SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
440	Entire Report	0	0	0		Drawing links to the SWIPA report 2017 and relevant AMAP scientific assesments, as well as extracting references from them, can be beneficial: https://www.amap.no/documents/18/scientific/21 [Charalampos Charalampidis, Germany]	Accepted; we have drawn on these in preparation of the Final Draft
442	Entire Report	0	0	0		Some attention should be paid to pending climatic hazards by abandoned facilities in the Arctic in a warming climate, e.g., Colgan et al. (2016), doi: 10.1002/2016GL069688 [Charalampos Charalampidis, Germany]	An interesting suggestion, though with comparatively little information available and only limited space it is not possible to highlight this issue expansively; we instead focus attention on the known wider aspects.
458	Entire Report	0	0	0		Many of the executive summary statements, including those carried to the SPM, contain so complex sentences that it is hard to see what the confidence language actually relates to. I will give many examples in my comments to individual chapters (particularly chapters 3 and 5, where I have most competence), but I suggest that the report leadership make an overall assessment of the key statements. A relatively simple solutions is to chunk down the long sentences into several sentences, each with confidence language, so it is easier to see what relates to what. [Cecilie Mauritzen, Norway]	The specific comments on individual chapters provided by the reviewers will be dealt with
460	Entire Report	0	0	0		The confidence language could greatly improve. For instance I don't think it is wise to use words like "very likely" in the text itself. Rather it should be used in a parenthesis after a statement. I will give many examples in my comments to individual chapters (particularly chapters 3 and 5, where I have most competence), but I suggest that the report leadership make an overall assessment of the use of confidence language, in particular likelihood language. I think the authors would have a much easier task in using this type of language consistently if they had access to a list of concrete examples, for instance in section 1.9.3. [Cecilie Mauritzen, Norway]	Noted
516	Entire Report	0	0	0		I think it would be useful if this report takes into consideration the suggestion made by Sutton (2018) to highlight particularly-high impact - low probability issues of concern (i.e. to use risk language) as well as to characterize such cases as something else than "very unlikely" (which inevitably will be read as something not to worry about). Although this paper is mentoned in chapter 1 I cannot see that the suggestion is brought forward in the topical chapters. [Cecilie Mauritzen, Norway]	Noted: this is covered in chapter 1, and relates to assessments made in chapter 4 (high sea level rise scenarios) and 6 (AMOC collapse)
674	Entire Report	0	0	0		I hope to see a separate chapter about the ocean changes outside the polar regions, and this chapter can be put ahead of the sea level chapter. Although there is relavant information in existing chapters, e.g., Chapter 5, a new chapter parallel to Chapters 1 and 2 can make the struture of the whole report clearer. [Mengxi Wu, United States of America]	Rejected: Such major change in the structure is unfortunately not possible at this late stage in the preparation of SROCC. The report has been prepared following the government approved outline.
736	Entire Report	0	0	0		I think there can be more figures like the right column panels of Figure 5.6 on p. 25 in Chapter 5. The separation of uncertainties is very helpful because a high scenario uncertainty implies the importance and applicability of mitigation. [Mengxi Wu, United States of America]	It is unclear which figure the reviewer is mentioning as Fig. 5.6 does not provide uncertainty estimates
1003	Entire Report	1	1	100	1	For Mountain section see citations to add [Falk Huettmann, United States of America]	Noted
1007	Entire Report	1	1	100	1	For Polar section see citations to add or to consider [Falk Huettmann, United States of America]	Noted

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1257	Entire Report	0	0	0		For Annex I Glossary: neither ocean nor cryosphere are defined. Defining the cryosphere, especially, might be helpful. [Jacinta Clay, United States of America]	Accepted: ocean and cyrosphere are now part of the glossary.
1279	Entire Report	0	0	0		Hysteresis, described in Chapter 1, is not described in the glossary. It might be a useful term to include [Jacinta Clay, United States of America]	Guidelines for the Glossary were to avoid including terms that are used infrequently in the report. A compromise was to describe it in Chapter 1, but since only Chapter 4 used the term (and references papers with hysteresis defined), the decision was made not to include in the Glossary.
