptation.	Government of Gambia	Department of Water Resources	Gambia	To address this comment, this part has been strongly reworked based on the last development in chapter 4 especially, as well as the development of current figure SPM5. Cross-references to chapter 4 (section 4.3.4) and to the integrative cross-chapter box on Low-lying Islands and coasts (CCB9) have also been added.
15217	15	0	0		Fig SPM4: The current figure is not comprehensive. It's missing cryosphere impacts i.e. for high mountainous regions. Please add.	Government of Gambia	Department of Water Resources	Gambia	The figure is revised into Figure SPM.3 that focuses on the ocean and Figure SPM.5 on SLR. The impacts of the high mountains are illustrated in SPM2. Chp 2 does not provide an ember assessment for high mountains
15219	15	0	0		Fig SPM4: The concept of burning embers is very useful to communicate the risks and impacts of climate change. However, they also involve a lot of expert judgement as they are highly aggregated. Including adaptation into the burning embers therefore seems to be a step too far. It does not provide any information on the enabling conditions (i.e. finance for coastal adaptation for LDC coastal megacities) nor on the value judgement involved when it comes to the concept of transformational adaptation that is deployed. Therefore, it is suggested to delete any adaptation framing from the burning embers figure.	Government of Gambia	Department of Water Resources	Gambia	See revised figure SPM.5 which is assessed for specific locations and also assesses adaptation responses
15277	4	0	4	0	At the moment there is too much "blank space" in the x axis. If there is no change in the time axis scale in the next version (which is suggested in the placeholder text), the axis should be truncated. "Panel B": If there is any estimate for world population in 2080-2100, it would be good to add. "Panel C": It would be good to clarify that "global mean temperature change" refers to air temperature and not to ocean temperatures. "Panel D": Ocean heat content in joules may be difficult for the non-specialist audience; if a "global ocean mean temperature" estimate exists, it would be good to add. "Panel F": The size of the mountain icons in the "mountain glaciers mass reduction" panel should be scaled according to projected changes.	EUCE	European Commission	Belgium	The overall layout and graphic approach has been changed to maximize use of space. Axis labels have been revised for accuracy.
15279	5	19	5	19	It would be good to clarify at this stage what is referred to by "high mountain regions" (e.g. See how "low elevation coastal zone" is defined in section B4)	EUCE	European Commission	Belgium	Accepted: Details of the definition of low elevation coastal and high mountain regions have been added as footnotes to the start-up box text.
15281	7	4	7	4	It would be good to clarify how a "marine heatwave" is defined. The average reader may not be familiar with this concept.	EUCE	European Commission	Belgium	Marine heatwaves is defined in the glossary
15283	10	1	10	22	The future expected evolution of oceanic pH should be mentioned in this section given its importance and potential impacts, as it is the case for warming, stratification (qualitative), oxygen content, etc. The statement on future pH changes is only about the most important control being emissions, but there is no mention of the expected range of change. According to 5.2.2.3 "there is high confidence that future ocean will experience pH drops of between 0.1 or 0.3 pH units by 2100, depending on the whether we follow the RCP2.6 or RCP8.5 emissios scenario"	EUCE	European Commission	Belgium	Taken into account - see revised B.2.5
15285	0	0	0		The SPM fully reinforces the message of the 1.5°C report. The ocean/cryosphere report includes intense (and scary) descriptions on impact on marine biodiversity and ecosystem functions and services, but also a focus on solutions including ecosystem/nature-based solutions and climate resilient development pathways. This is a crucial message for decision makers on all levels	EUCE	European Commission	Belgium	Noted and agree
15287	0	0	0		The SPM describes very well the permafrost thaw issue and its consequences in polar regions. The SPM should also alert about the consequences in terms of CO2 and CH4 emissions, as described in section 3.4.1.2.3 of the core report (chapter 3, from page 62). This would be an strong alert to policy makers, who may see the issues in polar regions too far away from their priorities.	EUCE	European Commission	Belgium	Taken into account - see revised B.1.2

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
15289	1	1	0		General SPM comment - structure and organisation of sections A & B It may be more productive to structure sections A & B of the SPM thematically rather than follow the current structure of ongoing changes (all of them - section A), followed by projected changes (section B, ordered thematically and with uneven treatment of mitigation and adaptation actions). Ordering the insights thematically would enable the reader to follow a more logical sequence from past and ongoing changes, through to projected impacts, their implications for natural and human systems and the main adaptation and mitigation options (noting that mitigation and adaptation more broadly are covered in Section C). As an example, the following thematic grouping could be obtained largely by re-organising the existing SPM statements: - 'macro' phenomena with major impact on the global climate: A1, A2.6, A3, B2.5, B2.6, B3.1, B3.2, B4.1-4.3, B7; - Mountains & cryosphere: A2.1-2.3, B1; - Arctic & Antarctic: B2 - SLR & coasts: A2.4, B4.4, B4.5, B5, B6.2, B6.3; - ocean/marine/fisheries: A2.5, B3, B6.1;	EUCE	European Commission	Belgium	Noted. Careful consideration was given to the restructure of the SPM. The sections have been retained (A observed changes and impacts, B Projected changes and risks and C Responding to changes: challenges, options and enablers). However, to guide the reader to thematic content, icons have been added throughout the SPM
15291	1	2	0		General SPM comment - greater attention to mitigation and adaptation in sections A & B * Section B (on projected changes) of the SPM currently deals with adaptation to differing degrees depending on the theme (for example, B5 on coastal defence is the most detailed). Meanwhile, the section is virtually silent on mitigation. Greater attention should be paid to potential for mitigation and adaptation to alleviate impacts in each of the main areas covered in this section. This sectoral treatment is essential and would be complementary to the more cross-cutting treatment of mitigation and adaptation action in section C. * Section B should elaborate on the potential and possible measures to mitigate the warming impacts of GHG release from permafrost, given its enormous warming potential as mentioned in A1.6 & B2.5. * The parts of Section C that cover sector-specific mitigation and adaptation should be moved to the relevant parts of section B. e.g. C2.3-2.5 on marine carbon storage and potential mitigation.	EUCE	European Commission	Belgium	Taken into account - the SPM has been revised substantially
15293	1	3	0		General SPM comment - greater attention to extremes, tipping points, uncertainties and risks * In addition to suggested thematic sections (previous comment), section A should have a section on high-impact, low likelihood events, bringing together the main message on the subject from Ch1, Ch4 & Ch6 (inter alia). Stakeholder interest how IPCC deals with these issues continues to grow, and the underlying report contains a lot of material. This should include: - an assessment of the likelihood of extreme SLR (i.e. levels significantly higher than the estimates of section B4); - possible high-impact outcomes related to the weakening AMOC circulation mentioned in B7; - upper end possibilities for contribution of permafrost release to warming to 2100 and beyond; - other identified high-impact, low probability events related to oceans & cryosphere such as those alluded to in B6.5; - advice from the scientific literature on the ability of people, societies and policymakers to assess and plan for high-impact, low-probability (and high probability, slow onset) outcomes. Such a synthesis could inclue the material provided in Cross-chapter Box 4 (in Ch1) and could be promoted to the SPM, together with whatever evidence is available on the issue of planning and decision-making under uncertainty (e.g. 4.3, 2.3.2, Ch 6 and elsewhere).	EUCE	European Commission	Belgium	Taken into account - the SPM has been revised substantially
15295	1	4	0		General SPM comment - distinguish between climate change and other drivers for impacts discussed in Section B * Parts of Section B (e.g. B3.11 and B4.5) make an effort to distinguish between the impacts of climate change and the effects of other drivers. Such comparisons should be made for all impacts discussed in section B, where applicable, since policymakers should not be under the impression that all ocean-cryosphere changes are exclusively due to climate change (and in order to inform adaptation choices).	EUCE	European Commission	Belgium	Taken into account - the SPM has been revised substantially

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
15297	1	5	0		General SPM comment [*joint SROCC/SRCCL comment*] - consider a joined-up approach between SROCC & SRCCL on general mitigation & adaptation advice (Section C of SROCC SPM, Sections C & D of SRCCL SPM) * Section C of SROCC SPM contains a lot of advice on mitigation and adaptation that is not specific to oceans & cryosphere and that 'competes' with very similar statements from the SRCCL SPM. Issues discussed in both SPMs include: the need to take short-term decisions in the context of uncertainty (C1.2); the need for ecosystem-based and community-based approaches; the challenges of short-term investment for long-term payback; the importance of indigenous & local knowledge; the need for stakeholder ownership/involvement & challenges of multi-layer governance; hidden barriers to measures that are theoretically low cost; the benefits of monitoring; early warning and a hazard-based approach. * Recommendation: explore the possibility of dealing with above general issues in a consistent manner across the SROCC & SRCCL teams. Ideally this would: help policymakers by avoiding separate 'competing' messages; save duplication of work within the author/ editor teams; allow SRCCL and SROCC to concentrate on the aspects of mitigation and adaptation action specific to the scope of their reports - drawing on common material for the more generic messages.	EUCE	European Commission	Belgium	noted with thanks
15299	1	6	0		General SPM comment - use of figures & relation to text * Some of the figures in the SPM, especially SPM1 & SPM4 are extremely informative. However, they should be referred to more explicitly in relevant parts of the text, rather than 'hang' in the SPM independently. * Fig SPM1 is important because it makes an explicit, quantified link between changes currently observed and the changes we can expect to see out to 2100 in different scenarios. It would be useful if some of the main findings underpinning these changes were discussed explicitly in the relevant sections of the text. The text in its current form does not offer this (due to the way sections A & B are split). * Fig 4 is important because it links selected phenomena to temperature levels. It would be better if the some of the discussion that is currently contained in the (lengthy) footnote were incorporated into the narrative of the SPM itself.	EUCE	European Commission	Belgium	Accepted. All figures have been revised and even redesigned. The figures are now better connected (referred to) in the text. Figure SPM.1 is linked to the relevant statements in A and B. SPM Figure 4 is now split into Figure SPM.3 and Figure SPM.5 - this indeed has allowed some of the lengthy text to be moved into the SPM text and into the new table added to SPM Figure 5
15301	2	8	2	15	Revise and simplify this statement. In its current form it does not say very much. The key point appears to be the climate change is affecting several key Earth systems with serious implications including further climate change and sea level rise, as well as numerous other impacts on natural and human systems. However, as per general comment above, it would be better to replace the current Section A1 with a section covering the major climate phenomena (i.e. those already listed in A1) from both a present-day and forward-looking perspective (rather than the current split between sections A & B).	EUCE	European Commission	Belgium	Agreed - statement A.1 was simplified and focuses now on cryosphere changes. However, the split into A observed and B projected has been retained. Icons have been added throughout the SPM related to the system components to help guide the reader
15303	2	23	2	24	The 25% of emissions absorbed by ocean statistic is very powerful. Can we say something similar in A1.1 on the % of trapped energy due to global warming that has been absorbed by oceans?	EUCE	European Commission	Belgium	Taken into account - see A.2.1 (90% of excess heat)
15305	2	36	2	37	As mentioned elsewhere, this sentence may be scientifically accurate, but it is structured in a way that may create confusion to policy makers. The end of this sentence would suggest loss from ice sheets cannot be linked to emissions. The lack of availability of attribution science should be perhaps put into context of what we know about these processes. we reccomend to cosider re-phrasing.	EUCE	European Commission	Belgium	We do not discuss attribution in the final version of SPM (see section A 1.1)
15307	2	36	2	37	"attribution of mass loss from ice sheets to human-induced climate change is currently not possible". Please rephrase; the current wording implies there is something like a 50-50 chance of climate change, or something else, causing the loss of ice sheet mass. Presumably climate change is a chief suspect (even if attribution is not currently possible).	EUCE	European Commission	Belgium	We do not discuss attribution in the final version of SPM (see section A 1.1)
15309	2	37	2	40	Consider placing this statement at the start of the paragraph, since it is very powerful, and high confidence. However - how does this compare with the observation in B4.5 that regional-to-local SLR is largely caused by phenomena unrelated to global SLR?	EUCE	European Commission	Belgium	The text is modified, SLR is now discussed in section A3. "how does this compare with the observation in B4.5 that regional-to-local SLR is largely caused by phenomena unrelated to global SLR?" - there is no contradiction, as global sea level is explained by volume (mass and density) of water, while local and regional sea level may be dominated by other factors (shape of Earth etc.)
15311	2	43	2	46	Rephrase. Expressing September 2017 as the month with the lowest sea-ice cover and the month with -13% average decline rate per decade is very confusing.	EUCE	European Commission	Belgium	Taken into account - month of lowest sea-ice cover no longer mentioned
15313	2	48	2	50	What are the drivers for increasing sea ice in parts of the Antarctic? Some might suggest this demonstrates that loss of sea ice due to global warming is not occurring.	EUCE	European Commission	Belgium	Taken into account. We have revised this message to highlight that Antarctic sea ice extent does not have a statistically significant trend over the duration of the satellite record. Attribution of the changes in extent (a small increase followed by rapid decrease since 2016) is currently lacking.
15315	3	14	3	22	The insights on permafrost carbon storage are extremely policy relevant and deserve greater attention. What insights are available from the scientific literature on suspected permafrost release by 2100 (and beyond) and potential ways to mitigate this?	EUCE	European Commission	Belgium	Taken into account. This section (now A1.4 in the SPM SOD) is about observations and assesses carbon storage. Projected release of GHG from permafrost is assessed in B1.3.
15317	5	51	5	53	The respective contributions of climate change and other drivers deserve greater attention in order to better inform mitigation, adaptation (and non-climate) decisionmaking.	EUCE	European Commission	Belgium	Noted. Where possible attribution to drivers are included
15319	6	21	7	29	It is essential to know how much these impacts vary with the extent of climate change (present vs 1.5°C vs 2°C & higher). Integration of this section with the insights of SPM-4 would help with this.	EUCE	European Commission	Belgium	Taken in account - the SPM has been substantially revised and restructured. Quantitative information, in particular for historical observations and RCP2.6 and RCP8.5 is added where possible
15321	7	1	7	1	The use of the verb "initiate" is not clear. Consider using "Call for" instead.	EUCE	European Commission	Belgium	No longer applicable - sentence removed
15323	7	32	0		Section B - to the extent possible, please quantify all impacts discussed and explain how they may vary with different degrees of warming.	EUCE	European Commission	Belgium	Accepted - this has been done where possible.
15325	8	9	8	11	Consider explaining the 'speed difference' between terrestrial and freshwater extinctions in simpler terms.	EUCE	European Commission	Belgium	The statement on slowed extinction in terrestrial ecosystems has been deleted.
15327	9	27	9	29	Ambiguous sentence, unclear message. Please, revise.	EUCE	European Commission	Belgium	Taken into account - the entire bullet has been re-written for clarity

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
15329	9	40	9	41	How is the reader supposed to interpret this 'low confidence' finding? If there is low confidence in it, why mention it all? Is it because it is important to exclude the notion that plant growth could compensate for permafrost loss? Or is it low confidence because more research is needed?	EUCE	European Commission	Belgium	Text revised to clarify language and confidence levels. Section B1.3.
15331	9	53	9	54	D2.4 of the SRCCL SPM also covers decision-making under uncertainty, concluding that "Uncertainty need not present a barrier to immediate decision making". In keeping with our general comment above, please investigate how to make general climate action messages consistent between the two reports (so that the individual reports can concentrate on matters specific to land and oceans-cryosphere respectively).	EUCE	European Commission	Belgium	Accepted. Statement B2.7 has been heavily revised due to overall changes and no longer contains the original statement. However, the fact that decisions can be made despite uncertainty is now stressed in the SPM, e.g. C3.4.
15333	10	27	10	30	This sentence implies we should expect some sort of 'balance' primary production as losses are compensated by gains elsewhere. Is this scientifically justified? If not, rephrase.	EUCE	European Commission	Belgium	Taken into account - text is rephrased see B2.4
15335	10	43	10	45	As per previous comments, please elaborate on the respective contributions of climate and non-climate drivers.	EUCE	European Commission	Belgium	Not applicable - sentence removed in revision
15337	11	31	11	33	These sentences seem to address, in an indirect way, the question of whether aquaculture can adapt to climate change. Better to address the question more directly, rather than merely discuss whether 'current management strategies' can be sustained.	EUCE	European Commission	Belgium	Not applicable - sentence removed in revision
15339	12	1	12	3	As per previous comments, it is important to have a more nuanced discussion about the relative contributions of climate change and other drivers affecting (in this case) ocean ecosystems, in order to inform mitigation and adaptation decisions in the context of broader socio-economic and environmental action.	EUCE	European Commission	Belgium	The authors cannot understand the recommendation from the reviewer. We tried however to clarify the attribution issue (in A9.1).
15341	12	11	13	7	Section B4 comment - There is great policymaker and public interest in the issue of SLR, in particular the likely of very high SLR due to massive ice sheet loss and tipping points. Stakeholders frequently question whether ranges around median estimates are a sufficient basis for policy. Therefore, this section (or a dedicated section on extremes/ tipping points) should provide great insight into the potential magnitude and likelihood of SLR in excess of the 1-1.4m stated in this section. Line 41 states that the probability of SLR in excess of 1.4m is deeply uncertain. Even so, some quantitative or qualitative indication of the factors surrounding this uncertainty would be helpful.	EUCE	European Commission	Belgium	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM
15343	12	22	12	24	Please explain the reference points better. 0.39m is projected rise compared to today? And 0.42m is the same rise but compared to 1990s ref period?	EUCE	European Commission	Belgium	Taken in account - baseline added
15345	12	55	13	1	As per previous comments, it is important to have a more nuanced discussion about the relative contributions of climate change and other drivers.	EUCE	European Commission	Belgium	Accepted - the SPM has been revised thoroughly.
15347	13	36	13	36	Is this a reasonable adaptation measure? Reclaiming land from the sea in the face of SLR seems counterintiutive. An economic argument made later on (lines 48-49 of the same page) whereby income generated by reclaiming land from the sea can be used to protect coast elsewhere seems also far-fetched. Is the evidence for this idea solid enought? Also seems contradictory with page 14, lines 4-5, where it is said that "SLR risk is compounded by locating new development in low-lying localities exposed to severe coastal hazards.	EUCE	European Commission	Belgium	Noted the SPM text has been revised. A definition of advance is given in revised A9.2. The new figure SPM.5 which assesses this option and others
15349	15	0	15		The text accompanying Fig SPM.4 is very rich. However, it would be better to incorporate these insights into relevant parts of the SPM text (which could in turn refer back to the figure). In this way the coherence of the overall SPM would be improved.	EUCE	European Commission	Belgium	An effort was made to reduce the length of captions to the extent possible without losing important details.
15351	16	5	16	5	"Marine" to be inserted before heat waves?	EUCE	European Commission	Belgium	Yes - taken into account
15353	16	5	13	55	As per general comment above, it would be better to include individual extreme event types in the thematic parts of Section B where appropriate (e.g. B6.3 would go in the part on SLR). This section to the most extreme events such as tipping points, compound risks & cascading impacts, and how to deal with low-probability high-impact outcomes.	EUCE	European Commission	Belgium	Taken in account - the section is substantially revised
15355	18	13	18	31	This section raises more questions than it answers (applies also to sentence on "teleconnections" in A1.4). Please address the following: - there appears to be something of a mismatch between the very likely weakening of AMOC and the various impacts which are described as medium confidence at most. - what is the meaning of its impacts being 'superimposed on the global warming signal' - that Atlantic SLR would increase by even more - but monsoons & cyclones by less - than would otherwise be expected? - why draw attention to the abrupt SPG cooling if its potential impact is low confidence? Is this in order to bring a low-likelihood, high-impact phenomenon to policymakers' attention (something we call for elsewhere in our comments), or merely an expression of low scientific confidence in the mechanism at all?	EUCE	European Commission	Belgium	Taken into account - the SPM has been restructured for a clearer narrative. Historical observations of AMOC are an A.2.8 and projections with implications in B.2.8. SPG text is removed from the SPM
15357	18	29	18	31	Unclear sentence. Please, revise.	EUCE	European Commission	Belgium	No longer applicable - bullet removed
15359	19	1	21	41	General Comment: Section C As per general comments above: * Effort is needed to make general mitigation and adaptation comment coherent with that of SRCCL; * More theme-specific material (e.g. on SLR, ocean ecosystems, Arctic etc) can be moved to section B. * The remaining material in Section C should be more general than Section B, but still tied to the ocean-cryosphere scope of the report.	EUCE	European Commission	Belgium	Taken into account. Messaging regarding mitigation and adaptation has been streamlined. Section C bullets now focus on challenges, options, enablers, with specific reference to ocean and cryosphere changes.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
15361	20	52	21	41	C3.5 & C4.3 - These sections can be improved by being more focused on the challenges related to ocean and cryosphere - and by taking greater care to avoid the appearance of being policy prescriptive. C3.5 - rather than recommend changes to UNCLOS and other "detailed regulations" (prescriptive) the section should explain what are the climate-related ocean challenges that would merit such a change in the first place. What would the goal of such political/ regulatory changes be? (perhaps there could be several ways to achieve them). C4.3 - Rather than repeat the transboundary nature of ocean/cryosphere issues, the section would do better to explain (with examples) why these issues specifically require international cooperation, transformative governance etc - the same could be said of many policy challenges.	EUCE	European Commission	Belgium	Taken into account: C1.1 and C1.2 offer a broad overview, while C2.1 and C4.1 provide concrete examples, and C5.1 and C5.2 discuss the importance of coordination.
15363	2	23	2	29	To add after words "losing oxygen": 2% in total since 1960s" (5-26 row 29) To add quantification for acidification: Ocean pH is declining by 0.02 PH units a decade (ref. 5-24). Please deep the analysis. The attention to ocean acidification in the SPM is too weak	EUCE	European Commission	Belgium	Taken into account - these statements have been modified and clarified
15365	4	1	4	1	There is a typo mistake in the caption of the last colum: end of century (2081-2010). It should be (2081-2100). Please add to the table changes of coastal wetlands (mangroves, slmarshes, seagrass)	EUCE	European Commission	Belgium	Correction applied.
15367	5	13	5	17	The services supported by the ocean include as well marine bioeconomy and related new products coming from marine organisms	EUCE	European Commission	Belgium	Many thanks.
15369	5	19	5	19	Please check the source of "almost 13% of the global population lives in the Arctic or high mountain regions"	EUCE	European Commission	Belgium	The population information is now in the start-up box on page 2 and further clarity is given. "Today, around 4 million people live permanently in the Arctic region" and "Around 670 million people (nearly 10% of the 2010 global population) live in high mountain regions"
15371	6	6	6	8	The ocean supports as well renewable energy production. To integrate some quantification from 5-55: "Coastal ecosystems (from beach up to 200 m depth) occupy only 7,6% of World Ocean, but provides 30% primary production and 50% organic carbon supplied to deep ocean, is responsible for 90% of Worlds fish catch and its economic value is 40% of the value of Worlds ecosystem services"	EUCE	European Commission	Belgium	Ocean Renewable Energy is mentioned in section 5.4.2.3.2 "blue economy"
15373	7	18	7	19	The sentecne mentions sources of stress, but without elaborating. The sentence remains quite vague.	EUCE	European Commission	Belgium	Taken into account - sentence has been revised and sources of stress have been specified
15375	7	26	7	27	It is not clear to what extent communities living in polar, mountain and coastal environments share the same challanges.	EUCE	European Commission	Belgium	Taken into account. The original sentence is no longer in the SPM due to other revisions. However, the SPM has been changed to me more specific on the particular challenges faced by communities in the polar, mountain and coastal environments, respectively.
15377	10	41	10	42	After words "losses reaching" replace the rest of sentence with "80% under 1,5° warming and 99% under 2% warming"	EUCE	European Commission	Belgium	Noted - this sentence was removed - this detail can be found in the SPM for SR15 (B.4.2)
15379	11	2	11	14	The report does not quantify the climate change impact on fisheries and aquaculture. Sources needed.	EUCE	European Commission	Belgium	Noted - the SPM is revised and quantitative information added where available
15381	13	30	13	30	The exacerbating role of reduced sediment load from rivers is emphasised in text and shoukd be echoed here.	EUCE	European Commission	Belgium	This is now emphasized in A6.4
15383	19	45	19	46	The report should quantify "carbon storage, per unit area, in vegetated marine habitats can be much greater than for terrestrial habitats".	EUCE	European Commission	Belgium	Noted - sentence deleted - replaced with assessment of mitigation potential (C.2.5)
15385	5	24	5	25	The reports says "much larger populations and cities downstream of high mountain areas": is it possible to quantify?	EUCE	European Commission	Belgium	Accepted: This statement was not clear and has been removed. SPM sections A7 and B7 now deal with observed and projected impacts of changing water resources from high-mountain areas.
15387	5	49	5	54	Please quantify the impacts of sea level rise.	EUCE	European Commission	Belgium	Taken into account - Impacts of sea level rise are quantified (as far as possible) in B9.1 and B9.2 and also highlighted in figures SPM4 and 5
15389	6	6	6	13	Need to elaborate on the reinforcing/cascading effects that a degeneration of the oceans will have.	EUCE	European Commission	Belgium	Noted the SPM has been substantially revised - see A8 and A9 for this information
15391	7	9	7	10	Please quantify/elaborate "cascading impacts on economies and societies"	EUCE	European Commission	Belgium	Noted - see revised B8
15393	8	50	9	2	The sentence states the the retreat of Arctic sea ice provides economic opportunities. However, the viability and adverse effects should be better analysed. Consider revising the sentence as follows: "… provides potential economic opportunities"	EUCE	European Commission	Belgium	Noted - opportunities is replaced with implications - see A.8.3
15395	9	4	9	5	Please specify and quantify "altering marine primary produciton".	EUCE	European Commission	Belgium	Noted - the SPM has been revised substantially - regional details are given in e.g. B.5.2
15397	9	27	9	29	Please elaborate on the sentence "there are limits to the success of adaptation measures"	EUCE	European Commission	Belgium	Taken into account. The material was thoroughly revised and, when possible, specific information related to limits to adaptation under specific climate scenarios and time frames were added.
15399	9	31	9	36	It would be beneficial to quantify the projections of the possible tipping effects of the permafrost melting and releasing	EUCE	European Commission	Belgium	Section text revised, this is now contained in B1.3.
15401	9	38	9	41	The possible losses of permafrost carbon under different scenarios should be quantified as much as possible and explained.	EUCE	European Commission	Belgium	Taken into account. Section B1.3.
15403	10	11	10	13	Please elaborate the paragraph and quantify "stratification"	EUCE	European Commission	Belgium	Taken into account - see detail in B.5.2
15405	10	27	10	27	It would be beneficial to define "global organic matter".	EUCE	European Commission	Belgium	Taken into account - the entire bullet has been revised for clarity and the term "global organic matter" is not used anymore
15407	11	34	11	35	Please explain "this exemplifies the limits to to the ability of existing natural resource management frameworks to address ecosystem change".	EUCE	European Commission	Belgium	Noted - we agree this is not clear and have removed the text in revision of the SPM
15409	12	19	12	20	Is it possible to quantify also the sea level rise by 2030 and 2050?	EUCE	European Commission	Belgium	Included in Figure SPM.1
15411	19	18	19	18	It would be beneficial to define "participatory approaches"	EUCE	European Commission	Belgium	Taken into consideration. The text has been substantially revised to express participatory approaches as "cooperation and coordination among actors across scales, boundaries, and planning horizons".
15413	19	52	19	54	The reports states that blue carbon and other methods currently have low feasibility. Has the report looked as well at effects of production at scale? Has there been any assessment?	EUCE	European Commission	Belgium	Noted - a sentence on assessment of mitigation potential has been added(C.2.5)

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
15415	1	1	21	41	General comment: the economic analysis is missing almost entirely, while much of it deals with the effects of climate change-related degradation of the oceans. More research results on economic analyses would be welcome.	EUCE	European Commission	Belgium	Noted - the assessment draws on the available literature
15417	16	6	18	6	Figure SPM.2 looks sparse, is not intuitive and should be revised to include as many parts of the world that have high mountain regions as possible (e.g., no reference to the Atlas mountain region)	EUCE	European Commission	Belgium	Assuming you mean figure SPM.5 - this has been removed
15419	17	11	20	11	Is there still a point in highlighting RCP2.6 in Figure SPM.3? Shouldn't the comparison address instead a more realistic pathway?	EUCE	European Commission	Belgium	Reference to RCPs has been removed to reduce complexity.
15421	11	12	17	12	Use of english language seems problematic and text does not flow. Please revise.	EUCE	European Commission	Belgium	Taken into account - the entire bullet has been revised and rewritten for clarity
15907	0	0	0		The summary for policymakers should emphasize the fundamental role of ocean observations. The whole SROCC report would not have been possible without the long term investment of nations in the global ocean observing system. The summary should thus remind in the introduction that the development of an integrated global ocean observing system has allowed a much better monitoring and understanding of the fundamental role of the ocean in the earth's climate. More importantly, it should clearly state that an improved monitoring of the oceans is imperative to predict the long term evolution of our climate and the climate change impacts on the oceans. The present observing system must be sustained and improved. Key observations for ocean biogeochemistry and the deep ocean are, in particular, critically lacking. Setting up a long term observation of the deep oceans is vital to understand how much, and how fast, the earth will warm (earth energy imbalance). A long term observation of ocean biogeochemistry is also required to better understand the evolution of the ocean carbon pump and to better assess the impact of climate change on ocean chemistry and ecosystems. These needs are described in the different SROCC chapters but a recommendation for policy makers is critically lacking. The following recommendation could be added "The development of an integrated global ocean observing system has allowed a much better monitoring and understanding of the fundamental role of the ocean in the earth's climate. To make informed political decisions on how to attenuate and adapt to climate change, it is essential to sustain and consolidate the global ocean observing system. Key observations for ocean biogeochemistry and the deep ocean are, in particular, critically lacking. Setting up a long term observation of the deep oceans is vital to understand how much, and how fast, the earth will warm (earth energy imbalance). A long term observation of ocean biogeochemistry is also required to better understand the evolution of the ocean carbon pump and to better assess the impact of climate change on ocean chemistry and ecosystems. "	Pierre Yves Le Traon	Mercator Ocean International	France	Agree - SPM C4 emphasises ocean monitoring
16195	0	0	0		Thanks a lot to the SPM authors for their hard work and dedication to provide a much improved SOD! Generally, it has to be noted that the current draft is very text heavy and the balance between text and figures should be optimized. Contentwise, a couple of central SROCC issues, like observed polar ice sheet mass loss, regional sea level rise, associated vulnerabilities, and long-term post-2100 sea level rise, in particular, don't get adequate coverage yet (including graphics).	Alexander Nauels	Climate Analytics	Germany	Noted with thanks. The SPM has been substantially revised
16197	0	0	0		SROCC is a special report partly focussing on the cryosphere, yet there is not a single SPM figure that captures related observed/projected regional changes. The SPM has to provide graphical information on changes in this climate system (e.g. use the IMBIE team/Enderlin et al figures from Chapter 3 for a synthesis graphic).	Alexander Nauels	Climate Analytics	Germany	Accepted. Observed regional changes in the cryosphere (and the ocean) and related impacts are included in FD Figure SPM.2.
16199	0	0	0		One SROCC deliverable is to provide UNFCCC stakeholders, the most vulnerable countries in particular, with new insights on regional ocean related risks. This information is not sufficiently represented to the SPM, also because some of the Chapters have not elevated this information adequately to their respective ESs.	Alexander Nauels	Climate Analytics	Germany	Noted with thanks. The SPM has been substantially revised
16201	2	10	2	12	Please check units and revise.	Alexander Nauels	Climate Analytics	Germany	Rejected - it is unsure what units the reviewer is referring to
16203	2	17	2	21	SPM section A completely lacks a quantitative assessment of observed sea level change. Please add corresponding numbers and add regional information.	Alexander Nauels	Climate Analytics	Germany	Accepted - quantification included in revised A3 and Figure SPM.1
16205	2	31	2	40	Observed acceleration in mass loss for polar ice sheets, the Antarctic ice sheet in particular, represents the primary concern for long-term SLR projections. Given the scope of this SR, would it be worth including a figure showing recent developments?	Alexander Nauels	Climate Analytics	Germany	There are several figures in the FD addressing the concerns for SLR. Done. The final version of SPM (section A 1.1) gives numbers for SLR. In more details SLR is discussed in section A3.
16207	3	9	3	10	Maybe use "mass loss has intensified" or sth equivalent to avoid confusion.	Alexander Nauels	Climate Analytics	Germany	No longer applicable - sentence removed
16209	3	17	3	22	Please specify that this part links to arctic permafrost not high-mountain permafrost	Alexander Nauels	Climate Analytics	Germany	No longer applicable - sentences rewritten
16211	4	2	4	2	Figure SPM.1: This kind of synthesis figure will be very helpful once optimised and complemented. Currently, it does not make good use of space. There is almost no information provided for the hist period, a third of the figure is empty space. Please include polar ice sheet mass loss observations as well as available projections (with uncertainty information). Please extend the Figure to include RCP4.5 as an intermediate warming scenario if possible. Please provide consistent ref periods for historical OHC and GMSL changes.	Alexander Nauels	Climate Analytics	Germany	The overall layout and graphic approach has been changed to maximize use of space.
16213	5	47	5	49	While SLR impacts put coastal areas across all latitudes at risk, coasts and low-lying islands of developing countries with small adaptive capacity are particularly vulnerable. This should be highlighted.	Alexander Nauels	Climate Analytics	Germany	Taken into account -see revised B9
16215	6	16	6	16	The SPM would benefit from a Figure SPM.2 analogue for the ocean, with documented changes and impacts mapped on a global scale. This would provide the comprehensive perspective that the SR on Ocean & Cryosphere is expected to deliver. A second map could provide current rates of regional sea level change and overlay observed impacts, like coral reef decline, recorded coastal flooding etc to indicate where particularly vulnerable regions can be located globally.	Alexander Nauels	Climate Analytics	Germany	Accepted - Overall graphical approach has been changed to ease comprehension. It is now depicting content coming from several chapters, not only mountain regions.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
16217	6	27	6	28	The SR1.5 SPM is a little bit more specific than this statement by saying that MISI could be triggered between 1.5 and 2 degC of warming (B2.2.). Please ensure full consistency in language across IPCC SRs.	Alexander Nauels	Climate Analytics	Germany	Accepted. See revision in B3 regarding ice sheet instabilities
16219	9	14	9	16	Please revise first part of the sentence as it doesn't make sense currently.	Alexander Nauels	Climate Analytics	Germany	Accepted - sentence has been revised for clarity
16221	9	31	9	36	Can you provide more quantitative information? In many sections, the SPM SOD appears to focus on a qualitative assessent while more specific quantitative estimates would be available. Projected changes in sea ice extent in the Arctic and Antarctic regions can be quantified.	Alexander Nauels	Climate Analytics	Germany	Accepted: text on Arctic sea ice projections revised to provide probabilistic information on the likelihood of sea ice free conditions in the summer.
16223	11	2	11	35	Currently, two very long sections cover projected changes for fisheries. Please improve balance regarding other reported ocean ecosystem change projections, ideally merge B3.8 and B3.9 and substantially shorten.	Alexander Nauels	Climate Analytics	Germany	Taken into account - the entire part has been revised to be more clear, focused and concise. Projected changes in fisheries are now summarised in B5.1
16225	12	11	13	13	Regional SLR information is incredibly important for IPCC stakeholders and currently lacking in the SPM. Please consider including regional information and ask Chapter 4 to elevate the corresponding assessment including maps, e.g. Figure 4.8.	Alexander Nauels	Climate Analytics	Germany	Taken into account - see new figure SPM.4 and expanded figure SPM.5
16227	12	26	12	27	As for the 2081-2100 or 2100 absolute estimates, GMSLR rates have to be also communicated by providing uncertainty ranges. Presenting 19 mm/yr for RCP8.5 would imply 100% certainty which is obviously not the case.	Alexander Nauels	Climate Analytics	Germany	Taken in account - added
16229	12	38	12	44	This is true for high emission scenarios, but there is far less "deep uncertainty" involved when it comes to SLR under strong mitigation pathways. Quantifiying e.g. 2300 GMSLR under RCP2.6 (~1m), however, is crucial to adequately communicate the long-term nature of SLR. It would be a missed opportunity to provide more quantitative information on post-2100 SLR projections. Providing estimates plus very large uncertainty bands with the appropriate caveats would allow for the discussion of fundamental gaps in process understanding while also underscoring the long-term sea level rise commitment.	Alexander Nauels	Climate Analytics	Germany	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM
16231	13	19	13	23	Is the SPM the appropriate platform to discuss examples? Suggest to leave this level of detail to the Chapters.	Alexander Nauels	Climate Analytics	Germany	Taken into account - the statement has been revised and the text on the example significantly shortened
16233	13	26	13	42	While B5.2. contains very important information, it is hardly readable in its current form. Please revise, shorten (removing bracketed examples), and focus on the key messages.	Alexander Nauels	Climate Analytics	Germany	Taken into account - the statement has been revised and shortened, and examples removed
16235	13	44	13	46	As pointed out by the SROCC authors elsewhere, seawalls are not the only coastal protection measures that can be applied. Please avoid painting a too simplistic picture of how adaptation will work in the future.	Alexander Nauels	Climate Analytics	Germany	This point has been considered in current A9.2
16237	15	2	16	2	Figure SPM.4: While the figure contains placeholders still, a couple of other figure features are highly problematic already. The temperature scale for the burning embers is wrong. If the reference period is pre-industrial and the present day horizontal grey bar correpsonds to the "2000s" (2000-2010??), the horizontal grey bars for 2100 warming under the RCPs are not placed correctly. RCP2.6 would have to sit at around 2 degC, RCP4.5 at around 3 degC and RCP8.5 at around 4 degC (e.g. WGI AR5 Fig SPM.7 and Table SPM.2). Also, the assessment of "annihilation of in situ vulnerability" for very high 2100 warming under adaptation scenario C is not appropriate for many reasons, mainly for being policy prescriptive. Implying full atoll population relocation as (ethically) feasible does not hold. This adaptation assessment has to be removed in its entirety. Also, please ensure full consistency with SR1.5 Figure SPM.2. For example, SR1.5 SPM.2 includes 'Warm Water Corals', 'Coastal Flooding', 'Small scale low latitude fisheries', and 'Coastal Flooding', all of which not covered specifically in Figure SPM.4.	Alexander Nauels	Climate Analytics	Germany	The global warming levels have been revised to ensure consistency in the projected changes in air and sea water temperature assessed in previous IPCC assessment reports.
16239	16	22	16	22	Please swap "slightly higher" with a more precise term, also given your assessment of a projected increase in cat 4/5 tropical cyclones in one of the following sentences.	Alexander Nauels	Climate Analytics	Germany	Taken into account - 'slightly higher' wording modified
16241	16	30	16	32	These last two sentences seem to be out of place here, and should be moved to Section C.	Alexander Nauels	Climate Analytics	Germany	Taken into account - removed from section
16243	16	44	16	45	Please clarify.	Alexander Nauels	Climate Analytics	Germany	Noted - sentence has been removed
16245	17	2	17	2	SPM.5 does not provide any information on the hurricane/cyclone strength but provides a somewhat redundant time series with exposed people and assets. Could you use the upper panel to show storm strength with circle size and colour for exposure?	Alexander Nauels	Climate Analytics	Germany	Figure SPM.5 was removed in revision
16247	19	18	19	18	Decision-analytical methods appears to be a very abstract term. Could you swap with a more specific explanatory term?	Alexander Nauels	Climate Analytics	Germany	Taken into consideration. The text has been substantially revised to address lack of clarity in the term used in the FOD.
16249	19	43	19	43	Would it be worth explaining blue carbon for IPCC stakeholders by adding a footnote?	Alexander Nauels	Climate Analytics	Germany	Taken into account. Here we refer explicitly to mangroves as an example.
16251	21	21	21	22	Very significant short-term investments are made to avoid risks with far greater uncertainties than the ones associated with climate change projections, for example, in the (re-)insurance industry. While the reluctance to invest into the future is very much a reality, this particular argument should maybe also cover the political sphere, not only 'communities' as such?	Alexander Nauels	Climate Analytics	Germany	Noted - text is removed and SPM revised. Section C4 talks to investments
16253	21	29	21	31	There is no underying SDG assessment in Chapter 4. Please remove the second part of this sentence.	Alexander Nauels	Climate Analytics	Germany	Taken into account. Sentence revised.
16505	2	20	2	21	wouldn't the Ocean area be more meaningful?	Georg Kaser	University of Innsbruck	Austria	Noted - this has been removed and the text revised for clarity see A.2.1
16507	2	38	2	39	according to Table 4.1 (Ch4) the largest increase comes from glaciers, not from polar ice sheets.	Georg Kaser	University of Innsbruck	Austria	this has been removed in FD. In the final version of SPM we give sea level contribution from ice sheets and glaciers - see A 1.1
16509	9	31	9	32	this statement is a repetition of B2.1.	Georg Kaser	University of Innsbruck	Austria	Taken into account. Section is completely rewritten
16573	4	0	4		The pictograms of the mountain glaciers have all the same size. Modifying the size of the pictogram according to the predicted mass loss would increase the visual message of the figure	Jens Rassmann	University of Liège	Belgium	Overall graphical approach has been changed.
16575	0	0	0		The SPM does not make any reference to 1.5°C vs 2°C scenarios that have been discussed in Paris and in the last report. This is likely due to the fact, that most predictions simply do not have the precision to access this difference. If this is the case, this should be mentioned somewhere, as it was topic of the previous report and topic of the Paris Conference.	Jens Rassmann	University of Liège	Belgium	Noted. The assessment is based on the available literature and the scenarios used therein.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
16621	2	10	2	11	"Reduced Northern Hemisphere snow cover" seems out of the scope of the report, which addresses snow cover only in the polar regions and high mountains, but at continental scale are explicitly reported ot be not covered in SROCC but rather in AR6. Maybe replace "Northern Hemisphere snow cover" by "High latitude snow cover" if that's the intent of this statement - need to check consistency in wording with Ch1 and Ch3.	Samuel Morin	Météo-France - CNRS	France	No longer applicable - statement modified
16623	3	6	3	7	"especially at lower snow elevations". This statement is unclear (and could be viewed as making no sense). I recommend using terminology adopted in Ch2, i.e. "especially below the mean snowline elevation" or adjust the wording with Ch2 authors so that a consistent terminology is employed.	Samuel Morin	Météo-France - CNRS	France	No longer applicable - sentence removed
16625	4	1	4	1	The "line" on mountain snow cover needs editing. "below mean snow elevation percentage" must be adjusted, e.g. replaced by "Change of depth of snow cover (in percent) below mean snowline elevation". Furthermore, it is possible to use information from Ch2 to provide numbers for near-term (2031-2050)	Samuel Morin	Météo-France - CNRS	France	Panels have been updated with a more suitable selection of variables. Labels have been revised for accuracy.
16627	5	25	5	25	I don't understand why section 2.2.2. (i.e., Snow cover in Chapter 2) si referred to here in support of a statement relevant to the location of population in high mountain areas.	Samuel Morin	Météo-France - CNRS	France	Noted. The SPM structure has been revised. This is now addressed with relevant detail in A7
16629	7	34	7	34	"elevation" needs to be added after "snowline", otherwise this is too jargon and will be subject to inconsistent interpretation.	Samuel Morin	Météo-France - CNRS	France	No longer applicable - text not in revised SPM
16631	7	44	7	44	It is not understandable, that while there is a paragraph of changes in atmospheric conditions (B1.1) and one on glaciers B1.2, there is none on changes in snow cover. Given the multi-faceted impacts of snow cover reduction, I don't understand this. Furthermore, section 2.2.2 on snow cover should not be referred to in B1.1, it is simply another topic, B1.1 is about atmospheric changes (temperature, precipitation), references are to 2.2.1, not 2.2.2.	Samuel Morin	Météo-France - CNRS	France	Accepted. Changes in snow cover are now addressed in section B1 of the SPM SOD.
16633	12	19	12	19	It is a bit surprising to not see any number for SLR from other sources than the Antarctic. What about Greenland or mountain glacier contributions ? I think it would be useful to provide such numbers in the SPM along side those for Antarctica, and not only total and Antarctica only.	Samuel Morin	Météo-France - CNRS	France	Taken into account - Greenland added (see B3.1)
16635	18	18	18	18	Is the level of "substantial" weakening described here (and its consequences) corresponding to the very likely range from the B7 header (page 18 line 13), or the more abrupt transition or collapse ? In short, are the consequences described in B7.1 in the very likely range, or in the higher impact and physically plausible but very unlikely ?	Samuel Morin	Météo-France - CNRS	France	Taken into account - the SPM has been restructured for a clearer narrative. Historical observations of AMOC are an A.2.8 and projections with consequences in B.2.8.
16781	12	11	12	17	This is downplaying the massive increase in long-term SLR commitment under high emission pathways such as RCP8.5. According to a recent paper by one of the WGI AR5 Sea Level Chapter CLAs (Clark et al. 2018, Nature Climate Change) such a scenario would lead to a SLR commitment of >10m until the year 3000 compared to around 1m under 1.5°C scenarios. This needs to be communicated much more clearly. The very illustrative figure of this paper should be shown in the Chapter 4 assessment. In fact, a similar version should be considered in the SPM, potentially expanded by other post-2100 impacts on ocean and cryosphere. In general, it seems like the entire discussion of post-2100 sea level rise is held hostage by what is referred to as "deep uncertainty". While the uncertainties for high emission scenarios, in particular, are indeed very large, it should not prevent the SROCC experts to adequately highlight the post-2100 sea level implications.	Government of Grenada	Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment	Grenada	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM
16783	13	26	13	42	Please provide more information about the needs and costing of these adaptation measures, in particular in relation to small island economies. Furthermore, please reflect on mitigation being a critical adaptation enabler by limiting future sea level rise and in particular the speed of rise to a manageable level.	Government of Grenada	Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment	Grenada	Noted - limits to adaptation are mentioned throughout
16785	13	44	13	52	This is a very disturbing statement, as it presents the future devastation of small islands as a statement of fact. This is very concerning. Rather than describing such doomsday scenarios, the IPCC should outline the adaptation needs for the most vulnerable as well as associated costs. We further note that this statement includes very useful information that should be included in a Limits to Adaptation and Loss and Damage Box.	Government of Grenada	Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment	Grenada	Taken into account - the statement has been completely re-written
16823	1	0	21		Good progress!	Panmao Zhai	China Meteorological Administration	China	Thank you
16825	2	14	2	15	some contents of the headline statement overlaps with those other two headline statement, please modify.	Panmao Zhai	China Meteorological Administration	China	No longer applicable - section A modified.
16827	2	17	2	18	I notice there is a "rate" methioned in this sentence, what is the rate? Can it be quantified?	Panmao Zhai	China Meteorological Administration	China	Noted see revised text in A2.1 and A3.3 and redesigned Figure SPM.1
16829	2	42	2	43	double check it is "sea surface temperature" or "sea surface air temperature"	Panmao Zhai	China Meteorological Administration	China	Taken into account - revised SPM says 'surface air temperature'
16831	5	13	6	18	what are the new findings in this part? Reading thoughout the whole A2 section, I suggest to show more quantified key findings, which are more persuasive for policemakers.	Panmao Zhai	China Meteorological Administration	China	Accepted. Material corresponding to this section was thoroughly revised, in light of the evidence provided in the final draft of the chapters and corresponding Technical Summary.
16833	5	13	6	18	please revisit the framing of this section about the structure. Which compount will be the first, ocean or cryosphere?	Panmao Zhai	China Meteorological Administration	China	Taken into account - text has been restructured and aligned with the structure of other parts
16835	6	15	6	19	only show documents of changes in high mountains, please consider to develop a new figure reflecting more synths results to replace this one.	Panmao Zhai	China Meteorological Administration	China	Accepted - Overall graphical approach has been changed to ease comprehension. It is now depicting content coming from several chapters, not only mountain regions.
16837	11	15	11	16	This figure too basic with limited information, not suitable for SPM figure.	Panmao Zhai	China Meteorological Administration	China	Figure has been extended to include additional projections.
16839	11	15	11	16	why just fishes and invertebrates in ocean are considered, not as many aspects as Fig SPM2	Panmao Zhai	China Meteorological Administration	China	Figure has been extended to include additional projections.
16841	11	23	11	35	Some sub-bullets are too long, such as B3.9, distil key findings making its concise and clear.	Panmao Zhai	China Meteorological Administration	China	Taken into account - the bullets under what is now B5 has been revised to be more clear, focused and concise
16843	17	1	17	8	It is not clear if there is any changing evidence reflect it in this figure of tropical cyclone. It is not approprate to use this figure as SPM figure.	Panmao Zhai	China Meteorological Administration	China	Figure SPM.5 was removed in revision

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
16845	18	1	18	10	Please consider to add an underlining world map to give readers some information about the regions.	Panmao Zhai	China Meteorological Administration	China	The overall graphical approach, including the usefulness of the map, has been reworked to ease comprehension.
16929	4	1	5	10	Figure SPM1: I would advise to include the projected changes in ocean deoxygenation in the form of oxygen concentration change, percentage change or, directly, as the projected change of volume occupied by the Oxygen Minimum Zones. In case of the figure becoming too large I suggest splitting it in the terrestrial and oceanic parts. The following papers could be useful: Takano et al. 2018 (doi 10.1029/2018GB005939), Cabre et al. 2015 (doi 10.5194/bg-12-5429-2015), Oschlies et al. 2018 (doi 10.1038/s41561-018-0152-2), Helm et al. 2011 (doi 10.1029/2011GL049513), Schmitdko et al. 2017 (doi 10.1038/nature21399) and Stramma et al.2008 (doi 10.1126/science.1153847).	Pedro J. Llanillo	University of Santiago de Chile	Chile	Panels have been updated with a more suitable selection of variables.
17125	1	33	1	33	The sentence " They are closely connected with the whole climate system" may be interpreted as if they are not among the components of the climate system. It is also ovius that they have to be closely connected as they are components of the system.Therefore we suggest to delete the sentence or re-write to read "They are among the components of the climate system, and are very	Government of United Republic of Tanzania	Ag. Director Research and Applied Meteorology Tanzania Meteorological Agency	United Republic of Tanzania	The text has been revised to say "The ocean and cryosphere support unique habitats, and are interconnected with other components of the climate system through global exchange of water, energy and carbon.'
17127	1	37	1	37	Replace "unprecedented environments" with "unprecedented environmental changes"	Government of United Republic of Tanzania	Ag. Director Research and Applied Meteorology Tanzania Meteorological Agency	United Republic of Tanzania	Noted - this text was removed from the final draft
17129	6	15	6	19	In Figure SPM 2, It is not cleaer how those eleven mountain has been chosen, it is very unfortunate that there is no a single mountain from Africa, To have a balanced assessment, The figure should also capture the highest mountain in Africa.	Government of United Republic of Tanzania	Ag. Director Research and Applied Meteorology Tanzania Meteorological Agency	United Republic of Tanzania	Taken into account - Overall graphical approach has been changed to ease comprehension. It is now depicting content coming from several chapters, not only mountain regions. Reference to the African location (Low Latitude) is now depicted.
17131	6	6	6	13	A2.6 Quantifiable statistics on how climate change is threatening Ocean ecosystm is lacking. It will be useful to quantify for example the level of decrease of biodiversity functions, Tourist attractions and coral reefs	Government of United Republic of Tanzania	Ag. Director Research and Applied Meteorology Tanzania Meteorological Agency	United Republic of Tanzania	Taken into account - quantified information is added where available
17133	20	42	20	44	after "global" add "regional and local monitoring and forecasting system"	Government of United Republic of Tanzania	Ag. Director Research and Applied Meteorology Tanzania Meteorological Agency	United Republic of Tanzania	Noted. Forecasting is addressed in C4 now.
17413	6	6	6	7	I suggest that the approach to presenting the science of climate impacts on fish stocks and fisheries is not as resonant to policy audiences as it could be because it does not place observed climate-related impacts within the broader context of historic pressures on the fisheries sector. I wonder whether any further text amendments could be made, at this stage, and particularly in the SPM, to address this point, so that the assessment may be even more helpful to and resonant with policy-makers? Namely: it struck me as curious that SPM Paragraph A2.4 (SPM-5 lines 52, 53, 54, and related chapter) talks about the non-climate drivers which are responsible for increasing people's exposure on coastlines (this correlates with Chapter 4, page 4-3, lines 35-41). Whereas, by contrast, two paragraphs later, SPM Para A2.6 (and in Chapter 5), the text discusses the climate change threat to 'ocean ecosystems…human livelihoods, food security' (SPM-6, lines 6-7). However, the SPM paragraph does not mention the other human activities – overexploitation of fish stocks and management challenges including IUU fishing – which have historically been recognised as the greatest contributor to fisheries decline. A research synthesis publication on fisheries and management options for the for the Ecosystem Services for Poverty Alleviation (ESPA) programme stated: "Marine ecosystems within each biogeographical unit face multiple anthropogenic pressures from the fisheries sector, and from rising temperatures and ocean acidification driven by climate change. The cumulative impacts on fisheries and communities should be considered when developing management measures (e.g. sustainable catch levels)." (The above sentence is quoted from ESPA synthesis policy brief 'How can ecosystem services support equitable and sustainable fisheries?' https://www.espa.ac.uk/files/espa/ESPA%20Fisheries%20Policy%20Brief%20WEB%20FINAL.pdf - March 2018). With regards to future projections and future management regime choices (as opposed to historic observation), the interplay of climatic impacts with non-climatic human drivers is well covered ie, in the section of SPM-11 lines 2-6 and SPM 20, lines 50-06 this is well articulated	Mairi Dupar	Overseas Development Institute	United Kingdom (of Great Britain and Northern Ireland)	Thank you for helpful comments - we have substantially revised text regarding fisheries
17415	6	6	6	7	I also strongly suggest that in the SPM, you include the finding: "Globally, the potential fisheries catch in the open pelagic oceans is projected to decrease by 2100 relative to the 2000s under RCP8.5, RCP4.5, and RCP2.6 scenarios with regional differences" (currently this text appears in Chapter 5, page 5-78 lines 17-18 but is (not yet) explicitly stated in the SPM, page SPM-6, where it would be very useful to policy-makers).	Mairi Dupar	Overseas Development Institute	United Kingdom (of Great Britain and Northern Ireland)	Accepted. See new B5 for details. In addition Figure SPM.3 shows maps of projected changes in maximum fisheries catch potential under RCP2.6 and RCP8.5