1885	Entire Report	0	0	0		Glossary is partly not well aligned with terminology used in the report. For instance, in glossary the term "cascading impacts" is defined to narrow as it refers only to "societal or infrastructural capacities" and ignores ecosystems, whereas ecosystem (services) are included in the definition of the term "impact" in the glossary and are widely included in the description of natural systems (e.g., ch 1.). [Jana Sillmann, Norway]	Glossary definition amended to include "physical, natural, social or economic disruption" - hence now including ecosystems and ecosystem services
1887	Entire Report	0	0	0		The definition of "impacts" in the glossary and hence its use in the report deviates from the definiton of "impacts" in AR5 WG2 glossary. The definition of "impacts" in SROCC glossary is questionable as it refers to "realized risks", rather than "effects on natural and human systems" which is more neutral and can refer to positive and negative effects, whereas the former are excluded in the SROCC definition of "impacts". Example: On page 22, line 23 it is explicitely written "Climate change impacts on the ocean and cryosphere also present opportunities, in at least the near and medium term.", which directly contradicts the definition of "impacts" in the glossary. [Jana Sillmann, Norway]	Whilst most impacts are negative, the SROCC definition includes the positive effects: "Impacts may be referred to as consequences or outcomes, and can be adverse or beneficial."
1899	Entire Report	0	0	0		It should be explained (maybe in Ch. 1) why some definitions in the glossary or text of SROCC deviate from AR5, such as currently the SROCC definition for "impacts", which however is questionable as explained in my other comment. [Jana Sillmann, Norway]	The definition of the term "impacts" was modified in the glossary (see above) and is therefore not re-defined in Chapter 1. Moreover, some definitions were adopted based on either AR5, SR15 or SRCCL Glossaries for consistency. Deviations may reflect the evolution of our knowlegde or refinement of terminology.
1901	Entire Report	0	0	0		Cross-chapter box 4: very important and very well developed box! Make sure the terminology use in there is used consistently throughout the report. E.g. compound events, compound risk. [Jana Sillmann, Norway]	Noted, the author team has carefully considered consistency.
2069	Entire Report	0	0	0		Anything with low confidence must be removed from this report. It is just conjecture. Change projected to possibility [Dave White, United States of America]	Reject; statements made with low confidence can still have use to policymakers and other stakeholders, they are more than conjecture
2075	Entire Report	0	0	0		We have had 50 years of warming and melting. However there is no sea rise faster than 1870. Please say at the begining of the report a location where the sea has risen faster and causing a problem. (high confidence) [Dave White, United States of America]	data from 1870 is unrelaible in isolation compared to more recent data. Also, short term variations are not meaningful against the long term trend.
2077	Entire Report	0	0	0		The tide gages clearly show no global sea rise. Juneau Alaska graph shows sea level retreating. You can acces them here: http://www.sealevel.info/MSL_global_trendtable5_L.html [Dave White, United States of America]	As explained in Chapter 4, particular locations can see rise or fall, depending on a variety of known factors so one stations provides little insight into the global picture.
2083	Entire Report	0	0	0		The above comments are the same for every page of this report. Also change the word projected to possibility [Dave White, United States of America]	Rejected; it is not clear which comments are being referred to. "Projected" and "possibiltiy" have very different meanings, and are used in the appropriate ways in the report.
2085	Entire Report	0	0	0		Thomas-Wysmuller Shows there is no global sea rise http://climateconferences.heartland.org/thomas-wysmuller-iccc9/ [Dave White, United States of America]	Rejected; the cited analysis is from a conference talk, not the peer-reviewed literature.

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2601	Entire Report	1	0	224		Dear authors, thank you writing very nice report. Overall it covers most of the topics, threre are few palce which need a bit modiciations. I have provided my coments Chapterwise below. [Pushp Raj Tiwari, United Kingdom (of Great Britain and Northern Ireland)]	Noted
2889	Entire Report	0	0	0		The report is based mainly on publications in English. Literature in other UN languages is poorly involved (although it exists). [Government of Russian Federation, Russian Federation]	This is unfortunately inevitable because the chapter teams only comprise authors fluent in a few languages, for example about 9 in chapter 1.
2891	Entire Report	0	0	0		Pre-industrial' should be defined. [Government of Russian Federation, Russian Federation]	Noted: Pre-industrial is defined in Cross-Chapter Box 1 of chapter 1. In SROCC and other AR6 products this term refers to 1850-1900
2903	Entire Report	0	0	0		The use of low confidence statements should be an exception, especially in SPM. [Government of Russian Federation, Russian Federation]	Noted: low confidence statements are only presented in the SPM for areas of particular concern.
2909	Entire Report	0	0	0		This report is about climate change impacts on the ocean and cryosphere. Therefore, where possible, the statements should be about warming effects, not about emissions' effects. The use of emissions reduces confidence, because rather uncertain 'emissions-temperature' relationships are involved. [Government of Russian Federation, Russian Federation]	Noted: however not all emission effects are warming. An example is ocean acidification, that is clearly a climate change impact caused directly by greenhouse gas emissions rather than the warming related to emissions.
2951	Entire Report	0	0	0		Section C appears less supported by scientific evidence compared to sections A and B. [Government of Russian Federation, Russian Federation]	Noted: Text changed
2981	Entire Report	0	0	0		In at least two chapters (1 and 4), the language used for uncertainties is not fully compliant with the uncertainty guidances of the IPCC (Mastrandrea et al (2010), mostly because the terms "likely", "very likely", etc are used in some places as synonyms of 17th-83rd or 5th-95th percentile levels, and in other places as recommended in the uncertainty guidances (probability larger than 66% or 90%). If there is sufficient confidence in probabilistic outcomes, then, the use of terms such as "likely" or "very likely" is not necessary, as recommended in the IPCC uncertainty guidances, and it could be just refered to percentile levels. [Goneri Le Cozannet, France]	Noted: The 2010 IPCC guidance does not fully cover the way likelihood language is used in IPCC reports (e.g. for expressing the likely range of future sea level rise). For this reason the SROCC report has used the 2010 guidance as well as more recent literature to clarify the usage of confidence and likelihood language. This is summarised in Figure 1.4
3495	Entire Report	0	0	0		Overall, this is an excpetionally well put together report that will provides valuable contributions and summaries of the existing knowedge in this space and that extends the valuable contributions of the IPCC to date. Well done to all involved. I look forward to reading the final report. [Katherine Bishop-Williams, Canada]	Noted, with thanks for the positive feedback
4645	Entire Report	0	0	0		This group review has been conducted by members of the University of Bern, Switzerland: Thomas Frölicher, Friedrich Burger, Sandra Striegel, Victor Onink [The UBern Team Group Review, Switzerland]	Noted
4715	Entire Report	0	0	0		Entire report: a complete acronym audit will be necessary: (1) even less acronyms in general – there is already a great improvement from FOD (2) acronyms only for terms that occur at least 5 times per section, erring on the side of avoiding them (3) defined on first mention, per section, then not spelled out again (i.e. search both acronym and full term), (4) check it appears in list of acronyms, and aim for a total number of acronyms that is not too long. [Debra Roberts and Durban Team, South Africa]	Accepted; we have sought to minimise the use of acronyms. (* "less" should be "fewer")

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
4925	Entire Report	0	0	0		Figures and tables in general: are the main entry points to large bodies of technical text, and if pulled out, should tell a story and carry much of the weight of the total message. They are the islands sticking out of the ocean of information, that is where readers will land. So figures and tables are not necessary for minor side-issues and can even be a distraction. This can be a guideline in terms of space considerations. Especially important is information relevant to national policy makers, eg cost of action and cost of inaction, adaptation and mitigation options, co-benefits, etc. but also increasingly, options to local authorities, business and individuals, with focus on the cost-benefit of climate change action and options for solutions. [Debra Roberts and Durban Team, South Africa]	Accepted, and the evolution of the latest draft has been guided accordingly.
5209	Entire Report	0	0	0		The overall narrative is still one of risk and as a result a strong and intergrated solutions focused narrative has not yet emerged in the chapters - solution optionstend to be tagged on at the end of chapters as a bit of an afterthought [Debra Roberts and Durban Team, South Africa]	To be taken into account.
5211	Entire Report	0	0	0		Quantification in terms of impact, responses and costs are still poor across the report [Debra Roberts and Durban Team, South Africa]	To be taken into account.