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
17417	2	31	2	40	Policy-makers, journalists and general audiences will approach the SPM wanting to know: 'To what degree is human activity contributing to sea level rise?' The answer to this question is buried deep in the full report (e.g. in Chapter 4, pages 4-17 and 4-18, etc.) However, the answer is not readily found in the SPM itself. I strongly recommend that the authors edit the SPM in order to answer this question more directly. The pertinent paragraph – which currently raises more questions in the reader's mind than it answers – is SPM-2, line 31-40, Paragraph A1.3. At present, this paragraph states very well and very clearly that ice sheet melt is the major contributor to sea level rise and it states the reasons why scientists are unable to attribute this ice melt to human activity. However, there are two obstacles for the general reader in lines 39-40: first, few general readers will know what 'steric' sea level rise means; it's better to explain the meaning on first use: insert here the definition from the Glossary. Second, lines 39-40 say that steric sea level rise is caused predominantly by human activities but does not say what proportion of sea level rise is steric (and so attributable to humans) and what proportion is due to ice sheet melting (cannot currently be attributed). I think it would be well worth pulling the information from the full chapter into the SPM here, to enable readers to understand 'to what degree human activity is scientifically proven to contribute to sea level rise'. In fact, the Executive Summary text at the top of Chapter 4 is excellent and does a very good job in this respect – see page 4-2, lines 17-19. It may be advisable to copy over the following text into the SPM: "Human activity has been the dominant cause of global mean sea level rise since 1970 (high confidence). Sea level rise (SLR) at the end of the 21st century will be strongly dependent on the global emission scenario followed."	Mairi Dupar	Overseas Development Institute	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - the SPM has been revised and SLR is addressed with more clarity in A3
17459	1	32	1	38	Additionally, important to note that the Arctic is warming twice the global average, so as global temperatures rise, there is an increased impact in the Arctic regions.	Kristin Campbell	Institute for Governance & Sustainable Development	United States of America	This is addressed in Final Draft sections A1-3 and Figure SPM.1. The text has been removed from the introduction to shorten the introduction
17461	2	42	2	43	In the SPM, the text reads "Arctic sea surface temperature", but in other sections of the cryosphere report, surface temperature is referred to without specification of being air temperature or sea surface temperature; for example, Box 3.1 uses "Arctic surface air temperature". Revise the SPM for consistency with the rest of the report.	Kristin Campbell	Institute for Governance & Sustainable Development	United States of America	Agreed - changed to Arctic surface temperature (now A.2.4)
17463	7	12	7	16	Permafrost thaw also releases stored carbon (in the form of CO2 and methane, the latter of which has a larger impact on warming in the near-term) that can further amplify warming.	Kristin Campbell	Institute for Governance & Sustainable Development	United States of America	Taken into account. This is now found in SPM A1.4 and B1.3.
17465	6	21	7	29	Should include more information in the text about the ice sheet loss and SLR that is mentioned in the header for the section.	Kristin Campbell	Institute for Governance & Sustainable Development	United States of America	Taken in account - the SPM has been substantially revised and restructured. The are dedicated sections to SLR (A3 and B3)
17467	8	40	8	46	Add information about feedbacks, specifying that some changes in these regions can further amplify warming. Also, reiterate the irreversible aspects of some of these changes, as mentioned in A3.	Kristin Campbell	Institute for Governance & Sustainable Development	United States of America	Noted - the SPM has been revised substantially
17469	8	47	8	47	Note that feedbacks in the region are key to this acceleration and amplification of warming; might also be a good place to note that the Arctic is warming twice as quickly as the global average, a trend that will continue.	Kristin Campbell	Institute for Governance & Sustainable Development	United States of America	Taken into account: Observed warming trends in the Arctic have a dedicated bullet in the SPM final draft.
17471	8	50	8	52	With increased transit within the Arctic, there will be increased localized pollution, including of climate-warming agents like black carbon that can further amplify warming by decreasing the albedo of the snow and ice surfaces it settles upon; reducing/eliminating sources of black carbon (e.g., the heavy fuel oil utilized in the shipping industry) are crucial to protecting the region.	Kristin Campbell	Institute for Governance & Sustainable Development	United States of America	Noted - there isn't space to add this level of detail
17473	9	31	9	36	Also include that declining Arctic sea ice reduces the planetary albedo, warming the region and the globe because of less ice means less incoming solar radiation is reflected back into space.	Kristin Campbell	Institute for Governance & Sustainable Development	United States of America	Taken into account: out of scope to include details on sea ice feedbacks, but observed sea ice trends text was revised for the SPM final draft.
17555	1	32	1	38	Additionally, important to note that the Arctic is warming twice the global average, so as global temperatures rise, there is an increased impact in the Arctic regions. And emphasize its role in the climate system, particularly the feedback mechanism whereby the continued loss of Arctic sea ice has already added tremendous amount of heat into the system and will continue as time goes on.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	This is addressed in Final Draft sections A1-3 and Figure SPM.1. The text has been removed from the introduction to shorten the introduction
17557	1	32	1	38	There should be a greater focus within the entire Report—and especially in the Summary for Policymakers—on the potential for cascading feedbacks, how many exist in the Arctic region, and how passing the critical threshold of a tipping element like Arctic sea ice can lead to further warming that can trigger another tipping element like melting of the Greenland Ice Sheet or thawing of permafrost.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	The interconnectedness of systems, abrupt change and irreversibly in introduced in the added Start up box. The Final Draft pays greater attention to these points e.g. the potential release of C from thawing permafrost is in B1.3, projected weakening of AMOC in B2.8 and melting of the Greenland ice sheet in B3. Figure SPM.1 has been revised to make these elements clearer
17559	2	42	2	43	In the SPM, the text reads "Arctic sea surface temperature", but in other sections of the cryosphere report, surface temperature is referred to without specification of being air temperature or sea surface temperature; for example, Box 3.1 uses "Arctic surface air temperature". Revise the SPM for consistency with the rest of the report.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	Agreed - changed to Arctic surface temperature (now A.2.4)

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
17561	2	42	3	3	Timing of when the Arctic will be ice free should be noted and emphasized for its close proximity in the Summary for Policymakers. Loss of Arctic sea ice is estimated to occur within 15 years, according to Overland and Wang (2013) When will the summer Arctic be nearly sea ice free?, GEOPHYSICAL RESEARCH LETTERS 40:2097–2101, 2097 ("Time horizons for a nearly sea ice-free summer for these three approaches [for estimating future ice loss covered in the study] are roughly 2020 or earlier, 2030 ± 10 years, and 2040 or later."). Also include the implications of increased climate forcing from reduced Arctic sea ice, which will be more extreme as less and less ice exists in the Arctic; see Pistone K., et al. (2014) Observational Determination of Albedo Decrease Caused by Vanishing Arctic Sea Ice, PROC. NAT'L. ACAD. SCI. 111(9):3322–3326.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	Accepted - sea ice projections bullet in the SPM final draft now includes probabilistic information on the likelihood of sea ice free summers under different scenarios
17563	7	12	7	16	Permafrost thaw also releases stored carbon (in the form of CO2 and methane, the latter of which has a larger impact on warming in the near-term) that can further amplify warming. Permafrost thaw is already evident in damage to infrastructure seen within the Arctic.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	Taken into account. This is now found in SPM A1.4 and B1.3 as well as A3.3. B2.6 for infrastructure.
17565	6	21	7	29	Should include more information in the text about the ice sheet loss and SLR that is mentioned in the header for the section.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	Taken in account - the SPM has been substantially revised and restructured. The are dedicated sections to SLR (A3 and B3)
17567	8	40	8	46	Add information about feedbacks, specifying that some changes in these regions can further amplify warming. Also, reiterate the irreversible aspects of some of these changes, as mentioned in A3.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	Noted - the SPM has been revised substantially
17569	8	47	8	47	Note that feedbacks in the region are key to this acceleration and amplification of warming; might also be a good place to note that the Arctic is warming twice as quickly as the global average, a trend that will continue.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	Noted - the SPM has been restructured and revised - see A1-A2 and B1-B2
17571	8	50	8	52	Must emphasize that the risks and additional climate impacts far outweigh the benefits that may be gained from shipping, tourism, or other transit through the Arctic. With increased transit within the Arctic, there will be increased localized pollution, including of climate-warming agents like black carbon that can further amplify warming by decreasing the albedo of the snow and ice surfaces it settles upon; reducing/eliminating sources of black carbon (e.g., the heavy fuel oil utilized in the shipping industry) are crucial to protecting the region.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	Accepted. Reference to the opportunities from the retreat of Arctic ice has been erased from part B due to overall revisions.
17573	9	31	9	36	Also include that declining Arctic sea ice reduces the planetary albedo, warming the region and the globe because of less ice means less incoming solar radiation is reflected back into space.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America	Taken into account: out of scope to include details on sea ice feedbacks, but observed sea ice trends text was revised for the SPM final draft.
17793	3	26	3	26	"(eg., western USA and Canada") is scientifically inaccurate - this should instead read "(e.g., conterminous USA and southwestern Canada)". The trends downstream from the huge icefields of northwestern Canada have been completely different from those in southwestern Canada and much more similar to those in adjacent Alaska. Refer to Fleming and Clarke, 2003, "Glacial control of water resource and related responses to climatic warming," Canadian Water Resources Journal, 28, 69-86; and to the widely cited review article by Moore et al., 2009, "Glacier change in western North America: influences on hydrology, geomorphic hazards and water quality," Hydrological Processes, 23, 42-61.	Sean Fleming	White Rabbit R&D LLC, Oregon State University, University of British Columbia, Los Alamos National Laboratory	United States of America	No longer applicable - these regional details have been removed
17795	3	27	3	28	Suggest changing "(e.g., Alaska)" to "(e.g., Alaska and Yukon)". I'm also not sure why line 28 reads only as medium confidence; I might call it "high" given the evidence for it. Additionally, I suggest preceding the sentence starting with "Runoff changes…" with "Additionally, glacier recession and snow cover reduction have changed flow regime characteristics, such as peak timing and late-summer river levels, which can exacerbate ecosystem, hydropower, and water resource impacts of climate change even where total runoff volume changes are modest."	Sean Fleming	White Rabbit R&D LLC, Oregon State University, University of British Columbia, Los Alamos National Laboratory	United States of America	No longer applicable - these regional details have been removed
17797	11	38	11	38	Is "conflict" being used as a synonym for something like "disagreement" or "argument", or does it really refer here to violent conflict? If so, is there really "medium confidence" that climate change impacts on the ocean increase the risk of violent conflict? Do we see any evidence of this happening yet? The reason I ask is that, for example, in the field of freshwater resource management, in spite of prenostications of "water wars" a significant social science literature has emerged suggesting that such pressures offer equal opportunity for conflict and cooperation, and that which way it goes depends at least as much on institutional and other capacities as it does on water scarcity (such as that induced by climate change in some regions) itself. Perhaps slightly more precise wording might be useful here.	Sean Fleming	White Rabbit R&D LLC, Oregon State University, University of British Columbia, Los Alamos National Laboratory	United States of America	disputes between fishermen
17973	0	0	0	0	To allow policymakers to move seamlessly between the relevant sub-sections resulting in a better understand the scientific findings, predictions, and adaptation strategies, we recommend a coordinated chapter structure between the sub-sections of Sections A, B, and C. For example, if a policymaker is concerned with "high mountain regions" they would start by reviewing Section A1.5. From there it would be helpful if they could flip to sub-section B1.5 for the predicted changes for "high mountain regions" and to sub-section C1.5 for adaptation strategies for "high mountain regions".	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken in account, we have add icons for the main regions : Mountain cryosphere, polar regions, sea level rise and coasts, oceans - to guide the reader

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
17975	0	0	0	0	To improve chapter structure, we recommend the following for Section's B and C. Section B: Specific information on adaptation strategies (as the sections B1.7, B2.7 B5.4, B5.5 B5.6) seems to be more related to section C. This information could permit to present the adaptation pathways depending on the region within the section C (see below). Section C: Better development of Section C's incorporation of economic and social contexts would make the text more relatable to policymakers. As done in the Figures, the context or the structure of the section could also be provided by region and different communities (e.g. as ice communities, SIDS communities).	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - the SPM has been revised substantially
17977	0	0	0	0	More than any other section, readers of the SPM will utilize the figures. Figure SPM.1 is the easiest to understand in isolation, even though it is unfinished. In order for the other figures to follow suit and be more intuitive, we recommend: Removal of unnecessary symbols and labels for uniform iconographic representation, Standardize data (i.e: coastal ecosystems are different height to rest of figure for example. We recommend that data in SPM.4 should be shown to 4 deg C.), Standardize figures' colours with either traffic light system or grey scale, Simplified use of graphics to not obscure the story (i.e: SPM.5 could be a line chart, and may be better to interpret as a result), The error bars and axes' labels should not be hidden (e.g. figure SPM.6), Figure legends should be brief, no extraneous information (i.e: Legend to SPM.4 is excessive), and Figures that show maps should better relate the graphical tools to the geographical range (e.g. for figures SPM.2 or SPM.6).	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account. All figures have been carefully revised in the SPM FD to reduce complexity and improve clarity and readability. Colour schemes have been standardized where appropriate. Please note that some figures are not included in the FD anymore.
17979	0	0	0	0	By including the SPM in the FOD, the text by the individual authors would be more consistent, grammatical errors fewer, and figure inaccuracies would be less distracting to reviewers of the SOD SPM. Together, all three of these editorial problems not just distracted reviewers, but caused concern regarding the SPM's message and useability by policymakers. We believe the SPM would benefit from a second review process and should be included in the next review process.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted- following IPCC procedures the SPM will be sent to government review followed by approval. An professional copyedit will be undertaken before publication
17981	1	1	21	70	E1b - Organization of Section-Headings: The language and structure used for section-headings provides the way for readers to navigate the document. Some of the SPM section-headings actively reflect the corresponding text (e.g., SPM A. Ongoing changes in the Ocean and the Cryosphere Illustrate Their importance for climate, ecosystems and people) while some do not (SPM B. Projected Changes). The A, B, and C sections respectively convey ongoing changes, projected changes, and adaptations, yet their internal structures are not comparable. As a result, a policy-maker could read section A.1 for information on ongoing changes in the Oceans. Then, they will likely read section B.2 expecting text on projected changes for the ocean and would be surprised to find a section on projected changes for mountains and likewise, if they jumped to section C.1 for adaptation text for their ocean-related population, they would find general text on adaptation theory instead. To increase the accessibility of this document to policymakers, I recommend: 1) descriptive section-headings, 2) corresponding sub-sections, and 3) a figure that summarizes the findings by the three sub-sections. If such a figure exists elsewhere in the report, simply mention in the text. 1.A: "Ongoing changes in the oceans and the cryosphere, and the impacts to the climate, ecosystems, and people"; B: Projected changes for the oceans, cryosphere, ecosystems and people, and extreme events; C: Pathways, ecosystem- and hybrid-bases, and coordination of decision-making and adaptation for oceans, cryosphere, and ecosystems and people. 2.The structure (not content) of Section A would need minor changes. The sub-sections of Section B (B1, B2, B3, B4, B5, B6, B7) would need to be combined into three sub-sections that reflect the section-heading. The structure (not content) of Section C needs significant work in order for the content to relate to SPM A and SPM B.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - the SPM has been revised substantially
17983	4	1	4	5	E1a - Figure SPM.1 The snowflake representing present day mountain snow cover should be black like the other icons in that category.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Overall graphical approach has been changed in order to ease understanding.
17985	4	1	4	5	E1a - Figure SPM.1 The Y-axis should be labeled. Three possible labels include: emissions, changes, human population. For "human population" the World Population needs to be moved to the bottom of the Figure. Re-ordering and labeling the content will increase the understandability of the cause-impact-effect process. By separating the content into three sections and labeling to all three sections, the space (years 1900-1985; 1850-1985) can be removed for variables for which it is not relevant.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Labels have been revised for accuracy.
17987	4	1	4	5	E1a - Figure SPM.1 The generally unused space corresponding with 1900-1985 should be reduced or removed entirely.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Overall graphical approach has been changed in order to ease understanding and make better use of space.
17989	6	14	6	15	E1a - Figure SPM.2 BOXES On the map, there are boxes with the names of the 11 high mountain regions and dark gray areas that demonstrate the spatial boundaries of the 11 high mountain regions. The correspondence of the boxes and the shaded areas is not intuitive. For example, I am not sure if the symbols overlaying the northern part of south america (livelihoods, hydropower, tourism, aquatic ecosystems, etc.) are impacts from the "low latitude" driver (glaciers) or the southern andes impact (glaciers). I recommend that the boxes with the names of the high mountain regions are transformed to the general shape of the dark gey areas on the map and that the all driver and impact symbols are housed inside of the box.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - The overall graphical approach has been modified, allowing the locations references to pointed with a line.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
17991	6	14	6	15	E1a - Figure SPM.2 COLOR The subcategories of the Impacts (human and managed system, hazards, biological systems) confounds the information portrayed by the map. The sub-categories could be removed and a single color (red) could be used. The blue color of the "Confidence of impact attribution" is confusing and should be updated to the single color used by the symbols. In order to differentiate the drivers from the impacts, a different color should be used. I recommend using black for the drivers. Also, since few medium confidence impacts are included in the figure, despite the fact that more exist and since some of the figures look very similar when filled and outlined, consider removing impacts that have only "medium" confidence.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - Overall graphical approach has been changed to ease comprehension.
17993	6	14	6	15	E1a - Figure SPM.2 BASE MAP Currently the base map is light and dark blue, despite the Figure description which reads "dark grey". Update the color of the base map accordingly.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - Overall graphical approach has been changed to ease comprehension.
17995	18	1	18	1	E1a - Figure SPM.6 FORMAT Rotate y-axis labels (Frequency, height (m)) 90 degrees to use space efficiently. The colored font of "frequency", "height (m)", and the related values (1000, 100 10, 1.5, 1.0 etc.) is distracting and does not increase understanding. Change the gold and the green font color of the y-axis labels to black. The current beige and blue color of the base map distracts from the values in the box plots. Change color of the base map to grayscale.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	The overall graphical approach, including the colour palette, has been reworked to ease comprehension.
17997	18	1	18	1	E1a - Figure SPM.6 The bright blue and navy blue, and beige and burgundy color of RCP2.6 and RCP8.5, and the light and dark shading of the two periods (2046-2065 and 2081-2100) distracts from rather than adds to understanding. For example, before studying the Figure, I did not think that there was any relation between the bright blue and navy blue or the beige and burgundy bars in the plots. To increase user friendliness of the figure, I recommend using the two colors noted in the figure description (gold and red) and change the saturation of the plots related to 2046-2065. In the legend, group RCP 2.5 (2046-2065 and 2081-2100) together and RCP 8.5 (2046-2065 and 2081-2100) together. Remove abbreviations from headings (e.g., G. of Alaska, N.E. America).	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	The overall graphical approach, including the colour palette, has been reworked to ease comprehension.
17999	8	5	8	5	E2 - To be in consistent with treatment of uncertainties, "high confidence" needs to be italicized.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Editorial – copyedit to be completed prior to publication
18001	8	10	8	10	E2 - To be in consistent with treatment of uncertainties, "medium confidence" needs to be italicized.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Editorial – copyedit to be completed prior to publication
18003	8	11	8	11	E2 - To be in consistent with treatment of uncertainties, "high confidence" needs to be italicized.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Editorial – copyedit to be completed prior to publication
18005	8	12	8	13	E2 - To be in consistent with treatment of uncertainties, "high confidence" needs to be italicized.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Editorial – copyedit to be completed prior to publication
18007	8	16	8	16	E2 - To be in consistent with treatment of uncertainties, "medium confidence" needs to be italicized.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Editorial – copyedit to be completed prior to publication
18009	11	43	11	43	E1a - To be consistent with SPM 12 Line 22 and SPM 8 Line 33, "indigenous" needs to be capitalizezd.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Editorial – copyedit to be completed prior to publication
18011	16	38	16	40	E2 - To be consistent with treatment of uncertainties, a confidence level needs to be attributed to the following statement: "For many Pacific Islands and the West coast of the Americas, extreme sea level heights that historically occurred once per century will occur one per year by 2046-2065 and more than ten times per year by 2081-2100".	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	This paragraph had been strongly reworked. See now section B3.3.
18013	20	38	20	40	E1a - In the Arctic, the changing climate greatly impacts Indigenous peoples and Indigenous peoples have a seat at the decision-making table (e.g., the Arctic Council includes 8 countries and 6 permanent participants or Indigenous peoples). The following edited sentence should include Indigenous peoples, as a group with interests to be considered: "The responses modify the cooperation and balance of interests between states, international groups, and Indigenous peoples, with informal organizations playing an increasingly active role in shaping climate-change relevant regulations.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted. The relevance of Indigenous population has been addressed particularly under C4.
18015	2	20	2	21	E1a - Energy imbalnce of 0.42W-2. Fig. SPM.1 uses J to express energy imbalances in the oceans. I find the wording of this section A1.1 to be lacking in punch compared to the following paragraphs, largely because Im left wondering what on earth 0.42W of energy is equivalent too. So I would assume that policy makers would be even more curious.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - sentence removed and the new A2.1 gives a statement in ZJ yr-1
18017	3	6	3	7	E2 - Uncertainty language not applied to 'high regional variability'?	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account. The text was revised for more clarity, now included in SOD SPM in section A1.2.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
18019	5	31	5	33	E1a/C4 - Suggest that wolverine is not a critical species to use as an example here. Better to use a keystone species such as lemmings, that are greatly affected by snow cover etc. For more please see comment number 10 and suggested references.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account: revised text in A4.1
18021	5	47	0		C2 - Define at what point a city become a 'megacity'.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted. The SPM is revised and the sentence not in SPM.A. See CCB9 Figure CB9.1 for a definition of megacity
18023	8	6	8	11	E1a -Suggest adding in comment on phenological changes to animal emergence as well as plants. i.e Line 7 - "changes in timing of species emergence and plant flowering, and amount of plant growth….". Please see comment 11 for more and suggested references.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Rejected. This section has been shortened and no further additions could be made.
18025	13	37	0		C2 - Clarify 'megacity'	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Clarification is in the glossary
18027	18	19	18	23	C1 - Why single out Sahelian rainfall's impact on associated millet and orghum production? Seems random to pick this one out. Either discuss impact to major crops in all areas discussed or not at all.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - crops removed from statement - see revised B.2.8
18029	19	24	0		C4 - Took me a moment to get my head around the sentence as it is. I suggest placing parenthesise after 'hybrid adaptation'.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted. The bullet has been revised.
18031	4	1	5	10	E1a - I think the rows of this table could be reordered to make it a bit easier to read. I think at the moment it is ordered by physical then biological change but I think there would be beneift in grouping the oceanic physical changes followed by the oceanic biological changes. I also agree that additional info listed in the placeholder - Antarctic sea-ice, pH etc would be a useful addition to the figure.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	The panels have been rearranged for a better storyline.
18033	6	15	6	18	E1a - I think this is a great summay figure highlighting the geographic regions affected but is there potential to included a similar figure for projected hazards and impacts? This could highlight existing and new areas at risk. There could also be a measure of certainity included in the figure to match the text.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - Overall graphical approach has been changed to ease comprehension. It is now depicting content coming from several chapters, not only mountain regions. Projected changes in ocean and cryosphere are shown in Figure SPM 1.
18035	11	16	11	20	E1a - Is it possible to add something to this figure to incorporate the predicted biomass changes across fish and invertebrates? These projections could have the potential to influence ecosystem based management or fisheries management and I think being able to distinguish between the two grourps would be useful.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Figure has been extended to include additional projections.
18037	10	25	10	35	E1a - An indication of depth when talking about Antarctic seafloor biodiversity would be helpful certain depths are protected whilst others not.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted - the SPM has been revised substantially
18039	10	49	10	49	E1a - Would be useful to define a depth for deep-sea benthic communities as it varies between regions and with opinion.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Rejected - details are given where necessary
18041	13	26	10	44	E1a - Examples/region of "small islands" and "densly populated areas" etc most at risk would useful here.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	This is a good point but it has been decided for the SPM to void mentioning specific examples. More details on the real-world case studies used for the risk assessment are provided in chapter 4 (4.3.4.1 and associated Supplementary Information).
18043	1	34	1	34	E1a - Consider shortening the sentence: 'global warming […[is associated with…' The middle part - GHG, human activity - is well understood already and could be omitted. Instead, may want to elaborate on how oceans affect livelihoods and well-being	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	This has been done in the new start up box
18045	1	43	1	44	E1a - Policymakers may not know what climate-resilient sustainable development pathways are - I suggest elaborating.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted - this text was removed in the final draft. Also note that Climate resilient development pathways were included in the Fifth Assessment Report WGII, and are defined in the SROCC glossary
18047	2	38	2	39	E2 - Consider adding a confidence qualifier to be consistent with the rest of the section.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Text is modified, see section A 1.1 and A 3.1 of SPM FD
18049	2	38	2	39	E1a - Latter half of the sentence (increasing losses from polar ice sheets…) seems redundant with the first half. Consider omitting.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - sentence revised
18051	2	38	2	39	E1a - Consider adding quantitiative data to support some statements (e.g. rate of mass loss, extent of sea level rise)	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	numbers are provided in the FD. see A 1.1 of SPM FD
18053	3	9	3	10	E1a - I suggest describing the rate of change - e.g. higher mass loss from later 21st century compared to early 21st century	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account. The text was revised for more clarity, see section A1 and Figure SPM.1 panel g

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
18055	3	19	3	19	E1b - It is a bit strange to mention cold sites only, what about warmer sites?	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account. The statements are now specific in time and supported by quantitative examples. The effect of phase change is discussed in Chapters 2 and 3 and not elevated into the SPM. SPM SOD A1.4
18057	3	31	3	31	E2 - Consider adding a qualifier. Also consider a different word than 'significant' as it has a statistics connotation. Unless quantitative analysis was done, I would change this language.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	No longer applicable - nutrients not mentioned in revised SPM
18059	4	1	4	1	E1a - 1850-1900 is industrial, not pre-industrial. End of century should be 2081-2100, not 2081-2010.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Correction applied.
18061	5	25	5	25	C2 - …'subject to cryosphere-change-related risks and impacts' - consider providing examples	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Accepted: This statement was not clear and has been removed. SPM sections A7 and B7 now deal with observed and projected impacts of changing water resources from high-mountain areas.
18063	9	12	9	12	C1 - It is not clear how climate change will impact marine primary production - could you provide some explanation?	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted - the SPM has been revised substantially - regional details are given in e.g. B.5.2
18065	14	7	14	7	E1a - Consider citing articles on community-based monitoring as an example of community-based adaptation. Of note, Indigenous communities have been monitoring and adapting to climate change for millennia; as such, supporting CBM with Indigenous communities presents a promising approach to adaptation as well as integration of Indigenous knowledge with scientific knowledge.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - this is in C4.4 in the revised SPM
18067	19	8	19	8	E1a - 'limits to adaptation…' - consider elaboration on types of limits needed. This section actually is a bit weak and non-specific. Either be more concrete or remove	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	accepted - text changed - see C 1.3
18069	20	42	20	42	E1a - consider also small-scale / local / community-level early warning systems as they provide nuanced information important for local decision-making and adaptation.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	taken into account: a variety of early warning systems in different contexts and scales discussed in C3.2, C3.4, C4.3
18071	21	5	21	5	E1a - Consider explaining what climate resilient development pathways are.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted. Climate resilient development pathways are now addressed in C5 and are defined in the Glossary.
18073	0	0	0	0	E1b - General comment - 21 pages is a lot - I suggest finding ways to cut out sections. Especially those with little reference, with high confidence / obvious	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted- however high confidence statements are the robust outcome of the assessment
18075	7	12	7	21	E1a - Cut cut out - high confidence already, well-known, and not supported by many references anyways.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Rejected - the uncertainty language is part of the robustness of the IPCC reports
18077	1	40	1	41	E1a - This paragraph lists all the topics of the SROCC but does not include the marine ecosystems and societies. Maybe at line 40 repeat "The SROCC asseses scientific knowledge about past, ongoing and future changes as well as their impacts [on marine ecosystems and societies] in high mountain areas ...".	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Agreed - the text is revised in the final draft in the start up box
18079	2	26	2	26	C4 - In the sentence "The ocean is observed to be losing oxygen and oxygen minimum zone have expanded" this two affirmations seems to have difference significance without being clear. Does this mean that observation suggest that the ocean is loosing oxygen although clearly showed an expansion of the oxygen minimum zones? In any case I suggest to be more unequivocal on the significance of these two affirmations. As this sentence is extracted from the Chapter 5 (p. 4 line 1) I also return this comment to the Chapter 5.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - these statements have been modified and clarified
18081	2	49	2	49	E1a - The sentence "negative departures" is a common expression in the scientific litterature on the sea ice variability. Nevertheless, even if it could has an intuitive understanding, I suggest to clarify this expression while addressing to the policymakers, or to integrate it in the glossary.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - wording revised for clarity

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
18083	2	12	2	13	C1 - By comparing paragraphs A1 and A1.3 of this page it seems that the confidence level for the sentence "Sea level rise has accelerated in the past decades due to increased contributions from ice sheets" is not correct. The very high confidence level is associate in paragraph A1.3 to the sentence "Glaciers and polar sheets are now the dominant source of sea level rise", altough the rest of the sentence ("inscreasing losses from polar ice sheets are resulting in increasing rates of sea level rise") has no confidence level. However due to page 17 of chapter 4, line 11 you can say "Sea level rise has accellerated during the past decades [(high confidence)] with an increased contribution from ice sheets (very high confidence)". As I did not find an accurate reference for the causality (i.e. for the affirmation "due to an increased contribution from ice sheets") in the Chapter 3 or 4, I suppose that this sentence refer to lines 38 and 39 from page 2 of SPM, where no confidence level is given and it can not be extrapolated from the affirmation "polar sheets are now the dominant source of sea level rise (very high confidence)". Indeed, an increasing contribution of a factor A to factor B not necessarily imply an increasing of factor B.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	The reviewers follow a complicated logic, ice mass loss from Antarctica tripled (e.g. Imbie paper), Greenland doubled over the past decades, so there is quite some evidence that the ice sheet contribution contributed to the acceleration in the observation as inferred from satellite data, so the statement in line 12 is correct
18085	4	0	4		E1a - In my opinion, the message "Mountain snow cover below mean snow elevation / pourcentage (%)" is not clear. I suggest to say "Mountain snow cover [reductions] below [the] mean snow elevation"	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Panels have been updated with a more suitable selection of variables.
18087	4	0	4		E1a - The projection figure for the global mean temperatures change is not very clear. I suggest maybe to make two thermometers for the near term band. One for the High emission future, with a red band and write on it the interval [2016-2035] and a second one, always in the near term band but located on the right of the latter (i.e. later) representing the Low emission future. Both thermometer should have the same level of temperature(i.e. 1.5 C) but one has a red band and one a blue band. There the 1.5 C inscription in the near term band should be deleted and instead of it I suggest to write 1.5 C on the left column (under the column "High emission future / Low emission future") as the other quantifications. In this case this inscription should be repeated twice, one with blue characters and one with red ones. And narrow should link these to the respective thermometers in the near term band. If there is few space for the temporal intervals [2026-2035] these may also be writen in two lines. In any case I suggest to display all the quantifications of projected changes in the left column and do not make exceptions for the temperature.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Overall graphical approach has been changed in order to ease understanding.
18089	8	31	8	31	C4 - Subsubsection B1.7 is part of the section SPM B which relies on Projected changes. However this section address the topic of human habitability in mountain regions, resilience and adaptation in these environments. This subsection is more related to section C that is on decision-making and management? As the subsection C.3 on mitigation measures and indigenous knowledge.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account. Limits to current adaptation measures under future climate change are in the scope of section B of the SPM SOD.
18091	6	0	6		E1a - Figure SPM.2 is very similar to figure 2.10 of Chapter 2. In particular, these two figures are differentiated by the information on the drivers (permafrost, snow, glaciers) but the information on the impacts is supposed to be the same. Nevertheless this is not always the case. For example for the Scandinavia region the impact on Hydropower is only showed in figure SPM.2, and not in figure 2.10, even if this latter displays this type of impacts. Is it an omission? Moreover I suggest to adopt the same color code between the two figures: indeed figure SPM.2 shows hazards in red and impacts on human and managed systems in light blue, although the figure 2.10 invert the colors. The color codes as figure SPM.2 appears to be more appropriate.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - Figure SPM 2 has been completely revised and is now depicting content coming from several chapters. Each chapter has a similar figure (same style, same colours) from which the SPM traces back.
18093	11	0	11		E1a - I think that the colorbar of this figure is missing the units. Are the changes in percentage? Is it a mean change on all the biomasses of fishes and invertebrates? In any case I suggest to add the units (as percentage) within the colorbar or in the caption of the figure (as "Projected changes in biomass (percentage, %) of fishes and invertebrates...") and eventually add "[Mean] projected changes...".	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Units have been now added to the colour bars and the caption has been rewritten and checked for accuracy.
18095	15	25	15	27	E1a - There is small mistake in the caption of the figure SPM.4. The sentence "This would results in the annihilation of in situ vulnerability …" refers to upper end of the (C) bar in Panel C and not in Panel B. So the sentence at line 26 has to be corrected as "as shown with the white color at the upper end of (C) bar in Panel C;".	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Caption has been rewritten and checked for accuracy.
18097	17	0	17		E1a - It could be interesting to add the colorbar corresponding to the scales in color and in size of the circles. This will permit to quantify the exposed population depending on the size and the exposed assets depending on the color darkness for each hurricanes/cyclones and gives additional information to the cumulated exposed assets and people over time (Panel B).	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Figure SPM.5 was removed in revision
18099	6	1	6	2	C1 - Is this sentence related to marine species in general? I would expect some possible considerable differences between the groups/species response or a higher confidence atributed to the current sentece.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	unsure what text this is referring to
18101	1	1	21	43	C5 - Climate-related events, as ENSO, could be cited along the text as influencing in the changes that has been observed - as cited in some papers (e.g. Cai et al., 2014), maybe in the item B6. I'm sorry if this specification is already adressed in another chapter throughout the report.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	noted

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
18103	0	0	0		E1a - Introduction and Box A1: For policy-makers it is essential to explain in the introduction that the ocean is the main regulator of planetary climate and how it happens: a) the ocean absorbs aproximately 90% of the heat from atmosphere; b) global circulations and atmosphere and ocean masses is related with differences of temperature and water density, resulting in global circulation. IF global climate is changing and if the ocean is warming, then its means that the ocean regulating and buffer capacity has been overreached.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted with thanks. The SPM has been substantially revised including the addition of a startup box on the importance of ocean and cryosphere for people
18105	0	0	0		E1a - Introduction: General comment: the role on planetary climate of the ocean and of the cryosphere should be differentiated, separated and clarified	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted
18107	0	0	0		E1a - General comment: Box A1 should become Box A2, given the above comments (i.e., Introduction and Box A1: For policy-makers it is essential to explain in the introduction that the ocean is the main regulator of planetary climate and how it happens: a) the ocean absorbs aproximately 90% of the heat from atmosphere; b) global circulations and atmosphere and ocean masses is related with differences of temperature and water density, resulting in global circulation. IF global climate is changing and if the ocean is warming, then its means that the ocean regulating and buffer capacity has been overreached.)	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted with thanks. The SPM has been substantially revised including the addition of a startup box on the importance of ocean and cryosphere for people
18109	2	8	2	15	E1a - Structure: Rephrase and separate acidification (which is not climate change) from Climate change.	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	No longer applicable - statement modified
18111	2	23	2	29	E1a - Re-Structure (separate warming from acidification as follows): A1.2 should become solely lines 26-29: The ocean is observed to be losing oxygen and oxygen minimum zones have expanded. The largest reductions in oxygen have been observed in the Southern Ocean, South Atlantic and North Pacific (medium confidence), but there is low confidence for changes in the tropical ocean due to natural variability and limited agreement across studies. {3.2.1, 5.2.2}	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - these statements have been modified and clarified
18113	2	23	2	25	E1a - Make lines 23-25 the new A1.3: The ocean is continuing to acidify in response to carbon dioxide uptake. It is very likely that the ocean has taken up about 25 ± 5% of total anthropogenic emissions in the past two decades. The anthropogenic pH signal has already emerged outside the range of natural variability over the entire surface ocean (high 26 confidence).	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - these statements have been modified and clarified
18115	7	47	7	54	E1a - Two options for the text: option a) Limited knowledge, financial resources, human capital and organisational capacity continue to constrain adaptation in many human geographies and sectors (delete 'of polar regions') (high confidence). Harvesters of renewable natural resources are adjusting timing of activities to changes in seasonality and less safe (delete 'ice') travel conditions, municipalities and industry are addressing infrastructure failures associated with flooding and (delete 'thawing permafrost'), and coastal communities and cooperating agencies are now planning for relocation. In spite of these adaptations, many groups are making decisions without adequate knowledge to forecast near and long-term conditions, and without the funding, skills and organizational support to engage fully in planning processes (high confidence). {3.5.3; 3.5.5; Cross-Chapter Box 7 on Low-lying Islands and Coasts} option b) Limited knowledge, financial resources, human capital and organisational capacity continue to constrain adaptation in many human geographies and sectors, 'incluing polar regions' (high confidence). Harvesters of renewable natural resources are adjusting timing of activities to changes in seasonality and less safe ice and other travel conditions, municipalities and industry are addressing infrastructure failures associated with flooding and thawing permafrost'). Coastal communities and cooperating agencies are now planning for relocation. In spite of these adaptations, many groups are making decisions without adequate knowledge to forecast near and long-term conditions, and without the funding, skills and organizational support to engage fully in planning processes (high confidence). {3.5.3; 3.5.5; Cross-Chapter Box 7 on Low-lying Islands and Coasts}	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account: The original B2.7 is no longer part of the SPM due to other revisions. Adaptation constraints are now discussed within section C; however, in a more condensed version.
18117	7	47	7	54	E1a - Overall Comment: often text about communities of the frozen coastal zones and of SIDS /low lying States appear together, as in B2.7 and that becomes confusing as measures relating to ice to not apply to tropical SIDS. They have other challenges to access natural resources, including fisheries, such as sudden storms, dust storms, and lack of communications to be alerted about such sudden storms. I have witnessed this- such as the dust blown from the Sahara, where fisherman get lost (and die or show up 200 nm away from home)	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted - the SPM has been substantially revised for clarity
18119	13	8	13	13	E1a - Restructuring the paragraph. Proposal: Coastal communities are implementing a variety of measures in response to diverse coastal risks, in order to protect, accommodate, advance and retreat many of which are compounded by sea level rise and/or storm surges. The selection and sequencing of these measures can have important synergistic, complementary or antagonistic consequences. 11-12 Community-based adaptation is more effective when including development efforts that reduce vulnerability and exposure to climate change impacts (high 13 confidence). {4.4.5, 5.4.2, 5.5.2, Figure SPM.4}	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Taken into account - the entire SPM has been restructured and this headline statement has been rewritten for more clarity and focus

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
18121	0	0	0	0	E1b - Overall comment: the document should try to separate issues /contexts more (e.g. Ice communities from SIDS communities, and cases are different). There are many good paragraphs, though sometimes a little overlapping on adaptation measures and strategies, and it would be worth to try using thse materials. Also, it is important to highlight that, that oher climate change impacts relate with the impacts of extreme meteorological events (cyclones, storm surges, not well understood or studied availability of fisheriess resources in places where the fisheries effort is not the root cause, and there are cases of ecosyste change in biodiversity, such as tropicalization in the north atlantic- region of Macaronesia) . Saying this: SLR has a huge role in this summary for policy makers, but there are other issues, that are already affecting livelihoods, lives, and whole countries' economies (cyclone with strom surges).	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted with thanks
18123	0	0	0	0	E1b - Overall Comment: Adaptation implies different actions depending on the social, cultural, economic, developmental and governance context, including institutional capacity to own and lead adaptation (direct access to finance). On the other hand, the terminology 'ecosystem-based adaptation' in this summary seems to refer to a combination of nature-based solutions, i.e. solutions based on 'green-infracstructure'. Many practiconers of integrated adaptation on the ground, consider and approach ecosystem-based adaptation in a sligthly different way: integrating all components of a place (the natural ecosystem plus human activities and communities's livelihoods, and by integrating all those, we are implementing EbA ... where nature-based solutions sould be prefered to grey solutions IF possible)	APECS Group Review	Université du Québec à Rimouski - Institut des Sciences de la Mer	Canada	Noted. The glossary provides the definitions used in the report
21349	37	27	36	28	It's not clear how this statement of change can be made when the differences between the population dynamics of krill reported by Atkinson et al. 2004 and Cox et al. 2018 for the same region are so different. The confidence assessments here are too high for the already changed statement, and I see no citation of any papers that provide modelling projections for the future expectations. The statement is not supported.	Steven Chown	Monash University and Scientific Committee on Antarctic Research (President)	Australia	Error in page or line number - cannot match text
21605	1	32	1	32	"Frozen ground", soil is a subset of ground	Stephan Gruber	Carleton University	Canada	The introduction was shortened and this text removed and revised in the added startup box
21607	1	35	1	36	"altering ecosystems and living conditions for people"	Stephan Gruber	Carleton University	Canada	this text is removed and replaced with the new start up box
21609	2	42	2	43	clarify whether "twice the rate of global temperature" refers truly to the globe (ocean and land) or whether this is comparing with global SST.	Stephan Gruber	Carleton University	Canada	Taken into account - there was a typographical error here (erroneous inclusion of word "sea"). We have clarified our meaning in the revised version.
21611	3	19	3	19	omit "continuous"	Stephan Gruber	Carleton University	Canada	No longer applicable - sentence removed
21613	3	19	3	22	These two sentences do not connect logically (there is a lot of carbon, therefore, quantifying emissions is important). Consider stating that there is a lot of carbon and that it is vulnerable to emission. Then, people will understand.	Stephan Gruber	Carleton University	Canada	Taken into account - logical flow has been improved in the revised sentence
21615	3	19	3	20	what you call the "permafrost zone" should be the "permafrost region"	Stephan Gruber	Carleton University	Canada	Accepted - the term 'permafrost region' is used in the revised SPM
21617	8	50	8	50	consider using the plural "peoples" to more clearly distinguish Indigenous poluation from persons in a more general sense	Stephan Gruber	Carleton University	Canada	Taken into account - text has been revised and wherever applicable "Arctic peoples" of "Arctic communities" has been used
21619	9	43	9	44	This is a problematic statement for several reasons: (a) The stated high confidence is not contained in Ch3 (p79l56–p80l1). (b) This is only one study. (c) many of the assumptions made in the study are questionable. The reported number of 70% by 2050 has in my mind no value. Given that I am on the LA team, I am happy to make that argument during LAM4. To be clear, I do not want to discount the study – it contributes in one of many ways to what we know. But reporting the numbers contained, let alone as 'high confidence' sends a signal that obfuscates the real barriers to better quantification of hazards.	Stephan Gruber	Carleton University	Canada	Accepted - sentence removed
21625	2	49	2	50	The sea ice extent of the Antarctic has changed dramatically in recent years. Therefore, I hope that the contents of the 2018 results will be included before SROCC is approved in 2019.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea	See A.2.3 'September sea ice reductions in the Arctic during the satellite era (1979-2018; very likely 12.8 ± 2.3% per decade) ' Note the cut-off date for literature to be assessed is May 2019
21627	4	0	4		it is also necessary to express the global mean sea surface temperature change with the global mean temperature change in this Figure SPM.1.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea	Suggestion applied.
21629	4	0	0		Figure SPM.1 right upper category (2081-2010) -> (2081-2100)	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea	Correction applied.
21631	5	21	0		Add hunting, ranching between fisheries and hydropower	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea	Noted: We have revised this text extensively in the start-up box of the SPM. The examples given are now worded to given broad-scale (inclusive) examples of the type of services provided by the ocean and cryosphere
21633	7	8	7	10	The negative effects of MHWs on coral reefs and marine ecosystems are also very important, but their negative impacts on the fisheries, especially aquaculture, is very serious. Threfore, a description of the negative impacts of MHWs on fisheries or aquaculture is needed in this SPM.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea	Noted - see revised B8
21635	10	0	13		The SROCC is structured that the contents of B3 follows the contents of B4. In this SPM, it would be helpful to change the order of B4 and B3 according to the whole report structure.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea	Noted - the whole SPM has been restructured for clarity
21637	21	53	0		The '(blue carbon)' after seaweed needs to be deleted. Seaweed ecosystem is not mentioned as blue carbon in the main report, 5.5.1.1.3.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea	Taken into account - seaweed is deleted from SPM. Chp 5 specifies high undetainties with seaweed in mitigtion thus "Seaweed aquaculture warrants further research attention."
21779	10	40	10	47	Please see this recent reference on deep coral diversity: Muir PR, Wallace CC, Pichon M, Bongaerts P. 2018 High species richness and lineage diversity of reef corals in the mesophotic zone. Proc. R. Soc. B 285: 20181987. http://dx.doi.org/10.1098/rspb.2018.1987	Nikhil Advani	World Wildlife Fund	United States of America	Noted with thanks

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
21781	22	10	22	10	Human responses to climate change can also have significant detrimental impacts to biodiversity. For example: Cascading effects of cyclones on the biodiversity of Southwest Pacific islands W. Goulding, P.T. Moss, C.A. McAlpine. Biological Conservation 193 (2016) 143–152	Nikhil Advani	World Wildlife Fund	United States of America	Noted - the revised SPM now concludes with Climate Resilient Development which encompasses the interlinkages between climate, nature, people
21973	1	40	1	40	This sentence suggests that only "scientific" knowledge is assessed in SROCC, but Chapter 1 spends several pages justifying the differentiation of indigenous knowledge and local knowledge from scientific knowledge, and explaining why it should be (and is!) taken seriously throughout the report. Could this wording reflect this?	David Schoeman	University of the Sunshnie Coast	Australia	Agreed - the wording has been changed to "By assessing new scientific literature"
21975	2	45	2	49	Why the change between % and km2/yr? This would be easier to read and interpret if the units were constant?	David Schoeman	University of the Sunshnie Coast	Australia	No longer applicable. Revised bullet states there is no statistically significant trend in Antarctic sea ice extent.
21977	4	1	4	1	For most impacts, explicit values are provided for near-term and end-of-century changes, but not for corals. Why?	David Schoeman	University of the Sunshnie Coast	Australia	Panels have been updated with a more suitable selection of variables. Data sets have been updated.
21979	7	47	7	48	Is it necessary to write Representative Concentration Pathway immediately before RCP?	David Schoeman	University of the Sunshnie Coast	Australia	Accepted - 'Representative Concentration Pathway' removed
21981	10	41	10	41	In most instances, the SPM is clear that estimated impacts for 2100 are just that…but here, we have just an overall loss of 70%. Does that mean by 2100 (in which case say so)? Or does the impact stop at this point (i.e., climate change doesn't make things worse)?	David Schoeman	University of the Sunshnie Coast	Australia	Noted - not assessed beyond 2100
21983	13	15	13	15	Despite heavy emphasis in Chapter 1 on the idea that LK and IK contribute to all aspects of observation, assessment, and adaptive responses, there seems very little input of either before this point, and the first actual mention of these knowledge systems appears for the first time on line 18 of p 20. This needs to be fixed either here or in Chapter 1?	David Schoeman	University of the Sunshnie Coast	Australia	Indigenous knowledge is strengthened in the SPM in section A and C
21985	15	1	15	1	Having worked on beaches for some decades, now, I don't think that this system's "burning ember" is correct. Sure, if you're talking about the effects of warming, I'd agree. But even at current rates of sea-level rise (~2 mm/yr), beaches are eroding globally. Projections here are for 19 mm/yr of SLR by 2100 under business as usual. Assuming that many populated shores at that point would be armoured with concrete, not only would there be no beaches because of coastal squeeze, but they would have been starved of sand long before 2100 by the demand for building the seawalls. So, if we're considering ALL impacts of cliamte change here (SLR and associated processes are extensively covered in Chapter 4), and not just warming, this could do with more thought...I think. PS Sorry for getting on my soap-box, but beaches are close to my heart, and they are often overlooked.	David Schoeman	University of the Sunshnie Coast	Australia	The assessment for the sandy beach ecosystem has been revised. Specifically, the assessment has been reviewed again by this reviewer because of his expertise on the ecosystem to ensure a more balanced assessment on the risk of impacts of climate change on sandy beach ecosystem.
21987	16	19	16	20	How can forecasts help reduce vulnerability of natural systems. I can understand how knowing of an impending MHW several months in advance might help a fishery, or a tourist operation, but it's can forecasts really help to reduce the vulnerability of natural systems?	David Schoeman	University of the Sunshnie Coast	Australia	Taken into account - the text is moved to C4.3 and specifies use of forecasts
21989	16	28	16	31	My understanding is that "early warning" systems and evacuation procedures are prepared in the knowledge of the tracks of individual cyclones (otherwise, they can be generic, and specific knowledge isn't much help). So I'm not sure that this statement isn't a bit problematic? How could climate (not weather) projections ever be expected to be useful in this context?	David Schoeman	University of the Sunshnie Coast	Australia	Noted - text removed
21991	17	1	17	1	The South Atlantic Ocean cyclone mentioned in the text on the right doesn't seem to appear in the plot?	David Schoeman	University of the Sunshnie Coast	Australia	Figure SPM.5 was removed in revision
21993	19	13	19	14	"…will…not…" is this not a little concrete? Would it be better to use confidence language?	David Schoeman	University of the Sunshnie Coast	Australia	accepted - text changed - see C 4, C 4.2 and C 4.4
21995	19	17	19	22	First, "…adaptation can proceed by…" is close to meaningless: adaptation CAN proceed by just about any means. The question is: which is best? The rest of the paragraph lists approaches and describes the range of decision-analytical methods, but then sort of tails off to say that they "can be applied", before seeming to admit that the benefits are unclear. To me, this seems like a wordy way of saying "We don't know what to do"?	David Schoeman	University of the Sunshnie Coast	Australia	Taken into consideration. The text has been substantially revised to express an assessment more clearly, with revised confidence statements and cross-references to examples presented in the main report that point to evidence for effectiveness.
21997	19	28	19	34	There are several typos in this paragraph	David Schoeman	University of the Sunshnie Coast	Australia	Editorial – copyedit to be completed prior to publication
22169	17	0	17	0	"The figure on Global account of hurricanes/ cyclones shows extreme events in North Indian Ocean from 1970s onwards. This requires clear explanation with the regard to the cause and future implications. It may also be noted that as per available information, such events, in varying degree have been occuring in North Indian Ocean.	NAYANIKA SINGH	Ministry of Environment, Forest and Climate Change	India	Figure SPM.5 was removed in revision
22411	1	1	21	43	Suggest including an explanation of how sea level rise is likely to affect coastal and (especially) small-island aquifers. In some cases seawater intrusion is likely to be another effect on the habitability of some low-lying coastal environments in addition to direct inundation.	Government of Australia	Australian Government - Department of Environment	Australia	Noted while not directly mentioned, indirectly in e.g. B9
22413	0	0	0		The term "novel" is occasionally used to describe new climate conditions (for example, SPM page 1, line 37, and SPM page 5, line 56). Suggest a more appropriate term is used, for example, "unfamiliar".	Government of Australia	Australian Government - Department of Environment	Australia	Taken into account. The entire SPM has been thoroughly revised and the term "novel" is not used in the FD anymore.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
22415	2	31	2	39	Suggest that references to the Antarctic Ice Sheet (and in the report as whole) more clearly distinguish between the West Antarctic Ice Sheet (WAIS) and East Antarctic Ice Sheet (EAIS). While this passage notes correctly that overall Antarctic Ice Sheet mass loss is dominated by the WAIS, it should note that uncertainties in the sign of the EAIS mass balance mean the data available allow for a positive mass balance for the EAIS. Also, projections suggest parts of the EAIS may see increasing accumulation under near-term warming: e.g. Zwally et al (2015), Mass gains of the Antarctic Ice Sheet exceed losses, J. Glaciol., 61(230), 1019-1036, doi:10.3189/2015JoG15J071. Shepherd et al (2018), Mass balance of the Antarctic Ice Sheet from 1992 to 2017, Nature, 558(7709), 219-222, doi:10.1038/s41586-018-0179-y. Frieler, K., P. U. Clark, F. He, C. Buizert, R. Reese, S. R. M. Ligtenberg, M. R. van den Broeke, R. Winkelmann, and A. Levermann (2015), Consistent evidence of increasing Antarctic accumulation with warming, Nature Clim. Change, 5(4), 348-352, doi:10.1038/nclimate2574.	Government of Australia	Australian Government - Department of Environment	Australia	Rejected. We do not have enough space to discuss these details here, so we limit discussion to the observed changes: Antarctic ice sheet is loosing mass, and this process is dominated by WAIS outlet glaciers acceleration. More details could be found in the main report.
22417	6	12	6	12	Suggest the report explain how the impacts described here will likely result in 'loss of educational opportunities'.	Government of Australia	Australian Government - Department of Environment	Australia	In 54214, one paragraph mentions education but it does not clarify why it is threatened by climate change. It says how education is important to deal with CC, so I agree to remove it
22419	11	9	11	10	Suggest a more detailed explanation of the likely redistribution of ocean productivity since the current statement seems to sugggest *all* people who depend on fisheries and seafood industries will experience decline in their incomes. The other related text around the issue of fisheries notes *some* fisheries will be affected by climate change. B3.4 implies high-latitude oceans may see higher productivity (higher organic carbon production).	Government of Australia	Australian Government - Department of Environment	Australia	Taken into account - the text is substantially revised
22421	1	46	2	2	Suggest the report include an introduction similar to the SRCCL SPM, which details the rationale behind the report's structure. Currently the SPM does not include an overall statement on how the SPM should be used and what should be gained from reading it other than it "synthesises key findings of the report and highlights new findings obtained since the AR5".	Government of Australia	Australian Government - Department of Environment	Australia	Agreed - the structure of the report and icons to assist the reader have been added
22423	1	0	21		Suggest simplifying and/or clarifying the rationale behind the structure of the high-level Sections of the report. Currently the integrative nature of Sections and chapters appears confusing. For example, each high level Section includes a chapter by chapter structure which begins at 1 (Section A, Chapter 1, 2, 3... Sectoin B, Chapter 1, 2, 3... etc). Suggest explaining the rationale behind the separation of the high-level Sections.	Government of Australia	Australian Government - Department of Environment	Australia	Noted - the SPM structure has been revised for clarity for the reader and in addition icons have been added to guide the reader
22425	10	10	40	47	Suggest clarifying statements to more accurately reflect that serious climate change impacts are already occurring to warm water coral reefs at current levels of warming - i.e. it is not just a future vulnerability. Suggest stating that these impacts are at the worse end of predictions, as noted in the 2018 IPCC SR1.5C (Chapter 3 summarised the evidence for this, and revised the warming thresholds downwards, relative to AR5, for when very high risk to coral reefs will occur).	Government of Australia	Australian Government - Department of Environment	Australia	Taken into account - figure SPM.2 and section A6 and B6 address risks to corals. In particular, burning ember figure SPM.3 shows corals already at risk
22427	10	10	40	47	Suggest removing the reference to "extensive bottom trawling" in relation to shallow coral reefs. This fishing method does not generally occur over shallow reef habitats as they are not suitable grounds for this type of fishing equipment to operate.	Government of Australia	Australian Government - Department of Environment	Australia	Accepted - reference has been removed
22605	2	49	2	50	The sea ice extent of the Antarctic has changed dramatically in recent years. Therefore, I hope that the contents of the 2018 results will be included before SROCC is approved in 2019.	IN-SEONG HAN	National Institute of Fisheries Science	Republic of Korea	See A.2.3 'September sea ice reductions in the Arctic during the satellite era (1979-2018; very likely 12.8 ± 2.3% per decade) ' Note the cut-off date for literature to be assessed is May 2019
22607	4	0	4		it is also necessary to express the global mean sea surface temperature change with the global mean temperature change in this Figure SPM.1.	IN-SEONG HAN	National Institute of Fisheries Science	Republic of Korea	Suggestion applied.
22609	7	8	7	10	The negative effects of MHWs on coral reefs and marine ecosystems are also very important, but their negative impacts on the fisheries, especially aquaculture, is very serious. Threfore, a description of the negative impacts of MHWs on fisheries or aquaculture is needed in this SPM.	IN-SEONG HAN	National Institute of Fisheries Science	Republic of Korea	Noted - see revised B8
22611	10	0	13		The SROCC is structured that the contents of B3 follows the contents of B4. In this SPM, it would be helpful to change the order of B4 and B3 according to the whole report structure.	IN-SEONG HAN	National Institute of Fisheries Science	Republic of Korea	Noted - the whole SPM has been restructured for clarity
22627	4	1	4	1	It would be extremely helpful if changes in permafrost in this Figure. I understand that there are in essence no numbers, however, some trends can be shown based on what is presented in the report.	Lukas Arenson	BGC Engineering Inc. / University of Manitoba	Canada	Suggestion applied.
22663	0	0	0		Tipping points and risks of abrupt changes get too little attention in the SPM. Understanding how near-term decision-making could reduce these risks would be highly relevant for policymakers (as the next decade will be so critical for the achievability of the Paris goals).	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Taken into account - the SPM has been revised substantially
22665	0	0	0		Throughout the SPM the RCP 2.6 and RCP 8.5 are simply explained as "stringent reduction scenario" and "business-as-usual high emissions scenario"or "low emission/strong mitigation future" and "high emission/weak mitigation future" respectively. For the SPM, it would be especially relevant and informative to add the extended explanation of what these RCP mean for the Paris Agreement, such as the sentence in Chapter 1, page 43 line 55 to page 44 line 1: "For reference .... RCP 2.6 is the pathway considered most compatible with the Paris Agreement goal of limiting global warming to well below 2oC".	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Taken into account - the SPM has been revised substantially and for clarity re scenarios - see footnote 7 in Section b
22667	2	20	2	21	This sentence is too technical for an SPM. Please make it understandable for policymakers.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Taken into account - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
22669	2	31	2	40	The summary statements on ice sheet mass loss must be much more concrete than this and they need to help policymakers understand the scale and significance of the accelerated rates in mass loss. The AR5 already found that the rate of ice loss from the Greenland ice sheet had accelerated more than six fold in a decade (see the WG1 SPM, page 9), so this report should provide an update on that. Has it accelerated further? What is the latest understanding of Greenland ice sheet tipping points? And similarly, how much more is now known about the rate of the ice loss in the Antarctic, and with what certainty? One would expect the SROCC SPM to consider the IMBIE findings which suggest that sea level rise due to Antarctica ice loss would have tripled in just five years. (The IMBIE Team, Shepherd, A , Ivins, E et al. (78 more authors) (2018) Mass balance of the Antarctic Ice Sheet from 1992 to 2017. Nature, 558. pp. 219-222. ISSN 0028-0836)	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	There is little to no progress with respect to the tipping point for the Greenland ice sheet as expressed in chapter 4. Results of the Imbie paper are extensively used in the report and are the fundament of the acceleration in mass loss in Antarctica. see A 1.1 and A 3.1 of SPM FD
22671	4	1	4	1	The Figure SPM.1 seems to become a helpful one! However, the figure now gives an impression of the RCP2.6 as a 1.5°C pathway, when it's not. Please be very accurate here, as even 0.1°C makes quite a big difference on the mitigation side, as 0.1°C means about 200GtCO_2.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Noted: We now show GMSAT as a continuous time series for RCP2.6 and RCP8.5 to avoid any confusion here.
22673	4	1	5	10	Figure SPM.1 rather than having the global mean temp change as a separate row in the figure, it could be better placed in the legend explaining the RCP relative to temperature, and furhter adding that RCP 2.6 is the Paris Compatible pathway (as stated in Chapter 1)	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Panels have been updated with a more suitable selection of variables.
22675	4	1	5	10	Figure SPM.1 would benefit from having RCP model that is inbetween 2.6 and 8.5 that is relevant to current policy projection, which, according to climate action tracker is between 3.1 and 3. 5 degrees Celcius (https://climateactiontracker.org/global/temperatures/)	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Noted: we did not add an additional model as the SROCC assessment focuses specifically on contrasting the RCP2.6 and RCP8.5 scenarios.
22677	9	38	9	40	RCP4.5 is not Paris Agreement compatible and the current wording of ""..while scenarios limiting anthropogenic carbon emissions (e.g., RCP4.5) will result in lower losses(high confidence)" is highly misleading the reader that RCP4.5 is an acceptable level of effort to reduce carbon emissions - which it is not and therefore this sentence is a critical misinformation	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Taken into account. Reformulated, Section B1.3 now only details RCP2.6 and RCP8.5.
22679	10	36	10	36	Anything above the Paris Agreement goals should be regarded as "high emission scenarios". The IPCC SR15 findings make it very clear. Hence, RCP4.5, RCP6.0 and RCP8.5 should all be considered high emissions scenarios, not just the extreme RCP8.5.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Noted - spelling error - should say higher
22681	10	49	10	56	This paragraph is way too technical for an SPM.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Taken into account - the entire bullet (now B5.2) has been revised to be more clear, focused and concise
22683	11	2	11	2	"Across the globe, seafood provision from some fisheries and aquaculture will be impacted by climate 3 change (high confidence)..." Is the word 'some' justified here? Sounds like an understatement.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Taken into account - the word "some" has been removed and text revised for clarity
22685	12	1	12	9	Specific management tools would benefit the SPM, such as Marine Protected Areas(MPAs) which, properly managed, have proven to control overfishing, habitat degadation, and thus increase resilience of the system.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Protected areas are now discussed in C2.1
22687	12	11	12	12	Anything above the Paris Agreement goals should be regarded as "high emission scenarios". The IPCC SR15 findings on the risks of even 2°C make it very clear. Hence, RCP4.5, RCP6.0 and RCP8.5 should all be considered high emissions scenarios, not just the extreme RCP8.5.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Noted - see added footnote 7
22689	12	30	12	32	RCP8.5 is less relevant to the policy makers as it assumes business-as-usual which doesn't exist anymore in the post Paris world where countries do have climate goals and policies - just not good enough.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Noted and rejected
22691	13	39	13	39	"However, the feasibility and affordability of hard protection, and in some cases advance measures, in such localities makes it possible to manage these risks in coming decades (medium confidence)." Perhaps "reduce these risks" would be a more accurate expression here.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Statements on hard protection have been re-written and are now included in C3 and underlying bullets
22693	15	1	15	1	Please make sure that the Figure SPM.4 is comparable to the Reasons For Concern graphs in the SR15, which means that the temperature increase should be compared to pre-industrial levels. Currently the graph gives the impression that the RCP2.6 would lead to warming of just little over 1°C while the RCP4.5°C would lead to below 2°C. This is not the case when compared to pre-industrial levels.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	The global warming levels have been revised to ensure consistency in the projected changes in air and sea water temperature assessed in previous IPCC assessment reports.
22695	19	43	20	5	Blue carbon is not only limited to coastal areas and should not be suggested as such. In light of the UNCLOS new binding instrument negotiations on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ), this is especially relevant to policy makers and the natural blue carbon potential of high seas protection needs to also be accounted for. Suggestion to add relevant open ocean language appropriately such as: "Blue carbon ecosystems naturally occur in the open ocean and the coast such as mangroves, salt marshes and seagrass, which can provide a nature based solution with multiple co-benefits" …"Conservation and protection of these carbon-rich marine and coastal ecosystems would also sustain the wide range of ecosystem services they provide and assist with climate adaptation…" Examples of open ocean primary production can be found here: Laffoley, D., Baxter, J. M., Thevenon, F. and Oliver, J. (editors). 2014. The Significance and Management of Natural Carbon Stores in the Open Ocean. Full report. Gland, Switzerland: IUCN. 124 pp.	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Noted - text revised to make clear that only coastal is discussed see C.2.5
22697	19	49	19	52	MPAs are a concrete example of such conservation measure and would benefit the sentence with more specificity with examples and provide more relevance to policymakers. Suggestion to add "...through management measures such as protected areas" after "Conservation of these habitats..."	Greeenpeace Group Review	Greenpeace East Asia	Republic of Korea	Noted SPM revised - C.2.5 uses well-managed for broader scope - MPAs are addressed in C.2.1
22797	1	37	1	37	"will continue to experience novel, unprecedented environments" seems like an odd choice of wording. The environment will change in novel and unprecedented ways, but I don't think it would be that common to create new environments	Raphael Kudela	University of California Santa Cruz	United States of America	Noted - this text was removed from the final draft

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
22799	2	20	2	20	It may be helpful (for an SPM) to specify what the total energy budget is, so that the 0.42 W/m2 has some context	Raphael Kudela	University of California Santa Cruz	United States of America	Noted - this has been removed and the text revised for clarity see A.2.1
22801	4	0	4	0	First, I like the figure. However, dark blue/dark red is difficult for some of us to visualize. Second, try to be consistent about RCP2.6 and RCP 8.5. For example, glaciers and snowcover depict it left tor right (2.6 to the left of 8.5), but marine animals and corals are depicted left to right. Given that it's already difficult to distinguish the colors, it just makes it easier to confuse going through the table	Raphael Kudela	University of California Santa Cruz	United States of America	Colour palette has been changed.
22803	7	8	7	10	Shouldn't there be a confidence attribution for this statement?	Raphael Kudela	University of California Santa Cruz	United States of America	Taken into account - Sentence revised (see A.6.3) and confidence added
22805	8	40	8	46	Suggest reformatting this. The first sentence doesn't really provide any information. You could rewrite it (for example) as: Climate change will affect ecosystems and biodiveristy of oceanic and cryospheric environments, with both the Arctic and Antarctica specifically exhibitng rapid change during the course of this century. This has implications for internationally important fisheries and food security.	Raphael Kudela	University of California Santa Cruz	United States of America	Text has been completely revised and restructured.
22807	9	13	9	13	One could argue that all species have some level of commercial or conservation value, realized or not. I would suggest at least inserting "significant" global commercial and conservation value. Also, does that mean if it's not of global value, it's less important?	Raphael Kudela	University of California Santa Cruz	United States of America	Noted - rather examples of taxa are added
22809	10	50	10	50	I'm not an expert on the confidence language but it's an odd juxtaposition having "medium confidence" next to "suggested". I would perhaps use the word "supported" instead	Raphael Kudela	University of California Santa Cruz	United States of America	Taken into account - use of uncertainty language checked throughout the SPM
22811	18	0	18	0	Consider expanding the y-axis on the plots so that the full error bar can be visualized for RCP8.5	Raphael Kudela	University of California Santa Cruz	United States of America	An alternative depiction of data has been applied. The uncertainty envelope has been placed into a single graph.
22813	0	0	0	0	A general comment: many but not all of the subsections end with a summary point that either provides some assessment of whether something can be done to improve the trajectories (B1.7, B3.11, etc.) or more generally focus on human adaptation/mitigation/resilience. As a reader, I found that framework to be useful, and would encourage the sections that end on some very specific topic to consider a similar approach (i.e. A1.7 ends on a specific scientific issue, somewhat different from other sections)	Raphael Kudela	University of California Santa Cruz	United States of America	Taken into account - the SPM has been revised substantially
22863	8	50	8	51	The international regulation related to marine and shipping sector is not limited, the IMO adopted many regulations related to safety, security and protection of marine environment, one of which is the Polar Code which is already came into force in 2017.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia	Accepted. Reference to international regulation has been erased from part B of the SPM.
22891	1	32	1	33	There is a bad logical breach in the following statement (it is a severe understatement): "The ocean and the cryosphere (snow, ice, glaciers, ice sheets, and frozen soil and ground) support human livelihoods and well-being in many ways." A more intelligent, correct and therefore appropriate statement is: "The ocean and cryosphere, which makes up more than 80% of the Earth's total surface area represent essential elements to the support of human livelyhood and well-being. They also include vitally important portions of the whole climate system."	Martin Hovland	University of Tromsø, Norway	Norway	Agree. The introduction was shortened and this text removed and revised in the added startup box
22893	1	33	1	36	The following statements are false and need rephrasing:"Global warming in response to increased emissions of greenhouse gases and other drivers due to human activities is associated with very clear and in some cases irreversible changes in the ocean and the cryosphere, altering living conditions for ecosystems and people." Here is a suggestion for a true and improved statement: "Indications of recent global warming trends, possibly in response to increased emission of greenhouse gases and other drivers, both natural and human activities, may be associated with observed specific changes in the ocan and crysophere, which in the future may alter ecosystems and living conditions for some people."	Martin Hovland	University of Tromsø, Norway	Norway	Agree - the text has been revised in the added start up box "The responses of the ocean and cryosphere to past and current human-induced greenhouse gas emissions and ongoing global warming include changes over decades to centuries that cannot be avoided, thresholds of abrupt change, and irreversibility.'
22895	1	34	1	36	There is a logical breach in the following statement: "…, altering living conditions for ecosystems and people." This is because climate, - even a changing climate is part of an ecosystem. The statement therefore has to be rephrased to provide exact meaning.	Martin Hovland	University of Tromsø, Norway	Norway	This has been done in the new start up box
22907	1	0	1		Some statements in paragraph 32 - 38 need to be more strongly grounded in an assessment. For instance, the notion of "unprecedented environments" is challenged by paleoclimate evidence (depending on timescales considered), I suggest to remove.	Valerie Masson-Delmotte	LSCE	France	Agreed text is revised
22909	2	0	2		I recommend to aim to reach a better balance between Arctic and Antarctic information, in separate bullet points, in section A and other sections.	Valerie Masson-Delmotte	LSCE	France	Taken into account - the SPM is substantially revised
22911	1	0	2		The beginning of the SPM fails to refer to drivers of climate change (Earth's energy imbalance) and the key role of energy imbalance for changes in the ocean and cryosphere. Part A may also better highlight what is new since the AR5 and could also mention gaps in observation networks (relevant for limits to the assessment).	Valerie Masson-Delmotte	LSCE	France	Agreed - efforts are made to identify in information in the FD. Where applicable gaps in observation networks are identified e.g. A3.2
22913	1	0	1		The second part of the title of part A could be removed ("illustrates…"). There is a lack of substance in the corresponding text. I am uncomforable with the expression "importance of ocean and cryosphere for climate" as they are components of the climate system.	Valerie Masson-Delmotte	LSCE	France	Agreed - title was revised to 'Observed impacts and changes|
22915	3	0	3		A1.5 : "substsantial" lacks content. What is the outcome of the assessment in terms of e.g. elevation related amplification.	Valerie Masson-Delmotte	LSCE	France	Taken into account. Elevation dependent warming is dealt with in detail in Chapter 2, but not elevated to TS and SPM, in order to focus on cryosphere changes and their impacts. Furthermore, it was not possible, due to the complexity of the issue and the regionally varying level of evidence, to provide a concise yet relevant statement on elevation dependent warming at the global scale.
22917	4	0	4		Figure SPM1 needs to be improved to report uncertainty / confidence associated with the assement (e.g. number of datasets, dispersion, level of scientific understanding…). At the moment it does not convey confidence associated with observations or projections. There could be severe misinterpretation of the size of coral pictograms with respect to the loss of diversity of reefs.	Valerie Masson-Delmotte	LSCE	France	Suggestion applied.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
22919	5	0	5		A2.1 and A2.4 Report years for which numbers are provided (13% and 27% of global population in which year?). Separate numbers for Arctic and for mountain regions.	Valerie Masson-Delmotte	LSCE	France	Noted: This information is now provided in the start-up box for the SPM
22921	5	0	5		A2.2. It would be relevant to identify which climate variables are key for mountain ecosystem shifts (is it dominated by temperature effects?). Are there any climate biophysical feedbacks of these shifts?	Valerie Masson-Delmotte	LSCE	France	Text rewritten - see new A4
22923	6	0	6		Lake and river ice are not considered in mountain cryosphere, why? Could it be possible to provide a sense of the climate driver of mountain cryosphere change too (D&A in the climate WGI sense), so that the figure would provide information on climate variables linked to human influence on the global climate system that affect regional cryosphere changes and in them their consequences, if / when available? The figure also needs to convey a sense of the time period considered (completely missing).	Valerie Masson-Delmotte	LSCE	France	Figure is largely redrawn. The different components of the cryosphere are no longer differentiated but the focus is on the impacts
22925	6	0	6		A3 is merging two very different ideas, one that is the irreversibility, and the other one on hazards. I would suggest to move the irreversible aspects at the very beginning (statements of facts, specificities of these climate components) and focus this subsection on hazards. There is substance in the sub bullets to be upgraded to the subssection text. I suggest a focus on marine heatwaves and avalanches (novel since AR5 and SREX). I also suggest a more systematic approach to exposure trends in items of part A building on the last sentence of A3.3. For instance, trends of population in coastal regions, Arctic, mountains...	Valerie Masson-Delmotte	LSCE	France	Taken into account - the SPM was restructured for clarity
22927	8	0	8		B2. I suggest to stress the differences between Arctic and Antarctic in the HS (e.g. different times of emergence). There is a need in section B to provide links between scenarios and levels of global warming to enable a continuity with the approach of SR15 (what happens when you read a certain level of warming, what depends on the rate of global warming etc).	Valerie Masson-Delmotte	LSCE	France	Noted - the SPM has been revised substantially
22929	9	0	9		B2.5 and B2.6 are very generic and vague on the magnitude of emissions associated with permafrost thawing. SR15 provided numbers for 1.5°C global warming (a range). It would be very relevant to consider providing more information here.	Valerie Masson-Delmotte	LSCE	France	Accepted Quantification added
22931	8	0	10		The "habitability" concept expressed in B1.7 could be also mentioned in B1.	Valerie Masson-Delmotte	LSCE	France	No longer applicable - section rephrased
22933	8	0	10		Content of B2.7 needs to be lifted at the level of B2 headline statement. There is a need to carefully consider not only risks (done) but also opportunities so as to provide an objective assessment. It is not addressed in the current SPM.	Valerie Masson-Delmotte	LSCE	France	Noted - included in headline statements in Section C
22935	8	0	10		There is duplication on food security in B2 and B3. I suggest to avoid duplication.	Valerie Masson-Delmotte	LSCE	France	The SPM has been revised and restructured for clarity. In the revised draft "food security" in terrestrial/freshwater systems is included in B7 and food security in marine systems in B8
22937	10	0	10		Please better highlight what is new in bullet points of B3.4. What elements of AR5 have been revisited?	Valerie Masson-Delmotte	LSCE	France	Noted - the SPM is revised and more nuanced information an be found in B.5
22939	11	0	11		B3.8 , 3.9 and 3.10 are very long. Consider splting in different sub bullets for different ideas. The harmful algual blooms should be a separate item with information on the scale of health related issues. There is a lack of counter part in the observations in part A (e.g. case studies, trends?).	Valerie Masson-Delmotte	LSCE	France	Accepted - the entire SPM has been restructured and revised. Most parts of B3.8, 3.9., 3.10 are now part of B5 and split by topics. HABs are related with seafood safety in B8.2 with an equivalent in A8.2
22941	0	0	0		There is a need to consider the whole visual elements envisaged for SROCC SPM and how they fit within work underway for the AR6 main reports. Figure 1 is very schematic and does not fully convey the elements considered (e.g. lack of Antarctic information, missing ocean biogeochemistry which are globally important). FIgure 2 OK with regional info. Figure 3 focused on only one aspect of ocean changes, is this the only one to be illustrated in SROCC? Figure SPM4 needs to build on a fully transparent and traceable assessment and convey level of confidence (there is a challenge associated with a "generalisation" to types of geographies. I strongly disagree with the choice of Figure SPM. While cyclones are important for risk, there is no clear message coming from the figure apart from the lack of any clear trend. AR6 WGI Chapter 11 will fully revisit cyclones in a changing climate, so this creates a risk for this finding to be challenged in 2021 (including work on detection and attribution in a systematic way). I would rather suggest a focus on marine heat waves which are really important in terms of consequences for marine ecosystems and are a novel element. A figure showing projected trends of temperature at ocean surface plus projected changes in marine heat waves plus projected changes in biomass could be considered. Figure SPM6 needs to convey a sense of the lines of evidence used and the associated confidence level (not just a dispersion). This means very little visual representation of changes in e.g. polar cryosphere and implications (missing in graphs apart from schematic SPM1).	Valerie Masson-Delmotte	LSCE	France	Taken into account - the SPM has been revised substantially including figures
22943	11	0	11		B3.10 could be reorganised with B3.8 on health issues, and B3.10 would then have a separate item on food security. The text is quite limited on food security, more substance would make sense (e.g. depending on level of warming).	Valerie Masson-Delmotte	LSCE	France	Noted - the SPM has been revised substantially
22945	11	0	11		Health is only considered in projections, not in observations. Moreover, mental health is not really treated, while there is literature related to e.g. solastagia relevant for SROCC.	Valerie Masson-Delmotte	LSCE	France	True, mental health is not developed in SROCC.
22947	12	0	12		B4. Tens of millions : depending on scenario?	Valerie Masson-Delmotte	LSCE	France	Taken into account - see added startup box for people in low-lying coastal zone and B9.2 (280 million)
22949	12	0	12		B4.1 is providing new information compared to AR5 on Antarctic contribution to future sea level rise. Wording needs to be adjusted (model studies demonstrate nothing unless you have confidence in models to represent adequately the mechanisms and processes). Please explain better why there is medium confidence and where the likely range comes from, and how it differs in different scenarios. I suggest to expand this part.	Valerie Masson-Delmotte	LSCE	France	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM
22951	12	0	12		B4.2 to be integrated with B4.1 to provide more transparent information on Antarctic sea level contribution as a function of scenario. Coherency with SR15 should be explicitely addressed.	Valerie Masson-Delmotte	LSCE	France	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
22953	12	0	12		B4.3 is the place to bring in physically plausible outlooks building on not just model spread but also confidence in models, observed rates of changes, paleo.	Valerie Masson-Delmotte	LSCE	France	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM
22955	13	0	13		B5 is quite void of substance and generic. I suggest to elevate substance from B5.2 and B5.3 in the headline statement.	Valerie Masson-Delmotte	LSCE	France	Taken into account - Headline statement (now B9) has been rewritten for more clarity and more substance has been included
22957	14	0	14		At the end of section B, maybe after B5.6, issues on how to implement response options should refer to education, climate literacy, social learning. It is not just about decision makers but also a major issue for societal change.	Valerie Masson-Delmotte	LSCE	France	These aspects have been introduced in C4 (see for example C4.2).
22959	14	0	14		Figure SPM4. Please provide confidence, explain why the assessment ends at 3°C or 4°C for different items, and provide clarity on how adaptation is accounted for (residual risk?).	Valerie Masson-Delmotte	LSCE	France	Confidence has been added to embers. Adaptation is now dealt in more detail in a separate figure (Fig. SPM 5).
22961	15	0	15		B6 is missing elements on response options (e.g. monitoring networks, early warning…).	Valerie Masson-Delmotte	LSCE	France	Taken in account - see additional detail in revised figure SPM.5
22963	15	0	15		B6.2 "slightly higher" reads very cautious, please provide more substance on what "slightly" means (not typical IPCC assessment language). There is a strong need to have an observation counterpart for changes in tropical cyclones in part A as done for marine heat waves.	Valerie Masson-Delmotte	LSCE	France	Taken into account - the text is revised in B.3.2 - while the increase is not quantified, statement can be made in increases under emissions pathways
22965	15	0	15		B6.5 The end of this bullet point should be lifted to the Headline statement B6 as it covers response options.	Valerie Masson-Delmotte	LSCE	France	This has been considered in the revision exercise.
22967	15	0	16		Figures SPM5 and SPM6 place an emphasis on extremes. What about regional trends in sea level and other aspects ? What are the key messages that we need to convey visually in the SPM?	Valerie Masson-Delmotte	LSCE	France	Noted - Figure SPM3 and SPM4 provides regional information
22969	16	0	16		There is missing information in part A on observations related to AMOC. This needds to be added in part A. The headline statement reads as technical in relationship to RCPs ; could it be possible to link it to the level of warming (1.5, 2, 3 or more)?	Valerie Masson-Delmotte	LSCE	France	An assessment of observed AMOC changes in now included in the FD
22971	19	0	19		C1 and C1.1 reads as very very generic (truism). Not needed here, I think, and covers mitigation (outside the scope). Section C1 bullets lack substance. What about case studies about the adaptation experience?	Valerie Masson-Delmotte	LSCE	France	Taken into account - Section C has been substantially revised
22973	19	0	19		C2.1 is very generic and abstract. Are there lessons learnt from ongoing adaptation experiences?	Valerie Masson-Delmotte	LSCE	France	Taken into account - Section C has been substantially revised
22975	19	0	19		C2.3 needs to be more quantitative (not "can be much greater than …") but the potential.	Valerie Masson-Delmotte	LSCE	France	Taken into account - Section C has been substantially revised
22977	20	0	20		C2.5 : last sentence very vague, lacks substance (ex what are undesirable non climatic consequences).	Valerie Masson-Delmotte	LSCE	France	Noted - C2 has been substantially revised and text removed
22979	21	0	21		C3.6 could also cover education and social learning.	Valerie Masson-Delmotte	LSCE	France	Taken into account. C4, a high-level statement, mentions " Education and climate literacy, monitoring and forecasting, funding, and institutional support are also essential and enable social learning and participation in context-specific adaptation and the negotiation of trade-offs and co-benefits between reducing immediate risks and building resilience (high confidence). " C4.2 traces the link between education and social learning.
22981	21	0	21		Reading C4.2, it seems that there is some circular reasoning about CRDPs.	Valerie Masson-Delmotte	LSCE	France	Taken into account - the bullet has been rewritten for clarity - see C5
22983	21	0	21		C4.3 could provide more context specific input (e.g. Arctic, Third Pole), and various scales (citizen, community, other). At the moment it is so general that it fails to make a clear point.	Valerie Masson-Delmotte	LSCE	France	Taken into account - the text has been rewritten for clarity and provide more detail - see section C4
23097	0	0	0		It would be relevant to highlight issues like deepl uncertainty, robust or flexible decision making in the SPM of this report (having a box on key definitions). This is relevant for x chapters. The SPM could also mention key knowledge gaps incl. Limits of observing systems.	Valerie Masson-Delmotte	LSCE	France	Taken into account - the SPM has been revised substantially
23211	0	0	0		SPM needs more inputs on economics. Elements available from many chapters but not conveyed in ES/SPM yet.	Valerie Masson-Delmotte	LSCE	France	Taken into account - the SPM has been revised substantially
23331	0	0	0		It would be relevant to highlight issues like deepl uncertainty, robust or flexible decision making in the SPM of this report (having a box on key definitions). This is relevant for x chapters. The SPM could also mention key knowledge gaps incl. Limits of observing systems.	Valerie Masson-Delmotte	LSCE	France	Noted with thanks. The SPM has been substantially revised
23431	0	0	0		Overall, the SPM reads well and has a logical structure. Section C may need, however, some reorganisation and more specificity (some of the statements do not point to oceans and cryosphere, but are more general).	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted with thanks. The SPM has been substantially revised
23433	0	0	0		Please use the calibrated uncertainty language in a consistent manner and aligned with the guidance note. All statements should be accompanied with an assessment. "Low confidence" statements should be avoided, unless it is well explained how the considerable uncertainty is a major policy-relevant finding.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted with thanks. The SPM has been substantially revised and use of uncertainty language checked
23435	0	0	0		Should avoid too specific examples (e.g. "such as wolverines", in A2.2), as selection criteria are not clear and the specificity would seem to be too high for the SPM.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - specificity removed
23437	1	32	1	33	Suggest amending the sentence to recognise that the systems in question also have intrinsic value (valuable on their own right, as unique systems, in addition to value from the human use perspective.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	The introduction was shortened and this text removed and revised in the added startup box
23439	1	36	1	38	This is already stated in the first part of the paragraph. Suggest removing or integrating with the sentence above.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	The text has been revised accordingly in the new start up box
23441	2	5	2	6	The heading is readable, but would seem to"downplay" the issue - that the changes ARE (not only "illustrate") important. Suggest, for example", something akin to "Ongoing changes in the… and their importance for… are already evident and increasing".	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	The title has been completely revised for the FD to "Observed changes and impacts"
23443	2	8	2	8	Suggest changing "global" to "global, regional and local", to emphasise that this is important on all scales.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	No longer applicable - statement modified
23445	2	28	2	28	Not clear why a "low confidence" finding is brought up in the SPM. (The issue is important, but may not be needed in the SPM.)	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - sentence removed from FD. See redesigned Figure SPM.2 for regional ocean

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
23447	2	46	2	46	"for example through changes in albedo" would seem to be unnecessarily detailed here, not needed for the message to come across.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - albedo no longer mentioned.
23449	2	46	2	46	Not clear why a "low confidence" finding is included. (The issue is important, but may not be needed in the SPM.)	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted: text regarding potential impacts of sea ice loss on midlatitude weather was revised. This specific low confidence statement no longer appears.
23451	2	42	3	3	Suggest considering adding a finding on sea ice thickness.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted: statement added to the SPM final draft stating that it is virtually certain Arctic sea ice has thinned over recent decades.
23453	3	2	3	2	Please specify what kind of "meridional wind trends" have been observed. How significant?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account; we have removed information at this level of detail.
23455	3	19	3	22	This is an important issue, but not observed ongoing change. Consider redrafting or moving too Secion B (B2.5?).	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. This section (now A1.4 in the SPM SOD) is about observations and assesses carbon storage. Projected release of GHG from permafrost is assessed in B1.3.
23457	2	8	3	32	Suggest adding a paragraph on Sea Level Rise, which is not included in the present draft SPM.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Agreed - A.3 in the FD now includes a focus on SLR with dedicated underlying bullets
23459	4	1	4	5	Consider identifying collectively the first three items in the figure as "Framing" or "Drivers" and the other data elements as "ocean and cryosphere changes". Could also add GHG emissions to the first part of the figure.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted: we have carefully considered the layout of the figure. We have not added labels for the groupings, but the order of the panels is designed with logical groupings in mind. We discussed whether it was better to show CO2 concentration or CO2 emissions (we don't have space to show both) and decided that concentration would be more accessible to a wide range of readers.
23461	4	1	4	5	Suggest "loss of coral reefs" instead of "Coral reef degradation", for clarity, if appropriate.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Panels have been updated with a more suitable selection of variables.
23463	4	1	4	5	For the 2081-2100 elements (e.g. SLR, Arctic summer sea ice extent" - would it be possible to illustrate that there is a trend (inclined rather that horizontal line over the two decades)?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Overall graphical approach has been changed in order to ease understanding.
23465	5	32	5	32	"such as wolverines" is probably too detailed (and selection criteria for an example are not clear).	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - the example of wolverines has been removed. revised text in A4.1
23467	5	52	5	53	The combination of "remains difficult" and "medium confidence" is quite unclear. What does the medium confidence refer to - the attribution, or that attribution is difficult"? Suggest redrafting the sentence.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - the sentence is removed - and SPM revised for clarity e.g. see A.3.5
23469	6	12	6	12	The "loss of educational opportunities" is very unclear. How relevant it is in the SPM?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - this statement has been deleted
23471	6	12	6	12	The "negative impacts on Indigenous knowledge" is unclear.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - the text has been revised
23473	6	16	6	18	The caption is a bit unclear - "also"?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - Figure has been completely revised and caption rewritten to improve clarity
23475	7	1	7	1	Suggest "prompt" instead of "initiate", in order to clarify what gives rise to and who acts.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	No longer applicable - sentence removed
23477	7	37	7	37	"if adequate adaptation measures are not taken" would seem to suggest that full adaptation is possible. Limits to adaptation and the non-feasibility of thorough adaptation measures to protect ecosystems and biodiversity are not recognised here.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. This statement was revised and made more concrete, in relationship with specific sectors and components.
23479	7	42	7	43	What is meant by "limited long-term change"? Does it align with the overall global (regionally varying) mean precipitation changes?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. The statement was thoroughly revised, with a stronger focus on changes in the cryosphere and corresponding impacts and risks. Future changes in winter snow cover are assessed and included in the SPM, but not the precipitation itself (which is covered in Chapter 2).
23481	8	2	8	3	"Quantitative projections… in some mountain regions." would seem to be unnecessary, already expressed in a sense in the previous sentence.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	No longer applicable - sentence removed
23483	8	24	8	24	It would seem that there indeed are multiple drivers, so "may also be" should be change to, e.g., "are also". Even better, the paragraphu could be redrafted to display that impacts and possible responses are shaped by multiple factors. The "however… may also be" would seem to have a different flavour.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	The entire bullet has been completely revised to become more clear and specific
23485	8	42	8	42	What aspect does "internationally" attempt to emphasise? "important" may suffice here.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - text has been revised
23487	9	31	9	31	Suggest "melting of" instead of "changes to", if appropriate.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - 'changes to permafrost' no longer used
23489	10	15	10	15	Does the 3.5% apply to all RCPs?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - Sentence removed from revised SPM - see B2.4 and B2.6
23491	10	20	10	22	Here, changes to the deep ocean are nevertheless driven by emissions, so "controlled by" may be unclear.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	No longer applicable - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
23493	11	7	11	7	Is the specification of "multiple models" needed? The inclusion makes the confidence statement more unclear.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - text deleted. Figure SPM.3 indicates models and projections used
23495	11	23	11	24	The writing is a bit confusing, as the impacts are first mentioned to be largest in tropical and polar systems, and then (decrease in catch) among the largest regional declines. Of polar and tropical? Or mix of increases and decreases?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - The entire part has been restructured and revised for clarity
23497	12	1	12	1	Suggest changing "carbon emission" to "GHG mitigation". Cf. B4.2	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - sentence has been removed
23499	12	12	12	12	Not only under "high emission scenarios", but also "medium", if the "high" refers to RCP8.5.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - high does refer to RCP8.5 - see footnote 7 , SROCC SPM contrasts RCP2.6 and RCP8.5
23501	12	14	12	14	"Tens of millions" sounds surprisingly few. The referenced chapter sections does not clearly point to the finding. Please check and if approrpriate, amend the underlying chapter.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	This has been removed from the revised SPM.
23503	12	16	12	16	Suggest removal of "Despite continuation of sea level rise" - it would not seem to be needed for understanding here, and thus only confuses the reader.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - phrase "despite continuation" has been removed
23505	12	31	12	31	Suggest changing "towards RCP8.5" to "with increasing emissions", for enhanced readibility.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	No longer applicable - sentence revised
23507	12	35	12	36	The last sentence (Few…) would seem to be out of place, not least as the overall section refers projections, not observations and attribution.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - sentence removed
23509	12	54	13	1	The combination of "remains difficult" and "medium confidence" is quite unclear. What does the medium confidence refer to - the attribution, or that attribution is difficult"? Suggest redrafting the sentence. For example, emphasis could be more on the fact that there are multiple drivers.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - the SPM has been revised thoroughly.
23511	13	15	13	15	What is emphasised with "continuum"? Is it different from, e.g., "range"?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - the entire bullet has been re-written for more clarity and the term "continuum" removed
23513	13	47	13	47	How do warning systems help to reduce residual SLR risk? Is ESL meant here instead?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	This sentence has been removed from the revised SPM.
23515	14	12	14	12	How do "pressing immediate needs" tend to dampen community efforts? Some other development or suchlike needs? Resource allocation?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	The bullet has been re-written and this statement doesn't exist anymore
23517	15	1	15	1	Consider adding horizontal grey bars for 1.5 degrees and 2 degrees.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Suggestion acknowledged.
23519	15	6	15	6	What does "mitigation" refer to here? (Assumedly not mitigation already in e.g. RCP2.6.) If the idea is "mitigation" in the disaster community terminology sense (handling impacts), it would be good to rephrase, as climate-use is different.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - mitigation is removed from the revised fig (SPM.5)
23521	15	16	15	16	Suggest changing "This conclusion… fact that our assessment..." to "However, the assessment…"	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Caption has been rewritten and checked for accuracy.
23523	15	24	16	1	"This context…" the formulation of the issue is a bit unclear. As given here, removing all the people from the island would seem to be an effective adaptation measure. However, it leads to impacts elsewhere. "Actual effectiveness" should perhaps be reworded as "effective outcome", "net effectiveness", or "true effectiveness", ...	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - the figure and caption are revised - see Fig SPM.5 here in panel c effectiveness refers to technological and biophysical limits its
23525	16	5	16	5	MIght "marine heat waves" meant here, instead of "heat waves"?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Yes - taken into account
23527	16	9	16	11	The second sentence in the frame would seem to repeat, in essence, the first sentence. Suggest removal or redrafting the two sentences.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - redundancy removed
23529	16	16	16	16	Can a "one-in-hundred-day" event be considered as an extreme event?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	No longer applicable - not in revised SPM
23531	16	19	16	19	The "Forecasts…" would seem to be misplaced as it considers responses rather than an event. Move to a later section?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	No longer applicable - sentence removed
23533	16	23	16	24	The "While some… is required." would seem to be misplaced as it considers responses rather than an event. Move to a later section?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - removed from section
23535	16	28	16	28	Poleward shift would seem to (section 6.3.3.2) apply also to extratropical cyclones, which could be mentioned here. Some additional information on extratropical cyclones (e.g. on changes to strongest storms) would also be useful.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Rejected - it is not possible to include everything in SPM
23537	16	50	16	52	The examples would seem to be unnecessary detail in the SPM, and as neither selection criteria are clear, could well be omitted to streamline the main message.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted - examples have been removed
23539	17	5	17	6	The "latitudinal expansion" should be explained/marked in the figure SPM.5.For example, depict the latitude that cuts across the data clouds from left to right.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Figure SPM.5 was removed in revision

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
23541	18	1	18	10	Please indicate clearly that the frequency data are on a logarithmic scale.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	The overall graphical approach, including the y-axis label, has been reworked to ease comprehension.
23543	18	6	18	6	Should omit "and therefore will no longer classify as extreme events". They do classify as such in terms of recent/present climate, which is the basis of vulnerability assessment.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Suggestion acknowledged. The caption has been rewritten to ease comprehension.
23545	18	7	18	7	Suggest considering showing the mean sea level rise in the figure, in conjunction with the "Heights".	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	The overall graphical approach, including the y-axis label, has been reworked to ease comprehension.
23547	18	18	18	18	The B7.1 would seem to be quite hypothetical, if the "weaken" in the headline statement and "substantial weakening" in B7.1 are far from each other. Suggest removal or rephrasing.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - the SPM has been revised for a clearer narrative. Historical observations of AMOC are an A.2.8 and projections with consequences in B.2.8.
23549	18	26	18	27	It is not clear what the "medium confidence" refers to. Is there medium confidence that identification has been done in some climate models, or does the confidence level refer to the new tipping element being an actual one?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - text on SPG removed from SPM
23551	18	31	18	31	Should avoid "low confidence" findings in the SPM. The significance of the issue is here not very clear either.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - text on SPG removed from SPM
23553	19	3	19	3	"including responses to sea level rise" would seem to be unnecessary detail. Its specific mention would not seem to follow from the contents of C1.1-C1.3 either.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. C1 is kept on a more generic level now.
23555	19	5	19	5	Perhaps "even in cases in which risk is deeply uncertain", or suchlike. Not all relevant risks here are "deeply uncertain".	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Accepted. Text has been changed.
23557	19	44	19	45	The detail may be too much here. Could omit "Some 151… all three." (This is found in the underlying Chapter, incl. Its Executive Summary, so the information is available for readers.) Or state that the systems are found all around the world.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Agreed - sentence deleted
23559	19	47	19	48	It is not readily clear how "reaching national net zero emission targets" which assumedly refer to antropogenic emissions and uptakes could ensue from this, as existing stocks and uptakes, future reference pathways do not always/fully count agains GHG emissions (depending on accounting principles).	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - sentence deleted from revised SPM and replaced with assessment of mitigation potential (C.2.5)
23561	20	16	20	16	"better" than what?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted - here the authors wants to say that adaptive governance systems are better than the usual governance system which is devoid of adaptation planning
23563	20	18	20	18	"Humans" is unnecessarily imprecise. Which actors are referred to?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	accepted - text changed - see section C 4.4
23565	20	28	20	28	"the" attention? - by whom?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. Sentence revised.
23567	20	32	20	32	What is the reason of writing "polar" and then further specifying "Arctic"? Intruduces risk of confusion. Would the latter suffice?	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. Sentence revised.
23569	20	32	20	40	The Arctic Council that involves countries and indigeneous peoples could be mentioned here as a significant example (cf. Section 3.5), or, alternatively, in C3.6.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	taken into account. Regional coordination is discussed inC4.1
23571	20	52	21	3	Could consider combining with C4.3.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted. Bullet has been revised an governance challenges discussed in various parts of C, according to systems addressed,
23573	21	5	21	8	The Arctic Council that involves countries and indigeneous peoples could be mentioned here (cf. Section 3.5).	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted. The SPM is written at a high level of generality, so it does not include specific detail. It signals the importance of organizations such as the Arctic Council in C4.1 "Regional cooperation, treaties and conventions in the polar regions, and in some mountain areas and transboundary river basins can support adaptation action; however, the extent to which into regional policy frameworks is currently limited (high confidence). In the Arctic and some mountain regions, institutional arrangements that provide strong multiscale linkages with local and indigenous communities benefit adaptation (high confidence)." The Arctic Council is one of the few organizations to receive lengthy treatment (multiple paragraphs) in SROCC (3.5.3.2.1 Formal arrangements: polar conventions and institutions).
23575	21	22	21	22	The "future" here may not be distant in real terms, but actors' perception of it being distant may be so. Or,"distant" in present-day decision-making terms? Please consider revision.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Noted. Sentence revised.
23577	21	33	21	41	Could consider combining with C3.5.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account. Cooperation is now addressed in (new) C4.
23707	15	26	15	26	The white colour at the upper end of (C) bar would seem to refer to panel C, instead of panel B.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Caption has been rewritten and checked for accuracy.
23709	18	1	18	1	The box in the upper left corner needs to have larger font, for better readability.	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Font size has been increased to ease readability.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
23727	0	0	0		A point on MISI and MICI on the West Antarctic Ice Sheet from 4.2.3.1.2 would be useful to include in the SPM. This section in Chapter 4 is well-balanced and captures the research frontline. As this theme has considerable implications for future SLR, and the possibility og approaching the tipping point for WAIS if sustained warming continues, this would well deserve some space in the SPM. (If material would need to be removed to fit this in, the B7.1 part on AMOC is a contender as it addresses a very unlikely development.)	Government of Sweden	Swedish Meteorological and Hydrological Institute	Sweden	Taken into account - see revised A3.2
23817	2	12	2	13	the word "accelerated" is often misconstrued to imply a constate rate of increase. Suggest wording similar to "The rate of sea level rise has increased…"	Government of New Zealand	Ministry for the Environment	New Zealand	Rejected - Thanks for the suggestion, however, it has a specific scientific meaning.
23819	2	31	2	32	This statement should include a reference year/period	Government of New Zealand	Ministry for the Environment	New Zealand	The reference year is mentioned in the next sentence, New text indicates period of time - see SPM FD A1.1
23821	3	21	3	22	In the SPM, any indication of the size/likelihood of potential future emissions from permafrost would be more useful that the statement that it is globally relevant.	Government of New Zealand	Ministry for the Environment	New Zealand	Taken into account. This section (now A1.4 in the SPM SOD) is about observations and assesses carbon storage. Projected release of GHG from permafrost is assessed in B1.3.
23823	4	0	4	0	Good visualisation- clear and easy to interpret	Government of New Zealand	Ministry for the Environment	New Zealand	Many thanks.
23825	4	0	4	0	First row should refer to Atmospheric Carbon Dioxide	Government of New Zealand	Ministry for the Environment	New Zealand	Suggestion applied.
23827	4	0	4	0	It may be necessary to distinguish between symbols which are length-based, and those that are area-based	Government of New Zealand	Ministry for the Environment	New Zealand	Overall graphical approach has been changed in order to ease understanding.
23829	5	13	5	17	We support the inclusion of this important material in the SPM	Government of New Zealand	Ministry for the Environment	New Zealand	Noted
23831	8	44	8	45	The SPM should provide as much information as possible about the nature of these implications.	Government of New Zealand	Ministry for the Environment	New Zealand	Noted and information added as appropriate
23833	12	12	12	12	the word "accelerate" is often misconstrued to imply a constate rate of increase. Suggest wording similar to "The rate of sea level rise will increase…"	Government of New Zealand	Ministry for the Environment	New Zealand	Taken into account - headline statement (now B9) has been completely revised and the term "accelerated" removed
23835	13	8	13	13	We support the inclusion of this important section in the SPM	Government of New Zealand	Ministry for the Environment	New Zealand	Noted
23837	13	49	13	50	Retreat may not eliminate the residual risk depending on circumstances. Suggest "virtually eliminates" or similar.	Government of New Zealand	Ministry for the Environment	New Zealand	Taken into account - this part is now included in C3.2 where it says "…retreat is especially effective,…"
23839	18	0	18	0	The choice of scale means that for the Pacific region, the difference between RCP2.6 and 8.5 in 2081-2100 cannot be distinguished. Perhaps the figure could be annotated to clarify this?	Government of New Zealand	Ministry for the Environment	New Zealand	An alternative depiction of data has been applied. The RCPs has been placed into a single graph.
23841	19	3	19	5	We support the inclusion of this important section in the SPM	Government of New Zealand	Ministry for the Environment	New Zealand	Noted. Thank you.
23847	0	0	0	0	The SPM could be reformulated to reduce redundancy and increase conciseness. A clearer plot might be achievable, for instance, if a stronger focus is placed on the relationship between climate changes and their impacts or between the characteristics of the changes and their impacts in each region.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Taken into account - the SPM has been revised substantially
23849	2	28	2	29	We wonder if the statement that changes in the tropical ocean are due to natural variability is in full agreement across studies.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Rejected - the text does not attribute all changes int he tropic to natural variations, but notes that this region displays substantial natural variability which makes it difficult to attribute trends to human activity
23851	2	31	2	33	The addition of some typical time scale that show mass loss of both Greenland ice sheet and Antarctic ice sheet may be needed.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	The period referred to in the first sentence is mentioned in the second sentence being mass loss since 2000 for Greenland and 2005 for Antarctica. Done - see A 1.1 and A 3.1 of SPM FD
23853	2	35	2	40	The current formulation seems confusing to an average policy maker, because in the first part it is mentioned that "attribution of mass loss from ice sheets to human-induced climate change is currently not possible.", while in the latter part, it is described that "Anthropogenic forcing has been the dominant cause of global mean steric sea level rise since 1970 (high confidence). Another formulation may be necessary to avoid discrepancy at first sight.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	We do not discuss attribution in the final version of SPM (see section A 1.1). Sea level rise is discussed in section A3
23855	2	39	2	40	We suggest moving the last sentence of A1.3, "Anthropogenic forcing has been the dominant cause of global mean steric sea level rise since 1970 (high confidence)." to A1.1.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	The SPM has been redesigned. Section A3 is now gives a focus on sea level rise providing quantitative information
23857	2	48	2	50	It would seem better to unify the description in referring to the Arctic snow cover extent (percent per decade) and the Antarctic sea ice extent (km2 per year) for ease of understanding.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	No longer applicable - statement on Antarctic SIE modified
23859	3	10	3	10	Suggest modifying "610±90kg m2 yr-1" to "610±90kg m-2 yr-1".	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	No longer applicable - sentence removed
23861	3	12	3	12	Suggest modifying 900kg m2 yr-1" and "190kg m2 yr-1" to ">900kg m-2 yr-1" and 190kg m-2 yr-1".	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	No longer applicable - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
23863	4	0	4	0	For Figure SPM.1, the addition of the description of changes in the area extent of (near surface) permafrost in the northern hemisphere will be greatly informative, so as to correspond to the description in A1.6. The present-day estimation can be obtained from the following: Zhang et al., 1999, 2000, 2003; and Brown et al. 1997. In addition, the future projections under different emission scenarios are available from Koven et al. 2013; Slater and Lawrence, 2013; Guo et al. 2016. Additional reference other than those already in the SOD, Chapter 3 are suggested as follows. Brown, J., Ferrians, Jr., O. J., Heginbottom, J. A. & Melnikov, E. S. 1997: Circum-Arctic Map of Permafrost and Ground-Ice Conditions, Geological Survey for the International Permafrost Association. USGS Circum-Pacific Map Series, Map CP-45, scale: 1:10,000,000. Washington, DC. Guo, D., and H. Wang (2016), CMIP5 permafrost degradation projection: A comparison among different regions, J. Geophys. Res. Atmos., 121, 4499–4517, doi:10.1002/2015JD024108. Zhang, T., R. G. Barry, K. Knowles, J. A. Heginbotom, and J. Brown (1999), Statistics and characteristics of permafrost and ground-ice distribution in the Northern Hemisphere, Pol. Geogr., 23, 132– 154. Zhang, T., J. A. Heginbotom, R. G. Barry, and J. Brown (2000), Further statistics on the distribution of permafrost and ground ice in the Northern Hemisphere, Pol. Geogr., 24, 126–131. Zhang, T., R. G. Barry, K. Knowles, F. Ling, and R. L. Armstrong (2003), Distribution of seasonally and perennially frozen ground in the Northern Hemisphere, in Proceedings of the 8th International Conference on Permafrost, 21–25 July, 2003, Zurich, Switzerland, vol. 2, edited by M. Phillips, S. M. Springman, and L. U. Arenson, pp. 1289–1294, A. A. Balkema, Brookfield, Vt.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Accepted: A panel on Northern Hemisphere permafrost has been added to SPM.1
23865	4	0	4	0	Regarding the row of "Coral reef degradation" in the Figure SPM.1, the color usage could be modified. For instance, for this row, the red letters are used for 2℃ or more warming, and the blue letters are used for 1.5℃ warming, while in all the other rows, the red letters refer to RCP8.5 and the blue letters, to RCP2.6. In order to avoid confusion by the reader, it would seem better to use different colors to refer to different scenarios.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Colour palette has been changed, and we also removed the icons.
23867	4	1	5	10	We would like to request a clarification of the detailed sources of the projected Global mean temperature changes in the Figure SPM.1. We recognize that Global mean temperature changes based on RCPs are not shown in SR1.5.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Noted: the data for this panel has been updated to continuous time series. Details are now traceable to Cross-Chapter Box 1 in chapter 1 and the accompanying supplementary material.
23869	4	1	5	10	The source of global mean sea level rise would be "4.2.3.2".	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Noted: section references have been updated
23871	5	45	5	47	Based on the Cross-Chapter Box 7, we suggest that the population of Low-Lying Islands and Coasts (>10% of the global population) or Low Elevation Coastal Zones (around 625 million people in 2000) be mentioned as the most vulnerable people to sea level rise.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Taken into account - The vulnerability of human communities in low-lying areas is highlighted in headlines statements A9 and B9 and underlying bullets, as well as in Figures SPM 4 and 5
23873	5	49	5	51	Examples of increasing evidence of changes at the coast seem not to be comprehensive (e.g. cultural and aesthetic values could be included in ecosystem services). We suggest examples be aligned with the title of subsections from 4.3.3.2 to 4.3.3.6 (submergence and flooding of coastal areas, coastal erosion, salinization, ecosystems and ecosystem services, and human activities).	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Noted the SPM has been substantially revised see e.g. B9
23875	10	27	10	29	It would seem that light availability could be playing a role in the increases in primary production at high latitudes. With that understanding, "in response to changes in ocean nutrient supply" could be replaced with something like "in response to changes in ocean nutrient supply and light availability".	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Noted - the SPM has been revised - see B2.4
23877	10	40	10	42	The text mentions the projected loss of coral reef as >70%, but different numbers are shown in the bottom row of the Figure SPM.1. Since this could be quite confusing for policy makers, the numbers are requested to be unified as much as possible, or detailed explanation is requested if the authors decide to use different numbers.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Taken in account - we note the confusion here (Fig SPM1 refers to 70-90% range) - the corals are removed from revised Figure SPM1
23879	11	15	11	18	The term(s) and base year(s) of projected changes and a unit are not shown in the Figure SPM.3. Suggest that the caption of the Figure 5.10 be cited.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Units have been now added to the colour bars and the caption has been rewritten and checked for accuracy.
23881	12	53	13	1	Suggest modification of the first half of B4.5, "There is increasing evidence…local processes unrelated to SLR (medium confidence)." as it offers the same information as the second half of A2.4 and not related to "projected change".	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	The entire bullet including this statement has been completely revised
23883	13	8	13	13	We suggest the whole section B5 should be moved to the section C because it is not related to "projected change".	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Rejected - it has been clarified in the headline statement (now B9) and the new structure of the entire SPM that these statements are about projections
23885	15	11	15	13	A very similar sentence "Under a ~+40cm rise…" appears on the previous line: and therefore, perhaps one of them could be omitted to avoid redundancy.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Caption has been rewritten and checked for accuracy.
23887	15	26	15	26	Suggest modifying "(C) bar in Panel B" to "(C) bars in Panel C".	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Caption has been rewritten and checked for accuracy.
23889	17	1	17	6	We suggest Figure SPM.5 be moved to section A with a new appropriate paragraph because it is not related to "projected change". In addition, we request a clarification of the sources which constitute the basis of this figure as we could not find the concrete data in the underlying report.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Figure SPM.5 was removed in revision
23891	18	1	18	10	The Figure SPM.6 is very informative but we could not find the concrete data in the underlying report. We request a clarification of the detailed sources of this figure.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	The underlying data is included in the repository and the methodology is described in the supplementary information of Chapter 4.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
23893	18	26	18	27	Since the SPG has been identified in some models, it would seem somewhat strange to put "medium" level of confidence here. The wording could be modified to something like "The Subpolar Gyre System (SPG) has been identified as a new tipping element, as has been suggested by some modeling studies (medium confidence)."	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Noted - text on SPG removed from SPM
23895	19	3	21	41	Some of the information in sections C1, C3 and C4 are overlapping. We suggest that C1.2 and C3.6, which refer to "transformation", be moved to section C4, and that C4.3, which refers to "international cooperation", be moved to section C3.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Take into account. Section C has been restructured to avoid overlaps.
23977	2	48	2	50	The Antarctic sea ice extent is described as having increased between 1979 and 2017…, but "with strong negative departures in 2016 and 2017." Clarification is requested whether they are the record minimum, for instance as of 2017. Please note that recent studies may suggest a reversal of the trend from now onwards (e.g. Kusahara et al., 2018; Env. Res. Lett.).	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan	Taken into account. We have revised this section and highlighted that Antarctic sea ice extent has been unusually low since 2016.
23987	8	42	8	42	The internationally important changes in polar fisheries and food security are unclear to me (non specialist). After reading Chapter 3, potential negative changes seem mostly restricted to Antarctic Krill and Arctic freshwater or species selective fishing of cultural importance fon Indigenous communities. B2.3 on p 9 l 12-19 of the SPM indicates overall benefits for Arctic fisheries.	Patricia Martinerie	Institut des Géosciences de l'Environnement, CNRS	France	Taken into account - the statement has been completely revised and projected changes regarding fish and fisheries have been clarified
24065	2	23	2	26	A1.2 It would be correct to mention here that ocean acidification is progressing at the highest rates in the Arctic. Also, there is high confidence that ocean acidification will be exacerbated in polar regions, especially the Arctic.	Peter Thor	Swedish Meteorological and Hydrological Institute	Sweden	Noted see revise A.2.6 - 'very likely that the near surface ocean acidification signal has already emerged from the background natural variability for more than 95% of the ocean area'
24275	1	36	1	36	"(societies)" is presented after "ecosystems and people" in the second phrase of this line. I suggest it be moved to the end of the previous phrase, which also has the words "ecosystems and people"	Carla Elliff	Universidade Federal da Bahia	Brazil	this text is removed and replaced with the new start up box
24277	2	50	2	50	I believe there is a mistake in the footnote below line 50. The percentages describing the likelihood of an outcome or result overlap in the classes of virtually certain (99–100%) probability, very likely (90–100%), likely (66–100%), unlikely (0–33%), very unlikely (0–10%), exceptionally unlikely (0–1%). Shouldn't each term cover a single interval? I.e. if "virtually certain" covers 99-100%, "very likely" should cover 90-99%, not covering the interval that "virtually certain" covers.	Carla Elliff	Universidade Federal da Bahia	Brazil	Rejected - see Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties
24279	2	8	2	50	For the benefit of policymakers I suggest that a table be created clearly indicating the meaning of IPCC calibrated language. While the footnote is explanatory, I feel a table or box-style feature (or some form of visual aid, maybe even standardizing colors for each term in the text) on the report would help non-specialized people to perceive more clearly what is meant in the description of findings.	Carla Elliff	Universidade Federal da Bahia	Brazil	Rejected - The SPM contains a footnote on the calibrated language. The Mastrandrea et al. (2010) paper provides a more detailed description on its meaning, and includes 'box-style' schematics as you describe.
24283	11	15	15	11	The color bar on the right does not have a measurement unit. Do the colors represent percentages?	Carla Elliff	Universidade Federal da Bahia	Brazil	Units have been now added to the colour bars and the caption has been rewritten and checked for accuracy.
24285	11	37	11	46	Item B3.10 mentions human conflicts due to climate change effects to the ocean. Could the issue of mass migrations be mentioned here? Or maybe a new item could be written regarding how mass migrations can be related to these conflicts and even how mass migrations also add to the impact to ocean and coastal resources (i.e. one place receiving a large number of people over a short period of time, all requiring resources).	Carla Elliff	Universidade Federal da Bahia	Brazil	We also avoided to mention migration in chapter 5 of SROCC in the section about conflicts. 54213 is only about potential conflicts in resource utilization
24287	12	19	12	28	Item B4.1 seems a bit too dense for the summary for policymakers. I would suggest rewriting this item not including all the values of projections for Antarctica, but focusing on the impacts that each RCP is expected to present.	Carla Elliff	Universidade Federal da Bahia	Brazil	The SPM is revised and restructured for clarity
24289	17	0	17	0	Panel A mentions the first hurricane since the 1970s in the South Atlantic, but the x axis extends since 1950, which makes this statement confusing. Did monitoring only begin in the 1970s in the South Atlantic? If so, I suggest this be indicated. If not, why mention the 1970s and not say since 1950?	Carla Elliff	Universidade Federal da Bahia	Brazil	Figure SPM.5 was removed in revision
24291	1	32	1	38	While it is clear to the scientific community that the ocean and the cryosphere are connected compartments that can have very different responses to climate change, I do not think the same applies to policymakers worldwide. To avoid climate change denial based on the occurrence of heavier snowfall or increased snow storms, I would suggest that a phrase or two be added to this paragraph emphasizing that climate change does not mean only a warmer planet, but in fact we do expect harsher winters within the scientific data available.	Carla Elliff	Universidade Federal da Bahia	Brazil	The introduction has been shortened to be more focus and a startup box added to provide background context. Regional aspects, including direction of change, are shown in the revised Figure SPM.2. The details are provided throughout the SPM
24489	1	0	21		General comment on whole chapter. It was really good work! The document is clear almost in all sections, and I don't have any doubt that this will be a large contribution in providing scientific information to government's stakeholders which they can use to develop climate policies. I want to congratulate and to thank all the people that worked on this report "Ocean and Cryosphere in a Changing Climate" (SROCC).	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Thank you
24491	1	0	21		General comment on whole chapter. To check the figures sizes. There is some information (or legend) in which the font size is small or hard to read.	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Accepted. All figures have been revised and even redesigned and attention paid to colours and font size
24493	2	0	6		Comment on a section within a chapter. After enjoying reading this document, I can only advise some changes on sections A1 and A2. Both use a language which is too scientific and technical for the stakeholders to understand.	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Agreed - efforts have been made to make the language in the final draft less technical and scientific
24495	2	20	2	20	Comment on a section within a chapter. The relevance of the "Ocean heat uptake" is not clearly explained here for a policymaker. Indeed, a Policymaker probably will not understand the meaning of a level of "0.42 W m-2".	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Noted - this has been removed and the text revised for clarity see A.2.1
24497	2	40	2	40	Comment on a section within a chapter. Should the Policymaker or stakeholder know what is the meaning of "steric sea level"? Maybe they would appreciate explaining what a steric sea level is.	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Text is modified, we do not use this term any more - see A 1.1 of SPM FD

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
24499	3	9	3	12	Comment on a section within a chapter. The sentence between the lines 9 to 12 show almost the same idea of the sentence between the lines 5 to 13 and that may not be easy to understand for a Policymaker. The sentence could be easier to understand if the mass losses levels are in percentages. For example, read paragraph B1.2 (page SPM 7 – Line).	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	No longer applicable - sentence removed
24501	3	9	3	9	Comment on a section within a chapter. What is the relevance of those 11 glaciated mountain regions? Why the author chooses only to show those 11 as the examples.	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	No longer applicable - sentence removed
24503	3	11	3	11	Comment on a section within a chapter. The Andes mountain range is large from North to South, and it forms part of several countries. So, it is not accurate to mention the "southern Andes", because the meaning of "South" will depend on several parameters points of view, such as climate, geography or the country. A better statement could be "the Andes glacier at the south of latitude XXXXX".	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Taken into account - the "Southern Andes" no longer appears in the SPM.
24505	6	14	6	18	Comments on the Tables/Figures. This figure it too general, hard to read, and in my opinion not necessary.	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Taken into account - Overall graphical approach has been changed to ease comprehension. It is now depicting content coming from several chapters, not only mountain regions.
24507	8	9	8	9	Comment on a section within a chapter. Taxa is could be too technical for a Policymaker, and maybe they will not understand the sentence. Maybe the reader would appreciate explaining what Taxa is.	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Accepted. The term "taxa" is not used in the FD SPM anymore.
24509	10	8	10	8	Comment on a section within a chapter. What is the meaning of 500 X 1021. Maybe the reader such as stakeholder without a natural or earth science knowledge as would appreciate explaining the magnitude of this number.	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	Noted - see revised A.2.1 and footnote 6 providing explanation of ZJ
24511	18	1	18	10	Comments on the Tables/Figures. Figure SMP.6 This figure is not easy to understand. It is not self-explanatory and has a lot of information in a reduced size.	Francisco Barraza	Center for Climate and Resilience Research (CR2)	Chile	An additional introductory panel has been added to ease the comprehension of these terms.
24617	2	23	2	29	A1.2. Why has it been done in the last two decades? In the course of two decades, there can not be a constant and documented trend for change; therefore, a review of changes over a longer period of time provides a proper process of change proposed by the Paleoclimatologist and Geologists. It is best to use this research to announce and present the results of the changes.	Hanieh Zargarlellahi	Geological Survey of IRAN (GSI)	Iran	Rejected - this is beyond the scope of the chapter
24619	2	31	2	40	Why are the terms "(high confidence, medium confidence,very high confidence and ..." used in an estimate? (The whole report also) To publish such world-class reports and to be the main source of research and scientific research, accurate and documented information should be used, with the authorities at least making mistakes, to witness the destruction of the citation Precisely not by humans in the oceans and ice butters, which have a large population in these areas and their margins.	Hanieh Zargarlellahi	Geological Survey of IRAN (GSI)	Iran	IPCC uses a standard phrasing for confidence levels in order to make statement comparable. The comment is not clear.
24621	0	0	0	0	Overview of the report: The collection of information and research and scientific studies carried out from all countries, especially those countries that have an effective role in climate change and changes in the world's oceans and resources, is a great help for more detailed and accurate reporting. Worldwide. This requires a world-class management that the IPCC can do with the participation of effective and even underdeveloped or developing countries (oil producers and industrialized countries), which is definitely due to their industrial and Whether it is very effective in developing these changes, and the financial contributions of developed countries and the ability of a member or non-member of the Paris Agreement to attain a timely and relevant information are accurate and accurate. In such reports, which will be the scientific citation of the whole world, in addition to announcing the problems and information gathered, solutions and suggestions to resolve or how to deal with such changes that are very effective in human life and can be dangerous, as well as the determination Fines for "carbon-producing countries" provide world-class rules to enable states to engage and co-operate in other countries.	Hanieh Zargarlellahi	Geological Survey of IRAN (GSI)	Iran	Noted with thanks
24709	0	0	0		The Government of Belgium would like to express its appreciation for the very large amount of work that went into the preparation of this report. We find however that the SPM is still too long. As we suggested before, 10 pages would be fine !We appreciate very much the integration of the information from several chapters of the underlying report and the intention of working on the integration of section B.The comments made below are meant to further improve the SPM, in order to make it more policy-relevant while fully respecting the scientific assessment made in the underlying report.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted with thanks
24711	0	0	0		Structure: the current structure will not be sufficiently clear to the reader. In particular B5 should be integrated in section C because it is about adaptation. There is a lack of clarity with regard to the scope of section A and B and the link to their titles. The fact that section A contains Figure SPM 1 including projections appears strange, given that projections are addressed in section B.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - the SPM is substantially revised including Fig SPM.1 which now shows historical and projected trends
24713	0	0	0		More reference to SR 1.5 would be welcome especially making the link regarding scenarios: the lower scenarios assessed in SR1.5 seems to be missing here, probably because they were not sufficiently assessed by physical models. The link between the scenarios assessed here and those from SR 1.5 (including those below RCP2.6) needs to be clearly explained.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted. Links to SR1.5 are given. The SPM focuses on RCP2.6 and RCP8.5 as it is constrained by the underlying report and available literature
24715	0	0	0		It is a pity not to have some more paleo-information (including climate, temperature of the ocean, oxygen in the ocean, acidification). Waiting for AR6 is too late. It is very policy relevant. This report will be THE REFERENCE for 'oceans' in the near future.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted with thanks
24717	1	46	1	47	Could be deleted because of overlap with p 1 line 28	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Agreed deleted

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
24719	2	12	2	12	Reductions in the Greenland ice sheets: we suggest: "volume loss" of Greenland ice sheets.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	No longer applicable - statement modified. Mass loss is referred to in A1.1.
24721	2	35	2	37	The term 'not possible' is very strong and not consistent with the underlying chapter. We suggest to stick to the language in the underlying chapter (limited evidence, considerable natural variability - which does not exclude anthropogenic influence). Otherwise the sentence gives the impression that there is no anthropogenic influence while the question is rather about 'how much' the anthropogenic influence is. Please clarify what is known and what is not known to avoid the risk of such wrong interpretations.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	We do not discuss attribution in the final version of SPM (see section A 1.1)
24723	2	40	2	40	"Steric" is a term that is not easy to understand by policymakers: can it be explained as 'due to thermal expansion and salinity changes' (see glossary)?	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - 'steric' no longer used
24725	3	9	3	9	Mass losses are not really shown in Fig. SPM.2.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Accepted - Figure SPM 2 has been completely revised and the new version shows changes in cryosphere
24727	4	1	0		SPM.1: end of the century: 2010 should be 2100; for some findings there is no information on the near term. Policymakers are interested to know what will happen within 30-50 years. Can the figure be completed? About coral degradation: what is meant precisely, what do the pictograms represent exactly? Please add data about acidification trends.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Correction applied.
24729	4	1	0		SPM.1 : global mean temperature change: is 1,5°C the best estimate of global warming consistent with RCP 2.6 ? AR5 WGI suggests that the average warming from CMIP5 models is roughly 1 + 0.6°C = 1.6°C from pre-industrial. If this is related to the use of GMST as in SR15, please explain in the SPM. It could also appear inconsistent with AR5 WGIII, which indicates that there were not enough 1.5°C scenarios to make a scenario category, while here the well known (and not new) RCP2.6 seems to reflect 1.5°C.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted: the temperature information has been updated and is now represented as time series for RCP2.6 and RCP8.5, relative to 1986-2005. The caption also gives information from AR5 on the assessed amount of warming from pre-industrial to the 1986-2005 reference interval.
24731	4	1	0		SPM.1 2100 is considered here as the final date, but policymakers want to know what will happen beyond 2100 as well, even if the uncertainties are large. This was also indicated in the framing.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted: the SPM (and chapter 4) gives details on sea level rise estimates beyond 2100. However, for other parameters this is not assessed and as such we have retained 2100 as the end of the graphical representation in SPM.1
24733	6	21	7	29	We regret that there is not much on GLOFS or outbursts? (also in the underlying report)	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted included in revised B7 and C1
24735	6	1	0		SPM 2: Information on Africa is missing. This is strange since in AR5 figure WGII SPM.2, the only indicator that was provided for "Africa as a whole" is "glaciers, snow, ice".	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - Reference to the African location (Low Latitude) is now depicted.
24737	7	34	7	38	There is a risk for misinterpretation of the statement. One could understand that if adequate adaptation measures are taken, there will be no natural hazards, which is not correct. B.1. does not represent well the following text. We suggest to take away 'if adequate …not taken" and to rephrase so that ambiguity is avoided.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	The Headline statement has been completely revised and the SPM has been restructured; Limits to adaptation are now included in B9 and underlying bullets and in Section C
24739	8	15	8	16	Freshwater related risks: is very vague. Does that include glacier lake outbursts?	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - the entire bullet has been re-written and the term "freshwater-related risks" removed; the risks have been specified
24741	8	40	12	9	Sections B2 and B3 are much too long and too detailed for a policymaker. This should be shorter. We suggest to delete for example B.3.7 because it is not much policy relevant.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - the SPM has been restructured
24743	8	44	8	46	Incoherence: the underlying text is all about ecosystems and nothing about loss of ice. Therefore the sentence 'Warming ….. Sea level rise ' could be deleted since this is addressed later.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Accepted - projected risks for people are now clearly separated into terrestrial cryosphere in B7, marine ecosystems and services in B8, and coastal systems (including impacts of sea level rise) in B9
24745	8	41	8	42	Why are only international fisheries mentioned, and not the local fisheries? It can be important for livelihood.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - the SPM has been completely revised
24747	9	38	9	40	"Substantial" is very vague. Could a range be added for the permafrost carbon loss, even if the range is large and with a low confidence?	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account. Section B1.3.
24749	12	11	12	17	Could you justify? We cannot find the explanation in the underlying chapter. In fact mitigation could reduce the magnitude of long term impacts significantly and this is not mentioned. The choice of RCP will affect the magnitude of adaptation needed. A strong message in the report could be that mitigation is important to reduce long term impacts. We suggest to move the sentence now in line 34 (B4.2) (replacing lines 16 and 17) and delete it from line 34.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	The paragraph has been reworked and refined, see section B9 in the revised SPM, and cross-references to chapter 4's section have been added. Note also that the points made in this comment helped designing current figure SPM5.
24751	12	12	12	12	Please clarify what "high emissions" mean. It should be clear for which scenario(s) sea level rise will accelerate.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted - footnote 7 explains high emission. Section B3 revised for clarity
24753	12	34	12	34	Delete the sentence if it is included in B1 replacing line 16-17	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	No long applicable - sentence removed.
24755	12	38	12	44	Paragraph mixing up different time scales. It should be defined what is meant by 'after 2100'. Is it until 2200, 2300, or much longer? Especially the last sentence deals with millennium time scales, which is also after 2100. It is also not clear why RCP8.5 is singled out here. Basically, on millennial time scales, all scenarios with the exception of RCP2.6 lead to multi-meter SLR from Antarctica.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - see section B3 for revisions

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
24757	12	41	12	41	In C1 and B4 the term 'deeply uncertain' is used. We wonder if it is necessary to introduce a new terminology beyond the IPCC calibrated language. Could the calibrated language be used ? For example high uncertainty with low confidence? Is it not going to create problems in the plenary that some delegations will not want to talk about deep uncertainties, while the message is important?	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account: text substantially revised for SPM final draft
24759	12	41	12	42	We suggest to delete the sentence line 41-42 because it is obvious.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	No long applicable - sentence removed.
24761	12	42	12	44	The languages a little sloppy: is it about the Antarctic contribution only or not?	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - text adjusted
24763	12	42	12	43	add: for most RCP scenarios.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - RCP 8.5 stated
24765	13	15	14	26	This section is too long, we think that it should be shortened.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account - the entire section has been significantly shortened and revised
24767	15	1	0		SPM.4 : the indicators for physical phenomena do not include anything related to sea level changes ; this is not satisfying given the likely use of the figure as a summary of key findings in the report. By contrast, the classic burning embers diagram (the 5th one) is related to "large scale singular events", which are related to sea-level : in the SR15, the only example provided for this 5th burning ember is "disintegration of the Greenland and Antarctic ice sheets". Given that AMOC is included here, one could also include a burning ember on ice sheet instability.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	The embers on physical phenomena have been removed after technical discussions.
24769	15	1	0		SPM.4: what is the definition of 'Marine Heat Wave'? It is indicated in the glossary but for the policymaker it would be useful to explain what is meant in for example a footnote or the figure description.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	The embers on physical phenomena have been removed after technical discussions.
24771	15	1	0		SPM.4: Please check the temperatures levels. They seem too low in the figure. The uncertainty is missing as well as the coherence with SPM.1. If what is labelled "present" is the recent past (1986-2005), it should be indicated as such.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Temperature scale has been checked for accuracy.
24773	16	7	16	7	In all scenarios: please specify better the differences between the scenarios.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Accepted - throughout the SPM quantitative data added where possible
24775	16	44	16	45	Is this phrase important for policy makers? What about the confidence level ?	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted - sentence has been removed
24777	16	5	0		While tsunamis do not have a link with climate change, their impacts are made worse by climate change and sea level rise. It would be helpful to include a sentence based on Chapter 4, to avoid confusion by for example journalists.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Rejected - not relevant for the SPM
24779	17	5	17	6	SPM.5 :add to fig B) : GDP in (billions of USD)	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Figure SPM.5 was removed in revision
24781	17	1	0		SPM.5 : is the exposed population the best indicator or is it rather the impacted population ? We wonder why the cases that are explained in the text e.g. tropical storm Washi does not corresponds to a large or dark dot. Would it be possible to define the size and color so that they are better linked to damaging events?	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Figure SPM.5 was removed in revision
24783	17	1	0		SPM.5: For the South Atlantic ocean reference is made to a hurricane since the 70ties but in the figure there are no hurricanes indicated in the 70ties.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Figure SPM.5 was removed in revision
24785	18	1	0		SPM.6: The uncertainty seems low for example for South Africa. We question the type of uncertainty in the figure. Could you explain.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	An alternative depiction of data has been applied. The uncertainty envelope has been placed into a single graph.
24787	19	1	21	41	Section C: The different sections are somewhat unbalanced: section C is very short compared to the rest, while it is important for policy makers.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Noted. The sections reflect the evidence from the underlying chapters. An new figure SPM.5 has been added to strengthen the messaging in Section C.
24789	19	1	21	41	Section C: the links between the limits to adaptation and decision making needs to be better reflected. The current draft gives the impression that limits to adaptation is a separate concept that does not have real implications, hence responses seem to be available to respond to any change.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account. The links between adaptation limits and response decisions is now strengthened in C3.1.
24791	19	1	21	41	Limits to adaptation: the text gives the impression that adaptation can solve all problems. But sometimes there are limits, which are not well described.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account. The text has been revised to stress and characterize adaptation limits in C1.3 and C3.1.
24793	19	3	19	3	We are wondering why C1 starts with 'Adaptation pathways' and why "Climate Resilient Pathways" which includes adaptation and mitigation are only mentioned in C4. We would expect to see the C4 (at least its headline) before C1 because the text under C1.1 already refers to mitigation and adaptation.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account. C1 is now focussing on challenges of adaptation, on the basis of previous sections, while C4 is specifically dealing with evidence on climate-resilient development.
24795	21	29	21	31	This sentence is 'jargon'. What means 'given adaptation limits' in this context?	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	Taken into account. Sentence revised.
24797	18	23	18	23	The meaning of "Such impacts would be superimposed on the global warming signal" is not clear. Does it mean that the impacts mentioned in lines 18-23 are for AMOC weakening only, without taking into account the global warming context? It is very important to be clear on this, in order to avoid the "Day After Tomorrow" confusion.	Government of Belgium	Belgian Federal Science Policy (BELSPO)	Belgium	No longer applicable - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
24813	2	32	2	39	"increasing losses from polar ice sheets are resulting in increasing rates of sea level rise". while this is not wrong it has incomplete logic: first it is stated that mass loss from polar glaciers and ice sheets has increased, then that these are the dominating source for sea level rise, so in the end it should be "increasing losses from polar glaciers and ice sheets..."	Thomas Schuler	University of Oslo	Norway	No longer applicable - bullet modified
24815	4	0	0		typo: the time axis on top of the figure: the rightmost label should be "End-of-Century [2081-2100]" (not 2081-2010)	Thomas Schuler	University of Oslo	Norway	Correction applied.
24817	8	44	0		"...loss of glacial ice…", "glacial" is an adjective related to the ice ages. While this still would make sense here, I think it was meant to refer to "…loss of glacier ice..:"	Thomas Schuler	University of Oslo	Norway	Taken into account - text has been revised and the term "glacial ice" has been removed
24881	11	15	11	18	In Figure SPM.3 the units of the scale bar are lacking (and also the word "Figure"in the figure caption).	Hernan Edgardo Sala	Argentine Antarctic Institute – National Antarctic Directorate	Argentina	Units have been now added to the colour bars and cation has been rewritten and checked for accuracy.
24883	12	46	12	46	Due to the term "subsidence" has different meanings according to different scientific disciplines (atmospheric sciences, geology, etc.), and particularly because it is used in a Summary for Policymakers, in order to disambiguate, I suggest to add "land" or "coastal" before it (for instance, "land subsidence").	Hernan Edgardo Sala	Argentine Antarctic Institute – National Antarctic Directorate	Argentina	Taken into account - wording has been improved in the revised SPM
24885	15	1	15	15	In Figure SPM.4 (page 15) are included the acronyms "AMOC" and "SPG", but they are not defined until the page 18. In order to facilitate its understanding, I suggest to include the complete name (Atlantic Meridional Overturning Circulation and Subpolar Gyre System, respectively) somewhere in the same figure.	Hernan Edgardo Sala	Argentine Antarctic Institute – National Antarctic Directorate	Argentina	All acronyms have been spelled out in each figure and/or explained in the captions.
24887	17	5	17	6	The last sentence of this figure caption says: "Note the latitudinal expansion of regions impacted by high intensity storms". Because it can not be so obvious for policymakers, I propose to replace the aforementioned sentence by this one (or something equivalent): The latitudinal expansion of regions impacted by high intensity storms can be seen in panel A, and it is implicit in panel B.	Hernan Edgardo Sala	Argentine Antarctic Institute – National Antarctic Directorate	Argentina	Figure SPM.5 was removed in revision
24929	7	13	7	14	I suggest to add a half sentence: "…, thus increasing the risk of GLOFs" (Glacial Lake Outburst Floods)	Dirk Hoffmann	Bolivian Mountain Institute - BMI	Germany	Rejected due to space
24943	3	3	8	8	Here there could be a reference to Figure SPM.1, as there is a category on glaciers.	Laurens Bouwer	GERICS	Germany	Accepted - see revisions in A.1.1
24945	3	3	9	9	Figure SPM.2 shows only the regions. It would make sense if the data shown in Figure SPM.1 also corresponded to the flux values indicated here.	Laurens Bouwer	GERICS	Germany	It is unclear exactly what the reviewer is suggesting.
24947	3	3	11	11	How large are the losses in the south Andes?	Laurens Bouwer	GERICS	Germany	No longer applicable - sentence modified
24949	3	3	19	22	Here it should be added what are the estimated fluxes; current and in the future. Now the statements of a large pool and global relevance are not supported, as the reader cannot grasp what is the size of emmssions (rather than stock) compared to other natural and enthropogenic emissions.	Laurens Bouwer	GERICS	Germany	Taken into account- see revisions in A.1.4 and B.1.3
24951	4	4	0		Figure SPM.1: if this figure includes only projections, it should be moved to Section SPM.B	Laurens Bouwer	GERICS	Germany	Noted: the figure includes historical information as well as projection information and has been designed to link part A and part B of the SPM.
24953	6	6	12	12	I am not sure if I understand the negative impact on indigigenous knowledge. Either this knowledge is there, or not. The fact that with climate chnage, such knowledge becomes less useful seems not relevant. Such a loss would rather fall under cultural/traditional values or indigenous lifestyle, than under 'knowledge'.	Laurens Bouwer	GERICS	Germany	It is well explained in section 54214 about cultural values
24955	6	6	27	27	'high to very high' risk should not be italic.	Laurens Bouwer	GERICS	Germany	Accepted - Italics are not used for this in the revised SPM
24957	7	7	8	8	Here it would be important to indicate what this medium confidence consists of. I would expect: 'limited evidence, high agreement'	Laurens Bouwer	GERICS	Germany	not applicable - sentence removed in redraft
24959	7	7	16	16	The term natural hazards is too broad here. Here it is essential to indicate which natural hazards have increased, and by how much/examples. Are these GLOFs, landslides, or other?	Laurens Bouwer	GERICS	Germany	Taken into account. More detailed and specific information (naming specifically the hazards) has been added in the SPM SOD B1.4.
24961	7	7	25	29	Here, a connection should be made to Loss and Damage: where the limits of adaptation apply. Which impacts cannot be avoided by adaptation; e.g. loss of atols and territory, loss of livelihoods and cultural values and heritage sites.	Laurens Bouwer	GERICS	Germany	Noted - we are unsure which part of the SPM you refer to. Please note, limits to adaptation and irreversible loss eg of biodiversity are in section B and C eg b.9.3
24963	9	9	38	40	Same issue as on page 3: how large are these carbon fluxes, also compared to emissions from other natural and human sources?	Laurens Bouwer	GERICS	Germany	Section text revised, this is now contained in B1.3. Space constraints do not allow for comparison to other carbon fluxes here in SPM but more detailed information shows in Chapter 3
24965	10	10	18	19	Please add: "It is virtually certain that *human carbon* emssions will be the most important .."	Laurens Bouwer	GERICS	Germany	No longer applicable - sentence removed
24967	12	12	12	12	This is an incomplete statement: according to Tables 4.1 and 4.3, also under RCP2.6 (3-3.5 to 4 mm yr-1) as well as RCP4.5 (3-3.5 to 7 mm yr-1 - a doubling!) SLR will accelerate further; not just under high emissions according to RCP8.5. A better statement would be: "Under high emissions (e.g. RCP8.5), the projected accelaration of SLR is substantially higher than under medium or low emissions according to RCP2.6 and RCP4.5." Maybe also consider adding these rates in mm yr-1.	Laurens Bouwer	GERICS	Germany	Taken into account. The entire section has been thoroughly revised and this sentence doesn't exist anymore. SLR is now addressed in B.3. In the headline statement reference to particular scenarios has been removed, it now says "Sea level rise will continue beyond 2100 and could exceed rates of several centimetres per year resulting in multi-metre rises in the long term (medium confidence)"; in B3.4 the statement with estimated rate of sea level rise has been revised for more clarity.
24969	12	12	13	14	Please move parts of this sentence, so that it makes more sense, and reads: ".. direct and indirect impacts on coastal ecosystems, infrastructure (e.g., in towns and cities), and associated livelihoods that .."	Laurens Bouwer	GERICS	Germany	Headline statement B4 has been completely re-written
24971	12	12	14	14	Tens of millions is incorrect. Balk et al. (https://doi.org/10.1177/0956247807076960) already showed in 2006 that about 10% of the world population, or more than 600 million people, live at elevations below 10 metres.	Laurens Bouwer	GERICS	Germany	This has been removed from the revised SPM.
24973	12	12	16	16	Delete the word "choices".	Laurens Bouwer	GERICS	Germany	Accepted - "statement has been revised and the term "adaptation choices" removed
24975	12	12	32	33	Mitigation does not reduce current extreme sea-levels. It reduces projected increases in extreme sea-levels.	Laurens Bouwer	GERICS	Germany	No longer applicable - sentence removed
24977	12	12	35	36	Actually, Sections 4.2.2.6.3 and 4.2.2.6.4 mention that some regional changes (Richter et al. 2017) and ESL events (Takayabu et al. 2015) are attributed. This is a major finding. So this sentence should read: "Its has been possible to attribute some regional to local mean sea-level changes, as well as individual ESL events to *anthropogenic* climate change. {4.2.2}"	Laurens Bouwer	GERICS	Germany	Accepted. The statement on attribution of observed extreme sea level events has been revised and now says "Anthropogenic climate change has increased observed precipitation, winds and extreme

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
24979	12	12	36	36	The reference to Section 4.2.1 does not seem relevant here, only 4.2.2.	Laurens Bouwer	GERICS	Germany	sea level events associated with some tropical- and extra-tropical cyclones,..." (see FD SPM A3.6)
24981	12	12	38	39	But I suppose also projections before 2100 are limited by the lack of realistic representation of such processes. So I would expect a similar qualifier in Section SPM B4.1, for instance at the high end of 1.4 m (RCP8.5). Or is there an (implicit) assumption that such processes only could start playing a signficant role after 2100? Is there evidence for that, then this should be explained here.	Laurens Bouwer	GERICS	Germany	Taken into account. The entire section has been revised for more clarity and statement has been removed. SLR projections are now addressed in FD SPM B.3 and underlying bullets.
24983	12	12	43	43	For which timeframe are these multi-metre projections valid? From Chapter 4, this already seems the case in 2500, so way before a next millenium. Please revise the sentence to reflect this.	Laurens Bouwer	GERICS	Germany	Taken into account, timescale has been specified to "centuries to millennia" and scenario to RCP8.5 in FD SPM B3.4.
24985	12	12	43	43	It would be helpful to understand what the medium confidence is made up of. Is that limited evidence, and medium or high agreement?	Laurens Bouwer	GERICS	Germany	Rejected. In the SPM, whenever possible, confidence was to be provided instead of evidence and agreement.
24987	12	12	54	54	Please epecify which changes, this is too vague.	Laurens Bouwer	GERICS	Germany	Accepted. In the FD SPM projected changes and projected risks have been more thoroughly separated now. Details on projected risks to coastal ecosystems are provided in FD SPM B6 and details on projected risks for human systems at the coast are provided in FD SPM B9.
24989	12	13	54	1	Doubles with Page 12, lines 34-36 (cut).	Laurens Bouwer	GERICS	Germany	Taken into account - This part of the SPM has been revised and any duplication removed
24991	13	13	8	13	Please also highlight that risk reductions have been observed, and that there is evidence of efective coastal adaptation. Make reference to Section 6.3.4, and add new literature including Wu et al. 2018 (https://doi.org/10.1007/s10113-018-1386-7) and Paprotny et al. 2018 (https://doi.org/10.1038/s41467-018-04253-1)	Laurens Bouwer	GERICS	Germany	Noted - C3 provides an assessment
24993	13	13	11	13	Unclear what the link is between communitybased adaptation and vulnerability reducing development efforts. Probably, the reverse is meant: community involvement improves vulnerability reducing development efforts. Please clarify.	Laurens Bouwer	GERICS	Germany	This is a good point. Accordingly, the section has been reworked to avoid any confusion.
24995	13	13	19	19	Unclear whay raising property is combined with sea-wall: both are very costly, and start-up costs are high. So probaly, a choice is made for either but rarely both. Please clarify.	Laurens Bouwer	GERICS	Germany	This has been removed from the revised SPM.
24997	13	13	22	22	"hazard impacts" delete the word impacts here.	Laurens Bouwer	GERICS	Germany	Accepted - has been corrected
24999	13	13	30	30	"disruptive impacts become progressively worse": please replace this normative text by more precise explantion of whihc impacts, and how they change. What is disruptive in this context?	Laurens Bouwer	GERICS	Germany	Accepted - statement has been rewritten for more clarity
25001	13	13	40	42	This statement is not generally true. Sometimes, this combination can be more effective, but please describe under whihc circumstances: e.g. costs of built infrastructure is very high, and savings can be made; co-benefits arise because of NBS solutions; habitat and local communicaties support such NBS, and so on.	Laurens Bouwer	GERICS	Germany	This sentence has been removed and the description of options improved (see for example C3.1 and C3.2)
25003	13	13	44	46	Please provide a qualifier for this statement. Under low rates of sea-level rise, this is not neccesarily true. Probably, there will be a rapid rate of SLR (accelaration) at which this diverging could become reality. "Struggling" also suggests quite high rates of SLR. Please rewrite, and support with references to underlying chapter sections.	Laurens Bouwer	GERICS	Germany	This has been removed from the revised SPM.
25005	15	15	0		Figure SPM.4: First line of the caption: are these risk scenarios, or Reasons for Concern as per AR4 and AR5 (RFCs). Please clarify	Laurens Bouwer	GERICS	Germany	Caption has been rewritten and checked for accuracy.
25007	15	15	0		Figure SPM.4: Caption: line 4: these are not impact levels, but warming levels/SLR by 2100	Laurens Bouwer	GERICS	Germany	Caption has been rewritten and checked for accuracy.
25009	15	15	0		Figure SPM.4: Caption, line 6: please replaced "societal adaptation" with "planned adaptation".	Laurens Bouwer	GERICS	Germany	Noted the term is removed
25011	15	15	0		Figure SPM.4: Caption, line 18-20: I do not agree. Transformational adaptation for atols (column B mentions both incremental AND transformational) could imply migration, whihc would have high benefits in terms of impacts and be very effective. Of course there are secondary effects. but the current explanation is not sufficient.	Laurens Bouwer	GERICS	Germany	Taken into account - panel C (Figure SPM.5) provides the assessment of adaptation and response options
25013	16	16	23	24	Please move these lines until after line 26 (between "scale." and "Rising ..".)	Laurens Bouwer	GERICS	Germany	Unclear which lines are referred to
25015	16	16	27	27	Please add: "more intense" tropical cyclones.	Laurens Bouwer	GERICS	Germany	Unclear which sentence is being referred to
25017	16	16	30	31	Reductions in vulnerability are not included in figure SPM.5, but the data and information on storm surge mortality from Bouwer and Jonkman could be easily inlcuded in this figure (see https://doi.org/10.1088/1748-9326/aa98a3).	Laurens Bouwer	GERICS	Germany	Noted the figure has been replaced (see Figure SPM.4)
25019	17	17	0		Figure SPM.5: Please provide a reference to the supporting section in Chapter 4 and/or Chapter 6, where the provenance of the data and publications are discussed. I understand this is Geiger et al. 2017 (http://doi.org/10.5880/pik.2017.005).	Laurens Bouwer	GERICS	Germany	Figure SPM.5 was removed in revision
25021	17	17	0		Figure SPM.5: GDP is not the same as assets. GPD is a flow, assets a stock. Please exlain either in the caption that GDP is used as a proxy for asset values, or that exposed GDP is meant here.	Laurens Bouwer	GERICS	Germany	Figure SPM.5 was removed in revision
25023	17	17	0		Figure SPM.5: The size of the exposed population in figure A seems very high for the west pacific. I would expect similar sizes for North Indian Ocean (Bangladesh 1970 for instance), but also India, and for some events in the North Atlantic, as well as Japan. When I look at other data from EM-DAT (for instance this ERL paper https://doi.org/10.1088/1748-9326/aa98a3) and other sources on affected people (flooding) in large cyclones, I would come to different numbers (easily reaching 10 million or more) in the North Indian Ocean.	Laurens Bouwer	GERICS	Germany	Figure SPM.5 was removed in revision
25025	17	17	0		Figure SPM.5: There seems to be a reporting/data bias in the North Indian Ocean frequecy, or is the lack of any cyclones >177 km/hr in the NIO from 1950 to about the 1970s?	Laurens Bouwer	GERICS	Germany	Figure SPM.5 was removed in revision
25027	17	17	0		Figure SPM.5: Panel B: please describe what is meant by largest?	Laurens Bouwer	GERICS	Germany	Figure SPM.5 was removed in revision

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
25029	17	17	0		Figure SPM.5: In sum: very interesting graph, but more could be explained on method and uncertainties, and this could be integrated in Chapter 6 on extremes. Actual impact data could be added to the figure, and various sources exist to do so. I am happy to dicuss and contribute where needed.	Laurens Bouwer	GERICS	Germany	Figure SPM.5 was removed in revision
25031	18	18	0		Figure SPM.6: Provenance of this figure is unclear, please provide a reference to the data sources	Laurens Bouwer	GERICS	Germany	The underlying data is included in the repository and the methodology is described in the supplementary information of Chapter 4.
25033	18	18	0		Figure SPM.6: Caption, line 7: "height": probably, what is meant here is total water level (TWL). Please clarify.	Laurens Bouwer	GERICS	Germany	The scope of this figure has changed and the change in height has been removed. Instead, the change in frequency is elaborated on.
25035	18	18	13	14	Please explain what is the observed AMOC variation and change, with reference to Chapter 6. Actually, in Chapter 6, page 4, lines 21-22 it says low confidence. This context is quite important for understanding future projections.	Laurens Bouwer	GERICS	Germany	Taken into account - the SPM has been restructured for a clearer narrative. Historical observations of AMOC are an A.2.8 - confidence is adjusted to medium
25037	19	19	8	8	Please mention context of the Loss and Damage debate, and mechanism under the UNFCCC here.	Laurens Bouwer	GERICS	Germany	Taken into consideration. In the final SPM, references to loss and damage have been made more broadly with regards to residual risks (see B9.3).
25039	19	19	36	36	Please add: "can" provide.	Laurens Bouwer	GERICS	Germany	Taken into account. Bullet has been revised and moved under C2.
25041	19	19	37	37	Please add: neraby coastal locations "where these ecosystems fit with natural coastal environments".	Laurens Bouwer	GERICS	Germany	Bullet has been revised and moved under C2.
25043	21	21	10	41	There is a lot of duplication with C1 (on page 19, lines 3-5), p. 20 (lines 12-56), and p. 21 (lines 1-8).	Laurens Bouwer	GERICS	Germany	Taken into account. C5 has been redrafted and overlap resolved.
25045	21	21	12	13	How are these Climate Resilient Development Pathways different, from the adaptation pathways (explained on p. 19, lines 3-5)? It seems a choice must be made for terminlogy and content with reagerd to pathway planning.	Laurens Bouwer	GERICS	Germany	Taken into account. The use of adaptation pathway is removed
25047	21	21	26	28	This sentence is too generic, and repeats points made eralier in the SPM. Please cut.	Laurens Bouwer	GERICS	Germany	Taken into account. The bullet has been revised to be more specific (see C5 and sub bullets)
25049	21	21	40	40	Please cut the word "worsening" whihc is too normative and not precise.	Laurens Bouwer	GERICS	Germany	Taken into account. The bullet has been revised.
25053	2	20	3	25	It would be useful to note the time-scales for each of the changes noted in sections A.1.1 to A1.7 and beyond. For A1.1, the time-scale is 1970 to 2010. No time-scale is mentioned in A1.2. In A1.7, the time scale is the "last two decades". Different time-scales are given the different changes noted may lead to confusion. It is difficult to obtain a picture of the different changes occurring and which are at a faster than others. I imagine it may be difficult, however it would be useful to have some alignment of the time-scales in the text, and the respective changes, with reference to common decadal/sub-decadal intervals as illustrated in Figure SPM.1.	Zelina Ibrahim	Universiti Putra Malaysia	Malaysia	Taken into account - text revised and Figure SPM.1 has been revised to show historical and projected trends
25055	4	0	4		I suggest that the "Key findings" listed in the figure be consistent and linked to the text section numbers, e.g. "Ocean heat content" change is A.1; section A1.4, is not listed in the figure. Consistent use of words in terms for the same change (like for A1.1) would also be useful. Otherwise the reader has to do a lot of work trying to match the text with the figure notations (e.g. A1.5 discusses "mountain snow cover" I think, but also "Mountain glaciers mass reduction"). There appears to be a disconnect between the text and words/terms expressing the changes listed and the terms/words used in the figure.	Zelina Ibrahim	Universiti Putra Malaysia	Malaysia	Text has been revised for consistency.
25057	5	19	5	19	"Almost 13% of the global population lives in the Arctic or high mountain regions ..." seems at first glance counter intuitive because of the mention of the "Arctic" as the first area. Only about 0.05% of the global population live in the Arctic zone compared to about 12.7% in high mountain regions. I suggest that it be rephrased to "Almost 13% of the global population live in high mountain regions or in the Arctic ...". This is because I think counter intuitive statements may generate disbelief and resistance to subsequent statements.	Zelina Ibrahim	Universiti Putra Malaysia	Malaysia	The population information is now in the start-up box on page 2 and further clarity is given. "Today, around 4 million people live permanently in the Arctic region" and "Around 670 million people (nearly 10% of the 2010 global population) live in high mountain regions"
25059	5	47	5	49	Some indication of "low-lying" would be useful. What range of elevation is meant by low-lying, for example.	Zelina Ibrahim	Universiti Putra Malaysia	Malaysia	Taken into account - these details are in the startup box which was added to the FD
25061	6	6	6	9	2.6 opens with consideration of ecosystems, however the economic aspect of "tourist attractions" is also included here. I think this is discordent with the the topic of impact to ecosystems. I suggest that consideration of the economic and livelihoods impact of ecosystem degradation due to climate changed should be placed in a separate paragraph (e.g. A2.7).	Zelina Ibrahim	Universiti Putra Malaysia	Malaysia	Accepted - the SPM has been re-structured to separate impacts on ecosystems (A4-A6) and impacts on people (A7-A9)
25063	6	28	7	2	Need to rephrase the "committed ocean and cryosphere changes initiate the use of adaptation measures... ". Suggest to change "committed ocean and cryosphere changes would require the use of adaptation measures... " or similar.	Zelina Ibrahim	Universiti Putra Malaysia	Malaysia	Taken into account - sentence removed
25065	7	4	7	21	Suggest some rearrangement of the sequence of sections A3.2, A3.3, and A3.4, as the topic of marine heat waves are repeated in A3.2 and A3.4. Suggest it to be A3.1, A3.2 (both on high mountains), then A3.4, A3.2 (mention of heat waves), finaly A3.5	Zelina Ibrahim	Universiti Putra Malaysia	Malaysia	Noted. The SPM and content of sections has been restructured.
25069	0	0	0		In some of the original scientific work looking towards future not all RCPs are considered. Please, aim to provide results (e.g. SPM.3 and SPM.6) in a way that allows comparison of different results under the same RCP. This refers particularly to SPM, e.g. RCP2.6 vs. RCP4.5.	Government of Finland	Finnish Meteorological Institute (FMI)	Finland	Noted. The SPM focuses on RCP2.6 and RCP8.5 as it is constrained by the underlying report and available literature
25071	2	20	2	21	The ocean heat uptake is compared with a number given for an energy imbalance. For most of the readers this number is unfamiliar, e.g. how it is derived, what it is accuracy, how it has changed over time, how it is projected to change. These questions should perhaps be answered in the underlying Chapters. Please, consider other options to quantify and "depict" ocean heat uptake in SPM, or at least give couple of quantative parameters to compare.	Government of Finland	Finnish Meteorological Institute (FMI)	Finland	Taken into account - sentence removed and the new A2.1 gives a statement in ZJ yr-1

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
25073	3	0	3		Fig SPM.1 contains relevant information, however, grapfical presentation needs some improvement, e.g. text font is too small and colors of the symbols are not easy to see, and the scales of them are not easy to comprehend. If the three top figures (Co2, world population and global mean temperature change) would be replaced with a temperature graph (not with thermometers, but with graphs) , there would be space for enalarging the figures and texts below Could changes in seasonal snow cover be included?	Government of Finland	Finnish Meteorological Institute (FMI)	Finland	Overall layout has been reworked to allow the use of a bigger font size and ease readability.
25075	6	0	6		Fig SPM.2: readability of symbols (size, color) need to be improved.	Government of Finland	Finnish Meteorological Institute (FMI)	Finland	Noted - this figure is removed and replaced with the new Figure SPM.2 which includes mountain impacts
25077	15	0	15		Fig SPM.4: Baseline period for Global mean surface and Global mean sea level rise should be clearly indicated. In the graph RCPs do not show any range. Please, consider adding description of uncertainty in the scenarios.	Government of Finland	Finnish Meteorological Institute (FMI)	Finland	Suggestion applied.
25081	0	0	0		The current structure is a complete mess and follows no logic or clear story line. I get the desire to be integrative, but it doesn't work how it is at the moment. It just comes across as a random collection of statements and jumps all over the place, and doesn't give the imression of a coherent well thought out summary. There are bits and pieces on adaptation popping up all over the place, and the "Projections" section is full of statements that are referring to the past or current situation, and not ot the future.	Simon Allen	University of Zurich	Switzerland	Taken into account - the SPM is substantially revised
25083	2	40	2	40	"steric sea level" needs defining in ( ).	Simon Allen	University of Zurich	Switzerland	Taken into account - 'steric' no longer used
25085	3	5	3	5	"high mountain regions" needs defining.	Simon Allen	University of Zurich	Switzerland	Noted - see chapter 2 for a definition
25087	3	7	3	8	Why is the statement on glaciers limited to the last 2 decades? This seems really weak and is strange given that the sentence that follows covers a range from 1986 to 2015? Given that AR5 provided a statement on glacier mass loss since 1971 this comes across as a backwards step in what the science can tell us.	Simon Allen	University of Zurich	Switzerland	Taken into account. The text was revised for more clarity, now included in SOD SPM in section A1 and Figure SPM.1 panel g
25089	3	11	3	12	Only a 9 year trend. Should this really be elevated to level of SPM? Is this really indicative of something longer-term and linked to climate change, or just natural variabilty.	Simon Allen	University of Zurich	Switzerland	Accepted - removed from SPM
25091	3	16	3	17	"Other mountain regions lack in-situ observations to assess trends". I don't understand this sentence in the context of what follows. Are the sentences that follow also based on data from European Alps, Scandinavia and Tibet? If yes, then this sentence about other mountain regions should move to line 19.	Simon Allen	University of Zurich	Switzerland	No longer applicable - regional details no longer included
25093	5	19	5	19	13% seems really large. This comes back to the comment on how are high mountain regions being defined here? I think you need to be clear on this and include a definition.	Simon Allen	University of Zurich	Switzerland	Accepted: Details of the definition of low elevation coastal and high mountain regions have been added as footnotes to the start-up box text.
25095	5	19	5	19	In addition to risks do you plan to include anything on opportunities? Or is the story all negative?	Simon Allen	University of Zurich	Switzerland	Noted: the SPM text has been clarified to be more specific on both opportunities and negative consequences.
25097	5	22	5	23	Getting already into adaptation responses here in this section seems out of place and does not have any relation to the headline statement above that does not refer to adaptation.	Simon Allen	University of Zurich	Switzerland	Accepted: The structure of the SPM has been revised extensively to provide a clearer flow. Adaptation responses are now covered in SPM sections A4-A9
25099	0	0	0		The headline statements are typically long and technical, and to be blunt, not very effective. They were termed headline statements in AR5 because they should make for easily communicated simple messages that public will easily capture. Furthremore, the paragraphs that follow the headlines statement should further support and link to the headline, but this is not always the case here.	Simon Allen	University of Zurich	Switzerland	Taken into account - the SPM is substantially revised
25101	5	29	5	30	Are some flora and fauna are also thriving and expanding their range? I yes, then for balance and even treatement of the science this should be mentioned here.	Simon Allen	University of Zurich	Switzerland	Accepted: revised text in A4.1
25103	5	35	5	43	Now in the middle of Section A we have an entire paragraph on adaptation. Then next paragraph we are back to talking about impacts and risk. I find the structure really not thought out at all. For a reader interested in adaptation experiences and options, they'll have to go looking all over the place.	Simon Allen	University of Zurich	Switzerland	Agreed - the SPM structure has been revised.
25105	5	45	5	45	For consistency with "high mountain regions" you probably also need to include a definition for "coastal areas" if you are going to be giving population figures etc.	Simon Allen	University of Zurich	Switzerland	Taken into account - definition for low-lying coastal zone has been provided in the Start-up Box, Footnote#4
25107	6	21	6	22	Is this statement really true for glaciers mass loss? How many glaciers have response times of >100 years. Or are you meaning once glaciers are totally lost, the situation is irreversible? The wording is vague and alarmist like this.	Simon Allen	University of Zurich	Switzerland	Taken into account - the SPM has been revised substantially for clarity . Glacier loss irreversibility addressed in B1
25109	7	15	7	16	As written, this would be interpreted as the exposure increasing because of the cryosphere related changes described above. But as discussed in the chapter it is also (and more so) because of increasing infrastructure and tourism etc in high mountain regions. I think you need to expand here to avoid giving a misleading picture that the changing cryosphere is the cause of all things bad.	Simon Allen	University of Zurich	Switzerland	Noted - the SPM has been rewritten and a more nuanced assessment can be found in A7
25111	7	35	7	35	I think would be a stronger and clearer statement if you remove 'natural hazards' from this sentence. They are included under "risks". Would make the sentence more accurate, as I don't think e.g, a shift in snowline causes natural hazards directly.	Simon Allen	University of Zurich	Switzerland	Taken into account - the entire headline statement has been rewritten to be more clear
25113	7	42	7	43	More relevant would be extreme precipitation. Can you add a statement on that?	Simon Allen	University of Zurich	Switzerland	Taken into account. The statement was thoroughly revised, with a stronger focus on changes in the cryosphere and corresponding impacts and risks. Future changes in winter snow cover are assessed and included in the SPM, but not the precipitation itself (which is covered in Chapter 2).
25115	8	6	8	6	"may include" is too vauge. Combined with the sentence above, you're saying you have high confidence that a bunch of things MAY happen. That is about as useful as a chocolate teapot and is hardly suggests a result of years of scientific studies. Why not use likelihood language? Also "could" on line 8, and another "may" on line 10. I have high confidence that this paragraph may not make it through the approval plenary.	Simon Allen	University of Zurich	Switzerland	Taken into account, the reformulated B4.1 makes better use of confidence language. [my children will disagree with your notion that chocolate teapots are useless]
25117	8	15	8	15	"some regions" is not too useful, leaves people open to interpret how they like. Better to specify in general terms which regions these are.	Simon Allen	University of Zurich	Switzerland	Taken into account - "some regions" has been specified (now in B7)

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
25119	8	25	8	27	This is a pretty bold statement and must have a confidence level/likelihood associated with it!	Simon Allen	University of Zurich	Switzerland	Taken into account. Substantial modifications of the wording of the Chapter 2 Executive Summary in the Final Draft were used to support substantial changes in the wording of such statements here, with more focussed information in the bullet points.
25121	8	48	8	48	what about ice sheets? or are they now being lumped under "glaciers"?	Simon Allen	University of Zurich	Switzerland	Taken into account - see restructure of section b
25123	8	50	8	50	"provides opportunities"...thank god, you include something positive at last!	Simon Allen	University of Zurich	Switzerland	Noted
25125	9	4	9	8	are these projections or observed changes? As written, seems like in the wrong section.	Simon Allen	University of Zurich	Switzerland	Taken into account - the SPM has been revised substantially
25127	9	21	9	29	Again… Are these projections?	Simon Allen	University of Zurich	Switzerland	Taken into account. The revised structure and wording of the SPM makes it clearer that section A deals with observed impacts, while section B addresses future impacts and risks.
25129	9	31	9	32	I'm getting lost….. B2.1 already went into some of these aspects. Now you jump back again to changes in the Arctic cryosphere? The storyline is jumping all over the place!	Simon Allen	University of Zurich	Switzerland	Taken into account - the SPM has been restructured for a clearer narrative
25131	10	1	0		Secton B3 seems too long and out of proportion with other sections. Clear messages are lost.	Simon Allen	University of Zurich	Switzerland	Taken into account - the entire section B5 (former B3) has been revised and significantly condensed
25133	12	27	12	27	Good… but everybody will ask WHY the assessment has changed. You need to give reasoning. It becomes clearer from the subsequent paragraph, but rather than making the reader piece bits of information together, would be much better and transparent to have a clear separate paragraph on how and why projections have changed since the AR5.	Simon Allen	University of Zurich	Switzerland	Taken in account - added
25135	12	53	13	6	This is meant to be a section on projections! Most of this paragraph is talking in past or present tense, and gets into attribution. And then last sentence jumps into adaptation and risk reduction! The storyline is a mess.	Simon Allen	University of Zurich	Switzerland	Taken into account - bullet has been revised and projections and observations clearly separated. Most parts of this bullet has been moved to become A9
25137	13	8	13	13	I'm completely lost now. I thought we are in a section on projected changes. What is this headline statement (and much of the information in the paragraphs that follow) doing here?	Simon Allen	University of Zurich	Switzerland	The entire SPM has been restructured and thoroughly revised. It has been clarified in the headline statement (now B9) and the new structure of the entire SPM that these statements are about projections
25139	13	44	13	44	Is the fact they are richer really the relevant issue here, or rather that they are densely populated? I expect densely populated coastal areas in poor countries (e.g. Bangladesh) will also be well protected, just with the funding coming from other sources (multilateral financing, Adaption Funds etc). I'm not sure the words "richer" and "poorer" are valid or needed in this sentence... but I guess this will give the delegations something to argue over during the plenary!	Simon Allen	University of Zurich	Switzerland	Accepted - the entire statement has been re-written and terms "richer/poorer" have been removed
25141	16	9	16	11	Remove this last sentence. It is not a headline message, but more of an explanation of what a compound risk is, and is not specfic to the ocean and cryo.	Simon Allen	University of Zurich	Switzerland	Taken into account - redundancy removed
25143	16	26	16	28	Is this any different then what is being said on lines 34 - 37 below?	Simon Allen	University of Zurich	Switzerland	the text has been substantially revised
25145	16	49	16	55	This section is meant to be about projected changes!!!	Simon Allen	University of Zurich	Switzerland	This had been considered when revising the SPM.
25147	17	1	0		Figure SPM.5 is a great and easy to interpret figure! Is there any way of normalising panel A based on the areal extent of each basin? Or atleast visually showing that the extent of each basin is not the same. For example, might look a bit ugly, but the basin name could be given in a font size that is proportional to the size of the basin.	Simon Allen	University of Zurich	Switzerland	Figure SPM.5 was removed in revision
25149	18	16	18	16	probably better to avoid "scenario" in this context, i.e., confusing with use of RCP scenarios in previous sentence.	Simon Allen	University of Zurich	Switzerland	Taken into account - scenario wording not used in this context in the revised SPM
25151	18	18	18	18	What is meant with a "substantial weakening"? Is this what is expected under the very likely headline statement above? Or does a different likelihood apply for "substantial weakening" and the associated impacts? Basically its unclear how the reader should reconcile the headline statement, with these potential impacts that are listed here.	Simon Allen	University of Zurich	Switzerland	Taken into account - the SPM has been revised for a clearer narrative. Historical observations of AMOC are an A.2.8 and projections with consequences in B.2.8.
25153	18	27	18	27	Medium confidence that a new tipping element has been identified (as the sentence currently reads), or medium confidence that it will occur?	Simon Allen	University of Zurich	Switzerland	Noted - text on SPG removed from SPM
25155	19	1	0		Section C: Throughout the previous sections there have been random bits and pieces on adaptation and mitigation. These should all be moved and consolidated within this section.	Simon Allen	University of Zurich	Switzerland	Taken into account. Adaptation is now dealt with mainly in Section C.
25157	19	3	19	5	This is very academic sounding. What is a policy-maker meant to do with this statement? Language should be clearer and more user-friendly especially at the level of headline statements.	Simon Allen	University of Zurich	Switzerland	Taken into account. The language has been revised for the final draft.
25199	37	1	37	1	"Vulnerability" here is wrong, and should be "risk".	Simon Allen	University of Zurich	Switzerland	Error in page or line number - cannot match text
25431	2	14	0		Replace "some" with "many" or at least "several"	Lisa Speer	Natural Resources Defense Council	United States of America	No longer applicable - statement modified.
25433	2	20	0		Most policy makers will have no idea what "an energy imbalance" means, let alone the significance of ".42 W m-2".	Lisa Speer	Natural Resources Defense Council	United States of America	Taken into account - these have been removed and the text revised see A.2.1
25435	2	26	0		Take out "is observed to be"	Lisa Speer	Natural Resources Defense Council	United States of America	Taken into account - "is observed to be" removed
25437	2	39	40		The sentence seems to contradict the sentence beginning on line 35 .	Lisa Speer	Natural Resources Defense Council	United States of America	text has been rephrased. The text is modified, in the final SPM version we do not discuss the attribution (see A 1.1). Sea level rise is now discussed in A3
25439	2	40	0		Find another word for "steric" (this chapter is for policy makers)	Lisa Speer	Natural Resources Defense Council	United States of America	Taken into account - 'steric' no longer used
25441	3	17	0		Make it clearer that 1st 2 sentences of this para refer to mountain permafrost, while the remainder addresses pfrost more generally.	Lisa Speer	Natural Resources Defense Council	United States of America	No longer applicable - sentences rewritten
25443	3	29	0		Mention changes in downstream abundance and timing of water availability downstream (not just pollutants)	Lisa Speer	Natural Resources Defense Council	United States of America	Taken into account - Callout updated and a sentence about heavy metal release added in the new B7.4
25445	5	7	0		concept figure for deoxygenation would be very helpful	Lisa Speer	Natural Resources Defense Council	United States of America	Panels have been updated with a more suitable selection of variables.
25447	7	26	0		The literature supports "high confidence"	Lisa Speer	Natural Resources Defense Council	United States of America	Accepted. The original statement has been changed during the course of the revisions. In other places of the SPM addressing the risk for sustainable development from CC change in the O&C, the confidence level has been changed to high.
25449	8	48	0		add deoxygenization and acidification, both of which are accelerating in the Arctic faster than many other parts of the globe.	Lisa Speer	Natural Resources Defense Council	United States of America	Noted - see revised B.2

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
25451	8	50	51		Loss of ice also opening up the Arctic to offshore oil and gas development which poses at least as much danger as shipping.	Lisa Speer	Natural Resources Defense Council	United States of America	Noted
25453	9	18	0		The same is true for Arctic marine species, many of which have limited or no refugia	Lisa Speer	Natural Resources Defense Council	United States of America	Taken into account - see revisions in B5.3
25455	9	31	0		Loss of snow cover on sea ice has major implications for ice seals -- take out "terrestrial".	Lisa Speer	Natural Resources Defense Council	United States of America	Substance
25457	10	2	0		Suggest taking out "some". Or replacing with "many". Supported in the main analysis and in this para	Lisa Speer	Natural Resources Defense Council	United States of America	Apologies, the authors were unable to identify which part of the SPM this comment refers to.
25459	11	32	0		Suggest replacing "manage the effects on" with "to enhance resilience of"	Lisa Speer	Natural Resources Defense Council	United States of America	Taken into account - the bullet has been revised and the phrase "manage the effects" has been removed
25461	11	16	0		Similar maps projecting changes in acidification, deoxygenation, pp, loss of reefs? Helps reader assess geography of changes	Lisa Speer	Natural Resources Defense Council	United States of America	Figure has been extended to include additional projections.
25463	20	33	0		insert "or robust" after "rapid"	Lisa Speer	Natural Resources Defense Council	United States of America	Taken into account. Sentence revised.
25465	20	37	0	38	Suggest substituting "making" for driving in line 37 and adding "more urgent" after "governance" in line 39	Lisa Speer	Natural Resources Defense Council	United States of America	Noted. Bullet has been revised and coordination and integration are now addressed in C4.5.
25467	2	0	0	21	A few general thoughts on this chapter: a) political conflict is mentioned SLR but not water conflicts due to mountain cryosphere effects. B) Specific adaptation measures are extensively discussed for SLR but not so much for other ocean impacts.Suggest inserting a para on enhancing resilience of ocean species and biodiversity through ecologically connected networks of marine protected areas, reducing other stressors from noise, chemical, plastic pollution, as well as habitat destruction by seabed mining and bottom trawling; managing for cumulative effects, etc. Some of these are mentioned in passing in the current text but could use elaboration to even out the adaptation discussion. C) Adaptation measures for water availability as mountain glaciers retreat could use some more emphasis.	Lisa Speer	Natural Resources Defense Council	United States of America	Taken in account where possible e.g. C2 addresses marine protected networks
25543	15	0	15		This figure is very problematic. If key issues can't be fixed it should be deleted. First and foremost, the temperature scaling apparently is messed up. RCP warming levels are apparently related to the recent past (1986-2005), whereas present day warming is to pre-industrial. Sending out such a figure to governments is quite an embarrassment for the IPCC. Specific comments on B and C are below.	Schleussner Carl-Friedrich	Climate Analytics	Germany	The temperature scaling has been revised and is expressed relative to pre-industrial level.
25545	15	0	15		The assessment of risks in Figure B) is questionable and illustrates the limits of the burning embers concept for less aggregated risks than the RFCs. Additionally, the selection if far from being comprehensive and the reason for the selection is not clear. For example: Why is the SPG selected and not Arctic sea ice? Why is there no assessment of the tipping risks for West and East Antarctica and Greenland? Why nothing on glaciers? Furthermore, the temperature scaling appears to differ from Fig. 6.11, which doesn't help either… My comments here are based on Fig. 6.11 as this temperature scaling actually seems to be more reasonable to me. Specifically: Cyclones: Present a high risk in regions where they occur already as a natural phenomenon. Not touching on the questions of occurrence, confounding factors increasing the impact such as reduced speed (Kossin 2018), precipitation (van Oldenborgh 2018) and sea level rise (Lin et al. 2016) exhibit a clear climate change signal. The assessment of risks as 'undetectable-moderate' therefore is questionable. And the translation to 'high' risks only beyond 4°C is difficult to comprehend and there is no literature that I am aware off that supports this. Extreme ENSO: Key literature including (Cai et al. 2014-2018) points towards a doubling of more extreme El Nino events already at 1.5°C (Wang et al. 2017) and intensifying further post 2100. How comes this is 'undetectable' risk? AMOC: Is slowing down already today. (Rahmstorf et al. 2015, Caesar et al. 2018 and others.) How is this not detectable? SPG: What's the global relevance of the SPG? Why is it selected here? And what is the literature this is assessment is based on?	Schleussner Carl-Friedrich	Climate Analytics	Germany	The burning embers are now separated into two SPMs (3 and 5). SPM 3 focuses on ocean ecosystems while SPM 5 focuses on coastal human communities. The selection of ocean ecosystems is also more comprehensive in the revised SPM3.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
25547	15	0	15		This panel is probably the worst IPCC product I've ever seen on moral grounds. But also in more general terms, inclusion of adaptation into the burning embers concept doesn't work for a variety of reasons: # SLR is inherently time lagged, whereas societal factors and adaptive capacity are time dependent. # The expert judgement exerted to assess risk levels is already an issue that requires careful monitoring. Doing the same then for adaptation potential, however, is pushing it too far. Adaptive potentials are very different at different regions and globally aggregating them is questionable. There are also clear logical inconsistencies, i.e. with the treatment of 'very high risks'. For Megacities, 'very high risks' that by definition set in when limits to adaptation are reached, can be reduced to moderate by adaptation. How? # The concept of transformation adaptation is policy prescriptive. Whether or not measures like relocation are considered 'adaptation' or are losses in themselves needs to be carefully evaluated. But just mindlessly applying such concepts does lead to outcomes that can just be described as cynical such as the "annihilation of in situ vulnerability" that then leads to "no risks". This is the annihilation of whole islands, livelihoods, culture and people!	Schleussner Carl-Friedrich	Climate Analytics	Germany	Taken into account. The Figure is substantially revised (SPM.5) and includes a panel assessing response options
25549	0	0	0		The SPM misses crucial information on 1.5°C and differences between 1.5°C and 2°C identified in the 1.5SR that should be added. This includes i.e. the risks for Artic Sea ice.	Schleussner Carl-Friedrich	Climate Analytics	Germany	Accepted. A comparison of 1.5°C vs 2°C for Arctic sea ice is included in FD SPM B2.1.
25551	0	0	0		The SPM falls short in characterising the risks of large scale tipping of ice sheets. It's remarkable that the 1.5SR has done a better job in outlining the risks of crossing tipping points of the Greenland and WAIS than the SROCC. Even with the strange concept of 'deep uncertainties', the risks can be and should be assessed.	Schleussner Carl-Friedrich	Climate Analytics	Germany	Accepted. This is now addressed in FD SPM B3 (see e.g. B3.4).
25553	12	38	12	44	I understand that the authors are cautious with locating exact tipping points. And it might indeed be that we've tipped parts of the WAIS already, but then the authors need to write it. Not mentioning them at all is just irresponsible.	Schleussner Carl-Friedrich	Climate Analytics	Germany	Accepted. Potential onset of Marine Icesheet Instability process of the WAIS is addressed in FD SPM A3.2, the potential contribution of Antarctic and Greenland ice sheets to SLR is addressed in B3 (see B.3.1 and B3.4).
25555	0	0	0		Many study objects of this report exhibit a substantial time lag in their response. This is the case for ocean circulation or coupled systems (AMOC, ENSO) and obviously the cryosphere. Adopting a framing up to 2100 therefore seems wholly inappropriate. Doing so has several consequences: 1.Miscommunication about the long-term impacts of climate change: If the IPCC does not clearly communicate i.e. the risks of an irreversible long term SLR commitment of >30m under high end scenarios, the public won't know. 2.Miscommunication about the differences between scenarios: For time-lagged systems such as glaciers and even more ice sheets and associated SLR, the main differences between different mitigation pathways will materialize beyond 2100. Not informing governments about these important differences means downplaying the benefits of mitigation. 3.Miscommunication about the legacy of present-day actions: By focusing on 2100 and the fact that SLR is largely scenario independent until mid-century, the report fails to convey the message of urgency that comes from our increased understanding about the cryosphere. Important recent studies have investigated the sea level commitment by GHG emissions implied by the NDCs up to 2030 (Clark et al. 2018) and have shown that every five years delay in peaking global CO2 leads to ~20cm median SLR increase in 2300 for Paris compatible scenarios (Mengel et al. 2018, notably without triggering tipping points). Not clarifying the link between short-term emissions and long-term SLR (or glacier melt, Marzeion et al. 2018 identify this for glaciers as well) is a major short-coming. In recent literature, 2300 has emerged as a useful time scale to illustrate differences in time lagged systems. There is also CMIP5 information available on this time frame through the extended RCPs. Furthermore, information on long-term sea level rise risks should be included in the SPM. In any case, a dedicated figure linking GHG emissions to long-term changes in oceans and cryosphere should be added to the SPM.	Schleussner Carl-Friedrich	Climate Analytics	Germany	Rejected - the SROCC SPM remains focused on RCP2.6 and RCP8.5. However, B3.4 has been revised to provide the perspective of SLR beyond 2100
25557	0	0	0		There have been major advancements in our understanding regarding the risks of tipping points of individual glacier systems or whole parts of ice sheets since the AR5. None of this is reflected in the SPM. There is no doubt that the future dynamics of these systems are still uncertain, but there the IPCC has a responsibility to inform the public about the grave risks associated with crossing such thresholds.	Schleussner Carl-Friedrich	Climate Analytics	Germany	Accepted. This is now addressed in FD SPM B3 (see e.g. B3.4).
25559	0	0	0		The issue of Loss and Damage is still not adequately dealt with in the SPM and the report as a whole. It's included as a concept in CC Box 1, but not followed through in the report or the SPM. If glaciers, coral reefs and marine species and eventually whole islands and coastlines disappear, how would you call that? The current proposal in the SPM appears to be "annihilation of in situ vulnerability". I'd prefer a less cynical and more policy relevant approach linked to the established framework of Loss and Damage. The box in SR1.5 provides a good starting point for assessing information relevant to Loss and Damage. Adopting a framing that clarifies the value judgements involved in the classification of adaptation and loss and damage (i.e. related to relocation among other things) would be very important.	Schleussner Carl-Friedrich	Climate Analytics	Germany	Rejected - it is not possible to add a box to the SPM due to space. key areas are covered in the SPM and in the underlying report the cross chapter box 9 in particular covers aspects for SIDS
25571	8	27	0		If there are limits to adaptive capacity, vulnerabilities don't increase. Impacts do. And the result is Loss and Damage.	Schleussner Carl-Friedrich	Climate Analytics	Germany	Taken into account. Substantial modifications of the wording of the Chapter 2 Executive Summary in the Final Draft were used to support substantial changes in the wording of such statements here, with more focussed information in the bullet points.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
25619	18	13	18	16	As detailed in my comments to chapter 6 I believe a very important conclusion is missing here: namely that "it is very likely that the AMOC has declined since the early-mid 20th Century, as predicted by climate models, and is at its weakest in recent decades since at least a millennium". Given that so many independent lines of evidence support this conclusion, but that no direct measurements exist, I would give this "medium confidence". (In particular in relation to the list of impacts given in the SPM point B7.1, which in my view are less supported than the past and ongoing slowdown, but are given "medium confidence".)	Stefan Rahmstorf	Potsdam Institute for Climate Impact Research	Germany	Taken into account see A.2.8 "Modern observations, climate simulations and paleoclimate reconstructions suggest that the Atlantic Meridional Overturning Circulation (AMOC) has weakened since the preindustrial (medium confidence)"
25621	18	13	18	16	Note that six different proxy data as well as several different analyses of instrumental temperature measurements as well as the CMIP5 historic runs are in agreement about this. This observed slowdown is obviously more important and much better supported by different strands of evidence than the potential tipping of the SPG which makes it into the SPM!	Stefan Rahmstorf	Potsdam Institute for Climate Impact Research	Germany	Noted - the SPG has been removed from the SPM
25715	17	0	17	0	"In figure SPM 5 on the global account of hurricanes/ cyclones in North Indian Ocean may be cross-checked."	Government of India	Ministry of Environment, Forests and Climate Change	India	Figure SPM.5 was removed in revision
25717	16	5	16	55	The analysis on extreme events could map degree of vulnerability vis a vis ability and capacity of the respective regions to adapt / undertake risk mitigation action.	Government of India	Ministry of Environment, Forests and Climate Change	India	Noted - this is not available in the report however Figure SPM.5 includes differences in adaptative capacity to SLR for specific geographies as an example
25719	0	0	0		In order to support decision makers, a few sections giving the economic loss due to natural hazards and SLR in the last decade would be useful.	Government of India	Ministry of Environment, Forests and Climate Change	India	Noted - the SPM has been substantially revised
25795	1	41	1	42	"particular attention" is also given to the long-term trends in CC, not just SLR and extreme events	Manuel Barange	FAO	Italy	Agreed - the text is revised in the final draft in the start up box
25797	2	26	2	29	Given that there is "medium" and "low confidence" for changes in relation to deoxygenation it seems problematic to link it to warming and acidification in box A1, as if we had similar confidence levels in their patterns	Manuel Barange	FAO	Italy	Rejected - this are key messages
25799	4	0	4		Fig SPM1, with regards to marine animal biomass, the numbers come from a paper not yet published. It should not be used as per the rules of IPCC	Manuel Barange	FAO	Italy	Suggestion applied.
25801	5	35	5	43	In A2.3 and A2.2 there are good references of changes to freshwater environments due to climate change but also agriculture practices. This is good. However, it fails to reflect the CRUCIAL food security role of freshwater environments in many countries (e.g. Uganda, Tanzania, Nigeria, Cambodia, Bangladesh, Myanmar, India are all in the top 10 producing countries for inland fisheries, and the implications of the changes mentioned for adaptation must cite fisheries too, as well as agriculture, tourism, etc.)	Manuel Barange	FAO	Italy	Taken into account. Changes to food security due to a changing cryosphere are covered in SPM SOD (A7, in particular A7.1).
25803	6	1	6	4	How can "overall shifts" be considered of "very high confidence" if the expansion towards the Poles is "high" and change in low latutudes "medium"confidence?	Manuel Barange	FAO	Italy	Noted the very high confidence refers to biomass and composition - the text has been revised - see A5
25805	6	8	6	10	There is significant literature that shows that ocean biodiversity is changing, but not necessarily declining, certainly not everywhere (e.g. Molinos et al. 2016). In fact some papers have reported an increase of marine biodiversity coinciding with global warming over geological times (e.g. Mayhew et al). Further, the concept of "ecosystem function" is rather difficult to interpret and confusing (ecosystems do not grind to a halt!). Suggest this sentence is re-written	Manuel Barange	FAO	Italy	Accepted - the entire bullet has been rewritten and now it says "climate-related changes in the ocean have modified or degraded marine ecosystem services…"
25807	8	22	8	28	B1.5. The role of freshwater systems in supporting fisheries in developing countries is overlooks in this paragraph, as mentioned above for A2.3	Manuel Barange	FAO	Italy	Noted - the section of the SPM has been revised substantially so no longer relevant
25809	10	33	10	35	The numbers mentioned are from an unpublished paper… Suggest to cite projections for fisheries potential catch change instead	Manuel Barange	FAO	Italy	Noted - publication status of all references in underlying report are checked before the Final Draft distribution to ensure they adhere to IPCC process
25811	11	0	11		SPM.3. This figure is from an unpublished paper…	Manuel Barange	FAO	Italy	The source for panel on changes in total biomass is now published: Lotze, H. K. et al., 2018: Ensemble projections of global ocean animal biomass with climate change. bioRxiv, 467175, doi:10.1101/467175.
25813	11	23	11	24	It seems strange that projected changes in catch potential, which we have at least 4-5 globally and regionally, all quantitatively consistent, are not mentioned, and a simple qualitative statement of total animal biomass for the tropical ocean is included instead, considering that unpublished quantitative estimates of total animal biomass are reported in previous paragraphs, with maps as well. This seems inconsistent use of information	Manuel Barange	FAO	Italy	Taken into account - see maps added to Figure SPM.3
25815	11	24	11	27	"The cascading effects of climate-induced stressors on polar marine ecosystems will have impacts on fisheries"- The Arctic region has a moratorium on fisheries, and the Southern Ocean krill fishery is significantly lower than the science-based catch limits. Thus this statement is probably incorrect	Manuel Barange	FAO	Italy	Noted - Sentence removed from revised SPM
25817	11	32	11	33	"Some current management strategies may not sustain viable commercial fisheries under higher emission scenarios". Suggest a more neutral language is used, such as "some management systems will require significant adjustment to respond to climate change pressures, especially under RCP8.5"	Manuel Barange	FAO	Italy	Taken into account - the statement has been revised in C2.3
25819	11	42	11	44	The statement about fish declines threatening food security is not categorized in terms of confidence, and I would argue it should. In which case it can only be a low to medium confidence because it depends much more on management and policy responses than climate change impacts alone, as has been published several times before. In fact, it is unfortunate that the SPM does not reflect on published work which shows that if taken seriously adaptations can result in very positive outcomes in revenues, food security and livelihoods (e.g. Gaines et al 2018, cited in Chapter 5)	Manuel Barange	FAO	Italy	section 54222 about food security
25821	19	0	19		These sections on adaptation are rather descriptive and lack innovation. What about using thr SPM to highlight what adaptation strategies work, what tooolboxes/ rameworks are available, and recognise that adaptations are positive as well as needed?	Manuel Barange	FAO	Italy	Accepted. Available adaptation measures have been specified and Figure SPM.5 includes a table with adaptation options including co-benefits and trade-offs.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
25823	21	0	21		Section C, especially C.3. is rather weak and does not offer any real solutions. Too many words with stale concepts. The SPM should provide a vision for solutions and opportunities rather than a statement of problems (some not event quantified)	Manuel Barange	FAO	Italy	Noted. Section C has been revised to address challenges, barriers, enablers, and options.
25831	15	1	15	27	My suggestion is that Figure SMP4, will be present separate, with their own text, part A Coastal Ecosystems with their text interpretation, same for B(physical phenomena), and in C (local Hotspot geographies), more explanation using the interpretation of the colors, models, etc. Decision Makers allways see and few read.	ELIZABETH SILVESTRE	UNIVERSIDAD CATOLICA SANTO TORIBIO DE MOGROVEJO	Peru	Suggestion acknowledged. Embers on geographies are now presented in a separate figure (Fig. SPM 5).
25833	6	16	6	18	I´m not sure, but thinking like a desición maker, they don´t going to take time to understand the legend of the figure SMP 2, sorry I did not have a proposal for a figure, but my comment is that, the Desición Makers not going to use time interpreting the figure...and this accions could be a to have few interest and accions from the decision makers	ELIZABETH SILVESTRE	UNIVERSIDAD CATOLICA SANTO TORIBIO DE MOGROVEJO	Peru	Taken into account - Overall graphical approach has been changed to ease comprehension.
25843	7	22	7	24	The origin of this conclusion is unclear. It cannot be drawn from the referenced 2.2.1.2 sub-section (nor Box 2.1) which includes a discussion on future precipitation. As stated in this sub-section, future total precipitation change is at first regionally dependent and it is the change of the solid (liquid) precipitation that is elevation dependent.	Serge PLANTON	Météo-France, CNRM	France	Taken into account. The statement was thoroughly revised, with a stronger focus on changes in the cryosphere and corresponding impacts and risks.
25853	4	0	4		While it is an excellent set of content, it is much too small to see clearly at 100% size. I think 'Near Future' could be clearer as a heading than 'Near Term', and I suspect 'End-of-Century [2081-2010]' is meant to have the second date as 2100. I find the mountain glacier line of the figure confusing to understand at first, and ideally the reader would not need to take time to work out the meaning. Is the mountain snow cover in summer or winter? Consider showing population < 1 or 10 m above SL as well? This could relate more meaningfully to the sea level projection numbers given in the same figure?	Elizabeth Petrie	University of Glasgow	United Kingdom (of Great Britain and Northern Ireland)	Overall graphical approach has been changed in order to ease understanding.
25855	15	0	15		This figure, Figure SPM 4, is also rather small - perhaps make landscape? Also Figure SPM 6 on p18.	Elizabeth Petrie	University of Glasgow	United Kingdom (of Great Britain and Northern Ireland)	Several embers have been removed and therefore spacing has been optimized.
25857	0	0	0		Would it not be helpful for the different RCP emissions scenarios to have a paragraph introducing them near the beginning of the summary for policymakers, rather than a brief footnote on p7? I realise there is material on p42 of Chapter 1, but think the summary would benefit.	Elizabeth Petrie	University of Glasgow	United Kingdom (of Great Britain and Northern Ireland)	Noted - footnote 7 has been expanded to include more detail
26195	2	40	2	40	Please avoid the technical term "steric"	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account - 'steric' no longer used
26197	2	37	2	39	Is it possible to quantify the relative contributions of the main sources of SLR?	Government of Denmark	Danish Meteorological Institute	Denmark	numbers are provided in the FD. see A 1.1 of SPM FD
26199	6	14	6	18	It is rather difficult to see the symbols on the map. The colour scheme for high mountain ares (dark grey areas on map) is not optimal. Please make sure the contrast with the symbols used for impacts and drivers has sufficient contrast to the map colours.	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account - Overall graphical approach has been changed to ease comprehension.
26201	6	28	7	2	I cannot understand this sentence. How can changes initiate adaptation measures? Suggestion: "have led to initiation of adaptation measures"	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account - sentence removed
26203	8	43	8	43	"consequences for climate regulation" - not sure how that should be understood? What is meant by climate regulation? Is it e.g. international agreements / legislation? How can changes in the oceans affect that?	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account - text has been revised and the term "climate regulation" has been removed from the SPM
26205	9	22	9	22	"disturbance regime" should be replaced with less technical language	Government of Denmark	Danish Meteorological Institute	Denmark	Noted - however term retained in SPM due to specific meaning
26207	9	43	9	43	"Arctic circumpolar infrastructure" - the word circumpolar is a bit confusing; it gives the impression of a structure that circles the entire North pole.	Government of Denmark	Danish Meteorological Institute	Denmark	The statement including the term "circumpolar infrastructure" has been removed from the latest version of the SPM
26209	10	25	10	25	language is too technical,especially the word "pelagic"	Government of Denmark	Danish Meteorological Institute	Denmark	Noted - we tried to reduce technical terms. Pelagic is retained as it is defined in the glossary
26211	10	49	10	49	language is too technical,especially the word "benthic"	Government of Denmark	Danish Meteorological Institute	Denmark	Accepted - the term "benthic" has been removed from this bullet
26213	12	38	12	44	Is this in line with SR1.5 which has strong statements on SLR beyond 2100? The risk of multi-meter SLR should be adressed more clearly. Suggest to stress that SLR in all emission scenarios will continue well beyond 2100 and to give some quantification of this, possibly divided into the case of ice-sheet collapse and the case where collapse does not occur?	Government of Denmark	Danish Meteorological Institute	Denmark	Accepted. This has been addressed in FD SPM B3 (see B3.4)
26215	19	43	19	43	"Blue carbon"?	Government of Denmark	Danish Meteorological Institute	Denmark	Noted - blue carbon is retained in C.2.5 as it is a relevant term that is defined in the glossary
26217	19	53	19	53	"seaweed (blue carbon) ecosystems" - the parenthesis is confusing. If the term "blue carbon" is essential for this paragraph, it needs a separate definition and introduction.	Government of Denmark	Danish Meteorological Institute	Denmark	Noted. Sentence has been revised.
26219	20	27	20	27	ready society -> prepare society	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account. Sentence revised.
26221	20	27	20	28	"inevitable surprises of climate change" ? It seems to be at once a very strong and very vague phrase. Does that imply entirely new and unforeseen impacts? Suggest to rephrase.	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account. Sentence revised.
26223	20	27	20	27	not sure if the word "trajectories" is relevant? Do societies prepare for trajectories?	Government of Denmark	Danish Meteorological Institute	Denmark	Talen into account. Text revised and term trajectory removed.
26225	20	28	20	28	require the attention - of ? Sentence ends abruptly.	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account. Sentence revised.
26227	21	22	20	22	"to deeply uncertain climate change impacts". Suggest to rephrase, it sends a signal of extremely low scientific understanding of climate change impacts. Is it perceived uncertainty, rather than actual uncertainty?	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account. The bullet has been revised.
26229	21	25	21	31	In the example, which are the conflicting interests that are resolved? I don't see how the example illustrates the first sentence?	Government of Denmark	Danish Meteorological Institute	Denmark	Taken into account. Text substantially revised - see C4 for coordination and cooperation

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
26241	4	0	4		Figure SPM1. I appreciate you want to get it all on one page, but the text is too small and the figure itself, in my opinion, to compliacted for the target audience	Katherine Yates	University of Salford	United Kingdom (of Great Britain and Northern Ireland)	Overall layout has been reworked to allow the use of a bigger font size and ease readability.
26243	6	0	6		Figure SPM.2 text imposed on map hard to read in places, figure not intuative/quick to access enough for a policy maker summary. I know there's a lot to be said and you're trying to be concise, but whats the main take home for a policy maker reading through quickly (SPM.3 for example has a very quick take home)	Katherine Yates	University of Salford	United Kingdom (of Great Britain and Northern Ireland)	Taken into account - Overall graphical approach has been changed to ease comprehension.
26245	15	0	15		text too small	Katherine Yates	University of Salford	United Kingdom (of Great Britain and Northern Ireland)	Font size has been increased.
26713	12	35	12	36	This statement is almost certainly going to lead to misunderstanding and will be quoted as showing that sea-level rise has not made coastal flooding events worse. Few people except attribution specialists will understand the specific narrow expert-jargon meaning of "attributed" used here, referring presumably to a specific type of attribution study. Given that the report attributes sea-level rise to anthropogenic forcing and the higher sea level without question does make coastal flooding events worse, the key message to the general reader here should clearly be that anthropogenic climate change is making these flooding events worse. Yet, to a non-specialist reader this statement seems to say exactly the opposite! In my humble opinion this is a classic example for why the IPCC is so bad at communicating its findings to the public.	Stefan Rahmstorf	Potsdam Institute for Climate Impact Research	Germany	Noted - sentence removed
26715	15	2	15	2	Fig. 4: I do not understand the AMOC column. As detailed in my other comments, the AMOC very likely has already slowed down, best estimate by 15%. Also, the presence of the "cold blob" in the subpolar Atlantic caused largely by the AMOC heat transport reduction is already affecting European weather. The German Weather Service is using the SST in this region routinely in its seasonal forecasting. It has been linked to the European heat waves of 2015 and 2003 (the latter caused 70,000 fatalities in Europe): Duchez, A., et al. (2016). "Drivers of exceptionally cold North Atlantic Ocean temperatures and their link to the 2015 European heat wave." Environmental Research Letters 11(7): 074004. By any sensible measure, there are already detectable and attributable AMOC risks at medium confidence level now. How can this diagram claim these won't happen until two more degrees of warming?	Stefan Rahmstorf	Potsdam Institute for Climate Impact Research	Germany	The embers on physical phenomena have been removed after technical discussions.
26717	16	22	16	32	These are very weak an hyper-cautious statements on tropical storms. Leading hurricane experts like Kerry Emanual and Jim Kossin have a rather different view on this, see http://www.realclimate.org/index.php/archives/2018/05/does-global-warming-make-tropical-cyclones-stronger/ The main concern is about the strongest storms, cat 4 and 5, which cause the most damage. These are clearly projected to increase strongly in number, and both the Best Track data as well as Kossin's homogenised satellite data show a major increase in the global number of these storms, at least a doubling since 1980. Also, in most of the hurricane basins, again according to the latter data, the strongest storms in the satellite record have occurred in the past few years. How likely is this just by chance? Why is this not discussed?	Stefan Rahmstorf	Potsdam Institute for Climate Impact Research	Germany	Accepted. The entire text has been thoroughly revised. Observed changes in tropical cyclones and associated changes are addressed in FD SPM A3.4 and A3.6. Projected future changes in tropical cyclones and associated changes are addressed in FD SPM B3.2 and B3.3.
26719	16	22	16	22	Numerous further records having been broken. Sandy (2012) achieved the largest diameter of any Atlantic hurricane on record. Western North Pacific typhoon Haiyan (2013) achieved the highest wind speed of any tropical cyclone in global history, a record broken in 2015 by eastern North Pacific Hurricane Patricia. Harvey dumped more rain than any hurricane in the United States, and Irma maintained Category 5 status longer than any storm anywhere on the planet. Ophelia (2017) became the first category 3 storm so far north-east in the Atlantic, cruising off the coast of Portugal. Plus records broken in 2018.	Stefan Rahmstorf	Potsdam Institute for Climate Impact Research	Germany	Noted
26721	16	22	16	22	And in the Southern Hemisphere, Cyclone Pam (2015) was the strongest ever observed in the South Pacific, only to be beaten by Winston in February 2016. Fantala in April 2016 was the strongest in the South Indian Ocean. Donna (2017) was the strongest May cyclone ever observed in the Southern Hemisphere. All just coincidence? How many hurricane experts would claim that this astonishing number of record-breaking storms is not related to the rise in sea surface temperatures, which provide the energy source for tropical storms?	Stefan Rahmstorf	Potsdam Institute for Climate Impact Research	Germany	Noted
26723	13	19	13	21	For example, a seawall in combination with raised buildings may protect a coastal community, and accommodate impacts arising from sea level rise (SLR) and extreme sea level (ESL) events in the short-term, while longer term ecosystem-based adaptation strategies may be initiated to enable managed retreat.	Christopher Pereira	Secretariat of the Convention on Biological Diversity	Canada	Comment taken into account.
26725	19	38	19	40	Ecosystem-based measures can provide substantial benefits but whilst the scale of economic benefits varies, multiple co-benefits such as coastal protection, biodiversity conservation and carbon sequestration, can be generated (high confidence).	Christopher Pereira	Secretariat of the Convention on Biological Diversity	Canada	Taken into account. The bullet has been revised.
26727	19	29	19	32	Adaptation through ecosystem-based approaches such as restoration of natural habitats can support biodiversity and enhances ecosystem functions and services that could support for livelihoods, provide economic benefits and help build resilience in coast-dependent communities vulnerable to climate change (high confidence).	Christopher Pereira	Secretariat of the Convention on Biological Diversity	Canada	Accepted and removed.
26729	19	36	19	37	Vegetation (such as marshes, mangroves, seagrasses and kelp) and reefs (including coral, oyster and mussel beds) provide protection and risk reduction benefits and build resilience for ecosystems and those living in nearby coastal locations (medium confidence).	Christopher Pereira	Secretariat of the Convention on Biological Diversity	Canada	Noted. The bullet has been revised.
26731	19	40	19	41	Due to their space requirements, ecosystem-based measures often play a smaller role in densely populated urban areas.	Christopher Pereira	Secretariat of the Convention on Biological Diversity	Canada	Taken into account. The bullet has been revised.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
26733	19	46	19	49	Successful implementation of measures to maintain and promote carbon storage in coastal ecosystems could significantly assist some countries in reaching national net zero emissions targets and contribute to the national commitments toward several multilateral environmental agreements (high confidence).	Christopher Pereira	Secretariat of the Convention on Biological Diversity	Canada	Noted - sentence deleted from revised SPM and replaced with assessment of mitigation potential (C.2.5)
26735	19	43	19	44	Blue carbon ecosystems such as mangroves, salt marshes and seagrasses, can help provide nature-based solutions with multiple co-benefits, such as coastal protection, biodiversity conservation and carbon sequestration.	Christopher Pereira	Secretariat of the Convention on Biological Diversity	Canada	Agreed - clarified in revised bullet C.2.5
26793	1	1	21	41	Overall, the SPM does not include references to potential opportunities/benefits that may arise from climate change, wehreas these are mentioned in the chapters of the report (for instance in paragraphs A2.6, B2.4, B.3, B3.8 where benefits from species shifts in temerate areas could be mentioned)	Tarub Bahri	Food and Agriculture Organization	Italy	Noted - included where relevant e.g. Fig SPM.2 includes positive and negative impacts at regional scales
26795	6	28	7	2	the sentence starting with "Committed …. Gas emissions" is not clear	Tarub Bahri	Food and Agriculture Organization	Italy	Taken into account - sentence removed
26797	21	42	21	42	"internationally important fisheries" is vague; if this refers to fisherie sin the polar areas, then I suggest to specify what type of importance the text refers to. In Antarctic, it is mainly economic importance for few countries for instance. In the Arctic, cultural aspects might need to be highlighted when it comes to fisheries	Tarub Bahri	Food and Agriculture Organization	Italy	It refers to economically important species and emblematic species
27293	1	34	1	44	Global warming is caused by the buildup of GHGs in the atmosphere rather than emissions - text should be clearer	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	the in the new start up box changed to 'human-induced greenhouse gas emissions and ongoing global warming"
27295	1	33	1	33	Replace "closely connected with" with "integral to"	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	The text has been revised to say "The ocean and cryosphere support unique habitats, and are interconnected with other components of the climate system through global exchange of water, energy and carbon.'
27297	1	48	1	48	The phrase "calibrated language" could be replaced with standard wording	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted - a footnote is included which provides details of the calibrated language
27299	2	19	2	19	Replace "anthropogenic forcing" with "human induced global warming" here and across the Report	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted. In this instance the wording was changed to 'anthropogenic global warming'
27301	2	23	2	29	The structure of A1.2 could be improved and the language made clearer	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - ocean acidification and ocean deoxygenation are discussed in two separate bullets in the revised SPM.
27303	2	23	2	29	The point regarding the ocean uptake and potential release of CO2 is very relevant to negative emissions and mitigation measures	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted
27305	2	31	2	37	The amount of mass lost in the Greenland ice sheet would be helpful.	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Numbers of mass loss are mentioned in the FD. Done - see A 1.1 and A 3.1 of SPM FD
27307	2	42	2	45	The actual increase of Arctic sea surface temperature would be useful	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - there was a typographical error here (erroneous inclusion of word "sea"). We have clarified our meaning in the revised version.
27309	3	5	3	8	Is this consistent worldwide or does it vary regionally?	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account. Changes in air temperature in mountain regions are assessed in Chapter 2 FD, but not elevated in the SOD SPM and FD TS. Section A1.2 in the SOD SPM provides more quantitative information about changes in mountain snow cover.
27311	4	1	4	5	The 2 degree level should be more prominent in these graphics	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted: the temperature information has been updated and is now represented as time series for RCP2.6 and RCP8.5, relative to 1986-2005. The caption also gives information from AR5 on the assessed amount of warming from pre-industrial to the 1986-2005 reference interval.
27313	5	15	5	15	Should this relate to CO2 uptake rather than Carbon uptake?	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - text has been completely revised
27315	5	14	5	15	Could be linked to terrestrial uptake	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	unclear what reviewer is asking for
27317	5	40	5	44	The message of limitations on adaptation measures is very important and should be separately highlighted	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Agreed. This text is removed. Limits to adaptation are now given greater focus in sections B and C. e.g. B9, C1, C3
27319	6	1	6	4	References to observed population declines should be greater than "medium confidence"	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted - the text is removed. See A.5.5 where more nuanced statements are included

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
27321	6	6	6	8	The role of ocean ecosystems could be elaborated in more detail. Also, on line 7, the role "is threatened" rather than "are threatened"	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Agreed - see the revised section A8
27323	6	11	6	13	Do the reductions of carbon stocks have a relevance to mitigation measures later in the report?	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	revised for clarity - see B.1.3, C.2.5
27325	7	4	7	19	Marine heatwaves could be explained more clearly for policymakers	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	A general definition is given with a more technical definition in Chapter 6
27327	7	26	7	26	Reference to sustainable development pathways could be linked to other Reports or explained more clearly here	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted. This sentence is now removed and sustainable development is in section C
27329	7	39	7	39	High mountain regions should be defined clearly, particularly if precipitation impacts differ vs lower levels	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - see the added startup box
27331	7	50	7	50	Reference to RCP8.5 should be explained clearly for policymakers	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - 'RCP 8.5' removed
27333	8	6	8	6	Use projected rather than 'may'	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Accepted - text revised to be clear that this is about projections
27335	9	1	9	54	"projected" can qualify all these statements. Some are very technical and could be expressed more succinctly	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - the SPM has been restructured and the text completely revised to be more clear and concise
27337	9	40	9	41	"low confidence" could be explained to clarify the impact of plant growth on losses	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Text revised to clarify language and confidence levels. Section B1.3.
27339	10	6	10	10	References to RCP2.6 and RCP8.5 should be explained clearly for policymakers	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - Additional detail on this has been added to the footnote on the RCPs
27341	10	49	10	49	Reference to benthic communities could be more clearly linked to policy-making	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted - see revised B5.4 on cold water corals and B5.2 on deep sea communities
27343	11	23	11	46	B3.9 and B3.140 are very long and would benefit with a reference to quantified impacts	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - the Section is revised substantially and quantitative information added where possible
27345	12	19	12	28	B4.1 is extremely technical	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted, but this is a necessary level of detail
27347	12	38	12	38	replace "deeply uncertain" with standard IPCC language	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted - the SPM has been checked for application of uncertainty language
27349	12	48	12	49	Replace 'period' with 'frequency'	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	No longer applicable - wave period not mentioned in revised SPM
27351	8	8	8	13	The effect of mitigation actions on the need for adaptation measures would be useful	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - the need for appropriate conservation and adaptation measures is highlighted in B4.1
27353	13	26	13	43	Point B5.2 is very long and could be split.The final point about the feasibility and affordability could be separated.	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - the statement has been revised and shortened, and examples removed. The final point on hard protection is now included in C3 and underlying bullets
27355	18	1	18	10	This table could refer to Western Europe rather than just Scandinavia	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	The overall graphical approach, including the usefulness of the map, has been reworked to ease comprehension. Data points are no longer clustered into specific regions.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
27357	18	26	18	31	Explain Subpolar Gyre System	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted - text on SPG removed from SPM
27359	19	29	19	29	Remove brackets from 'international' or else remove the term completely	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account. The bullet has been revised.
27361	19	43	19	48	These could be described as coastal carbon stocks. Vulnerability of this mitigation option could be clarified	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted - blue carbon is retained in C.2.5 as it is a relevant term that is defined in the glossary. A statement on mitigation potential is added
27363	19	45	19	46	Unclear why marine and terrestrial habitats are being compared.	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Agreed - sentence deleted
27365	19	46	19	48	Elaborate on role of measures in achieving national net zero targets. This is very important	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted - sentence deleted from revised SPM and replaced with assessment of mitigation potential (C.2.5)
27367	20	24	20	25	Replace 'disbenefits' with something more appropriate such as negative impacts	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account. The bullet has been revised.
27369	20	24	20	27	Examples of global to local responses would be useful	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted - due to space issue - we could not elaborate with example but section C 4.4 has elaborated it
27371	20	42	20	45	Explain how governance systems have strengthened response capacities	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account: specific governance systems which strengthen response capacities are discussed in C1.2, C2.1, C2.3, C3.3, C4.1, c4.3, c4.5
27373	20	37	20	38	Explain 'new polar interests' and the responses referred to	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	taken into account: language modified to speak more broadly of scales of impacts and governance (C1.1, C1.2, C4.1)
27375	21	5	21	7	Define governance, pathways, frameworks and integration more clearly. This point makes little sense otherwise	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted. Following IPCC policies, terms are defined in the glossary; governance receives attention also in Cross-Chapter Box 3: Governance of the Ocean, Coasts and the Cryosphere under Climate Change, located in in Chapter 1.
27377	21	10	21	14	This point could be made more clearly	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account - the section has been revised and C4 is now focussed on enablers with examples. See also added figure SPM.5
27379	21	15	21	23	Point C4.2 is unclear and doesn't seem particularly relevant to the rest of the Report	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Taken into account. The bullet has been revised to be more specific (see C5 and sub bullets)
27381	21	34	21	34	Define 'new climate change challenges'	Government of Ireland	Department of Communications, Climate Action and Environment	Ireland	Noted. Section C has been revised to address challenges, barriers, enablers, and options.
27393	4	13	0	15	“Adoption of new crops and irrigation techniques have reduced vulnerability of some high mountain agricultural communities to reduced stream flow linked to glacier retreat and changes in snow amounts”. Is it also seen in high mountain agricultural communities of Nepal as herein the status of adoption of new crops and irrigation techniques are still in very preliminary stage (i.e. almost lacking).	Government of Nepal	Ministry of Forests and Environment, Government of Nepal	Nepal	Noted - sentence removed
27395	4	28	0	29	“Line Elevation dependent warming is projected to amplify in many mountain regions (medium confidence)”? Why not in all mountain regions? Can you rewrite this as “Line Elevation dependent warming is projected to amplify in mountain regions (medium confidence)”?	Government of Nepal	Ministry of Forests and Environment, Government of Nepal	Nepal	This sentence is not in the SPM
27397	4	33	0	34	“The mass and duration of the mountain snow cover are projected to remain highly variable, and decline by 25% [10 - 40%]……”. Due to use of variable as well as decline words simultaneously it is hard to follow up. Please rewrite this with a meaningful sentence. It is recommended to write “The mass and duration of the mountain snow cover are projected to decline by 25% [10 - 40%]……	Government of Nepal	Ministry of Forests and Environment, Government of Nepal	Nepal	This sentence is not in the SPM
27645	0	0	0		Some of the headline statements of the SPM seem a bit general and it will be beneficial to include more substantial and quantitative information from report into the headline statements. E.g. one important issue is related to how the melting of ice illustrates the on going climate change and will have impacts on the rest of the climate system.	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted - the SPM has been substantially revised
27647	0	0	0		In general it would be useful to include more information what findings are new compared to AR5.	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted - the SPM has been substantially revised

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
27649	1	32	1	38	We believe it would be useful to put this report also in context with the broader climate system, i.e. by including a sentence starting with describing the four important components of the climate system: atmosphere, ocean, land, cryosphere. And then explain that this report deals with two of these four components and their importance both in the climate system and also when it comes to impacts and feedbacks etc.	Government of Norway	Norwegian Pollution Control Authority	Norway	The introduction has been shortened and the new start up box provides background context and that the ocean and cryosphere interact with other components of the climate system
27651	2	14	2	14	We feel that this sentence on irreversible changes is very important and relevant.	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted - details are discussed throughout the SPM at relevant points e.g. A.3.2
27653	2	17	3	31	We miss a reference to "irreversible changes" in subparagraphs for A1, which has been mentioned on page 2 line 14. Please consider to write one or to sentence about it under the section(s) that is (are) most relevant and include references to chapters.	Government of Norway	Norwegian Pollution Control Authority	Norway	Accepted - details are provided in revised section a e.g. A.3.2
27655	2	31	2	33	In the AR 5 SPM the rate of loss from the Greenland ice sheet was quanitied (See B.3., page 7). From table 3.1 in chapter 3 in SROCC it seems like the best estimate for the rate of loss has increased by approximately 15% (from 215 Gtyr-1 to 247 Gtyr-1). Please consider to include this information to inform policy makers about the development in the rate of mass loss from Greenland since the AR5.	Government of Norway	Norwegian Pollution Control Authority	Norway	Numbers for mass loss are mentioned in the FD. In SPM FD the numbers of mass loss are given - see A 1.1 and A 3.1
27657	2	37	2	39	"Glaciers and polar ice sheets are now the dominant source of sea level rise (very high confidence), and increasing losses from polar ice sheets are resulting in increasing rates of sea level rise." Please explain what you mean by "are now" as it seems to us that the glaciers and polar ice sheests was the dominant source of sea level rise also in AR5. WGI, page 11 states: "Since the early 1970s, glacier mass loss and ocean thermal expansion from warming together explain about 75% of the observed global mean sea level rise (high confidence). Over the period 1993 to 2010, global mean sea level rise is, with high confidence, consistent with the sum of the observed contributions from ocean thermal expansion due to warming (1.1 [0.8 to 1.4] mm yr–1), from changes in glaciers (0.76 [0.39 to 1.13] mm yr–1), Greenland ice sheet (0.33 [0.25 to 0.41]mm yr–1), Antarctic ice sheet (0.27 [0.16 to 0.38] mm yr–1), and land water storage (0.38 [0.26 to 0.49] mm yr–1). The sum of these contributions is 2.8 [2.3 to 3.4] mm yr–1. {13.3}". Also please update the sea level rise number of 2.8 mm over the period 1993-2010 or similar based on more recent data.	Government of Norway	Norwegian Pollution Control Authority	Norway	numbers are provided in the FD. The text is modified - see A 1.1 of SPM FD
27659	2	40	2	40	We find that "steric" is a difficult word to understand. Please substitute with a more understandable term.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - 'steric' no longer used
27661	2	42	2	46	It might sometimes be difficult to understand if the change or shift or impact mentioned is positive or negative or both, e.g. Please look through the report and SPM to make sure this is clear to the reader. One example where change could be substituted is in this sentence: "Continued substantial declines in Arctic summer sea ice extent (averagerate –13.0% per decade in September; the month with the lowest sea ice cover over 1979–2017) and Arctic spring snow cover extent (–13.6% per decade in June; 1967–2018) have occurred (high confidence), with consequences for the global climate system, for example through changes in albedo." Here we believe "change" cold be substituted by "decrease". Another example is: B3.8 "Across the globe, seafood provision from some fisheries and aquaculture will be impacted by climate change (high confidence), reducing their revenues and influencing the livelihood of the dependent communities and food security of vulnerable people (medium confidence)." Here we believe that "negatively" could be incerted before "impacted". in Chapet 3 page 20, line 13-15 " Recent reassessments of carbon storage in the Southern Ocean reveal strong sensitivity to changes in overturning circulation (Cross-Chapter Box 5), with anthropogenic and natural carbon being highly variable(30–100%) but out of phase on decadal timescales (DeVries et al., 2017; Tanhua et al., 2017)", we do not understand if "changes "refer to decrease , increase or both. The sentence therefor gives no meaning. Further in chapter 3, page 3 line 28-29 it is unclear in which direction climate change is modified.	Government of Norway	Norwegian Pollution Control Authority	Norway	Accepted: wording of observed historical snow and sea ice trends changed for the SPM final draft.
27663	2	48	2	50	Please add the decadal percentage increase in brackets in order to compare with the persentage decrease in Arctic.	Government of Norway	Norwegian Pollution Control Authority	Norway	No longer applicable - statement on Antarctic SIE modified
27665	3	14	3	16	Please consider if it is possible to better quantify the changes like it was done in AR5, WGI, SPM: There is high confidence that permafrost temperatures have increased in most regions since the early 1980s. Observed warming was up to 3°C in parts of Northern Alaska (early 1980s to mid-2000s) and up to 2°C in parts of the Russian European North (1971 to 2010). In the latter region, a considerable reduction in permafrost thickness and areal extent has been observed over the period 1975 to 2005 (medium confidence). {4.7}	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account, more specificity on warming rates has been added. Regional details is contained in Chapters 3 and 2.
27667	3	14	3	14	Please make sure that Spitsbergen is included in this list.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account. Permafrost is now more integrated between polar and mountain regions and individual locations are not mentioned (A1.4 in SPM SOD).
27669	3	16	3	16	The definition of "mountain regions" is not clear to us, since permafrost may also occur in areas that are not defined as mountains. Please clarify e.g. by using "other areas" if that is what is meant.	Government of Norway	Norwegian Pollution Control Authority	Norway	No longer applicable - sentence removed
27671	4	0	4		Figure SPM.1: Very illustrative and informative figure, but colour schemes to separate between RCP 2.6 and RCP 8.5 could be clearer, and also chosen such that this separation is clear also when printing in black/white. Please also consider how the end points for the values in the first column of all graphs (high vs low emissions) could best be represented (it is not so easy to understand the arrow concept). Please also consider including more themes/subjects covered in the report (as suggested in placeholder in the figure caption), such as ocean acidification. This figure should represent all the most important findings in the whole report!	Government of Norway	Norwegian Pollution Control Authority	Norway	Overall graphical approach has been changed in order to ease understanding. Panels have been updated with a more suitable selection of variables.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
27673	5	16	5	16	We support mentioning "trade and transport" in the A2 headline statement, but it would be useful also to include a reference to "Trade and transport" in the most relevant subparagraph(s) for A2. References to "Transport" are mentioned in B2.6. Please consider where it would be better to adress this topic, A2 or B2.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - "trade and transport" are mentioned in headline statement A8 and also referred to in underlying bullet A8.3
27675	5	35	5	43	This paragraph (A2.3) should better reflect the underlying chapter, cf. 2.3.1.4.3. As it is written now in the SPM it gives the impression that adoption of new crops and irrigation techniques are more widely implemented adaptation measures than what is stated in the chapter. Please check that the SPM text correctly reflects the chapter and consider to include sentences in chapter 2 on p 2-28, lines 12-15, and on p 2-29, lines 46-49 and lines 53-56. In addition this paragraph should also point to that som adaptation measures, such as snow making, actually is energy and water demanding and thus may contribute to CO2 emissions and climate change.	Government of Norway	Norwegian Pollution Control Authority	Norway	Accepted. The content of this bullet was considerably revised and recast in the revised structure of the SPM SOD, along with corresponding confidence statements. The material is found in A7.1, A7.2, A7.4 and A7.5.
27677	6	2	6	2	Consering the term "timing of biological events". We believe that this term is meant as synonymous to the scientific term "phenology" to cover recurring biological activities or events occuring on a yearly or seasonal basis. In AR5 the term that was used for these kinds of activities and events was "seasonal activities". If these two terms are ment to be synonymous, but a change has been made inadvertently or becuase the new term is considered better, it is useful to explain the change e.g. in a foot note, also including potential differnces.	Government of Norway	Norwegian Pollution Control Authority	Norway	The text in this bullet has been completely revised and the phrase "biological events" does not exist anymore. The spm has been revised for clarity - phenology is used in A.5.2
27679	6	0	6		Figure SPM.2: This is an important figure! Please consider if it is possible to include also hazads and impacts also for Africa. It is however a bt unclear what is eant by the dark grey areas of the map.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - Overall graphical approach has been changed to ease comprehension. Reference to the African location (Low Latitude) is now depicted.
27681	7	9	7	9	Please consider to clarify that "coral reefs" here refers to warm water coral reefs (symbiontic shallow water coral reesf in tropical areas).	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - clarified by moving this information under the "coastal ecosystems" headline statement; also now clear because bullet talks specifically about coral bleaching events
27683	7	37	7	37	This is not only a question about whether adaptation measures are taken, but also whether adaptation measures are possible. Please consider to include this aspect in the text.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account. This statement was revised and made more concrete, in relationship with specific sectors and components.
27685	7	34	7	38	The SPM text and the underlying report shows that there is a big different in the impacts of the low and high emission pathways respectively, which illustrates the connection between future mitigation efforts and projected changes. This perspective is very important and but now not included in the headline statements. We propose relationship bewteen emissions and projected changes is described in the first headline statement of SPM B.	Government of Norway	Norwegian Pollution Control Authority	Norway	Accepted. The material was considerably revised for the SOD SPM, and more focused headline/bullets have been developed, where specific information about limits to adaptation are explicitly assessed, for different climate scenarios whenever possible based on available evidence.
27687	8	31	8	38	Many issues mentioned in this section about mountain areas seem relevant also to premafrost areas, described in B2.6 and B2.7. However the issues related to socio-economy and governance is less described in B2 compared to B1. Please consider to a similar approach in the sections on permafrost areas.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account. These sections deal with impacts on and risks to human societies and socio-economic sectors. Impacts and risks due to changes in permafrost are included in these bullet points, and this was further strengthened and clarified in the SOD SPM.
27689	9	38	9	54	Many issues mentioned in B1.7 about mountain areas seem relevant also to premafrost areas, described in B2.6 and B2.7. However the issues related to socio-economy, Indigenous knowledge and governance is less described in B2 compared to B1. Please consider to a similar approach in these sections on permafrost areas.	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted - the SPM section has been revised and restructured
27691	8	40	8	41	Please consider to change "The oceanic and cryospheric environments of both the Arctic and Antarctica are projected to change during the course of this century." to "Climate-induced changes to the cryosphere and ocean in the polar regions have global consequences and impacts that are evident now (very high confidence)" from the executive summary.	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted - the SPM has been restructured
27693	8	50	8	50	Arctic peoples appear three times in the SPM. Please define this term and also indicate how many people this term includes in order for the reader to have a better understanding of the magnitude of effects.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - see the added startup box
27695	10	24	10	25	The same sentence is in B2.2 on page 8 line 4-5. Please write only once.	Government of Norway	Norwegian Pollution Control Authority	Norway	No longer applicable - sentence removed
27697	10	33	10	33	Please explain what are the key components in quantity of "global biomass of marine animals", e.g. if it is mainly fish or also includes other vertebrates and invertebrates.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - Figure SPM3 specifies including fishes and invertebrates
27699	10	1	10	5	Please consider to include in this headline statement the finding in B3.5, lines 32-35, about decrease in global biomass of marine animals related to different emissions scenarios.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - add to HS B5
27701	11	23	11	23	In this sentence, please clarify the direction of the climate impacts, e.g. whether the changes are the same in tropical and polar regions, and also clarify the difference in impacts between the low and high emissions scenarios respectively.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - see maps added to Figure SPM.3
27703	11	23	11	27	These sentences cover only some regions. We believe that it would be useful to also describe changes in regions such as off the coast of southern Europe, off the coast of Scandinavia and the Arctic region. In some regions the changes go from positive to negative between RCP 2.6 and RCP 8.5, and this is a very relevant finding in addition to broader picture.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - see maps added to Figure SPM.3
27705	11	37	11	44	We think there are some important and very relevant findings in these sentences. Please consider to highlight the most important points in the headline statement of B3.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - the statements have been in part included in headline statement B8 and are also highlighted in underlying bullets
27707	12	3	12	6	We think that this is an important finding. Please consider to highlight this perspective in the headline statement of B3.	Government of Norway	Norwegian Pollution Control Authority	Norway	Accepted. In FD SPM this is considered in B6 and C2 headline statements.
27709	12	46	12	51	Please include examples of measures that can reduce subsidence (e.g. regulation of human activities causing subsidence)	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted in section C and figure SPM.5
27711	13	6	13	6	Please include "subsidence" in the examples of drivers of exposure and vulnerability	Government of Norway	Norwegian Pollution Control Authority	Norway	not applicable text revised

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
27713	15	1	16	2	In line 2-3 it is stated that the figure shows risk scenarios for impacts of ocean warming, acidification and sea level rise. In panel A and B, y-axis gives surface temperature change, and in panel C y-axis gives sea level rise, but it is unclear how impacts of acidification is accounted for. In general, the figure caption gives a very detailed description and discussion of panel C, while panel A and B is not explained.	Government of Norway	Norwegian Pollution Control Authority	Norway	A distinction is now clear by having a separate figure for embers driven by temperature (Fig. SPM 3) and embers driven by sea level (Fig. SPM 5).
27715	15	10	15	12	Seems as the sentence starting in line 10 is repeated from line 11.	Government of Norway	Norwegian Pollution Control Authority	Norway	Caption has been rewritten and checked for accuracy.
27717	15	0	15		Figure SPM.4: This is potentially a very informative figure, but at the moment it is very complex, with e.g. different scale on y-axis (A/B vs C) and different hights on bars (A vs B), which may confuse readers.	Government of Norway	Norwegian Pollution Control Authority	Norway	Embers have been reduced to a single panel and complexity has been reduced.
27719	15	0	15		Figure SPM.4: Does "coral reefs" refer to all types of coral reefs or specifically to warm water coral reefs?	Government of Norway	Norwegian Pollution Control Authority	Norway	Corals from warm waters and deep waters now have distinctive embers.
27721	16	13	16	19	Abbreviation MHW for marine heatwave: we believe that this abbreviation is not necessary. Please consider writing such terms out instead of using abbreviations, to increase readability	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - MHW no longer appears in the SPM
27723	0	0	0		Please consider if it is possible to reduce the use of abbreviations in the SPM. E.g. abbreviations such as MHV, SLR, ESL etc. is not easy to understand for the average reader.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account. The use of acronyms has been reduced and where acronyms are used in the FD they are clearly defined at first use.
27725	16	16	16	16	Does "coral reefs" refer to all types of coral reefs or specifically to warm water coral reefs?	Government of Norway	Norwegian Pollution Control Authority	Norway	Warm-water here however sentence is removed
27727	17	0	17		Figure SPM.5: It should be made clear whether lack of points in the graph (e.g. for South Atlantic Ocean) represents lack of data, lack of events, or both.	Government of Norway	Norwegian Pollution Control Authority	Norway	Figure SPM.5 was removed in revision
27729	19	14	19	15	We think this is an important finding. Please consider to highlight transformation in headline statement of C1. We suggest the following "long-term decision making enabling transformation in the face of dynamic and deeply unceratin risk" (SPM page 19, line 5).	Government of Norway	Norwegian Pollution Control Authority	Norway	noted - See section C 4.4 where this has been taken up and strengthened the statements from the evidence of the report
27731	19	52	19	54	This sentence does not reflect the underlying chapter satisfactorily. Please consider to divide this sentence into two: one on "other natural carbon removal processes", and one on "non-biological marine CO2 removal methods". Furthermore, the statement on "other natural carbon removal processes" should be as clear as the underlying chapter on that more research is needed to evaluate the potential for carbon mitigation in seaweed systems. There is mounting scientific evidence that the potential is far larger than previously thought, and a lot of ongoing research into both seaweed as natural carbon sink, and mitigation through kelp cultivation. As it is stated here now, policy development and future research investment in this field will be difficult.	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted. Bullet has been substantially revised - see C.2.5. Chp 5 specifies high undetainties with seaweed in mitigtion thus "Seaweed aquaculture warrants further research attention."
27733	20	3	20	3	Please specify what is included in "total emissions from all sources", and whether it is net or brutto emissions	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted - sentence deleted from revised SPM and replaced with assessment of mitigation potential (C.2.5)
27735	20	12	20	12	Please consider to add "mitigation" (Integrating climate change mitigation and adaptation) as there are som references about it in C3.2	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted - see C 5 and C 5.2 where this has been incorporated
27737	20	24	20	25	Please explain this statement better. E.g. what is meant by "efficient".	Government of Norway	Norwegian Pollution Control Authority	Norway	noted - text changed see section C5.1
27739	20	32	20	33	Please include information about why the capacity of the polar governance system recently has been strenghtened.	Government of Norway	Norwegian Pollution Control Authority	Norway	accepted - C 4.1 elaborates it
27741	21	5	21	7	We think this is an important result. Please consider to highlight it in the headline statement of C3. We suggest the following in line 15-16"[…]such as transformation and adaptive governance systems [...].	Government of Norway	Norwegian Pollution Control Authority	Norway	Noted. Adaptive governance now addressed in C4.2 and SPM Figure 5.
27743	21	25	21	26	We think this is an important result. Please consider to highlight it in the headline statement of C4.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account. Climate-resilient development is now part of C5.
27745	21	33	21	34	We think this is an important result. Please consider to highlight it in the headline statement of C4.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account. Cooperation is now addressed in (new) C4.
27747	1	0	0		In chapter 3 executive summary page 3 line 13-14 is said that: "This chapter provides strong evidence of many substantial changes in the Arctic and Antarctic since AR5, with several important new changes detected." It is very difficult to understand which of the findings in the SPM that is related to research after the AR5 and which is not. We suggest that you clearly list, and if possible quantify the substantial changes referred to in order to make the SPM more communicable. A possible solution is that you use chapter 1 in the SPM to repeat some of the (quantified) knowledge from AR5, and later in the SPM refer to the updated knowledge/figures in preceeding chapters. One example where we think this is already done is in the SPM on page 2, line 42-43 whare it is stated that "Arctic sea surface temperature has increased at approximately twice the rate of average global temperature (very high confidence)". This does not appear to be a new finding (see e.g. Box 5.1 in WGI AR5), but a good reference for the reader. If the new thing about the statement is the uncertainty language, "very high confidence" this should be pointed out to the reader.	Government of Norway	Norwegian Pollution Control Authority	Norway	Taken into account - the SPM has been revised substantially
27749	1	0	0		RCPs are used extensively. Would it be possible to include scenarios and results applied in the 1.5 special report like 1.5 and 2 degree scenarios?	Government of Norway	Norwegian Pollution Control Authority	Norway	Rejected - the underlying report reflects the available literature (including since SR15)
27879	1	26	21	41	The language used in this chapter does not seem very accessible to policymakers (who come from various backgrounds and do not necessarily have scientific training). Therefore, the message may not be get across.	Gerson Fernandino	Red ProPlayas	Brazil	Noted. Efforts have been made in the Final Draft to remove scientific jargon and use clear messaging
27881	2	50	2	50	Confidence and likelihood percentages in footnote 4 overlap each other. Need review.	Gerson Fernandino	Red ProPlayas	Brazil	Rejected - see Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties
27883	1	26	21	41	The use of terms, such as “high confidence” and “very high confidence”, is too frequent and, although relevant, may be too much information for the target audience and hamper the comprehension of the message. This information could be conveyed using another strategy, such as color scale, a table, etc.	Gerson Fernandino	Red ProPlayas	Brazil	Rejected. the use of uncertainty language is a standard communication for IPCC SPMs

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
27885	3	28	3	31	I believe the relationship between runoff and nutrient/heavy metal availability should be more clear, considering that the target audience may not have scientific training.	Gerson Fernandino	Red ProPlayas	Brazil	Taken into account - Callout updated and a sentence about heavy metal release added in the new B7.4
27887	4	1	4	1	Figure SPM.1: In the line "Artic summer sea ice extent", percentages in blue and red are missing values.	Gerson Fernandino	Red ProPlayas	Brazil	Panels have been updated with a more suitable selection of variables. Data set has been updated.
27889	4	1	4	1	Figure SPM.1: Add information of projections of incidence extreme events.	Gerson Fernandino	Red ProPlayas	Brazil	Panels have been updated with a more suitable selection of variables.
27891	5	23	5	26	Give a concrete example to illustrate these risks/impacts.	Gerson Fernandino	Red ProPlayas	Brazil	Accepted: This statement was not clear and has been removed. SPM sections A7 and B7 now deal with observed and projected impacts of changing water resources from high-mountain areas.
27893	12	19	12	28	This paragraph is too polluted with data. Perhaps a table could be created to convey this information.	Gerson Fernandino	Red ProPlayas	Brazil	Noted - there is not space for a table. However the paragraph is streamlined (see B3.1) and details added to Figure SPM.1
27895	13	2	13	2	Add "…interruption of sediment supply due to dam construction, for example…"as example.	Gerson Fernandino	Red ProPlayas	Brazil	Rejected - space does not allow inclusion of many examples
27897	12	53	13	6	Other implications of sea lever rise should be included, such as salinization of aquifers and erosion, for example.	Gerson Fernandino	Red ProPlayas	Brazil	Accepted - the SPM has been revised thoroughly.
27899	17	1	17	1	In panel A, figure SPM5., the information on the South Atlantic Ocean indicated the "First hurricane in South Atlantic since 1970's". My question is: why did this hurricane that occurred during the 1970's is not shown in the figure, since it encompasses the period between 1950 and 2015? Was it a matter of scale?	Gerson Fernandino	Red ProPlayas	Brazil	Figure SPM.5 was removed in revision
27901	7	34	8	38	Comment on the impacts on human health should be included, e.g. the relationship between disease spreading and climate change.	Gerson Fernandino	Red ProPlayas	Brazil	Accepted. Impacts on and risks to human health have been added in several bullet points in sections B7, B8 and B9 of the SOD SPM.
27903	1	26	21	41	Other implications of sea lever rise should be included, such as salinization of aquifers and erosion, for example.	Gerson Fernandino	Red ProPlayas	Brazil	Taken into account - see e.g. B9
27935	12	11	12	15	Given the numbers in this report along with the litterature (eg Rowley et al, 2007, EOS, Risk of Rising Sea Level to Population and Land Area, vol 88, #9 and Neumann et al, 2015, PLoS ONE doi:10.1371/journal.pone.0118571) "tens of millions of people" should be "hundreds of millions of people" for the LEC zones	Lev Tarasov	Dept. of Physics and Physical Oceanography, Memorial University of Newfoundland	Canada	This has been removed from the revised SPM.
27939	0	0	0		There should be more attention to the expected distribution of regional population displacement and relatedly raising concerns about the potential geopolitical impacts. Consider the socio-political changes and impacts in Europe, partly in response to order 3 million migrants over the last few years. What is going to happen in south east and south Asia in response to potentially order 50 to 100 million displaced persons in a region (and associated loss of arable land and ecological services) with much less socio-economic capacity than Europe? Relatedly there should be a call for more detailed research on rigorous estimates of population displacement along with associated migrations, and potential social/geopolitical impacts and responses.	Lev Tarasov	Dept. of Physics and Physical Oceanography, Memorial University of Newfoundland	Canada	Noted. Figures SPM.4 and SPM.5 deal with projected SLR and adaptation in retreat/displacement. This is also addressed in C.3.2 and fig SPM.2
27951	0	0	0		Section (A, B, C) headings need to be revised and have the same style. Ideally they should carry the main overarching message of the section. Otherwise they should just reflect the theme of the relevant section, similarly to B and C in the current version of the SPM.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Accepted. Section A, B and C titles have been revised for clarity and consistency in style. Additionally, structuring sub-titles have been added under sections in the FD to improve readability.
27953	2	20	2	21	What is the meaning of this imbalance? Could this be added please. The text before this sentence should be condensed.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Noted - this has been removed and the text revised for clarity see A.2.1
27955	2	42	2	43	This is a very important statement. Some numbers should be given to support it and it should be a separate paragraph A1.X.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - there was a typographical error here (erroneous inclusion of word "sea"). We have clarified our meaning in the revised version.
27957	2	46	2	47	Please refrace this sentence and make it more easily understandable. 'Teleconnection' is not in the Glossay and the confifence statement should be rather in the brackets.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Accepted: text regarding potential impacts of sea ice loss on midlatitude weather was revised.
27959	2	48	3	3	What is the importance of changing Antarctic ice cover? Also there is too much detail for SPM here.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Accepted; we have removed a significant amount of detail.
27961	3	19	3	22	This is a very important statement. Some numbers should be given to support it (how much carbon is stored and how much is likely to be released and how it will change the SR1.5 carbon budget) and it should be a sepatare paragraph A1.X.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account. This section (now A1.4 in the SPM SOD) is about observations and assesses carbon storage. Projected release of GHG from permafrost is assessed in B1.3.
27963	4	0	5		Figure SPM 1. It is a good illustrative figure and, as we understand, still work in progress. There are some missing numbers and typos there (such as the years for end-of-century). We also notice that there is plan to add more to this figure that is already crowded. This can make the figure more difficult to read and understand. Please consider this while completing the figure. All impacts included to the figure should also be explianed in the (sections A and B) text together with relevant numbers.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Overall graphical approach has been changed in order to ease understanding.
27965	6	1	6	4	It is not clear why this consistency with modelling brought out here. Perhaps something of it's importance and time frames should be added here or the sentence deleted.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - The text in this bullet has been completely revised and the statement on "modelled responses" has been removed
27967	6	0	6		Figure SPM 2. A minor correction. There capture says 'also' - perhaps it´s not needed there as the figure only covers high mountain areas.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Accepted - Correction applied.
27969	6	28	7	2	This sentence could be deleted or it should say what type and how much action has been taken. Also elsewhere, the SPM needs to state facts and research outcomes and avoid vague statements.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - sentence removed
27971	7	8	7	10	Add a confidence statement.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - Sentence revised (see A.6.3) and confidence added

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
27973	7	34	7	38	Here and elsewhere, all pink boxes (A.X, B.X, C.X) should include confedence and/or likelyhood statements. It should be possible to read only these and get the summary of the main messages of the SPM.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - the use of uncertainty language in the headline statements has been checked
27975	7	46	7	50	Instead of say which RCPs, give temperature increases (RCP numbers can stay in brackets). This will make it easier to understand why these losses are happening.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account Revised text gives states that RCP2.6 and 8.5 are low and high emissions scenarios, respectively.
27977	8	31	8	34	Needs a confidence level. The same applies for some other paragraphs (for example B2.1). Please check and add.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - the revised SPM was checked for uncertainty language use
27979	9	38	9	40	How much carbon and by when is likely to be lost to the atmosphere? What will be the temperature impact of this? As for RCPs also give the temperature increases by 2100 here and elsewhere. Would be good to see 1.5 and 2 pathways considered.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account. Section B1.3.
27981	10	7	10	9	This sentence is not easy to understand, please rephrase.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - statement rephrased for clarity
27983	10	11	10	12	What is stratification of the ocean? It is not in the Glossary. Please use other words or explain the term.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - Stratification is now defined in the glossary
27985	10	15	10	16	Is it irrespective of the possible temperature stabilisation pathways?	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account - RCPs added - see B2.4 and B2.6
27987	17	0	17		Figure SPM 5. A) It is not clear which events the arrows are pointing to. For South Atlantic it says that the first hurricane since 1970s was in 2004, but there are no hurricanes shown in 70s.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Figure SPM.5 was removed in revision
27989	19	6	19	8	C1.1 is too vague and general and hence could be deleted.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Taken into account. C1.1 has been revised and the vague elements have been removed.
27991	20	7	20	10	These are important statements - please add confidence levels.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Noted - text is removed from SPM. Such geoengineering options will be discussed in WGIII AR6.
27993	0	0	0		Some overarching comments on the content of SPM. The SPM should have more focus on the links between mitigation and adaptation, unceratainties, on risks and tipping points, on attribution. The SPM needs to stay focussed on oceans and crysophere - hence some general sections applicable to mitigation and adaptation could be condensed or deleted.	Government of Estonia	Estonian Meteorological & Hydrological Institute	Estonia	Noted - the SPM has been substantially revised
28103	2	23	2	24	"The anthropogenic pH signal has already emerged outside the range of natural variability" replace with reached beyond	Peter Barrett	Victoria University of Wellington	New Zealand	Rejected - emergence from natural variability is a concept used in the report.
28105	2	36	2	38	"..attribution of mass loss from ice sheets to human-induced climate change is currently not possible. Glaciers and polar ice sheets are now the dominant source of sea level rise (very high confidence).." The text in red could imply to Policymakers a lack of IPCC knowledge confidence on the whole issue, especially if taken out of context. It seems inconsistent with the "very high confidence" statement that follows, unless you indicate an alternative credible reason for sea level rise or more helpfully add the text below in red - "However, no other cause can be found to explain why glaciers and polar ice sheets...". This also fits better with the statement about anthropogenic forcing of SLR that follows, though ice sheet melt is only 1/3 of the cause.	Peter Barrett	Victoria University of Wellington	New Zealand	We do not discuss attribution in the final version of SPM (see section A 1.1)
28107	2	48	2	50	The average sea ice extent for 2018 is now known and looks to be the lowest on record (NASA's website Fig 6 for Antarctic sea ice extent from 2007 to 2018 https://neptune.gsfc.nasa.gov/csb/index.php?section=234. This needs to be added to the comment about 2016 and 2017.	Peter Barrett	Victoria University of Wellington	New Zealand	Accepted; we have amended the statement accordingly.
28357	0	0	0	0	General comment about the SPM from a transdisciplnary and science-communication perspective: The SPM draft consists of an impressing number of paragraphs and facts. I suggest to present the many details in a way that makes it easier for readers to gain an overview. The individual sections / topics of the SPM should be introduced more comprehensibly. The highlighted introductory sections should make it even clearer what relevance the sub-theme has. The paragraphs are convincing in terms of content, but seem to be unconnected.	Nicole Aeschbach (née Vollweiler)	Heidelberg University (TdLab Geography – 3DGeo Research Group – Dept. of Geography)	Germany	Noted - the SPM structure has been revised for clarity for the reader and in addition icons have been added to guide the reader
28359	0	0	0	0	In my opinion, the illustrations are generally very well done by linking many individual aspects. What could be improved is their integration into the text. It is not yet clear from the paragraphs where the text refers to a figure or vice versa.	Nicole Aeschbach (née Vollweiler)	Heidelberg University (TdLab Geography – 3DGeo Research Group – Dept. of Geography)	Germany	Taken into account. The entire SPM incl figures has been thoroughly revised and the integration of figures into the text has been improved in the FD.
28361	5	5	5	10	I would like to strongly support the idea of including more elements in fig. SPM.1! In particular, illustrations of human systems and regarding the SDGs would be extremely meaningful!	Nicole Aeschbach (née Vollweiler)	Heidelberg University (TdLab Geography – 3DGeo Research Group – Dept. of Geography)	Germany	Panels have been updated with a more suitable selection of variables.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
28363	6	14	6	18	A spatial representation of the impacts is to be welcomed in any case. However, I do not think that the chosen method of illustration is sufficiently meaningful. Although it is of course of advantage that the figure is simple, more information on the character and extent of the changes should be included.	Nicole Aeschbach (née Vollweiler)	Heidelberg University (TdLab Geography – 3DGeo Research Group – Dept. of Geography)	Germany	Accepted - The overall graphical approach has been modified, allowing the locations references to pointed with a line. The figure is now depicting content coming from several chapters, not only mountain regions.
28365	16	5	16	11	I very much like the concept of compound events (e.g. Zscheischler et al. 2018, https://www.nature.com/articles/s41558-018-0156-3) and would suggest to use this framework to a larger extent also in the SPM (on basis of chapter 6.8 of the SROCC). The concept of compound events could be used as an overarching narrative to illustrate the consequences of climate change for the oceans and the cryosphere in a holistic way. This could possibly even be illustrated in the SPM by a new figure based on fig. 1 from Zscheischler et al. 2018.	Nicole Aeschbach (née Vollweiler)	Heidelberg University (TdLab Geography – 3DGeo Research Group – Dept. of Geography)	Germany	Noted - it is not possible to add a figure just to the SPM
28409	5	56	6	9	A2.6 reads that there is medium confidence that declines in biodiversity and ecosystem function are threats to human well-being. However the previous paragraph states that large changes are occurring including overall shifts in biomass and species composition, these are known to have serious consequences on human food chains, and thus well being. Thus confidence level should be changed.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Noted - the SPM has been revised for clarity and sentence removed. See A4-A6 for revised statement of impacts on ecosystems
28411	13	30	13	37	Statement needs to be more definitive than “very likely”	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	This sentence has been removed, but the point raised by the reviewer has been considered in the rewriting process. See for example B9.1
28413	13	44	13	46	Quantification of the likelihood should be stronger based on evidence presented in the chapter.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	The entire bullet has been re-written and this statement does not exist anymore
28415	16	13	16	15	Based on chapter, there is high confidence that changes resulting from MHW will impact beyond limits of resilience	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Noted. This particular statement is not included anymore in the FD SPM.
28417	16	22	16	22	The quantification of slightly higher is not evidence in the chapter, there is evidence of higher.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Taken into account - the text is revised in B.3.2 - while the increase is not quantified, statement can be made in increases under emissions pathways
28429	0	0	0		The issue of Loss and Damage is insufficiently dealt with in the report. The report covers key areas causing Loss and Damage in SIDS including slow onset events like sea level rise or ocean acidification as well as extreme weather events like tropical cyclones or marine heat waves. These require much more attention. The 1.5SR provided a good starting point to assess the issue of Loss and Damage and limits to adaptation in a Cross-Chapter Box. Such a box, maybe even in the SPM is warranted for this report. We note that there is plenty of information on such limits in the current SPM.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Rejected - it is not possible to add a box to the SPM due to space. key areas are covered in the SPM and in the underlying report the cross chapter box 9 in particular covers aspects for SIDS
28431	12	11	12	17	This is downplaying the massive increase in long-term SLR commitment under high emission pathways such as RCP8.5. According to a recent paper by one of the WGI AR5 Sea Level Chapter CLAs (Clark et al. 2018, Nature Climate Change) such a scenario would lead to a SLR commitment of >10m until the year 3000 compared to around 1m under 1.5°C scenarios. This needs to be communicated much more clearly. The very illustrative figure of this paper should be shown in the Chapter 4 assessment. In fact, a similar version should be considered in the SPM, potentially expanded by other post-2100 impacts on ocean and cryosphere. In general, it seems like the entire discussion of post-2100 sea level rise is held hostage by what is referred to as "deep uncertainty". While the uncertainties for high emission scenarios, in particular, are indeed very large, it should not prevent the SROCC experts to adequately highlight the post-2100 sea level implications.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Partly taken into account. The entire section in SLR projections has been thoroughly revised (see FD SPM B3 and underlying bullets). There is a strict page limit for the SPM and only a limited number of figures can be included, so adding the suggested figure has not been considered.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
28433	13	26	13	42	Please provide more information about the needs and costing of these adaptation measures, in particular in relation to small island economies. Furthermore, please reflect on mitigation being a critical adaptation enabler by limiting future sea level rise and in particular the speed of rise to a manageable level.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable	Saint Lucia	Noted - limits to adaptation are mentioned throughout
28435	13	44	13	52	This is a very disturbing statement, as it presents the future devastation of small islands as a statement of fact. This is very concerning. Rather than describing such doomsday scenarios, the IPCC should outline the adaptation needs for the most vulnerable as well as associated costs. We further note that this statement includes very useful information that should be included in a Limits to Adaptation and Loss and Damage Box.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Taken into account - the statement has been completely re-written
28437	15	1	0		This figure is very concerning. The panel C seems to suggest that impacts disappear for atoll islands as the result of relocation. This is not only questionable scientifically, this is just cynical. It's like saying the health risks for a person disappear by the individual dying. If anything, a new colour 'black' should be introduced to indicate the failure to protect vulnerable people from the risk of sea level rise. Apart from this particular feature, the inclusion of adaptation in the burning embers framework is generally problematic for a variety of reasons. For example, the dubious concept of transformational adaptation is applied here that includes measures like relocation and is clearly policy prescriptive. In the current figure, very high risks include 'limits to adaptation' being reached. But all of the sudden, adaptation can reduce the risks to 'medium'. This is confusing and we have great difficulties finding justification for this in the underlying chapter and corresponding SPM statements. Furthermore, the burning embers do not provide any information on the means of implementation required for this adaptation, i.e. adaptation costs and support for the most vulnerable. We therefore suggest the deletion of panel C altogether.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Accepted. The ember of concern (ember C, limits to adaptation) for urban atoll heat islands in Panel C has been removed (see FD SPM Figure SPM.5 panel A) and a panel B has been added to Figure SPM.5 for more clarity on the benefits of adaptation in megacities, urban atoll islands, large tropical agricultural deltas and Arctic communities.
28439	17	2	0		This figure should also include a panel showing the damages of tropical cyclones relative to the economies of countries affected, not just absolute damages.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Figure SPM.5 was removed in revision
28441	16	22	0		Additional information on the impacts of tropical cyclone damages is required. This should include damages in relation to the economies of the affected countries. For island economies, cyclone damage has repeatedly exceeded 100% of annual GDP. This information should also be added to Figure SPM5.	Government of Saint Lucia	Department of Sustainable Development, Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia	Noted. The focus of this special report is on ocean and cryosphere and not on extreme weather events. However, observed changes in tropical cyclones are adressed in FD SPM A3.4 and A3.6 and projected changes in B3.2 and B3.3.
28539	1	0	2		It must be taken into cognizance and emphasized that anthropogenic activities that will impact on the cyrosphere are almost irreversible and so the need to mitigate these activities are more urgent than ever	Andrew Eloka-Eboka	University of KwaZulu-Natal	South Africa	Agreed - irreversibility and abrupt changes are more prominent in the FD
28631	2	8	2	15	Ocean changes listed include warming, acidification and deoxygenation, and others: no mention in this overview of changes in ocean circulation, such as the AMOC, and I'm curious why you didn't include it. I see the AMOC mentioned in Figure SPM 4.	Joanna Nelson	LandSea Science	United States of America	AMOC is now discussed in several places in the Final Draft
28633	4	0	4		I like the graphical representation of predictions. Are the red and blue colors different enough in value for people who are red-green colorblind? (I don't know.)	Joanna Nelson	LandSea Science	United States of America	The new colour palette has been tested for sensibility to colour-blindness.
28635	10	45	10	45	B. 3.6. Suggests that shallow coral reefs are an important refuge without mentioning that they are vulnerable to marine heat waves and bleaching.	Joanna Nelson	LandSea Science	United States of America	Not applicable - sentence removed in revision - heatwaves and bleaching in A6.3
28637	2	36	2	37	Placing this statement in the SPM is highly inadvisable, as it inevitably will be read as stating that current ice sheet mass loss could be entirely natural; whereas the scientific basis of this statement is simply that longer time frames are necssary to make this determination. This "determination" therefore does not rise to the level of SPM (covered in a mere four lines in Chapter 4, 30:25-29). It WILL be misinterpreted. Suggest it remain only in the main text -- unless of course, the CLAs and IPCC Bureau actually believe that there is credible research showing that current ice sheet mass loss is part of a non-anthropogenic process? However, there is no evidence for this cited in the main Report. In short: headlines that the IPCC believes that the ice sheets may be changing "naturally" and not due to human activity will not be helpful.	Pam Pearson	ICCI	Sweden	We do not discuss attribution in the final version of SPM (see section A 1.1)
28639	2	49	2	49	Especially for SPM, use same percentage measure as above for Arctic sea ice (eg, percent dcline rather than merely noting total area) – use of two scales will be confusing and indeed might be misleading to policy makers unaware of the difference in scale between the two regions, as well as the very different dynamics of "an ocean surrounded by land" with extensive multi-year ice (but no real ice shelves), versus a continenent surrounded by ocean and ice shelves.	Pam Pearson	ICCI	Sweden	No longer applicable. Revised bullet states there is no statistically significant trend in Antarctic sea ice extent.
28641	2	23	2	29	Need to note here that also the Arctic and Southern Oceans (or may wish to cite regions thereof) similarly are showing higher levels of acidification, including early signs of impacts on some shell-building species.	Pam Pearson	ICCI	Sweden	Taken into account - these statements have been modified and clarified

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
28643	3	16	3	17	While this deals with mountain regions, I am missing a similar statement regarding permafrost elsewhere. My understanding is that there is extensive monitoring indicating increased permafrost temperatures in Alaska, northern Canada and a few monitoring sites in Russia, though perhaps less evidence of growth in the active layer over time. This is covered in Ch. 3 and some statement regarding this change should be elevated to the SPM, especially as these regions directly impact human infrastructure as well as contain more carbon reserves than mountain permafrost.	Pam Pearson	ICCI	Sweden	Taken into account. Section A1.4 is explicit in referring to mountain and polar areas.
28645	3	28	3	28	Rather than state, "has increased, suggest "continues to increase" to make more clear.	Pam Pearson	ICCI	Sweden	No longer applicable - these regional details have been removed
28647	6	21	6	24	Strongly suggest clarifying point on irreversibility as follows, because it comprises an important policy-relevant SPM takeaway:"…cannot be reversed or restored to previous states by human mitigation efforts, on timescales of centuries to thousands of years and beyond." Also, add "carbon loss from permafrost thaw" to this list.	Pam Pearson	ICCI	Sweden	The SPM has been substantially revised - carbon release from permafrost is on A1.4 and B1.3 . Irreversibility is introduced in the new start up box and A.3 2 among other places
28649	7	50	7	50	Because glaciers respond more significantly on longer timescales, and this has significant impact on vulnerable populations, suggest the following: "On longer timescales (2200-2300), some of these mid-latitude glaciers will have disappeared under high and perhaps even moderate emissions scenarios (RCP8.5, RCP4.5 eg current Paris commitments), and under RCP8.5 a large majority of glaciers globally will have lost nearly all current mass. Mid-latitude glaciers especially may preserve significant remnants under low emissions scenarios, especially RCP2.6 (consistent with 1.5 degrees), while higher-altitude and latitude glaciers should stabilize despite some loss of mass." Cf Marzeion et al (2012), perhaps as well Hock et al (submitted). Policymakers find this distinction highly important when presented with such regional projections, which are less apparent when stopping at 2100 due to time lag of impacts even on some of these relatively small glacier systems, which nevertheless are regionally important not only for their ecosystem services, but as very clear signals of a changing climate.	Pam Pearson	ICCI	Sweden	Rejected. Almost all existing projection studies only go to year 2100; too limited evidence to make robust statements to elevate this to the SPM
28651	8	18	8	18	Suggest citing examples, for instance, "..with greatest seasonal impact projected in the Indus and Tarim basins near the Himalayas, and some central Andes and central European river systems."	Pam Pearson	ICCI	Sweden	Rejected. Due to space limitations and the impossibility to guarantee an exhaustive list, citing specific regions was not carried out in the SOD SPM.
28653	9	50	9	50	Add, "for Arctic peoples as well as globally."	Pam Pearson	ICCI	Sweden	The entire bullet has been re-written and this statement has been removed
28655	9	38	9	41	These lines on carbon permafrost loss belong in the first section, along with other "globally signifcant" impacts. Suggest incorporating in corrent permafrost points on SPM p. 3, beginning at line 16, per comment in Row 5, above.	Pam Pearson	ICCI	Sweden	Taken into account. Section B1.3.
28657	10	29	10	30	Suggest adding here and perhaps in connection to other references to "increased" high latitude ocean productivity, "..however with uncertainty due to potential negative impacts of stronger ocean acidification in these regions, as well as displacement (potentially to extinction) of native species by more prevalent mid-latitude species."	Pam Pearson	ICCI	Sweden	Taken into account - see also caveat in Figure SPM.3
28659	10	49	10	49	Suggest adding a section B3.6"a" here on loss of the Arctic sea ice marine ecosystem, for example: "In the Arctic, multi-year sea ice provides a coral-like structure for the Arctic marine ecosystem, where growth of plankton on and within multi-year ice has provided a basis for the Arctic food chain. As multi-year ice has decreased by over 90% since 1979, the loss of this unique ecosystem may have significant impact on Arctic fisheries and ecosystems (high or medium confidence)."	Pam Pearson	ICCI	Sweden	Noted - B5.3 has been revised to provide impacts of loss of Arctic multi-year sea ice
28661	9	13	9	13	Perhaps add, "The Barents Sea already has essentially undergone "Atlantification," with stratification and other indicators consistent with an Atlantic rather than Arctic environment (high confidence)." Add next sentence, "Some of these species such as cod have..."	Pam Pearson	ICCI	Sweden	Noted - the text is rewritten to remain general (see B5.3) - also see Figure SPM.3
28663	12	38	12	44	From an SPM policy maker point of view, Section 4.3 badly requires an additional paragraph referencing paleo-climactic studies per Chs. 1 and 3, because otherwise, the unfortunate (and erroneous) take-home for policy readers is, essentially that sea-level rise will stop at 1.4m; or that models are so poor that this is all we know. To prevent this dynamic, an additional section 4.3'a' might begin as follows: "Although ice sheet models cannot easily quanitfy long-term sea-level rise, paleo-climactic data from Earth's past indicates a sharp increase in sea-levels over time at temperatures and CO2 levels between 1 and 2 degrees, and 400-450ppm. In the Eemian (~1 degree), sea levels were at least 2-3 meters higher than today; but in past epochs where temperatures exceeded 2 degrees, sea levels were never less than 9 meters or more above present day (indicating at least partial loss of the WAIS and/or Greenland). The Pliocene (4 degrees) was characterized by sea levels in excess of 20 m.; the Eocene (5-6 degrees) saw complete global deglaciation and sea levels 60 m. above today. Therefore while the rate of sea-level rise, and the time required at these temperatures to reach these new sea levels remains deeply uncertain, paleo-climatic data from past Earth epochs at these temperature levels is remarkably consistent. The uncertainty regarding rates and processes from ice sheet models therefore should not detract from the paleo record, which indicates that the risk of reaching these levels increases as the time spent at higher CO2 levels and temperatures, as well as peak temperatures also increases."	Pam Pearson	ICCI	Sweden	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM
28859	2	14	2	14	Indicate level of confidence.	Government of Brazil	Ministry of External Relations of Brazil	Brazil	I don't think the statement is specific enough to assign a confidence statement to it. It depends on what is meant by some. The FD order draft does not use this statement any longer
28861	6	21	6	24	Indicate level of confidence.	Government of Brazil	Ministry of External Relations of Brazil	Brazil	The SPM has been substantially revised and application of confidence language checked
28863	7	34	7	38	Indicate level of confidence.	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Accepted. The material was considerably revised for the SOD SPM, and more focused headline/bullets have been developed, where the confidence language has been applied consistently.
28865	10	1	10	1	Include the word ADVERSELY: “Ocean ecosystems are ADVERSELY affected by…”	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Taken into account - The Headline statement B5 (former B3) has been completely revised and the direction of effects have been specified

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
28867	10	1	10	5	Indicate level of confidence.	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Taken into account - the SPM has been completely revised and use of uncertainty language checked
28869	10	6	10	7	The finding "The overall warming of the ocean will continue this century even if radiative forcing stabilizes (e.g., 7 RCP2.6, high confidence)" is one of the main politically-relevant conclusions of this report; recommend it be moved to the summary/highlighted part of this section (B3).	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Noted - this is in revised B2 however stabilisation of radiative forcing was not included as WGIII not contributing to SROCC
28871	11	38	11	38	Delete "and from conflicts within and between political entities". The relationship between the impacts of climate change and conflict risk is not linear and depends on a variety of other factors (political, social, economic, cultural and environmental).	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Noted. This sentence/statement doesn't exist anymore in the FD SPM.
28873	11	44	11	45	Delete "Redistribution of fish stocks under climate change increases the risk of dispute between countries or regions (high confidence)". The relationship between the impacts of climate change and conflict risk is not linear and depends on a variety of other factors (political, social, economic, cultural and environmental). Chapter 5.4.2.1.3, which provides the basis for this finding, presents level of certainties that do not find correspondence in the scientific literature or in observation and appear to be based on extrapolations of one or a few occurrences (e.g. transboundary disputes arising from shifts in Pacific salmon and Atlantic mackerel). This sections further confuses "dispute" with "conflict".	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Taken into account. The entire section has been carefully revised and this statement has been rephrased for more clarity (see FD SPM B8.1)
28885	19	43	19	54	Delete "Blue carbon" in this paragraph and in Chapter 5. There is no agreed definition for this term; its use interchangeably with "coastal ecosystems", mangroves, salt marshes, seagrasses and wetlands reduces the accuracy of the report.	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Rejected - blue carbon is retained in C.2.5 as it is a relevant term that is defined in the glossary
28887	19	46	19	49	Delete "Successful implementation of measures to maintain and promote carbon storage in coastal ecosystems could significantly assist some countries in reaching national net zero emissions targets (high confidence)." This sentence leads to promoting carbon storage in coastal ecosystems as offsets to fossil fuel emissions — a challenge to environmental integrity of any mitigation strategy.	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Noted - sentence deleted from revised SPM and replaced with assessment of mitigation potential (C.2.5)
28889	20	4	20	4	Delete "blue carbon". There is no agreed definition for this term; its use interchangeably with "coastal ecosystems", mangroves, salt marshes, seagrasses and wetlands reduces the accuracy of the report.	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Rejected - blue carbon is retained in C.2.5 as it is a relevant term that is defined in the glossary
28893	19	27	19	27	Add excerpt from Chapter 5, page 5, line 55-57: "However, ecosystems-based mitigation solutions cannot replace the need for the very rapid phase-out of fossil fuels, and the control of all other emissions, nor for further research and development of environmentally-friendly negative emission technologies."	Government of Brazil	Ministry of External Relations of Brazil	Brazil	Taken into account. The revised FD SPM C2 focusses on adaptation (not mitigation). The suggested sentence has not been added, but the statement has been revised to clarify that the effectiveness of some ecosystem-based adaptation approaches will be compromised under high emission scenarios. And the need for urgently implementing both, a low emission pathway and adaptation actions, is now adressed a emphasized in C5 and underlying bullets.
28901	9	38	9	39	B2.6: Is the contribution of this process already incorporated in emission scenarios or is it until now included in climate projections? Eg, is it an unforeseen threat that policy makers have to aware about in future climate projections?	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Section text revised, this is now contained in B1.3.
28903	12	26	12	26	B4.1: also the rate of SLR needs an uncertainty bound for policy makers.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken in account - added
28905	12	35	12	36	B4.2: Why is this sentence included here? Is this related up to 2018 whereas the statement further deals with 2100. This is causing noise. Please, place this line 35-36 somewhere else.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - sentence removed
28907	12	48	12	48	B4.4: The most important parameter for coastal flooding in Europe is wind set up combined with waves. when indicating physical loads one cannot ingore the wind set up (this caused the 1953 flood in the Netherlands). With respect to that uncertainties in the wind climate are important as well.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - extreme sea levels are included in B3.3. Examples not added due to lack of space
28909	15	0	25	0	Many of the abbrevations in the Figure are not clear and are only will be explained on the coming pages. Abbrevations should be spelled out when first used (ENSO, AMOC, SPG)	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	All acronyms have been spelled out in each figure and/or explained in the captions.
28911	16	42	16	42	B6.4: Extreme events like storms are not projected yet to intensify in western europe. The uncertainty of this projection is too large. This has less impact for climate projections related to coastal infrastructure and protection by coastl vegetation in Western Europe.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	This section has been reworked - see also the new figure SPM.4 which provides regional perspective
28913	2	14	2	14	"some of these changes..". Please make explicit which changes.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - details are discussed throughout the SPM at relevant points e.g. A.3.2
28915	2	20	2	21	If possible: please add the amount of thermal expansion/SLR that resulted from this heat uptake between 1970 and 2010	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - the text revised for clarity see A.3
28917	2	38	2	38	"dominant": please indicate contribution in mm/yr (or percentage)	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	numbers are provided in the FD. see A 1.1 of SPM FD
28919	12	12	12	15	Are the tens of millions people in low elevation coastal zones affected by flood risks only (as stated in 4.3.3.2.2: 0.2 - 4.6% of the global population is expected to be flooded annually) or what is meant by disruptive events? Is there a reference in the main report to the number of people affected?	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	This has been removed from the revised SPM.
28921	5	52	5	53	what is meant by 'non climatic drivers an local processes unrelated to sea level rise? Subsidence, mangrove detoriation?	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - the sentence is removed - and SPM revised for clarity e.g. see A.3.5
28923	12	19	12	28	please present this information in a table, including the contributions of the various factors such as steric, glaciers, Greenland, Antarctica. It would be also useful to add the numbers of slr/yr in 2100 for all RCP scenario's as this is policy relevant information.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - there is not space for a table. However the paragraph is streamlined (see B3.1) and details added to Figure SPM.1. Figure SPM.5 includes response options

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
28925	12	43	12	43	please add the range of uncertainty beyond the 1.4 m that applies to the mechanisms described in the mentioned "few studies". Also a reference can be made here to sea level changes in paleo archives. For many regions para B4 is highly policy relevant information.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted. The entire section on projected sea level rise has been revised for more clarity and more policy relevance (see FD SPM B.3 and underlying bullets). This particular statement has been carefully revised and the reference to 1.4m been removed.
28927	13	1	13	1	please clarify "non climatic drivers and local processes unrelated to SLR"	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Accepted - the SPM has been revised thoroughly.
28929	12	12	12	12	In all scenarios SLR is accelerating in the 21st century. An acceleration beyond 2100 only for RCP8.5 sounds strange. Can this be clarified?	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Accepted. The entire section has been thoroughly revised. SLR is now addressed in B.3. In the headline statement reference to particular scenarios has been removed, it now says "Sea level rise will continue beyond 2100 and could exceed rates of several centimetres per year resulting in multi-metre rises in the long term (medium confidence)"; in B3.4 the statement with estimated rate of sea level rise has been revised for more clarity.
28931	18	1	18	1	Please add in figure caption that extreme sea level events are associated with surges due to tropical cyclones	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	This is not exclusively the case and, in fact, tropical cyclones are poorly captured in the observations used in this analysis. In the caption, it is now mentioned that extreme events are caused by a combination of storm surges and high tides.
28933	21	8	21	8	please explain what is meant by "altenative political/legal/institutional frameworks and participatory stakeholder integration etc."	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted. C3.6 serves as a bridge between C3 overall, which includes a number of specific statements about these alternatives, and C4. which also provides greater specificity. Granted space limits in the SPM, these earlier statements in C3 were not repeated here.
28935	21	23	21	23	Because of these challenges an important conclusion could be "Therefore an important contribution to risk reduction could be to make planned short term investments in infrastructure and urban developments water proof."	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - text is removed and SPM revised. Section C4 talks to investments
28937	0	2	0	2	General comment - Most bold statements are only qualitative in nature; adding quantified information would strongly enhance there communicative value (see some suggestions in comments).	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account - quantitative details have been added to bullets underlying the headline statement
28939	2	20	2	21	A1.1 This statement on the energy balance is rather technical and does not inform policy makers about the extent of energy absorbed by the oceans; would be better to indicate the % of additional heat absorbed by the oceans over time and how the heat uptake compares to global energy use.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - this has been removed and the text revised for clarity see A.2.1
28941	2	36	2	37	A1.3 In the summary of Chapter 3 (pag 3-4) the word "unambiguous" is added to attribution; that word is missing here and important to add as it indicates that attribution is plausible but still not certain.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted. This sentence is not in the new final draft. See A1.1 and A3.1 for the revision
28943	2	39	2	40	This statement is a bit out of place as it does not relate to the ice sheets and seems to contradict the statement that glaciers and polar ice sheets are now the dominant source of SRL. Overall A 1.3 is thus not very clear about the relative contribution of the various factors to sea level rise	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	text has been rephrased. In the final SPM version we state that "The sum of glacier and ice sheet contributions is now the dominant source of GMSL rise, exceeding the effect of thermal expansion of ocean water (very high confidence)" - see section A 3.4
28945	4	0	4	0	there is a typo in the "end of century" range should be 2081-2100; not 2081-2010	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Correction applied.
28947	4	0	4	0	It would be good to restructure the table and change the order of indicators starting with (physical) state indicators to impact related indicators; also add to the (impact) indicators permafrost thawing	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	The panels have been rearranged for a better storyline.
28949	5	13	5	17	A2 Add: Climate climate impacts on the oceans and cryosphere particulary affects almost 13% of the global population living in the Arctic or high mountian regions en 27% living in coastal areas, including half of the world's megacities.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account. Statements about such information is provided in the Startup Box of the SOD SPM.
28951	7	34	7	38	B.1. Add: Glaciers are projected to lose on average 29% - 47% of there mass by the end of the century, with up to more than 80% mass loss for glaciers in regions with relatively little ice cover.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account. Future changes in glacier are assessed in section B1 of the SPM SOD about future changes in physical elements. Section B7 of the SPM SOD deals with future direct impacts and risks related to changes in the terrestrial cryosphere.
28953	10	1	10	5	B.3 The statement is made in a very neutral and qualitative way and unrates the negative nature of the impacts in terms of loss of biodiversity, ecosystem services and hazards. Thus change line 1 into "Ocean ecosystems are significantly negatively impacted by (...)	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account - The Headline statement B5 (former B3) has been completely revised and the effects have been specified
28955	12	11	12	17	B.4 requires more quantification of SLR projections. Suggested changes: "Global mean SLR is projected to rise by 0.39 to 0.97 meter for RCP 2.6 - 8.5, respectively", by the end of the century and will continue to rise thereafter for centuries and millennia for all emission scenarios."	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted. The requested quantification of SLR is provided in FD SPM B3.1 and B3.4.
28957	13	8	13	13	B.5 add: 'A likely impact of SLR will be a divergent world, with richer and densely populated areas well protected behind seawalls and poorer and less densely populated areas struggling to cope with SLR impacts and eventually retreating from the coast.'	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	This has been removed from the revised SPM.
28959	19	1	19	1	It is suggested to start this section with three overarching paragraphs from the executive summary of CHPT 1: "The characteristics and impacts of oceans and cryosphere change place urgency on limiting climate warming (…) (line 20-25) and " Climate change related impacts (...) line 38-45 on page 1-3 and "Commited ocean and cryosphere changes (...)(lines 1-9 pages 1-4).	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Talen into account. The revised section C now builds on three pillars, challenges, options, enablers.
28961	16	19	16	19	B 6.1 add before the last sentence from the executive summary of CHPT 6 on pag 6-3 text on El Nino /La Nina: "Extreme El Nino and La Nina events are likley to occur more frequently in the future, even at relatively low levels of future global warming (medium confidence)."	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Accepted - a revised sentence is added to B.2.7
28963	0	3	0	3	General Comment - specialist language is sometimes used in he SPM, maby difficult to understand by policy makers, e.g. "steric sea level rise", "microclimate refugia" and "benthic communities". At least explain these in the Glossary.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account. The entire text has been thoroughly revised for more clarity and the use of jargon/technical terms in the FD SPM reduced where possible.
28965	0	4	0	4	Please define the sub-categories of adaption options, such as protection, acommodation, retreat, advance, etc. in the Glossary.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - aspects also given in Figure SPM5c

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
28967	0	1	0	1	General SPM comment - greater attention is needed to extremes, tipping points, uncertainties and risks. Section A should have a section on high-impact, low likelihood events, bringing together the main message on the subject from Ch1, Ch4 & Ch6. There is a lot of interest by policy makers to include: - an assessment of the likelihood of extreme SLR (i.e. levels significantly higher than the estimates of section B4); - possible high-impact outcomes related to the weakening AMOC circulation mentioned in B7; - upper end possibilities for contribution of permafrost release to warming to 2100 and beyond; - other identified high-impact, low probability events related to oceans & cryosphere such as those alluded to in B6.5; - possible solutions in the scientific literature and mentioned in the chapters on the ability of people, societies and policymakers to assess and plan for high-impact, low-probability (and high probability, slow onset) outcomes.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account - the SPM has been revised substantially
28969	2	23	2	24	Besides mentioning the 25% of emissions absorbed by ocean, it is worthwile to add a statement in A1.1 on the percentage of trapped energy due to radiative forcing that has been absorbed by oceans (e.g. see Box3.1 Figure 1, p.264, IPCC AR5, WGI).	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account - see A.2.1 (90% of excess heat)
28971	2	36	2	37	"attribution of mass loss from ice sheets to human-induced climate change is currently not possible". This statement seems too weak or at least prone to more than one interpretation. Perhaps more can be said about the connection with higher temperatures. At least the word "ambiguous" should be added before attribution as this is stated in the summary of Ch.3 (p.4, l.15-17)	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	We do not discuss attribution in the final version of SPM (see section A 1.1)
28973	2	48	2	50	What are the drivers for increasing sea ice in parts of the Antarctic? Some clarification can be given on basis of scientifc literature, e.g. changing circulation patterns and fresh water flows due to ice melt.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account. We have streamlined this message, and now emphasize the circumpolar extent rather than regional.
28975	3	14	3	22	The insights on permafrost carbon storage are extremely policy relevant and deserve greater attention. What insights are available from the scientific literature on expected release of carbon (CO2, CH4) from thawing permafrost by 2100 (and beyond)? Can the range of additional permafrost emissions be given here as well as the statement that these emissions haven't been incorporated in the emission scenarios? (ref 3.4.3)	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account. This section (now A1.4 in the SPM SOD) is about observations and assesses carbon storage. Projected release of GHG from permafrost is assessed in B1.3.
28977	12	11	13	6	Taken into account - see added section 4.1 in Chp 4 and presented in revised B3.4 in SPM	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Accepted. The entire section on projected SLR has been thoroughly revised and is included in FD SPM B3 and underlying bullets. Underlying section 4.1 in chapter 4 has been also revised to provide more clarity.
28981	2	5	7	29	We suggest to add a graph to section A of the SPM on the measured (and slightly modelled) historic global sea level based on the series of Church and White, Hay et al. and Dangendorf et al. 2017 (as also shown in Figure 4.3 (page 4-24) or based on an update of AR5 figure SPM.2 (d)).	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Agreed Figure SPM.1 was redesigned to include graphs of historical and projected changes including Global mean sea level
28983	4	1	4	5	There is an error in the caption at the top of Figure SPM.1. At the far right we see the years [2081-2010]. This should be: [2081-2100].	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Correction applied.
28985	4	1	4	5	In Figure SPM.4 Global temperatures for the present day are taken as 0.87 degrees. This is correct for the years 2006-2015. Please shift the thermometer to the year 2017, consistent with the SPM of the IPCC special report on 1.5 degrees, it is stated that the value for 2017 is 1.0 degrees (plus minus 0.2). See SR 1.5 SPM opic A.1. The difference is 0.13 degrees means that at least 5 risk components in fig SPM.4 shift to a higher risk level, for example marine heat waves.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted: the temperature information has been updated and is now represented as time series for RCP2.6 and RCP8.5, relative to 1986-2005. The caption also gives information from AR5 on the assessed amount of warming from pre-industrial to the 1986-2005 reference interval.
28987	5	45	5	45	key concern': For many delta's human-induced subsidence is far outreaching sea level rise. Consistent with ch 4 pag 4-2 line 1-7, please insert this notion by changing this line into: 'Sea level rise, driven by… sheets, in combination of subsidence in many delta regions, is a key concern…'	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted - the SPM has been substantially revised and this sentence removed. A.3.5 includes "local anthropogenic subsidence"
28989	6	14	6	19	The lay-out of the world map is blurry, it is not possible to identify these 11 regions. The confidence levels are indeed explained if ones knows where to look.But the symbols are hard to de-cipher. The dark grey areas are not explained in the caption or the legend.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Taken into account - The overall graphic approach has been changed adding more clarity to confidence levels.
28991	2	42	2	50	As for the arctic it is first noted that SSTs have increased and then that sea ice substantially has declined. But then in line 48 SSTs are not mentioned for the area around Antarctica and to the surprise of the reader, the sea ice extent has increased . Please mention SSTs and trends therein around Antarctica and explain this counter-intuitive result.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Accepted. The statement referring to Arctic SSTs has been corrected. The statement referring to Antarctic sea ice extent has been amended to reflect new information (updated series) which show no statistically significant trend over the duration of the satellite record - the small increase up to 2015 has since reversed with major decreases.
28993	2	5	7	29	A statement on historic changes in wind extremes including cyclones is missing in the A-section. They are shortly named in B6 on page 16, line 5. Here, such extremes are named 'rare'. Could you be more explicit on trends over time?	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Cyclones and wind are now in A.3.6 indicating the limits to knowledge
28995	7	4	7	10	Please see our comments on Marine heat waves in Chapter 6. E.g., the claim of double in frequency .. very likely .. In line 4 is made too firm, especially in the period before profiles from the ARGO network were available (i.e. before 2007). We would not present claims from pre-industrial onwards as in line 7.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Noted. The text on MHW has been thoroughly revised for more clarity (see FD SPM A2.2) and the reference to pre-industrial conditions has been removed. However, we reject the request to weaken the statement that MHW have very likely doubled in frequency. Please note that we used daily SST data over the 1982-2016 period, and not yearly data. This is consistent with Frölicher et al. (2018)

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
28999	17	1	17	8	Generally, its is assumed that impact from natural desasters are reliable from 1980 onwards (data from CRED or Munich-Re). The x-axes of the upper and lower panel start in 1950. Please omit the period 1950-1980. The reason is bias due to so-called reporting bias. That could explain the absence of data for the South Pacific Ocean or the North Indian ocean.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Figure SPM.5 was removed in revision
29001	17	1	17	8	Economic damage over time is useally corrected for the fact that countries become richer (called normalization). This correction is not done for the lower panel as far as we can see. Idem corrections for population growth over the years 1950-2015 for exposed population in the upper panel and exposed assets in the upper panel. Graphs without correction are a bit misleading since they suggest that things become worse. See for example Visser et al. (2014): "On the relation between weather-related disaster impacts, vulnerability and climate change", in Climatic Change.	Government of Netherlands	Ministry of Economic Affairs and Climate Policy	Netherlands	Figure SPM.5 was removed in revision
29195	2	12	2	13	Ch 5 notes there has been an acceleration in ocean heat content in recent decades as well - does this contribute to the acceleration in sea level rise?	Stephen Rintoul	CSIRO	Australia	Noted - see the revised text in A.3 e.g. A.3.4
29197	2	17	2	17	Chapter 5 notes an acceleration in OHC (not "a steady rate")	Stephen Rintoul	CSIRO	Australia	Noted see revised text in A2.1 and A3.3 and redesigned Figure SPM.1
29221	0	0	0		A solid first draft with many key points made clearly. Section B should follow the integrative approaches of sections A and C. Many paragraphs include excessive detail for an SPM, and could be made more concise. Frequently the points could be reordered to develop a stronger storyline. Each paragraph should present only one idea. Currently some important content is buried in later sentences which should be stand-alone points.	Government of Canada	Environment and Climate Change Canada	Canada	Noted - the SPM has been substantially revised
29223	0	0	0		The idea of multiple stressors (including non-climate stressors) and cumulative impacts could be more strongly developed. It is included in B3.11, B4.4 and B4.5, but shoud also be an element of sections A and C	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - the SPM has been substantially revised
29225	0	0	0		Impacts on human health could be better developed throughout the SPM. They are only explicitly noted in para B3.10, but are certainly relevant in sections A and C	Government of Canada	Environment and Climate Change Canada	Canada	Noted - the SPM has been substantially revised, health is in A7 and A8, B8 and section C
29227	2	5	2	6	This section describes changes in the ocean and cryosphere, but does not describe the importance of the changes for ecosystems or people, as indicated in this title. Suggest replacing 'Illustrate their importance for climate, ecosystems and people' with 'have been observed', 'are projected' or similar.	Government of Canada	Environment and Climate Change Canada	Canada	The title has been completely revised for the FD to "Observed changes and impacts"
29229	2	13	0		Should note seal level rise has accelerated due to increased controbution from ice sheets and glaciers (add "and glaciers").	Government of Canada	Environment and Climate Change Canada	Canada	No longer applicable here - statement modified. Taken into account elsewhere in SPM.
29231	2	14	2	15	Since CO2-induced climate change is irreversible on timescales of decades to centuries, all of the changes just described are irreversible. Replace 'Some of these changes are irreversible' with 'These changes are irreversible'.	Government of Canada	Environment and Climate Change Canada	Canada	No longer applicable - statement modified.
29233	2	20	2	21	The units W m2 will not mean anything to policy makers. Either restructure or delete.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - sentence removed and the new A2.1 gives a statement in ZJ yr-1
29235	2	23	2	24	The word 'about' introduces unnecessary imprecision, and is not a defined in IPCC Guidance note on uncertainty. If the assessed very likely (90%) confidence range is +/- 5%, then the statement stands without 'about'. If the assessed 90% confidence range is larger than +/- 5% then quote this larger range, and delete 'about'.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - see A.2.6 (20-30%)
29237	2	28	2	29	It is not clear what the low confidence for changes in the tropical ocean applies to. Is it low confidence in observed changes i.e. the measurement are imprecise? Or the measurements are precise, but the variability is large? Or the underlying forced trends are uncertain because of large variability and/or disagreement between studies? Clarify.	Government of Canada	Environment and Climate Change Canada	Canada	Noted - sentence removed from FD. See redesigned Figure SPM.2 for regional ocean
29239	2	33	2	35	The text says that there is only medium confidence that the rate of Antarctic mass loss has increased since 2005, but there is very high confidence that West Antarctica has made a dominant contribution to this increase. The second part of the sentence depends on the first part being true, so this seems logically problematic. Better to say first that there is very high confidence that the rate of mass loss from West Antarctica has increased since 2005, and medium confidence that this has led to an overall increase in the rate of mass loss across Antarctica since 2005. Also, Chapter 3 assesses that West Antarctic ice sheet mass loss increased with high confidence, not very high confidence as written here.	Government of Canada	Environment and Climate Change Canada	Canada	The new version says "Ice sheets and glaciers worldwide are losing mass (very high confidence)". SPM is now consistent with chapter 3 of SROCC
29241	2	35	2	37	IPCC AR5 Chapter 10 (Bindoff et al., 2013) assessed that 'Ice sheets and glaciers are melting, and anthropogenic influences are likely to have contributed to the surface melting of Greenland since 1993…', based on assessment of Hanna et al. (2008) and other studies. This assessment that no attribution of mass loss from ice sheets seems to be inconsistent with assessment of the AR5. The reasons for the difference in assessment compared to IPCC AR5 Bindoff et al. (2013) are not discussed in Chapter 3. The reasons for the change in assessment conclusions should be discussed in Chapter 3 and could be summarised here.	Government of Canada	Environment and Climate Change Canada	Canada	We do not discuss attribution in the final version of SPM (see section A 1.1)
29243	2	38	2	39	No confidence qualifier is given for the statement that 'increasing lossess from polar ice sheets are resulting in increasing rates of sea level rise'. There is only medium confidence that the rate of mass loss from Antarctica has increased since 2005, so presumably this is not known with certainty.	Government of Canada	Environment and Climate Change Canada	Canada	text has been rephrased
29245	2	40	0		Avoid terminology that will not be familiar to policy-makers. Replace "steric sea level rise" with a more understandable term - perhaps thermal expansion.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - 'steric' no longer used
29247	2	42	2	43	Change "average global temperature" to "global average sea surface temperature"	Government of Canada	Environment and Climate Change Canada	Canada	No longer applicable - sentence modified

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29249	2	42	2	43	There is no basis for this statement that with very high confidence Arctic sea surface temperatures (SSTs) are warming at approximately twice the rate of global average temperature in this report.	Government of Canada	Environment and Climate Change Canada	Canada	Noted see revised text in A.2.4 ' Arctic surface air temperature has likely increased by more than double the global average over the last two decades, with feedbacks from loss of sea ice and snow cover contributing to the amplified warming (high confidence)"
29251	2	42	2	43	There is no assessment of trends in Arctic mean SSTs in either section 3.2.1 or Box 3.1, which are the two references cited here. Box 3.1 cites two studies in support of a statement that Arctic near surface air temperature (not Arctic SST) is warming at double the global rate. This statement is based on two cited references - Notz and Stroeve (2016), and Richter-Menge et al. (2017). The first of these does not report or discuss changes in Arctic near-surface air temperature or SSTs. The second of these shows a graph of changes in land (not ocean) temperature, north of 60 degrees, comparing this with global mean temperature. While the text of Richter-Menge et al. (2017) does report that the Arctic near-surface air temperature over land is warming at 'more than twice the global rate', other than showing the graph, this is based on no quantiative analysis, and there is no discussion of the time frame over which this statement applies or the associated uncertainties. The only statement in Section 3.2.1 about SST trends is 'August linear trends for 1982–2017 reveal summer mixed-layer temperatures increasing at about 0.5°C per decade (high confidence) over large sectors of the Arctic basin that are ice-free in summer (Timmermans et al., 2017) (see also Figure 3.3)'. But the map shown in Timmermans (2017) (their Fig 3) has mostly missing data over the Arctic basin (due to the presence of sea ice) and where data is present, some regions show negative trends, and some regions show non-significant trends. Moreover, this is for one month only (August) and based on a single dataset (OISST), in which SSTs are inferred from sea ice measurements using a regression model and not actually observed in areas with sea ice. Moreover, there is no calculation of the trend in Arctic basin mean SST, and no comparison with the trend in global mean temperature. Overall, there is therefore no quantitative analysis in either the report itself or in any of the cited references to support a statement that Arctic SSTs are warming at twice the rate of global average temperature, much less a statement at very high confidence.	Government of Canada	Environment and Climate Change Canada	Canada	Accepted - this was a typographical error (erroneous inclusion of word "sea"). We have clarified our meaning in the revised version.
29253	2	50	3	1	An example of excessive detail for an SPM - do not need to identify specific seas, simply state there is spatial variability.	Government of Canada	Environment and Climate Change Canada	Canada	No longer applicable - sentence removed
29255	3	9	3	12	It would be much more useful to communicate these changes as percentages rather than than measurement units.	Government of Canada	Environment and Climate Change Canada	Canada	No longer applicable - sentence removed
29257	3	14	3	22	An example of too many ideas in one paragraph, result is that the very important information about carbon sinks is not prominent. Move to separate paragraph.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - bullet has been shortened and flow improved in the revised SPM.
29259	3	17	0		What is the time basis for the statement that permafrost temperature have continued to increase with high confidence? Since when? This reads as though this is an update on a previous assessment that permafrost temperatures had increased up until a past year, but there is no such previous sentence.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account. The statements are now specific in time and supported by quantitative examples. SPM SOD A1.4
29261	3	25	0		This sentence contrasts the 'western USA' with 'Alaska'. Do the authors mean 'western contiguous USA'?	Government of Canada	Environment and Climate Change Canada	Canada	No longer applicable - these regional details have been removed
29263	3	25	0		This sentence contrasts 'regions with predominantly small glaciers', including Canada, with regions 'with larger glaciers' such as Alaska. But Canada has a number of large glaciers, ice caps and ice fields, such as the Agassiz Ice Cap which is ~21000km2. Is this sentence just referring to glaciers in the mountains of western Canada?	Government of Canada	Environment and Climate Change Canada	Canada	No longer applicable - these regional details have been removed
29265	4	0	0		This will be an effective figure. Suggest reoredering to group the ocean elements and the cryosphere elements, with sea ice the link between the two.	Government of Canada	Environment and Climate Change Canada	Canada	The panels have been rearranged for a better storyline.
29267	5	19	5	20	The population living in the Arctic circle is small (approximately four million), so almost all of this 13% of world population must be living in 'high mountain regions'. This number must depend sensitively on the definition of high mountain regions, so consider instead giving the altitude threshold (for example 1000m), which was used to define this number. Also, since the population of the Arctic is within the rounding error of this percentage, it would be clearer just to quote the fraction of the world's population living above x m altitude, and if desired, separately specify the fraction of the world's population living in the Arctic (approx 0.06%).	Government of Canada	Environment and Climate Change Canada	Canada	Accepted: Details of the definition of low elevation coastal and high mountain regions have been added as footnotes. Numbers for Arctic population, including Indigenous proportion, are now also given separately.
29269	5	20	5	22	Observed impacts on should include Indigenous ways of life / non-commercial food supplies - this is not captured by either agriculture of fisheries.	Government of Canada	Environment and Climate Change Canada	Canada	Accepted: in start-up box wording now specifies that ocean and cryosphere services include food production and ecosystem support, cultural values, health and wellbeing (among others)
29271	5	20	5	22	The text states that observed changes in the cryosphere have been exerting considerable influence on a number of sectors since the mid-20th century. Climate change attributable to anthropogenic influence has only clearly emerged in the past four decades. So presumably these impacts of observed cryospheric changes emerging in the mid-20th century were not due to anthropogenically-induced climate change? If that is the case, then why were these impacts not observed before the mid-20th century - is this just when reliable records of these impacts began? Clarify.	Government of Canada	Environment and Climate Change Canada	Canada	Noted: The wording here was not clear, and in the revised SPM the time interval of changes is discussed more explicitly (within SPM section A). The "mid-20th century" was reflecting the lack of reliable observational records for many aspects of ocean and cryosphere change before this time.
29273	5	41	5	43	The text here seems to confuse constraints on adaptation measures themselves, with constraints on assessment of the performance of the adaptation measures. The latter may be of interest to scientists studying adaptation, but is probably of less interest to stakeholders, and if sufficiently important should discussed in a separate sentence.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account. The content of this bullet was considerably revised, made more concrete, and recast in the revised structure of the SPM SOD, along with corresponding confidence statements.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29275	5	46	5	47	The percentage of the world's population given here is not the percentage that live in areas that could be inundated by sea level rise, but presumably those that live within some vertical/horizontal distance from the coast. The percentage will depend on this definition. Suggest specifying the definition e.g. X% of the world population lives with 5m of sea level or within 10km from the coast.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - these details are in the startup box which was added to the FD
29277	6	6	6	11	The text here indicates that there is high confidence that damage from more severe storm events due to climate change is a threat to human well-being. But IPCC AR5 WGI Chapter 2 assessed that 'Confidence remains low for long-term (centennial) changes in tropical cyclone activity, after accounting for past changes in observing capabilities' and 'Confidence in large-scale trends in storminess or storminess proxies over the last century is low owing to inconsistencies between studies or lack of long-term data in some parts of the world' and 'confidence is also low for trends in small-scale severe weather events, such as hail or thunderstorms'. How can there be high confidence that more severe storm events have impacted human well-being, if there is low confidence that any such changes in storm events have been observed?	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account. The threats to human well-being in this context have been specified in FD SPM A8.1 and A8.2.
29279	6	22	0		The statement "negative impacts on Indigenous knowledge" does not make sense. It is the equivalent of saying negative impacts on science.	Government of Canada	Environment and Climate Change Canada	Canada	Accepted - the text has been revised
29281	6	16	0		The absence of information for Africa is striking, although the extent of high mountain areas with significant cryosphere may be over-represented. There certainly is considerable work on impacts on food/agriculture in those areas that could have been captured here.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - Reference to the African location (Low Latitude) is now depicted.
29283	6	28	7	2	Final sentence of this paragraph should be rephrased or deleted. It seems to simply say that adaptataion and mitigation is taking place in response to observed impacts, which is fine but more specifics would be useful.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - sentence removed
29285	7	20	7	20	The text here indicates that there is high confidence that storms are exacerbating the rate of ecosystem changes. It is not clear on whether this is just referring to a change in storm characteristics, or just storms as a manifestation of internal climate variability. IPCC AR5 WGI Chapter 2 assessed that 'Confidence remains low for long-term (centennial) changes in tropical cyclone activity, after accounting for past changes in observing capabilities' and 'Confidence in large-scale trends in storminess or storminess proxies over the last century is low owing to inconsistencies between studies or lack of long-term data in some parts of the world' and 'confidence is also low for trends in small-scale severe weather events, such as hail or thunderstorms'. Therefore presumably it is just referring to storms as a manifestation of internal climate variability. Clarify this.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - the SPM is revised and the sentence replaced see section A6
29287	7	41	7	41	Clarify what 'below the mean snowline elevation' means in this context. Is this referring to the present-day mean snowline elevation, or the future projected mean snowline elevation, which will presumably increase over time?	Government of Canada	Environment and Climate Change Canada	Canada	No longer applicable - sentence removed
29289	7	42	7	44	The text here should say something about the projected pattern of precipitation changes as a function of latitude. Precipitation is projected to increase strongly in the polar regions, which is important in the context of this report, but this isn't mentioned.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account. The statement was thoroughly revised, with a stronger focus on changes in the cryosphere and corresponding impacts and risks. Future changes in winter snow cover are assessed and included in the SPM, but not the precipitation itself (which is covered in Chapter 2).
29291	8	15	8	15	The phrase 'freshwater-related risks' isn't easily understandable. This could be read as referring to floods or drought, but I think the intended meaning here is drought. Clarify.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - the entire bullet has been re-written and the term "freshwater-related risks" removed
29293	8	40	13	6	Somewhere in sections B2 or B4 the link should be made that the combined effects of reduced sea ice extentt and relative sea level rise have major implications for coastal erosion and flooding in the Arctic, including relocation of some communities. Hopefully this will emerge when you take a more integrated approach to section B.	Government of Canada	Environment and Climate Change Canada	Canada	Noted - the SPM has been restructured
29295	9	21	0		Add sea ice to current list (snow, freshwater ice and permafrost thaw) as changes in sea ice have tremendous implications for the Inuit accessing traditional food supplies.	Government of Canada	Environment and Climate Change Canada	Canada	Accepted. Changes in sea ice are explicitly accounted for in the SOD SPM, especially in section A7.3
29297	9	35	9	35	Listing 'mitigation measures' separately from 'greenhouse gas emissions' implies that mitigation measures are expected to influence permafrost temperature trends other than through their effect on greenhouse gas emissions (for example through changes in land management). Clarify, if this is the intended meaning, or otherwise delete 'and mitigation measures'.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - the wording of 'greenhouse gas emissions and mitigation measures' is no longer used
29299	9	44	9	44	Insert 'only' before 'on past environmental records'. Infrastructure design requirements should not be based exclusively on model projections of future climate. Past environmental records are required to downscale and bias adjust model projections.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - the entire statement has been revised (now B7.2)
29301	10	40	10	47	The conclusions appear weaker than those of the SR1.5, which assessed that 'Coral reefs, for example, are projected to decline by a further 70–90% at 1.5°C (high confidence) with larger losses (>99%) at 2°C (very high confidence).'	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - HS B6 repeats this finding from SR15
29303	11	23	11	23	Figure SPM.3 shows an increase of biomass of fisheries in much of the Arctic and Southern Ocean. This appears at odds with the text here which states that climate impacts on fisheries are projected to be largest in tropical and polar systems, unless the text is referring to a positive impact on biomass. Given that this bullet appears just after the figure, this should be address in the paragraph e.g. 'Despite a projected overall increase in biomass of fisheries in the high latitudes, climate changes is projected to impact.....'	Government of Canada	Environment and Climate Change Canada	Canada	The text has been updated to clarify the projected impacts (positive and negative) in the high Arctic region. The high uncertainty of the projections for the polar regions relative to other parts of the ocean is also highlighted and explained.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29305	12	46	12	51	The text here discusses subsidence as a contributor to local relative sea level change, but nowhere in the SPM are departures from global mean SLR due to ocean dynamics or gravity effects discussed. These are discussed in chapter 4, but this discussion is not elevated to the ES of Chapter 4 or the SPM. AR5 WGI Chapter 13 'It is very likely that in the 21st century and beyond, sea level change will have a strong regional pattern, with some places experiencing significant deviations of local and regional sea level change from the global mean change'.	Government of Canada	Environment and Climate Change Canada	Canada	Accepted. In FD SPM A3.5 regional departures due to thermal expansion, ocean dynamics and land ice loss as well as changes in wave heights and tides have been included.
29307	12	48	12	49	Is this text referring to projected future changes in wave height and period? This should be clarified/explained. I would expect that projected wave changes must be uncertain.	Government of Canada	Environment and Climate Change Canada	Canada	B3.2 includes projections for wave heights, details are in the underlying report
29309	12	22	12	28	Simplify information for SPM or create a table to provide details and use the text to make clear points linking to decision-making.	Government of Canada	Environment and Climate Change Canada	Canada	Noted - there is not space for a table. However the paragraph is streamlined (see B3.1) and details added to Figure SPM.1
29311	13	44	13	46	A very interesting conclusion with appropriate phrasing for an SPM.	Government of Canada	Environment and Climate Change Canada	Canada	Noted
29313	15	0	0		Figure SPM.4 - Exclusion of bar "C" from megacities and densely populated deltas implies there are no limits to adaptation in these settings. Suggest column "C" be included for all.	Government of Canada	Environment and Climate Change Canada	Canada	Geographies are now dealt in a separate figure, and bars have been reduced in all embers.
29315	15	0	0		The meaning of the bars in panel B is unclear, and is not described in the caption. Do the bars show impacts and risks (for what?) due to the physical phenomena listed under the bars? And is it the impacts of the physical phenomena in the presence of ocean warming, acidification and sea level rise, or is it the effects of changes in the physical phenomena? For example, for cyclones, does the bar show changes in risk and impact, due to existing pattern of tropical cyclones in the presence of SLR? Or changes in risk due to changes in intensity of tropical cylones? Or the combination of the two? In the case of 'Extreme ENSO' I could not find this defined or discussed in cited reference. IPCC AR5 WGI Ch14 'However, natural modulations of the variance and spatial pattern of ENSO are so large in models that confidence in any specific projected change in its variability in the 21st century remains low.' So presumably the impact shown is that of the existing pattern of ENSO variability superposed on warming oceans and SLR? This should be explained somewhere. Finally, 'SPG' shoudl be defined in the caption.	Government of Canada	Environment and Climate Change Canada	Canada	The embers on physical phenomena have been removed after technical discussions.
29317	16	19	0		Statement "Forecasts of MHWs can help in reducing vulneraility needs some explanation. How?	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account, The revised text is C4.3 and specifies support for adaptation planning and implementation and management
29319	16	19	16	20	This bullet discusses the impact of marine heatwaves on marine organisms, fisheries and ecosystems. How can forecasts of marine heatwaves help reduce vulnerability of ecosystems to marine heatwaves? I would have thought that forecasts would reduce vulnerability in human systems, but not in natural systems.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - the text is moved to C4.3 and specifies use of forecasts e.g. for coral reefs (reducing/halting other human stressors on a reefs when heatwave is forecast)
29321	16	28	16	30	Uncertainty around changes in future characteristics of tropical cyclones, such as shifts in their mean tracks, concerns centennial-scale changes in mean characteristics. Early warning and evauation depend on numerical weather predictions of individual tropical cyclones, and these predictions would be expected to improve as NWP models improve and computing resources increase. The relevance of uncertainty in centennial trends for prediction of individual TCs is not clear.	Government of Canada	Environment and Climate Change Canada	Canada	Noted - text removed
29323	16	32	0		This paragraph is about projected changes whereas Figure SPM.5 is limited to historical observations - and therefore does not support this paragraph.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account - Fig SPM5 is deleted
29325	16	53	16	55	The text here compares the cost of avoidance and preparedness investments with the cost of impacts of extreme events and concludes that the latter is very likely less. Given that avoidance strategies and preparedness will not completely avoid costs associated with impacts, I would have thought a more relevant comparison would be between the costs of these investments and the marginal reduction in costs associated with impacts of extreme events due to better preparedness and planning.	Government of Canada	Environment and Climate Change Canada	Canada	Noted. This sentence does not exists anymore in the FD SPM. The entire text has been carefully revised, Land-use planning, preparedness and early warning systems are addressed now in FD SPM C3 and underlying bullets.
29327	17	0	0		Figure SPM.5 only presents historical data and therefore, if retained, should be placed in Section A.	Government of Canada	Environment and Climate Change Canada	Canada	Figure SPM.5 was removed in revision
29329	17	0	0		The meaning of 'exposed population and assets' might be less clear to some readers, and might depend sensitively on the definition applied. Could the chart instead show number of deaths, and the cost of the damage?	Government of Canada	Environment and Climate Change Canada	Canada	Figure SPM.5 was removed in revision
29331	17	5	17	6	The caption says 'Note the latitudinal expansion of regions impacted by high intensity storms'. However, the chart does not directly show latitude, and the regions affected by TCs are mostly separate and distinct - for example tropical cyclones do not cross the equator. Presumably this is referring to the occurence of tropical cyclones in areas where none had previously been observed - if so it should be re-phrased. Somewhere the authors should consider whether this is a real climate change signal, or whether it might be influenced by observing system changes, for example the advent of satellite monitoring.	Government of Canada	Environment and Climate Change Canada	Canada	Figure SPM.5 was removed in revision
29333	18	26	18	27	Very curious use of a confidence statement. That a new tipping element has been identified in some climate models is a statement of fact. There may be medium confidence that this tipping element exists, but that is not what the sentence says.	Government of Canada	Environment and Climate Change Canada	Canada	Noted - text on SPG removed from SPM
29335	19	1	21	41	While mention of transformation is important for this section, it should be framed in a way that it makes clear what type of transformation is required - otherwise comes across as an impossible task. Transformative governance (C3.6 and C4.3) needs a clear explanation.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account. Statements C4.2 and C5.1 now specify transformation.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29337	20	8	20	10	Iron fertilisation has been proposed as a geoengineering approach to increase carbon uptake by the ocean. This should be discussed somewhere in the SPM.	Government of Canada	Environment and Climate Change Canada	Canada	Such geoengineering options will be discussed in WGIII AR6.
29339	20	18	20	22	This is a very good paragraph on the importance of Indigenous knowledge but its placement does not make sense. This needs to be tied in the broader decision-making processes.	Government of Canada	Environment and Climate Change Canada	Canada	accepted - text changed - see section C4.4
29341	20	26	0		"global and response options" is too large a leap in scales. It's the regional, national, and sub-national options that are most important in enabling local measures.	Government of Canada	Environment and Climate Change Canada	Canada	Noted. Bullet has been revised.
29343	20	34	20	35	The text here refers to human response to climate change in the 'polar regions'. If this is referring only the Arctic, replace 'polar regions' with 'Arctic', since this is more specific.	Government of Canada	Environment and Climate Change Canada	Canada	Taken into account. Sentence revised.
29345	21	25	21	28	The second sentence is not an example of the point made in the first sentence, even though the phrase "For example" is used. It says nothing at all about conflicting interests.	Government of Canada	Environment and Climate Change Canada	Canada	Noted. Sentence revised.
29487	2	26	2	26	It seems to me it would be worth explaining the typical consequences of oxygen minimum zones as not all readers may associate the term with the full range of activities that could result (so fish death, algal blooms, etc.)--the SPM is speaking to policymakers and needs to be using terms that bring to mind the types of very disruptive consequences that are implied here.	Michael MacCracken	Climate Institute	United States of America	Rejected - this is beyond the scope of the bullets in section A2
29489	2	17	2	21	It seems to me that this paragraph needs to indicate that the ocean heat uptake values are of great importance because this is where of order 95% of the trapped energy from human-induced GHG warming is being stored, and that the heat is in the ocean will be a factor in seriously prolonging the warming that is resulting, and indeed is slowing the occurrence of the warming that the present atmospheric composition will be causing (so thermal lag). What is missing here is why the findings reported here are important in terms that the average policymaker would understand. This very much reads as if it is a scientist talking to an expert in the field rather than to a policymaker. I think it essential to be explaining the why it matters aspect of the finding in the SPM. And I am surprised that the finding on line 9 is not "very high confidence"--I'm not aware of any other alternative explanation.	Michael MacCracken	Climate Institute	United States of America	Taken into account - see revision in A.2.1
29491	2	31	2	32	Oh come now--is there even a 1% chance that Greenland has not lost mass, and is there really a 5% chance that Antarctica has not lost mass. This sticking to the IPCC lexicon when presenting the results to Policymakers is really inappropriate--the expressions need to be using the types of risk-based assessment that Policymakers use, not this type of language that is appropriate perhaps for a Technical Summary, but not for speaking to Policymakers. This could be rephrased to say something like: "Satellite and surface observations make clear that the Greenland Ice Sheet has lost enough mass over the past two decades to cause measurable sea level rise; for the Antarctic, the same types of observations make clear it has been losing substantial mass for at least the last decade." Basically, make the first sentence of the paragraph more direct and quotable and move terms like "virtually certain" and "very likely" to later in the paragraph.	Michael MacCracken	Climate Institute	United States of America	The text has been rephrased to get the message better across. Taken into account. I assume we have to stay in the frames of confidence language. However, in the final version we give specific numbers on how much ice was lost in Antarctica and Greenland (A 1.1)
29493	0	0	0		This is a Summary for Policymakers, and the framing here should be using one that uses a lexicon that is more appropriate for them--at least that uses a framing in the first sentence of each finding that is appropriate to them and does not revert to the quite cautious framing that is used by the scientific community. I would thus urge keeping the IPCC lexicon language out of the first sentence of findings and use it in the later sentences in the paragraph if necessary to include at all.	Michael MacCracken	Climate Institute	United States of America	Noted - the SPM has been substantially revised
29495	2	35	2	37	Regarding the statement here on attribution, the sentence really needs to explain the likelihood framing being used here. Yes, the science may not adequate to say with two-standard deviation accuracy that the changes in Antarctica are due to human activities for the reasons indicated, but how is the collective information (including that if the identified rate of loss had been going on for centuries that it would have led to noticeable sea level rise, the changes in ocean temperature, the apparent faster motion of a number of ice streams, the inability to explain sea level rise without there being ice sheet contributions, ocean warming that was the point of an earlier finding, etc.) not adequate to say that it is likely that human-induced global warming is substantially contributing to the changes in ice loss that are occurring? In the IPCC Second Assessment, the controversy that arose over detection/attribution was largely due to the use of statistical jargon (something likely cannot be convincingly shown--which meant with two standard deviations)--here it would seem one could clearly say that 'the balance of evidence suggests a discernible human-induced effect contributing to the increasing loss of mass from both the Greenland and Antarctic ice sheets.' The statement here just seems like a hiding behind statistical jargon--and at the very least the criteria for the statement need to be much better explained.	Michael MacCracken	Climate Institute	United States of America	We do not discuss attribution in the final version of SPM (see section A 1.1)

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29497	2	46	2	48	Again, this seems to be hiding behind a statistical analysis rather than providing policymakers with a statement using their framing of relative likelihood. When there is an El Nino or La Nina involving just a few degree C temperature change over a large area, there are recognized impacts on atmospheric circulation and storm tracks over large areas of the globe. How is it then that when there are changes in surface temperature of at least several times larger over a comparable sized area that there would be no effect. There may not be agreement on exactly what the outcomes are and how they are manifest, but it is pretty clear that changes in the energy budget temperature of the spatial size and duration that is occurring are very likely to have a significant influence on the weather over and beyond the location of the changes. Indicating that there remains uncertainty on exactly how the influence is manifest is fine--implying that there may not be an impact seems to me to be downplaying the broader scale understanding of the science that in every other case where the energy balance is so affected, there are noticeable influences on the circulation.	Michael MacCracken	Climate Institute	United States of America	Accepted: text regarding potential impacts of sea ice loss on midlatitude weather was revised.
29499	2	48	3	3	It seems to me that this sentence needs to have some context given, namely that there are multiple human influences that can be influencing the climate. For the Antarctic, this is particularly true as both stratospheric ozone depletion and CO2/GHG induced warming are both exerting influences, and that they sometimes cancel and sometimes reinforce, etc. So, let the reader know that there are multiple influences on the climate and that they combine to exert their influences and then that distinguishing the influences is a challenge that scientific research is pursuing, etc.--and particularly say that for this reason the observations will not always be in perfect sync with the change in the CO2 concentration. Aside from just here, this is an important point to be making--one has to be considering the effects of all influences and then distinguish the role of each, to understand how the relative influences can affect the timing of what is dominant at a particular time, etc. With respect to the second sentence, this seems a quite limited and confusing statement somehow leaving out that the meridional wind trends could well be induced by human influences (indeed, by the comparative influences of different human influences acting over time depending on the intensity of the relative forcings); I just don't think leaving this to imply that it all might be natural variability in the winds influencing all this is an appropriate statement.	Michael MacCracken	Climate Institute	United States of America	Taken into account. We have greatly revised this message, and streamlined it to focus on the key findings of most importance for policymakers.
29501	3	12	3	12	Just to note that the unit should be per square meter (so minus sign is missing) in both expressions of the dimensions.	Michael MacCracken	Climate Institute	United States of America	No longer applicable - sentence removed
29503	3	16	3	16	Given the text says late 20th century, I'd suggest it should say "early 21st century", maybe even "already in the early 21st century"	Michael MacCracken	Climate Institute	United States of America	No longer applicable - sentence removed
29505	4	2	5	10	This caption appears not to include the sea level estimates apparently fail to account for loss of ice resulting from ice stream movement from the Greenland and Antarctic ice sheets, and this would seem likely to be the largest term. At the very least, this needs to be explicitly mentioned in the caption and the potential contribution that could result. At least so far, I have seen no indication that paleo-climatic indications of sea level change have been considered, and they are very worrisome. At the last interglacial roughly 125ka, SL was perhaps 4-8 meters higher when the temperature was up perhaps 1 C and the CO2 concentration was less than 300 ppm, which would have allowed emission over the winter of much of the heat taken up during the warm season. And a few tens of millions of years ago, with global average temperature perhaps up 4 C or so, and there was no Greenland Ice Sheet and the Antarctic ice sheet was greatly reduced, so SL was likely up 60 meters or so. At the last glacial maximum 20ka, SL was down something like 120 meters when global average temperature is estimated to have been perhaps 6 C colder. Together, these data suggest an equilibrium sea level sensitivity of perhaps 15 to 20 meters per degree C. As to the potential rate of change, from 20ka to 8ka, sea level rose on average 1 meter per century for 120 centuries while the global average temperature was rising at an average rate of 1 C per 2000 years. We are warming at about 40+ times that rate and with the CO2 concentration over 400 ppm, thus limiting wintertime cooling of the ice sheet. To have a chart that shows a rise of only about a meter, with no uncertainty and no projection of how much more rise would be expected as the climate heads toward equilibrium seems to be a very serious omission. The other key lesson from the paleoclimatic record is that ice sheets take much longer to build up that to deteriorate, and so if the temperature keeps heading up, overshooting 1.5, 2, 2.5 and even 3 C, the notion that bringing the temperature increase back to 1.5 C a century or from now, per the IPCC 1.5 report analyses, seems very unlikely to stop further ice sheet loss and quite rapid sea level rise. This report seeming to ignore lessons from the paleoclimatic record seems a very serious oversight.	Michael MacCracken	Climate Institute	United States of America	Noted: additional panels have been added to the figure showing details of ice loss from the Greenland and Antarctic ice sheets. The paleoclimate evidence of past high sea levels is covered in chapter 4, however this information can not be covered in the time period (1950 to 2100) of SPM.1
29507	5	13	5	17	Just saying "food" to cover how dependent the global population is on fish, lobsters, oysters, clams, shrimp and all sorts of other food sources seems to me totally inadequate. Coastal wetlands and rivers, etc. are essential to fish reproduction, and ocean protein is vital for the global population, etc. And suggesting that the ocean is only being affected by climate change and not mentioning ocean acidification also seems a very important omission. Climate change is also causing extensive loss of coral reefs, which are also nurturing locations for ocean marine life. If this is to be the key quotable paragraph on these issue, much more explicit discussion of the likely impacts are needed.	Michael MacCracken	Climate Institute	United States of America	taken into account - the SPM has been revised - more detailed on fisheries and aquaculture is found throughout the revised SPM, and ocean acidification is addressed in more detail

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29509	5	19	6	13	The ordering of the points supporting the main finding seems in roughly inverse order of importance. I'd suggest reordering the points so that the most important supporting points come first, where importance relates to the general magnitude of the effect in terms of those affected and importance. Thus, I'd suggest starting with the global scale issues and then working down to the regional ones (even though the regional effects have indirect effects that also have consequences around the world.	Michael MacCracken	Climate Institute	United States of America	Rejected - the SPM has been restructured and the text has been completely revised. The order of bullets underlying the headline statements does not aim to reflect "importance" or relevance but follows a "bottom-up" structure wherever possible
29511	7	4	7	10	This paragraph needs to in more detail explain why ocean heatwaves are important--it seems to me the relative weighting of text on that they occur should be toward why this is important to society (they have been devastating coral reefs in many locations, and so the consequent effects of devastated coral reefs needs to be mentioned). And then also the consequences for algal blooms, and more. And explain the types of consequences to society, etc. Also "detrimental" seems a rather mild descriptive adjective.	Michael MacCracken	Climate Institute	United States of America	Taken into account. In the revised SPM historical trends in marine heatwaves are in A2.2 while the consequences are in A6 (for ecosystems) and A9 (for people)
29513	6	21	6	24	This main point mentions sea level rise, but none of the sections subpoints have to do with the projected rise in sea level, especially the potential for long-term sea level rise and the lessons to be drawn from paleoclimatic and oceanographic studies. For example, that sea level was down of order 120 meters 20ka and up 4-8 meters 125ka is clear evidence that sea level can change and it is clear that most of these change (and also back a few tens of millions of years) were caused by changes in the amount of ice on land in the form of ice sheets. Also, clear paleoclimatic evidence makes clear that sea level can rise at least 1 meter per century as that is what happened, on average for 120 centuries from 20ka to 8ka--sea level has and can change by large amounts, and by a lot. And from 20ka to 8ka sea level rose an average of a meter per century for 120 centuries when the global average temperature was going up only 1 C per 2000 years and the CO2 concentration was less than 300 ppm. Projections are for global average temperature to go up roughly a degree per 50 years and the CO2 concentration will be over 400 ppm. I would also suggest that there needs to be mention that sea level rise is going to continue indefinitely--so not only are the changes projected to 2100 irreversible, but that rate (or more) is expected to continue for many centuries unless (we hope) the global average temperature increase is brought way down. I would also note there an alternative and perhaps more useful way of expressing uncertainty would be to indicate the range of time when sea level is likely to pass a certain level--so, sea level rise is expected to reach 1 meter sometime between, say (I'm not expert on this--just suggesting an approach) 2075 and 2125, and, assuming no sudden collapse of ice sheets, for which there is a non-zero probability, reach 2 meters between, say 2125 and 2175, and so on. The IPCC 1.5 report offered a rather useless indication that the advantage of being at 1.5 versus 2 C was that sea level rise would be less by something like 0.06 m in 2100; what it failed to say was that sea level rise, even absent ice stream movement being considered, would be at something of order 6-10 cm/decade, so being at 1.5 versus 2 C has the effect of delaying sea level rise by a decade or so, as if that is not well within our knowledge of uncertainties and would matter in some sort of long-term planning. We are in the stage of committing the Earth to sea level rise of order 10-20 meters per degree C of sustained rise in global average temperature, and the IPCC report is	Michael MacCracken	Climate Institute	United States of America	Taken into account. This section has been thoroughly revised and expanded. Details can be found in FD SPM A3 and underlying bullets.
29515	2	8	2	15	Just showing a figure of potential sea level rise is not sufficient--the numbers (amounts, uncertainties, and rates) need to be expressed in the text so they can be quoted/cited without having to show the figure. This is a document intended for Policymakers, and giving quantitative amounts of melt rates, etc. is just not the clearly type of understandable information that policy makers need.	Michael MacCracken	Climate Institute	United States of America	Agreed, quantitative information has been added throughout the SPM e.g. A.3.4 and Figure SPM.1 is redesigned to provide graphs for key variables including global mean sea level rise
29517	0	0	0		The SPM as written seems much more a technical summary than a summary for policymakers. It simply does not provide the type of clear statements of what is expected to happen that matters to the public and environment and the reasons to be concerned about how much more change is likely (that we are committed to). Providing numbers on loss rates of ice sheets rather than actually giving numbers on sea level rise amounts (don't just have them in a table) and saying they are essentially irreversible without seeming to say that the rate of rise will be continuing seems to me a serious omission. Also there is virtually noting here providing a perspective on how much sea level rise can change from what we know about Earth history, and that buildup of ice took lots longer than its reductions (and I'll be looking to see if there is a history of how the near-term changes compare to past changes over the Earth's history and what this has meant, and that the changing conditions were caused by forcings and not random, and anthropogenic forcings are comparable to past forcings, though occurring much more quickly, etc. I just do not get the sense the SPM has really clearly made the case for how serious the situation is--little is provided about what happens after 2100 and how sensitive Earth history demonstrates the climate and sea level are.	Michael MacCracken	Climate Institute	United States of America	Noted - the SPM has been substantially revised including figures. SLR is addressed explicitly in A3, B3 and figures SPM.4 and SPM.5
29519	7	34	7	38	It seems to me essential to explain that the calculation for potential sea level rise presented here does not, as I understand it, include the contribution that would result from ice stream movement and loss--so is basically presenting results that are leaving out what is (or is likely to become) the largest term and would extend future sea level rise for many centuries. It seems to me that this phrasing is far too sanguine about the situation that society faces and much more needs to be said about lessons provided from scientific study of Earth's history of climate change and sea level variation. Even if not asked for or included in the instructions/guidance for this report, the scientific community has an obligation to give a clear indication of what the quite plausible results of ongoing warming and sea level rise could be, especially if the paths described in the 1.5 C special report are followed for situations where overshoots occur, etc.	Michael MacCracken	Climate Institute	United States of America	Error in page or line numbers

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29521	7	37	7	38	This sentence has virtually no content, providing too little specifics on what lies ahead--revision of this sentence in one of the key findings is essential; just saying more changes lie ahead is just not adequate.	Michael MacCracken	Climate Institute	United States of America	Accepted. The material was considerably revised for the SOD SPM, and more focused headline/bullets have been developed, where the confidence language has been applied consistently.
29523	7	39	7	44	A key point to mention here is that the amount of accumulated winter snowfall (so stored water equivalent) will go down due both to less snowfall and to more limited areal coverage of the snowpack.	Michael MacCracken	Climate Institute	United States of America	Taken into account. The statement was thoroughly revised, with a stronger focus on changes in the cryosphere and corresponding impacts and risks. Future changes in winter snow cover are assessed and included in the SPM, but not the precipitation itself (which is covered in Chapter 2).
29525	7	46	7	50	This makes it sound as if each glacier will lose 80% of its mass. In reality, of course, many glaciers will disappear totally with the integrated mass loss being 80%. Rewording here would help.	Michael MacCracken	Climate Institute	United States of America	Substance
29527	8	1	8	3	It is not just high-mountain permafrost that will be lost. Given the potential for findings to be taken out of context, the sentence here needs to indicate that all permafrost is going to face the potential for thawing, with losses not only at low but also at high elevations.	Michael MacCracken	Climate Institute	United States of America	Taken into account. This is now formulated in B1.3 and B1.4.
29529	0	0	0		Overall, the SPM is rather long to be a summary that actual policymakers would read. The document needs an opening one-page summary of key findings prepared by those other than the scientific authors, perhaps by experts in risk management/risk assessment who are likely to better phrase findings in the relative-likelihood framing that policy makers use. Basically, what is presented for review needs to be retitled as a Technical Summary and a SPM actually written that is aimed at Policymakers. I'd be interested in having this text evaluated by the types of program that estimate the grade level of the text--my guess would be late college or graduate school, so far above the level to be aiming for for policy makers.	Michael MacCracken	Climate Institute	United States of America	Noted - the SPM has been substantially revised
29531	8	41	8	46	The first sentence is much too mild a statement--by 2100 the Arctic as we know it will be gone if overshoot of the 1.5 C value occurs and this persists, as the 1.5 C special report suggested as the long-term new stabilization level. Deep winters will essentially be gone, the environment that the Indigenous Peoples of the Arctic have adapted to will be gone, with species changing and, as was said during the Arctic Assessment of 2004, their culture will be destroyed in that subsistence hunting and sharing of foods that can be kept cold in permafrost will not be possible, so the sharing community culture they developed will necessarily need to be changed to a market economy with food products being brought in, etc. Species mixes will change, and lots more. With much of the permafrost area thawed, the landscape will become very different. The statement here needs to be much more forthright and explicit about the societal change that will be occurring. For the Antarctic, the key issue is potential destabilization of ice streams that have the potential to commit the world to sea level rise of several meters per century or even more and ultimate equilibrium sea level rise of a few tens of meters when a new equilibrium is established. Yes, there are uncertainties, but the risk is quite high and such long tail consequences need to be indicated--what happens by 2100 will set a path that persists for many millennia unless climate intervention efforts start in the near future, perhaps initially for the polar regions and later for the world. While some of these points are elaborated in following paragraphs, the key, highlighted summary needs to be more explicit.	Michael MacCracken	Climate Institute	United States of America	Accepted. Text on changes, impacts and risks in polar regions has been strenghtened throughout the FD SPM.
29533	9	4	9	10	The word choices here really don't convey much about what is really occurring and its significance. Words like "impact" and "affecting" don't give a sense of whether the changes are good or bad, large or small, etc.--they are equivalent to not using the IPCC lexicon and instead saying something "may" happen. The next paragraph does better without having to get into specific quantitative results. But then the third point goes back to words like "impact" and "affect"--I'd urge the authors to write their findings without using these and related words--indicate what is happening and why it is important.	Michael MacCracken	Climate Institute	United States of America	Taken into account - the statement has been completely re-written to become clear and specific in direction of effects and to provide quantitative information where possible
29535	9	21	9	29	Again, too much use of words like "impact" and "affect" without giving any indication of magnitude, significance or even sign. Throughout the SPM, authors need to be using words that provide real and useful information. Of course things are affected--but is it important, will it make a difference, etc. Ban the words "impact" and "affect".	Michael MacCracken	Climate Institute	United States of America	Taken into account - the SPM has been completely revised and attention paid to this
29537	9	34	9	36	Okay, so there is not agreement, but do these differences have any substantive effect on how the changes will matter for the public, etc. Yes, scientists will want to narrow the range of results, but do they give a useful indication of prospects for the future and for how resilience may be reduced, etc. This is a summary for policymakers--give them a sense of what the likely range of change will be and its significance instead of just saying that there are differences without indicating if the range is important or not.	Michael MacCracken	Climate Institute	United States of America	Taken into account - quantitively information added where possible
29539	9	38	9	40	Would it not be important here to indicate if the loss of C is occurring either as methane or as CO2? That difference has the potential to be quite significant for how much climate change occurs, so at least some indication needs to be given about how the carbon is coming off.	Michael MacCracken	Climate Institute	United States of America	Section text revised, this is now contained in B1.3; the scale of the models is such that only total carbon is tracked rather than carbon dioxide and methane separately. More detailed information on the two greenhouse gases is provided within chapter 3
29541	9	47	9	48	It is not just lack of information that is problematic for adaptation. Some significant share of the changes will simply not be able to be adapted to and will be inducing long-term impacts, dislocation, and the increasing failure of traditional knowledge and experience to help people figure out how to respond.	Michael MacCracken	Climate Institute	United States of America	Taken into account - the entire SPM has been revised and attention paid to this point
29543	10	7	10	9	Just how are policy makers supposed to understand "Joules" taken up and its significance? A sentence like this should be in a Technical Summary and not the SPM unless text is added to indicate what this will mean (e.g., in terms of sea level rise from thermal expansion, warming that it will sustain in the atmosphere, etc.). This SPM is not supposed to be a Technical Summary or abstract of the scientific chapters and it is becoming increasingly clear that the scientific authors should not be the ones who prepare the drafts as what is needed are statements of the significance of the findings, not just what they are.	Michael MacCracken	Climate Institute	United States of America	Taken into account - The values in Joules has been removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29545	10	11	10	13	And stratification also affects the amount of nutrients upwelled as well. Again, the implications of this need to be further elaborated, saying this affects the food resources like fish, etc. that can be drawn from the oceans. State clearly what the impacts will be in understandable ways.	Michael MacCracken	Climate Institute	United States of America	Noted - the entire SPM has been revised for clarity
29547	10	15	10	15	Giving global averages really does not seem very useful. That such changes might well be concentrated in local/region areas that are particularly productive is what is important to convey.	Michael MacCracken	Climate Institute	United States of America	Noted - Sentence removed from revised SPM - see B2.4 and B2.6
29549	10	16	10	17	How is this apparently so well established and why is it important/what does it mean/why should we care? Does it mean policies can change this or not--that is, is it inevitable based on what we have already done? And what is the metric for asserting this? The text just does not make clear where this is coming from and why it is true and important.	Michael MacCracken	Climate Institute	United States of America	Noted - See revised B5.4 which provides impacts
29551	10	32	10	35	It would really be helpful if information provided on what sort of consequences these changes would have for society, etc. Is this a big change compared to variability? Is it focused on small versus large species, etc.? How does this compare to the effects of overfishing, etc.?	Michael MacCracken	Climate Institute	United States of America	Taken into account - see revised B8 on implications for fisheries and common communities
29553	10	49	10	56	So, consider reading this paragraph to a member of a country's legislature and please indicate what the message is that they are to draw from all of this. Reading this as an example, do you really think they will read more of the whole SPM? The whole text of the SPM needs to be evaluated under such a test and I think it will be clear this is really a Technical Summary and not an SPM.	Michael MacCracken	Climate Institute	United States of America	Taken into account - the entire bullet (now B5.2) has been revised to be more clear for the target audience, focused and concise. The entire SPM has been thoroughly revised having the audience in mind.
29555	11	2	11	4	Other than using the word "impacted," which can mean anything and conveys no useful information at all, the sentence is at least understandable. How about changing "impacted" to "downgraded" or "adversely impacted" or something similar. For the whole paragraph, adjectives are needed to give a sense about whether the changes, decreases, reductions, etc. are environmentally and/or significant?	Michael MacCracken	Climate Institute	United States of America	Accepted - the bullet has been revised, "impacted" has been removed and the projected effects have been specified
29557	10	1	12	9	There does not seem to be any (or enough) mention of how changes along coastlines and estuaries due to sea level rise, changes in salinity, and other factors can influence ocean ecosystems. Existing wetlands could be significantly disrupted and this has the potential to disrupt much marine productivity. And ocean acidification issues would seem worthy of more mention, especially as they are already being felt.	Michael MacCracken	Climate Institute	United States of America	Taken into account - see revisions in Section B e.g. estuaries and salinisation in B6.3
29559	12	11	12	17	The phrasing here gives the misimpression that SL rise might be limited to 10 meters over time--if the global average temperature is sustained at 1.5 C or some overshoot value, etc., the equilibrium rise seems very likely to put at risk people and infrastructure to those at an elevation a good bit above 10 m.	Michael MacCracken	Climate Institute	United States of America	Taken into account. The text on projected changes in SLR and associated risks has been thoroughly revised for more clarity (see FD SPM B3 and B9 and underlying bullets).
29561	12	19	12	28	In that global sea level rose an average of 1 meter per century from 20ka to 8 ka when the global average temperature was rising, on average 1 C per 2000 years, this suggestion of such limited rise during the 21st century and beyond when the global average temperature is rising at a rate of about 1 C every 50 years and the CO2 concentration is over 400 ppm seems far too cautious, especially the indications from the Pollard-DeConto paper about how rapid glacial retreat can be if one considers the breaking off of ice shelves and how considering this helps to get the Antarctic ice sheet models in pretty close agreement with geological evidence of Antarctic ice mass. At the very least, this finding needs to give an indication of the potential for much higher rates of rise based on implications from Earth's climatic history.	Michael MacCracken	Climate Institute	United States of America	Taken into account - revised B.3.4 presents SLR beyond 2100 and also ice sheet instability B.3.1 revises projetions and presents potential contribution from ice sheets.
29563	12	32	12	33	This seems a quite dubious conclusion (low confidence at best) as far as what will happen over the next century or two given that paleoclimatic evidence suggests and equilibrium sea level sensitivity of perhaps 15-20 meters per degree C of global warming, and what happens the next few centuries is very likely to be a period when the situation is far out of equilibrium no matter what the warming path is (unless, perhaps, there is early and strong climate intervention). It is pretty clear that the ice sheets have long time constants and one started (e.g., by a temperature overshoot) that the ice flows will continue and be little slowed by coming back to 1.5 to 2 C). Also, we know that ice sheet deterioration goes much more quickly than formation, in part due to altitude feedback (the lower the ice sheet, the warmer the temperature), and so on. It really seems to me that this sentence really underplays what is likely to be occurring one and more centuries into the future.	Michael MacCracken	Climate Institute	United States of America	Accepted. This sentence is not included in the FD SPM anymore (see FD SPM B3 and underlying bullets).
29565	12	34	12	34	I am a bit baffled at this suggestion that there are substantial adaptation options other than general retreat and relocation, and think the report needs to be much more forthright on how extensive this is likely to be. For the 1.5 versus 2 C outcomes, the notion that a decade delay in the amount of rise is significant for society's planning does not seem at all plausible (the 0.06 m difference reported in the special report is about a 1 decade delay in sea level rise given the rate of rise that is occurring).	Michael MacCracken	Climate Institute	United States of America	Noted - the section has been rewritten. Figure SPM.5 is added which gives examples of response options for coastal communities
29567	12	36	12	36	This needs to say "mainly due to climate change" or something similar. Climate change has surely be adding some component even if perhaps not yet clearly the major contributing factor.	Michael MacCracken	Climate Institute	United States of America	No long applicable - sentence removed.
29569	12	39	12	41	Some explanation of "deeply uncertain" is needed, indicating that it is not implausible that it could occur even over the next several decades given how some glacial streams are being identified as already on a path to significant loss. While one can't be sure, this cannot be ruled out, and (as noted elsewhere) there was sea level rise of average 1 meter per century for 120 centuries when the rate of warming was only a few percent as rapid as is projected for the 21st century. Taking a precautionary perspective would suggest that there is at least some potential for SL rise of several meters per century, even if traditional scientific analysis cannot say this with statistical significance. Again, the text here seems more appropriate to a Technical Summary than an SPM.	Michael MacCracken	Climate Institute	United States of America	Taken into account. The paragraph has been revised and "deeply uncertain" is not used anymore. Projected rated of SLR are now addressed in FD SPM B3.4.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
29571	12	46	12	51	It would seem appropriate to mention that there is ongoing subsidence or emergence occurring due to past geological events such as the formation and loss of ice sheets. This will have impacts in some areas (like along northeastern coast of North America).	Michael MacCracken	Climate Institute	United States of America	included in A3.5
29573	13	8	13	13	Somewhere here it needs to be mentioned that the underlying geology can affect what measures may be appropriate and effective. New Orleans can potentially be protected by levees and pumps as it is not underlain by limestone, whereas southern Florida is underlain by limestone that can be dissolved and thus open channels linking levels inside and outside a region for which protection by levees might be attempted.	Michael MacCracken	Climate Institute	United States of America	Taken into account. We don't go into detail regarding geology but the entire text on responses to SLR has been carefully revised and clarified that responses should be context-specific and locally appropriate (see FD SPM C3 and underlying bullets).
29575	13	26	13	42	While fine to say that some regions will be able to adapt strategies that work for several decades or a bit longer, it is equally or even more important to be mentioning areas where this is just unlikely to be possible, so low lying islands and more. It is also worth mentioning that typically it is not the slow and steady rise that creates the crisis, but when storms occur on top of the rising baseline level and various measures are overwhelmed and recovery is not possible. And going to stilts works fine in calm situations, but creates severe isolation problems once a storm starts because of an extra added wave and storm surge induced rise (and this is especially true for the handicapped and others) as emergency responders are simply too endangered to respond. I think the overall sanguineness of the text here will mislead policy makers unless re-oriented to the severe consequences that can arise with storm surge and waves.	Michael MacCracken	Climate Institute	United States of America	A discussion on potential adaptation limits have been included, see for example B9.3.
29577	13	45	13	45	What is actually happening in Miami, however, is that the rich are retreating first and buying up land that is relatively far from the coast, but is higher and so has been less desirable. So, their actions are forcing the poor to live at lower and more vulnerable levels. The idea that sea walls will provide protection for very long seems quite mistaken. And another case I know of is that the better off are renting or leasing in the low lying lands and will just move out when endangered, leaving the mess to the poor.	Michael MacCracken	Climate Institute	United States of America	Noted - see added figure SPM.5 which includes a table assessing response options
29579	15	0	15		That this figure only considers impacts and levels out to 2100 is very misleading as in 2100 there will be trends occurring, such as in sea level rise, that will go on for centuries. The figure has to be changed to make clear that the long-term equilibrium values and ongoing rates of sea level rise will be much, much greater than shown here	Michael MacCracken	Climate Institute	United States of America	Noted - the ember assessment is to 2100
29581	15	2	16	52	The caption has to make sure to explain that the rates of change will be continuing after 2100 and in that various actions taken during the 21st century will carry over to the 22nd, analyses of what is done need to be taking a time perspective of several centuries, at least, not just take the 2100 values.	Michael MacCracken	Climate Institute	United States of America	The assessment of risk of impacts of coastal and open ocean ecosystems focus on the 2100 time frame, which is reflected in SPM3.
29583	16	13	16	20	It is not at all clear how the last sentence provides any useful insight for the sufferings that the natural world will be experiencing as a result of Marine Heat Waves. For the last sentence to make any sense at all, the importance of how the effects on natural organisms will have effects that people can avoid (and there are some, but need to be explicitly mentioned).	Michael MacCracken	Climate Institute	United States of America	Noted. Thetext has been revised and this sentence does not exist anymore (see FD SPM B2.3).
29585	0	0	0		After reading section C of the SPM, I would like to suggest that section C be viewed as the SPM (yes, it would benefit from having a few more examples, but it has conclusions and points that are appropriate to form an SPM. Consistent with my other comments on the other parts of the draft SPM, they seem to me much more appropriate to being considered a Technical Summary--they are simply not written and framed the way that an SPM needs to be. In addition, this would have the benefit of putting the general findings as expressed in Section C right up front and not at the back as in the present document.	Michael MacCracken	Climate Institute	United States of America	Noted - the SPM has been substantially revised, the structure following A, B and C has been retained
29767	11	2	11	3	as far as I'm informed revenues from some fisheries (e.g. Shrimps in Greenland) is currently seeing an increased revenue. Please consider modifications in the text to allow for region-dependent affects.	Dorte Krause-Jensen	Aarhus University	Denmark	Taken into account (but not this example) - also see Figure SPM.3 maps
29769	11	23	11	23	Does this line refer to negative impacts in both tropical and polar systems?	Dorte Krause-Jensen	Aarhus University	Denmark	Taken into account - see maps added to Figure SPM.3
29771	19	52	19	54	Please modify text. The climate change mitigation effectiveness of seaweed blue carbon systems are not are not necessarily lower than those of other blue carbon ecosystems (seagrasses,mangroves, saltmarsh). Rather, a recent paper proposes that C-sequestration contributed by seaweeds doubles the previous estimates of blue carbon (Krause-Jensen & Duarte 2016. Nature Geoscience). Also, there is a large potential in seaweed aqualculture for climate change mitigation and adaptation (Duarte et al. 2017). Indeed there is a need for further research effort in the field of seaweed blue carbon both in terms of science and policy for seaweeds to be fully integrated blue carbon accounting and action. An science and policy research agenda for this field has recently been proposed (Krause-Jensen et al. 2018. Biology Letters.)	Dorte Krause-Jensen	Aarhus University	Denmark	Noted. Bullet has been substantially revised - see C.2.5. Chp 5 specifies high undetainties with seaweed in mitigtion thus "Seaweed aquaculture warrants further research attention."
30271	5	0	7		while the information in section A. is quite useful, the way it is organized is confusing. The section starts with an overview of oceans, first, and then cryosphere, but the order changes after A.2. it would be much clearer if for each section with both oceans and cryosphere, the language on oceans came first, followed by that on cryo. reversing the order would also be acceptable but the order needs to be consistent throughout the SPM	Charlotte de Fontaubert	The World Bank	United States of America	Noted: the structure of the SPM has be significantly revised, with clearer groupings of content.
30273	10	0	12		in section B. 3, the language of changes in ocean warming, an important aspect could be made more explicit: whilst some species will migrate as a result of climate change, representing a net loss for these ecosystems, the species will also repopulate other areas in the direction of the poles. it is unclear whether this will be a net benefit for these ecosystems, particularly as they may displace indigineous species, but this "knock-on effect" should be at least mentioned in the SPM, since it is likely to have policy implications for decision makers	Charlotte de Fontaubert	The World Bank	United States of America	Taken into account - see revisions in B.5
30275	10	0	12		Another important aspect of the migration of species from the tropics to the poles is that it will call for a transboundary approach, which again should be flagged here for the benefit of decision makers.	Charlotte de Fontaubert	The World Bank	United States of America	Noted - now included in Section B.8

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
30277	13	0	14		When looking at options for adaptation, it would be helpful to delve into at least a level of detail into the issue of vulnerability of impacted coastal communities, as measured by exposurse, sensitivity and adaptive capacity, which will likely have a bearing on the type of adaptation measures that are called for.	Charlotte de Fontaubert	The World Bank	United States of America	Accepted - the SPM has been revised thoroughly.
30473	20	42	20	43	Specific and integrated management measures such as large-scale early warning systems, or global and multi scale monitoring and forecasting systems, can help to address the uncertainty of increasing extreme events and abrupt changes at different geographic scales.	Michele Capobianco	CAPOBIANCO	Italy	taken into account: a variety of early warning systems and monitoring in different contexts and scales discussed in C3.2, C3.4, C4.3
30475	20	46	20	48	The evidence-base for the locations and size of economic and social impacts from extreme and abrupt changes is sparse, which hinders decision-makers from adequately assessing risks and vulnerabilities and developing and implementing adaptation options at the proper scales.	Michele Capobianco	CAPOBIANCO	Italy	Noted. This comment is a direct quote from the FOD. This point is carried forward into the Final Draft, e.g.C1.3. and the gaps and missing information in Figure SPM.2
32189	0	0	0	0	Uncertainty assessments are often weak or worse, entirely lacking where they are dearly needed. Moreover, many statements are unclear with respect to the uncertainty assessments. This is in particular true for the headline statements. Statements of fact should be reserved for cases where certainty is bigger than virtually certain, while still making a non-trivial statement, which is for the majority of these statements not at all warranted. Therefore the headline statements require considerable improvement in this respect. A good, exceptional example how this coudl/should be done is B7.	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account - the SPM has been revised substantially
32191	0	0	0	0	Please use for all headline statement a period after the label, i.e. not B.1, not B2, not B3, not B4, not B5, not B6, not B7, but B1., B2., B3. etc.	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Rejected. For consistency the current style of numbering is used in the SPMs of all three Special Reports.
32193	2	8	2	9	It is not clear to what part of the sentence the uncertainty assessment belongs. That oceans and cryosphere play a key role or that impacts are now evident	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Confidence statements at the end of the sentence apply to the entire sentence.
32195	2	9	2	12	This senctence should also have some uncertainty assessment?	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account. This section has been restructured and includes confidence language at finer granularity. The corresponding statements are found in A1 and A2 of the SPM SOD.
32197	5	13	5	17	Very general, somehow trivial statements. Notably the last sentence has at least some uncertainty assessment, but for a statement where one might argue the confidence should virtually certain, since modifications, even small ones, are virtually certain to happen. If the emphasis of the last sentence ought to be on the negative impacts, then the sentence should be written accordingly by dropping "are modified".	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Noted: this text has been extensively revised as a start-up box to the SPM. This sentence was completely changed and the revised structure and content of the SPM directly address changes and impacts.
32199	7	34	7	38	The first sentence insinuates that adaptation measures can fully reduce any risks. This is most questionable, even in rich countries with high adaptive capacities. Please reformulate	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account - The Headline statement has been completely revised
32201	8	2	8	3	Does this somehow reduce the confidence in the former statement? If yes, what exactly? In any case, please clarify to which extent that sentence affects the preceding sentence.	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account. This section had been restructured and this formulation avoided. In Chapter 2, it is explained in more detail.
32203	8	5	8	6	Best drop this trivial sentence. Alternatively qualify the change and add uncertainty assessment.	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account: text substantially revised for SPM final draft
32205	8	6	8	9	Convoluted argumentation starting with a may part causing a could part. Please formulate this as statements of fact and make then a proper uncertainty assessment.	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account. The section B4.1 has been revised, shortened and reformulated.
32207	8	9	8	11	Species extinction from what exactly? CC? But this far from clear since, species richness tends currently rather to increase in mountains, at least at lower altitudes. While this is of course different at the top of mountains, the text fails to make all these phenomena clear and seems to assume that there is only extinction gooin on. Please state clearer what processes exactly you are referring to and how those are moderated by counteracting (refugia) or amplifying effects (heterogeneity).	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account. The revised section B4.1 is more specific to types of species and elevation ranges.
32209	8	17	8	18	Uncertainty assessment missing	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Accepted. The revised text includes confidence language elements.
32211	8	18	8	20	Uncertainty is not equal risk, please avoid this formulation and assess the risk with an uncertainty assessment	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Accepted. Text was revised for clarity and compliance with IPCC calibrated language.
32213	8	18	8	20	Avoid a formulation such as "may also be driven". Instead write "are also driven" and add the uncertainty assessment	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Accepted. Text was revised for clarity and compliance with IPCC calibrated language.
32215	8	25	8	27	I doubt this is true for all high mountain regions. I think you need to consider regional differences here.	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account. Substantial modifications of the wording of the Chapter 2 Executive Summary in the Final Draft were used to support substantial changes in the wording of such statements here, with more focussed information in the bullet points.
32217	8	33	8	34	Uncertainty assessment missing	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Accepted. Text was revised for clarity and compliance with IPCC calibrated language.
32219	8	34	8	35	These limits call for some explanations of their nature	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account. Clearer, more concrete and less general statements were made in the SOD SPM.
32221	8	36	8	37	Uncertainty assessments missing (be careful with the two parts of the sentence)	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Accepted. Text was revised for clarity and compliance with IPCC calibrated language.
32223	8	40	8	40	Write "B2. " not "B2 "	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Editorial – copyedit to be completed prior to publication
32225	8	44	8	45	That sentence sounds awkward to me ("Warming will drive further loss"), but I am not a native English speaker. Nevertheless, I would prefer "Warming will cause further loss of glacial ice …"	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account - the text has been revised
32227	10	1	10	1	Write "B3. " not "B3 "	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Editorial – copyedit to be completed prior to publication
32229	12	12	12	15	Uncertainty assessment(s) missing	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Sections have been reworked in the revised SPM and confidence statement added where relevant.
32231	16	7	16	9	Repleace "could" by "will" and add uncertainty assessment	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Accepted - the SPM has been checked
32233	20	12	20	12	IPCC must not be policy prescriptive. The word "imiplies" is for me policy prescriptive. A more neutral formulation might be "does profit from" and then adding uncertainty assessment.	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Taken into account. The bullet has been revised.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
32299	0	0	0	0	The SPM uses a lot the expression "ecosystem services". Chapter 1 (page 21 lines 40-46) observe that "The ecosystem services framework has been challenged as monetising the relationships of people with nature, and undervaluing small-scale livelihoods, cultural values and other considerations that contribute little to global commerce. More recent frameworks, such as Nature's Contributions to People (NCP), used by IPBES, aim to better encompass the non-commercial ways that nature contributes to human quality of life. Both ecosystem services and NCP frameworks are used within SROCC". This should be better reflected in the SPM!	Jean-Pascal van Ypersele	Université catholique de Louvain	Belgium	Noted - both terms are defined in the glossary. The term ecosystem services is retained however to the IBPES report 2019 are added
32307	12	11	12	44	Figure 4.11: from Chapter 4, about GMSL rise until 2500, should be included in this section.	Jean-Pascal van Ypersele	Université catholique de Louvain	Belgium	Rejected. GMSL rise is shown together with the other observed and projected changes in ocean and cryosphere in FD Figure SPM.1 and all projections are until 2100. We don't see the need to add another figure on GMSL change projections, in particular not given the strict page limit for the SPM.
32315	1	1	21	41	In addition to the few additional comments I submitted, I fully subscribe to the comments submitted by the Government of Belgium	Jean-Pascal van Ypersele	Université catholique de Louvain	Belgium	Noted
32457	13	9	13	9	Trivial statement, perhaps delete?	Andreas Fischlin	IPCC and ETH Zurich, Switzerland	Switzerland	Accepted - has been deleted
32503	5	19	5	26	There is no clear definition for the Arctic/high mountain region that 13% of the population is located in - cross-references here and in Chapter 1 link to Chapter 2 but there is no clear definition there either. (The number seems rather high to me, unless it includes lowland regions in key mountain gridboxes).	Blair Trewin	Australian Bureau of Meteorology	Australia	The population information is now in the start-up box on page 2 and further clarity is given. "Today, around 4 million people live permanently in the Arctic region" and "Around 670 million people (nearly 10% of the 2010 global population) live in high mountain regions"
32505	17	0	17		Figure 5 as it stands is potentially misleading as tropical cyclone data prior to the satellite era (1970s) is incomplete in many basins, and some very high-impact cyclones (e.g. the 1970s Bangladesh cyclone) have been missed. It would be better to start this figure in 1975 or 1980. Also, is the 177 km/h definition based on sustained winds or gusts? (and if sustained, is it a 1-minute or 10-minute average?). It should also be clarified whether the western/eastern Pacific split only refers to the northern hemisphere.	Blair Trewin	Australian Bureau of Meteorology	Australia	Figure SPM.5 was removed in revision
32581	4	1	4	70	Consider adding a third, "long-term" column showing 2300, as this is available in a number of studies and will better show the anticipated response of cryoshere, especially as regards mountain glaciers and to some degree ice sheets and permafrost.	Pam Pearson	ICCI	Sweden	Noted: we considered adding this, however long-term assessments are only done for sea level rise so we have decided not to extend the time axis for SPM.1. Long term information on sea level rise is given in the SPM text and in chapter 4.
32591	3	9	3	10	Wouldn't it be better to refer to common averaging intervals, ie 198 1995; 199 2005, and 200 2015? or choose among them. I see liabilities in comparing 20yr past period to 10yr recent period bc of potentials to average internal variablity to varying degrees.	Kim Cobb	Georgia Tech	United States of America	Noted The text was revised for more clarity, see section A1 and Figure SPM.1 panel g
32593	4	0	0		X-axis labels must be bigger - perhaps in larger font grey color?	Kim Cobb	Georgia Tech	United States of America	Overall layout has been reworked to allow the use of a bigger font size and ease readability.
32595	4	0	0		I wonder if 2015 is an appropriate baseline for the coral reef degradation? Terry Hughes has compiled some bleaching and mortality prevalance over the last decades, on basin-to-basin scale. Perhaps some early surveys could be schematically represesnted if this work is included/assessed elsewhere?	Kim Cobb	Georgia Tech	United States of America	This panel has been removed.
32597	7	1	7	1	maybe better to say that committed changes "require" or "motivate"; the commited changes do not initiate.	Kim Cobb	Georgia Tech	United States of America	No longer applicable - sentence removed
32599	8	20	8	20	suggest changing "taking adaptation measures" to "the design of effective adaptation measures"	Kim Cobb	Georgia Tech	United States of America	Taken into account - The entire bullet has been completely re-written and the phrase "taking adaptation measures" doesn't exist anymore
32601	10	33	10	35	these numbers are likely quite low, if one considers the compound effects of habitat destruction, overfishing/illegal fishing etc; I recommend specifying the climate-related impacts but noting that these ecosystems face a range of compund threats exacerbated by climate change/OA/Doxy.	Kim Cobb	Georgia Tech	United States of America	Noted - specification this is from warming and primary production changes added (see B5.1)
32603	11	45	11	45	can you find another phrase aside from "socially marginalized"? I think these communities would not self-identify with this term - the point is that they are economicaly disadvantaged, not socially bereft.	Kim Cobb	Georgia Tech	United States of America	Accepted - the statement has been revised and term "marginalized" has been removed from the SPM
32605	17	0	17		would it be worth noting that this dataset reflects only land-falling hurricanes (that's my assumption at any rate); is it uniformly trustworthy over the depicted interval?	Kim Cobb	Georgia Tech	United States of America	Figure SPM.5 was removed in revision
32677	2	12	2	13	The statement should also link sea level rise to increased ocean heat content. The acceleration of sea-level rise is mainly attributed to melting land ice. The contribution from ocean warming was fairly linear through the past few decades.	Government of United States of America	U.S. Department of State	United States of America	Agreed see revision of A.3.4
32679	2	40	2	40	Non-experts may not understand the term "steric." Suggest replacing with "changes in sea level due to thermal expansion and salinity variations".	Government of United States of America	U.S. Department of State	United States of America	Taken into account - 'steric' no longer used
32681	2	42	2	49	Add material on sea ice thickness and how measurements are sparse. There is a need for more international research on this topic. For example, in Chapter 3 (page 15 lines 20-23): "In-situ observations of Antarctic sea ice thickness are extremely sparse (Worby et al., 2008). There are no consistent long-term observations from which trends in ice volume may be derived. Calibrated model simulations suggest that ice thickness trends closely follow those of ice concentration (Massonnet et al., 2013; Holland et al., 2014) (low confidence)."	Government of United States of America	U.S. Department of State	United States of America	Accepted: statement added to the SPM final draft stating that it is virtually certain Arctic sea ice has thinned over recent decades.
32683	3	7	3	8	It would be relevant to include whether this retreat can be attributed to climate change.	Government of United States of America	U.S. Department of State	United States of America	noted
32685	3	9	3	12	It would be helpful to include the total number of glaciated mountain regions assessed.	Government of United States of America	U.S. Department of State	United States of America	No longer applicable - sentence removed
32687	4	1	4	1	Nice concept figure but near-term projections are missing for sea-level rise, mountain snow cover, summer sea ice extent, and animal biomass.	Government of United States of America	U.S. Department of State	United States of America	Data set has been updated.
32689	4	1	4	1	The uncertainty on ocean heat content change should be expressed.	Government of United States of America	U.S. Department of State	United States of America	Uncertainty data has been added to each panel.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
32691	4	1	4	1	Scale the mountain glacier icons so that their area was proportional to the projected fractional decrease similar to what is done of for mountain snow area. The little horizontal dotted lines are not very effective. Also the little people icons in the population bars are very odd.	Government of United States of America	U.S. Department of State	United States of America	Overall graphical approach has been changed in order to ease understanding.
32693	5	46	5	46	Need to define "coastal" when authors indicate that 27% of the population resides in coastal regions. Are authors referring to land within a certain distance to the sea, land with a certain elevation, or land within coastal watersheds? On page 12 of the SPM, there is mention of the tens of millions of people in the low elevation coastal zone (elevation <10m). Chapter 1 describes "coastal" as 100 km from the coastline and less than 100 m above sea level. Also authors need to define "megacities"as having a population above 5 million, as in Chapter 1.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - these details are in the startup box which was added to the FD
32695	5	52	5	54	Local processes such as subsidence from groundwater pumping can induce local sea-level rise that is unrelated to the increase in global sea levels from steric and eustatic processes. This sentence should be rewritten to clarify the distinction.	Government of United States of America	U.S. Department of State	United States of America	The text in this bullet has been completely revised
32697	5	56	5	56	What are "novel ocean conditions"? Do you mean "recent" or "unusual" changes?	Government of United States of America	U.S. Department of State	United States of America	Taken into account - text has been completely revised
32699	5	57	5	57	Add species after ecology. Species that are listed or rare need to be elevated in this context.	Government of United States of America	U.S. Department of State	United States of America	The text in this bullet has been completely revised
32701	6	2	6	2	Is the timing of all biological events earlier, or only in certain seasons?	Government of United States of America	U.S. Department of State	United States of America	The SPM has been revised for clarity and more nuanced information is now given in section A.5
32703	6	6	6	8	How does climate change threaten the role of oceans in climate regulation? Seems like a poor mix of terms. Climate change may alter the role of oceans but it does not eliminate the role of oceans.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - the bullet has been completely rewritten
32705	6	6	6	8	Some of the items on the list in the final sentence of this paragraph would be of more than 'medium confidence'. For example, isn't reduced carbon sequestration [into the oceans] predicted based on basic chemical properties of seawater and dissolved gases? Also, aren't there indigenous communities whose culture is threatened because reduced sea-ice limits access to traditional hunting grounds?	Government of United States of America	U.S. Department of State	United States of America	Taken into account - the section has been completely rewritten
32707	6	9	6	13	The list of evidence ranges from those fairly directly linked to climate change (e.g., reduced carbon sequestration) to indirect and multifactorial (e.g., loss of educational opportunities and negative impacts on Indigenous knowledge and culture). Suggest describing more clearly how the latter pieces of evidence are negatively affected by climate change.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - the SPM is substantially rewritten to provide more nuanced information
32709	6	14	6	14	Figure title should be more clear, perhaps "Documented changes in 11 high mountain regions and corresponding effects" and the icons should be grouped more clearly into 'change' and 'effect'. Caption should be rewritten accordingly.	Government of United States of America	U.S. Department of State	United States of America	Accepted - Title has been rewritten.
32711	6	14	6	15	An icon for observed permafrost decline should be added for Alaska (see numerous USGS publications on this topic).	Government of United States of America	U.S. Department of State	United States of America	Taken into account - Figure SPM2 has been completely revised and the new version includes an icon showing cryosphere decline in Alaska
32713	7	1	7	32	Should mention the effects of permafrost decline in coastal sediments. Coupled with sea ice retreat, these drivers of Arctic change threaten infrastructure and are causing entire cmmunities to retreat from the coastal zone. See articles by Dave Houseknect and this article by Jones et al.: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2008GL036205	Government of United States of America	U.S. Department of State	United States of America	Taken in account - the SPM has been substantially revised and restructured. Thaw of permafrost and associated risks can be found e.g. in B1.3 , B7.2 and other places
32715	7	25	7	29	Are the "sustainable development pathways" referred to here the same or different from the "climate resilient development pathways" referred to in Section C4 of the SPM? Suggest choosing one concept and describing fully.	Government of United States of America	U.S. Department of State	United States of America	Noted. This sentence is now removed and sustainable development is in section C
32717	7	34	7	37	Is climate change creating natural hazards that did not exist before, or changing and in many cases exacerbating existing processes? Suggest adding the word exacerbating before "natural hazards".	Government of United States of America	U.S. Department of State	United States of America	Taken into account - wording revised for clarity
32719	8	50	9	2	Referring to regulation only uneccesarily limits what policy actions might be taken. Suggest changing to "… cause risks for the polar environment and coastal communities, without proper management." "Regulation" is repeated at the end of the next sentence, when the term "management" might be more inclusive. Use of the word "exposed" in the first sentence is unclear: exposed to what? The atmosphere?	Government of United States of America	U.S. Department of State	United States of America	Noted - the text is revised instead see A.8.3
32721	9	4	9	10	Loss of arctic permafrost affects nesting habitat of waterfowl that migrate to lower latitudes during winter resulting in loss of species abundance and diversity; species for recreation and ecosystem function.	Government of United States of America	U.S. Department of State	United States of America	Noted - the SPM provides high level summary so this level of detail is not included
32723	9	22	9	22	Non-experts may not be familiar with the term "disturbance regimes." Suggest a more general description such as "patterns of disturbance".	Government of United States of America	U.S. Department of State	United States of America	Noted - however term retained in SPM due to specific meaning
32725	9	31	9	32	To what is the committed warming described in this sentence referring? The warming that has already occurred or warming associated with continued emissions; and, if the latter, under which scenario?	Government of United States of America	U.S. Department of State	United States of America	Taken into account. Paragraph largely rewritten
32727	10	25	10	27	Are the "region-specific changes" described here specifically due to climate change? If so, specify.	Government of United States of America	U.S. Department of State	United States of America	Noted - section B2 has been revised to be clearer
32729	10	49	10	54	Given that the structural and functional changes to benthic communities this century are based upon several relationships and projections described in the following sentence, suggest changing the word "will" in the first sentence to "projected to." It would be helpful to describe how the processes described are connected to climate change -- e.g., how warming affects POC flux.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - it has been clarified in Section title B and subsection titles that these statements are about projections. The relationship between stratification-nutrient supply-primary production-sinking flux has been clarified in what is now B5.2 (building on projected physical changes described in B2)
32731	11	2	0		Add indirect effects from rising temperature and changes in salinity of disease effects. Example of sea star wasting disease that appears to be associated with warmer waters.	Government of United States of America	U.S. Department of State	United States of America	Rejected - there is not space to add all this detail

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
32733	11	9	11	11	The income of people who are dependent on fisheries and related sectors is multifactorial, and depends on processes besides climate change (e.g., intensity of fishing). Suggest changing sentence to read "When fisheries are negatively impacted by climate change or ineffective management, the effects on people who are dependent on fisheries and related sectors can be to reduce income, livelihood and availability of animal-sourced nutrients."	Government of United States of America	U.S. Department of State	United States of America	Taken into account (not with suggested text) - the SPM section is substantially revised
32735	11	12	11	14	This sentence lacks a confidence statement.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - see revised text in B8.2
32737	11	23	0		Add that declining fisheries also indirectly affect fish available to other species (see birds and marine mammals) due to competition for limited resources.	Government of United States of America	U.S. Department of State	United States of America	Noted
32739	11	29	1	31	Clarify the meaning of "global supply of fish and shellfish." Is this the available biomass, or the catch? Catch is highly dependent on fishery management policies and practices.	Government of United States of America	U.S. Department of State	United States of America	Noted - sentence removed - see revised B8.1
32741	11	37	11	46	Does the term "conflicts" in the first sentence refer to competing interests, unrest, disputes, armed conflict, a combination, or something else? "Conflict" can be interpreted as "armed conflict," when the rest of the paragraph and underlying chapter describe a wider range of phenomena.	Government of United States of America	U.S. Department of State	United States of America	disputes between fishermen
32743	12	1	12	9	This paragraph does not differentiate between adaptation to climate change and management practices that are complementary but not necessarily specific to climate change.	Government of United States of America	U.S. Department of State	United States of America	Taken into account. The entire section has been thoroughly revised for more clarity. In the FD SPM adaptation options for marine and cryospheric ecosystems are adressed in C2 and underlying bullets.
32745	12	12	12	12	The text states that sea-level rise will accelerate "further" under higher emissions scenarios. It would be clearer to state that sea-level rise will accelerate "more rapidly" under higher emissions scenarios.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - The SPM has been restructures and revised. Projected changes in SLR are now included in headline statement B3, risks for people in relation to SLR are now included in B9. The term "accelerated" in context of SLR has been removed
32747	13	8	13	13	The summary statement refers only to sea-level rise. However, storm surge is a separate issue exacerbated by climate change that also requires consideration. Modeling impacts due to sea-level rise does not necessarily give the same results as storm surge assessments.	Government of United States of America	U.S. Department of State	United States of America	The point on extremes is now clearly made in A9 and B9 (and also in B9.1).
32749	14	12	14	14	The language refers to "powerful interests" marginalizing vulnerable groups in local planning and the decision-making process, yet no evidence is provided. Local planning is based on many factors. The statement appears to be opinionated, rather than based on direct evidence, and should be modified accordingly.	Government of United States of America	U.S. Department of State	United States of America	Accepted, the text is revised and included in C4 enablers
32751	15	1	15	1	Text within the figure should be larger and/or darker (to increase contrast) in order to improve readability (e.g., y-axis labels and the written description of the color legend). The figure caption contains repeated text in lines 11-13.	Government of United States of America	U.S. Department of State	United States of America	Suggestion applied.
32753	15	1	15	17	Need to define "megacities".	Government of United States of America	U.S. Department of State	United States of America	The term is included in the glossary
32755	15	1	16	3	The depiction of limits to adaptation as an additional scenario "C" is confusing. If the risks from sea-level rise become unmanageable, people will relocate to other areas of lesser risk. However, under scenarios A and B, the population of these islands choose to live with the risks from sea-level rise. It is unclear from this figure what differentiates these scenarios and choices. Furthermore, there may be a point where the risks from sea-level rise (and accounting for other factors which limit development on atoll islands) will lead to significant levels of migration from these islands. The full relocation of the population will of course remove the risks to the population. However, because relocation can be seen as an adaptive measure, this should not be seen as a limit to adaptation, rather it should be seen as a outcome of fully transtitive adaptation measures. Finally, the comment on transboundary risks should be further explained, as it does not seem directly relevant to the results presented in this figure.	Government of United States of America	U.S. Department of State	United States of America	The scenario "C" bar has been removed and other aspects of adaptation have been extended in additional panels (now Fig. SPM 5).
32757	15	1	0		Figure SPM-4 is difficult to understand. The authors may want to either provide additional explanation or think of a different way to display the data.	Government of United States of America	U.S. Department of State	United States of America	The amount of embers has been reduced, thus reducing complexity.
32759	16	22	16	40	Add language that extreme events include larger waves generated by storms (documented by Bodega Marine Lab UCD and others) that increase SLR and coastal erosion.	Government of United States of America	U.S. Department of State	United States of America	Noted - B3.3 includes storm surge
32761	16	54	16	55	The statement says it has medium confidence that investments in avoidance strategy are very likely less than the cost of impacts of extreme events. Does this mean, for example, that there might be higher confidence that such investments are likely less? The use of different probabilities is a little confusing.	Government of United States of America	U.S. Department of State	United States of America	Noted. This sentence does not exists anymore in the FD SPM. The entire text has been carefully revised, Land-use planning, preparedness and early warning systems are addressed now in FD SPM C3 and underlying bullets.
32763	17	1	0		The top panel of Figure SPM.5 is difficult to understand. The authors may want to either provide additional explanation or think of a different way to display the data.	Government of United States of America	U.S. Department of State	United States of America	Figure SPM.5 was removed in revision
32765	17	1	0		Consider mentioning that the TC observing system has changed over time. Was there even global coverage of TC observations in 1950?	Government of United States of America	U.S. Department of State	United States of America	Figure SPM.5 was removed in revision
32767	18	1	18	1	The key is illegible. Suggested rewording for lines 3-5: "For example, a frequency increase of 10 indicates that events which historically occurred once every 100 years are expected to occur ten times every 100 years."	Government of United States of America	U.S. Department of State	United States of America	Suggestion acknowledged. The caption has been rewritten to ease comprehension.
32769	18	1	0		Recommend adding a section on ocean circulation in the Pacific related to ENSO events, e.g., uncertain warming events as described by NOAA as the "Blob" that affect fisheries and climate. Reinforce the strong link between ENSO events and weather.	Government of United States of America	U.S. Department of State	United States of America	Accepted. Earlier B7 has been integrated in the FD SPM into B2 (see B2.8), and a bullet on extreme El Nino and La Nina events has been added (see B2.7).
32771	18	3	18	5	"Have emerged"? From what exactly have these 'pathways' emerged? "Approaches" do not 'recognize and enable'. "Deeply uncertain"? How deep is deep?	Government of United States of America	U.S. Department of State	United States of America	Apologies cannot match comment to text
32773	18	13	18	24	Is the "substantial weakening of the AMOC" described in the first sentence of B7.1 the same, smaller, or larger than the weakening projected for the 21st century for all or some RCPs? This information is important for context.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - the SPM has been restructured for a clearer narrative. Historical observations of AMOC are an A.2.8 and projections with implications in B.2.8
32775	18	21	18	22	Why single out millet and sorghum in the SPM compared to broad agricultural impacts? The report could also have listed specific impacts to certain species, etc.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - crops removed from statement - see revised B.2.8

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
32777	18	26	18	26	"Tipping element" and other terms need to be defined in plain language.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - term not used in revised SPM
32779	18	26	18	31	The conditions and likelihood for this tipping point should be stated, and if unknown should be stated as unknown.	Government of United States of America	U.S. Department of State	United States of America	Noted - text on SPG removed from SPM
32781	19	28	19	29	While the existence of funding for an approach is a sign of interest in it, funding is not itself evidence for effectiveness. Moreover, resources may come from many sources and take a range of forms. Suggest rephrasing the sentence to read "A growing body of literature supports the effectiveness of coastal ecosystem-based adaptation, and resources for the approach are increasing."	Government of United States of America	U.S. Department of State	United States of America	Taken into account. The bullet has been revised.
32783	19	36	19	41	Language is confusing. There is only medium confidence in vegetation and reefs to provide benefits but high confidence that multiple co-benefits can accrue? The statement is confusing and needs to be reworded.	Government of United States of America	U.S. Department of State	United States of America	Noted. The bullet has been revised. The first sentence is removed. Revised Section C2 gives more nuanced narrative
32785	20	1	0		Recommend adding a section on creating refugia for coastal ecosystems/species along gradients, which have ecosystem services and conservation benefits -- for example, a network of Marine Protected Areas as established in California where reduced fishing pressure and proximity to adjacent waters allowing for dispersal as ocean waters warm. See California Ocean Protection Council website for research findings.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - revised C.2.1 addresses protect areas and indirectly refugia
32787	20	2	20	5	What is the confidence of this statement?	Government of United States of America	U.S. Department of State	United States of America	Taken into account. Entire SPM has been checked for application of uncertainty language
32789	20	12	20	17	It seems surprising that there is only medium confidence in this statement.	Government of United States of America	U.S. Department of State	United States of America	noted: The medium confidence is because of lack of literature to support the statement
32791	20	12	21	41	Use of the terms "governance systems","governance actors", and "governance networks" in this section is unclear. For example, what does it mean to "develop governance for the ocean and cryosphere" (SPM-20, line 19)? Is this suggesting a strategy, or a new governing entity? Likewise, what is a "governance system"? A domestic management policy, an international entity, or something else? Suggest using clearer terms.	Government of United States of America	U.S. Department of State	United States of America	Taken into account. The terms "governance actors" and "governance networks" are no longer used in the new version. the terms "governance structures" and "governance systems", however, appear to be less problematic and are still used.
32793	20	17	20	17	The phrase "novel challenges of climate change" should be repaced with more universally understood language (i.e., replace "novel").	Government of United States of America	U.S. Department of State	United States of America	Taken into account. The bullet has been revised.
32795	20	32	20	40	Why is there only a focus on polar governance systems in the SPM? Why not include island nations / states in the SPM?	Government of United States of America	U.S. Department of State	United States of America	Taken into account. Sentence revised.
32797	21	22	21	22	The statement says that communities are reluctant to incur significant short-term costs to reduce exposure to "deeply uncertain" climate change impacts in the distant future. This statement seems incorrect because (i) the effects can be predicted with reasonable certainty (as demonstrated by this report and others, such as the recent USGCRP Fourth National Climate Assessment), and (ii) the effects are happening now, not in the "distant future." This statement seems to negate the value of this report.	Government of United States of America	U.S. Department of State	United States of America	Noted - text is removed and SPM revised. Section C4 talks to investments
32799	21	25	21	31	It's unclear how this summary item is different from C3.5.	Government of United States of America	U.S. Department of State	United States of America	Taken into account. Text substantially revised - see C4 for coordination and cooperation
32801	0	0	0		Consider the potential policy actions governments may make using this information to see if the report aligns the science with decisionmaking. One potential addition to the SPM would be recommendations where additional research and knowledge is needed. Governments would have the ability to address these needs and knowledge gaps through their climate research programs. For example, on page 16 lines 41-43 in the Polar Regions chapter, it is stated "Despite the importance of snow on sea ice, surface or satellite-derived observations of snowfall over sea ice, and snow depth on sea ice are lacking (Webster et al., 2014). This gap is the primary source of uncertainty in satellite altimetry-based retrieval of sea ice thickness (Ricker et al., 2015)." And on page 20 lines 6-11, "Observational products are largely based on coordinated gridded ship-based data products (Bakker et al., 2016); significant data gaps in these, especially in the wintertime Southern Ocean, reduce the confidence levels on the contemporary trends and variability (Gruber et al., 2017; Ritter et al., 2017; Fay et al., 2018). Recent initiatives based on biogeochemical-enabled floats suggest that ship-based observations overlooked higher than expected CO2 outgassing fluxes south of the Polar Front in winter (Williams et al., 2017; Gray et al., 2018). The confidence level of this finding is low/medium pending independent confirmation." Where are there places that the international science community could partner to address these gaps? Are there gaps that are critical to the science needed for policy decisions with this information?	Government of United States of America	U.S. Department of State	United States of America	Taken into account - the SPM has been revised substantially and limits to knowledge indicated where appropriate
32803	0	0	0		To help policymakers understand the basis for the projected impacts under specific emission and development scenarios, suggest explaining the range of GHG emissions and socioeconomic conditions consistent with the RCP and SSP scenarios used in the report. Some relevant content may the drawn from AR5 WGI Chapter 12. This information should be presented concisely within a box early in the SPM. This box should explain to readers with which pathway or pathways current emissions are consistent, and help readers understand the global context that would likely accompany a particular projected scenario.	Government of United States of America	U.S. Department of State	United States of America	Taken into account - the SPM has been revised substantially and footnote 7 has been expanded to include more detail on RCP2.6 and RCP8.5
34151	0	0	0		In the Introduction, the structure/Table of content of the SPM shoud be provided: Introduction; SPM A Ongoing changes in the ocean …; SPM B Projected changes … etc.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted - the SPM has been substantially revised - line 11 page 2 introduces the three sections

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
34153	0	0	0		A Box on sea level (how it is determined; what are the drivers of its change, locally and globally; how changes are measured; etc.) would be useful.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted - the SPM has been substantially revised. SLR is addressed explicitly in A3, B3 and figures SPM.4 and SPM.5
34155	0	0	0		A Table with the summary of the risks and the potential responses would be useful.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted. Figure SPM.5 (a and b) provides an examples of responses for risks to coastal communities
34157	0	0	0		The scenarios used in the report should be mentionned in the Introduction or in section SPM B.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Taken into Account. Figure SPM.1 provides more detail for RCP2.6 and RCP8.5 used in the SPM and footnote 7 in Section B provides explanation of the RCPs
34159	0	0	0		Response measures for Mountains are not mentionned Section SPM C. It would be useful to include reference to them in this section.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted. Many of the statements in Section C are applicable to mountains or drawn from the assessment in Chp 2. The addition of icon to the text for mountain cryosphere directs the reader to the relevant text
34161	1	28	1	28	Write: "By assessing new scientific literature since the AR5, this report expands the knowledge base on climate chage and oceans and cryosphere, building on …". The UNFCCC is not the unique user and addressee ogf this report.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Accepted - Removed from text as suggested
34163	1	32	1	33	Rewrite the two sentences: "The ocean and the cryosphere (snow, ice, glaciers, ice sheets, and frozen soil and ground) are closely connected with the whole climate system. They support human livelihoods and well-being in many ways."	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	The introduction was shortened and this text removed and revised in the added startup box
34165	1	41	1	41	Wrtie: "… polar regions, coasts and coastal areas, …".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted - this text was removed from the final draft

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
34167	2	20	2	20	Would it be possible to provide also the ocean heat uptake in Joule/year, and provide an additional figure/explanantion to the rather technical "energy imbalance of 0.42 W/m**2 …"?	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted - this has been removed and the text revised for clarity see A.2.1
34169	2	23	2	29	Would it be possible to have absolute figures and timeframes for the: 1) the ocean emissions uptake 2) the ocean acidity change 3) the ocean oxygen change?	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Taken into account - these statements have been modified and clarified
34171	2	31	2	40	Provide absolute figures for: 1) loss of Greenland ice sheeht mass 2) sea level rise.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	numbers are mentioned in the FD. Done - see A 1.1 and A 3.1 of SPM FD
34173	2	42	2	43	Provide a figure for the Artic sea surface temperatue change.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Taken into account - there was a typographical error here (erroneous inclusion of word "sea"). We have clarified our meaning in the revised version.
34175	4	1	4	1	Write, in the Key findings: "Atmospheric concentration of Carbon Dioxide".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Labels have been revised for accuracy.
34177	6	9	6	9	Write: "… and ecosystem functions…".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Accepted - "ecosystem function" has been replaced by "ecosystem functions" or "ecosystem functioning" throughout the SPM
34179	6	28	7	2	The use of the words "initiate the use" are very confusing and the sentence should be rewriten.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	No longer applicable - sentence removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
34181	7	39	7	39	Footnote 5 on the scenarios would be more appropriately placed here (rater in page 7 line 48), where scenarios are mentionned first.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted - the revised footnote is now on the first mention of scenarios
34183	8	26	8	26	Write: "…… current snowmaking technologies; development of non-snow related tourism activites) …".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Taken into account - the entire bullet has been revised and now includes the sentence "Diversification through year-round activities supports adaptation of mountain tourism under future climate change" (B7.5)
34185	9	34	9	36	Provide a range for these changes.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Taken into account - quantitative information added where possible
34187	9	42	9	45	There are estimated figures on the cost of adaptation of these infrastructure to new climate scenarios. Could a range of these estimated costs be included here?	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Rejected - the assessment draws on available literature
34189	10	11	10	11	Could the word "stratification" be defined in the Glossary?	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Taken into account - Stratification is now defined in the glossary
34191	12	46	12	46	Could the word "subsidience" be defined in the Glossary?	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Taken into account - Anthropogenic subsidence has been defined in the glossary
34193	12	53	12	53	Write: "… with respect to biodiversity, ecosystems, …".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	The entire bullet including this statement has been completely revised

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
34195	13	44	13	44	Write: "… of sea level rise (SLR) may be a diverging world …".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	The entire bullet has been re-written and this statement does not exist anymore
34197	15	1	15	27	Figure SPM.4 could be transformed in a Box because it contains in its caption many explanations on responses measures.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Embers have been reduced to a single panel, allowing for a better use of space.
34199	16	24	16	26	The sentence is confusing with the words "will increase" providing the sensation that the there will be more cyclones, although the change of their frequency is uncertain. Write: "Projections on the intensity of cyclones show that the proportion of Category 4 and 5 tropical cyclones will increase (medium confidence) although there is low confidence in future frequency changes for tropical cyclones collectively at the global scale."	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted - the text is revised to use projected rather than will
34201	16	52	16	53	Provide figures on this ratio.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	The notion of "ratio" had been removed from the revised SPM.
34203	17	1	17	8	The title of Figure SPM.5 should read: "Observed global hurricanes/cyclones between 1950-2015". The caption should also mention the time period of the presented data: 1950-2015.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Figure SPM.5 was removed in revision
34205	17	1	17	8	Figure SPM.5 would be better in section SPM A on observations.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Figure SPM.5 was removed in revision
34207	19	3	19	5	The sentence is currently difficult to read. Could it be possible to be more explicit on the fact that decisions on adaptation for immediate action should take into account uncertainty and ensure that long life-time actions are robust against it; and that furthermore, such decisons should aim at preventing unintended consequences and maladapation?	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Taken into consideration. The section has been revised fundamentally and is now more specific.

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
34209	19	7	19	7	Write: "… of climate change, including anthropogenic contributions, support …".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted. The bullet has been removed since it was overly generic.
34211	19	14	19	14	Write: "… long-term focus, taking into account uncertainty and gaps,, will …".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted, Bullet has been revised.
34213	19	41	19	41	Write: "… populated coastal and urban areas.".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted. The bullet has been revised.
34215	19	49	19	49	Write: " … the wide range of biodiversity and ecosystems and the services they provide and assist …".	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	Noted. Bullet has been revised.
34217	20	24	20	25	Could "disbenefit" be defined?	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland	The bullet has been revised.
34245	1	33	1	33	Too week to say just that "They are closely connected with the whole climate system", suggest to be more specific using terms as "regualte" or something like that. Since they are part of the climate system.	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	The text has been revised to say "The ocean and cryosphere support unique habitats, and are interconnected with other components of the climate system through global exchange of water, energy and carbon.'
34247	1	33	1	38	Suggest to add more balance to the paragprah adding a short sentence on how warming afexts the sytems themselves fro mthe physical moint of view.	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	This has been done in the new start up box
34249	2	9	2	12	on the A1. on the sentnece: "Ongoing changes include unabated warming, acidification and deoxygenation of the ocean, reduced Northern Hemisphere snow cover and Arctic sea ice, worldwide retreat of mountain glaciers, reductions in the Greenland and Antarctic ice sheets, and permafrost degradation and thaw." Is there less confidence on that those processe are ongoing? It seems the whole list is link to the sentence one, but for example sea rise is not included. And later sea level rise acceleration is trated as very high confidence.	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	Taken into account. This section has been restructured and includes confidence language at finer granularity. The corresponding statements are found in A1 and A2 of the SPM SOD.
34251	4	0	4		Figure SPM.1. The figure explantion can be improved. For example in relation to the RCPs some sort og uncertainty is provided, explain where it comes from?. On population we can inferer you refer to Billions, can be more explicit. Explain whay different reference years are used.	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	Suggestion applied.
34253	5	16	5	16	A2: the services can be modified also in a positive way in some regiones, if you add the word degraded or elimitaed, it hasto be recognized that positive impacts may be seen in some areas even if they are samll. A possible way out is to use the word modified alone or impacted is this high level statement.	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	Taken into account - text has been completely revised and restructured. In A7 it now says "mostly negative impacts" and in A8 "modified or degraded, with details on changes in services in the underlying bullets. The term "eliminated" has been completely removed

104	1	32	1	32	Add: "The ocean (FROM OPEN-OCEAN, TO COASTAL AREAS) and the cryopshere (snow, ice, glacier…"?	Alexandre MAGNAN	IDDRI	France	The introduction was shortened and this text removed and revised in the added startup box
34255	5	13	6	13	There are some issues that can be perceived as positive as it is for example indicated in the following link http://www.ocean-climate.org/wp-content/uploads/2017/03/the-arctic_07-9.pdf. In some cases those postivie "impacts"/opportunities may lead to further unsustainability if pursued. This debate needs to be some how relected. It can not be just ignored at the level of the SPM	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	Noted - overwhelmingly impacts are negative - Figure SPM.2 shows positive and negative impacts
34257	8	42	8	44	B2: This sentence is unclear, how you compare change and assess is more or less rapid in one system or an other. In other processes than the Polar and Artic we have less information to assess the change.	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	Taken into account - the section has been completely revised
34259	17	0	0	17	SPM.5: A) The intensity of the blue and the size of the circule needs to be explained the figure. It can be improved using colors to illustrate the intensity, for example red more intense in the series 1950, orange second more intense, yellow third more intese. As it is know the text in the figure itself it is not clear enough respect to the time series presented for the East and West P, or the North Atlantic. B) the figure seems to indicate that the cost of theevents is less with similar amount of people exposed in the recent decades, but why or it is not reflected in the text. It is becasue those events affecto more developed countries and they are better adapted? this can be infere by a reader.... is this what you want to indicate in the figure?	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	Figure SPM.5 was removed in revision
34261	19	3	19	22	The text ovrall is too general and can apply to any climate change area. Can be turn into more especific for the Oceans and Cryosphere. Can the authros also address that the national and regional actions cover what it is in the domeain of the country boundaries or areas of influcnece, but that in this particular case the multilateral agreements on how to manage open oceans and the polar and antartic regions are extremnely relevant. Some how it is addressed indirectly in C2.5 and C.4.3, but it is not enough.	Maria Jose Sanz Sanchez	Basque Centre for Climate Change	Spain	Taken into consideration. The section has been revised fundamentally and is now more specific. However, individual agreements are not explicitly mentioned in the SPM.