8481	Entire Report	0	0	0		The speak is often “science” speak which can be exclusionary. This report should be as accessible to a social scientist as a natural scientist. For instance, a particular issue repeatedly mentioned is “preindustrial”. Preindustrial what? Please mention “level” or “era” afterwards, as applicable. The same is applicable to "interglacial/present-day/Eemian/Deglaciation/Mid-Pliocene". Sometimes too "the" is missing before these time-periods (e.g. "present" instead of "the present"). [Nina Hunter, South Africa]	Accepted; we have sought to minimise the use of exclusionary language, and/or explain the more technical verbiage in glossry entries
8483	Entire Report	0	0	0		Please refer to previous IPCC assessments consistently. Sometimes "the AR5" at other times "AR5" sometimes "fifth assessment report". Sometimes "IPCC" or "WGII" used in addition, at other times not. In addition, sometimes particular chapters within assessment reports are referred to and these are inconsistently referenced. [Nina Hunter, South Africa]	Editorial; final version will be copyedited by IPCC
8485	Entire Report	0	0	0		At times years are referred to with a hyphen in between (e.g. "2005-2006") but at other times "to" is used instead of a hyphen. It would be preferable to refer to time periods in a consistent way across the report. [Nina Hunter, South Africa]	Editorial; final version will be copyedited by IPCC
8487	Entire Report	0	0	0		With regard to information in the text that is in parentheses: sometimes 'e.g.' or 'i.e.' are used, but at other times not. In many cases it would be useful to have these acronyms in parentheses for clarity. Whatever is decided it would be helpful to apply a consistent approach across chapters. [Nina Hunter, South Africa]	Editorial; final version will be copyedited by IPCC
8489	Entire Report	0	0	0		Acronyms are not applied consistently in the report. An acronym may be defined and then is used as a word before being used as an acronym again. Sometimes the acronym is not stated in plural (e.g. ESL should be ESLs) and sometimes it is in plural but should not be (e.g. ETCs/TCs). Sometimes the acronym has already been defined but is defined again (e.g. LECZ, MARPOL, SOLAS). Sometimes an acronym is not defined at first usage (e.g. RCP in SPM). Sometimes some terms are defined as acronyms (e.g. IK and LK) but others are not (e.g. scientific knowledge) and it is not clear why. [Nina Hunter, South Africa]	Editorial; final version will be copyedited by IPCC
8491	Entire Report	0	0	0		References within parentheses are not all alphabetized. Please check and correct throughout the report. [Nina Hunter, South Africa]	Editorial; final version will be copyedited by IPCC

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8493	Entire Report	0	0	0		Number findings cited in the text usually have the reference provided, but the exact page number for a finding is not provided. Why is this not applied when it is a commonly adopted approach in academia? This is problematic for the reader who wants to locate a particular finding that is cited. Both direct quotations (for which the page number is usually given) and numeric findings (e.g. percentages) should be page referenced. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8495	Entire Report	0	0	0		In some chapters terms that are in the glossary are pointed to (e.g "see SROCC Glossary" in chapter 6 page 21 line 56). I think it is useful to point the reader to the glossary definition the first time a glossary term is mentioned. This would be very helpful for the non-scientific minded reader to whom most of the terms will be foreign. However if this is done it needs to be applied consistently to the first mention of each glossary term. Likewise if the decision is made to remove this information, it must be done across the report. Chapters 3 and 6 make mention of the glossary terms in this way. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8497	Entire Report	0	0	0		Sometimes "&" is stated in the text instead of "and". Please find and replace throughout report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8499	Entire Report	0	0	0		Some table headings end with full stops (e.g. Tables 3.3, 3.4, 3.5, 3.6) while others do not. Please make consistent across the report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8501	Entire Report	0	0	0		Not all direct quotations have page numbers with the reference provided. Please provide throughout report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8503	Entire Report	0	0	0		In Chapter 4, page 84, line 6 "per se" written in italics. "In situ" sometimes written with a hyphen, sometimes italicised, at other times not. Please see that all Latin terms in the report are treated consistently. [Nina Hunter, South Africa]	copy editor will fix
8505	Entire Report	0	0	0		With regard to titles, please check where commas are inserted - sometimes they are inserted before "and", sometimes not. A consistent approach should be used. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8507	Entire Report	0	0	0		It would have been useful to be able to refer to a list of acronyms and abbreviations whenever they came up in the text, especially since the report is filled with terms that are foreign to a non-natural scientist. But there is no such list. Why is this? [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8509	Entire Report	0	0	0		Sometimes words are written with a capital letter and it is not clear why (e.g. Peoples, Elders, Polar Regions, Glaciers, Ice Sheet). At other times these words may be written in lower case. Further examples are in references where “Submitted” or “In review” may be start with capital letters at times. It is also not clear why some terms start with a capital letter (e.g. Indigenous knowledge) but other terms not (e.g. local knowledge). [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8511	Entire Report	0	0	0		Sometimes words are written as abbreviations in the text (for instance, Myrs, Kyr, myr, yrs, vs, approx., etc., e.g.) which comes across in an unprofessional way. It would be better to state these in full across the report. Suggest write abbreviations in full in the text and use abbreviations such as "e.g." and "etc." only in parentheses. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8513	Entire Report	0	0	0		Sometimes the approximation sign is used frequently (for instance in the cross chapter box) and at other times not. This needs to be made consistent across the report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
8515	Entire Report	0	0	0		Direct quotes are sometimes made with a single quotation mark and at other times with a double quotation mark. Consistency is required across the report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8517	Entire Report	0	0	0		Commonly, numbers that are under ten are written out in full but this is largely not applied in the report. This may be something to consider applying to the report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8519	Entire Report	0	0	0		Sometimes years are written with a forward slash - does this refer to the full year for each year or to some months in both? For instance "2016/2017" in chapter 3. Also in chapter 6, "2015/2016". It is not clear why a forward slash is used instead of a hyphen which is more commonly used across the report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8521	Entire Report	0	0	0		The same word is not always written consistently. For instance "sea-level" and "sea level", "preindustrial" and "pre-industrial", "foodweb" and "food web". Please attend to this across the report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8523	Entire Report	0	0	0		There are many terms that are mentioned and for the non-natural science reader, these can be overwhelming. There is a glossary that describes only some of these terms. Many terms are not defined and the non-natural science reader has to look them up if they are to understand what is being spoken of. Suggest increase the terms that are included in the glossary or provide brief definitions in the text in parentheses. I have highlighted terms that I think need defining. [Nina Hunter, South Africa]	Glossary has been expanded to include more terms.
8525	Entire Report	0	0	0		The 'source' sentence at the end of figure/table notes is inconsistently applied. Sometimes it is in parentheses, sometimes with the word "source" etc. The figure/table description sometimes ends with a full stop, sometimes not. Suggest consistency across chapters. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8527	Entire Report	0	0	0		Chaper 2 page 22 line 7: In chapter 1 and the SPM chapter the two bits of information in separate brackets are included in one bracket, together. Please apply one method consistently across the report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8529	Entire Report	0	0	0		Species' Latin names are sometimes seperated from their common names by a comma (e.g. chapter 5 page 39) and sometimes by parentheses (e.g. chapter 5 page 40). Sometimes italicized and sometimes not (e.g. chapter 5 page 41). One approach to be chosen and consistently applied. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8531	Entire Report	0	0	0		Currency is sometimes written as "USD" and sometimes "US $" - please choose one approach consistently across the report [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication
8533	Entire Report	0	0	0		At various points in the report information is listed but sometimes it is done using numbers and sometimes using letters of the alphabet. A consistent approach for all lists should be applied across the report. [Nina Hunter, South Africa]	Editorial – copyedit to be completed prior to publication

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9281	Entire Report	1	1	80	57	There are no references to Integrated Coastal Zone Management (ICZM) as a key instrument throughout the whole document, and this is a critical gap. Also there is not reference to the different challenges of coastal areas and the ocean. Policies and instruments have been devised to plan the use of resources and the risks associated to the extreme processes in those two areas, for more detail see: Ballinger, Rhoda 2014. On the edge: coastal governance and risk. In: Fra Paleo, Urbano ed. Risk Governance: The Articulation of Hazard, Politics and Ecology, Springer, pp. 373-394.doi: 10.1007/978-94-017-9328-5_20. Wescott, Geoffrey 2015, Ocean governance and risk management. In: Fra Paleo, Urbano ed. Risk Governance: The Articulation of Hazard, Politics and Ecology, Springer, pp.395-412, doi: 10.1007/978-94-017-9328-5_21. [Urbano Fra.Paleo, Spain]	Taken into account. Literature on ICZM has been comprehensively assessed in Ch5, esp in Section 5.5.2
9283	Entire Report	0	0	0		France would like to emphasize the overall quality of the report, especially at this stage of production. Clear texts and structure help to deliver an understandable knowledge of the important role played by ocean and cryosphere in the Earth climate system, and the numerous links connecting them with its other components. The integration of human and social sciences is also welcomed. The general design of the Figures in the SPM fits well with the objectives of such a Summary (except Figure SPM.5 which we suggest to remove). [Government of France, France]	SPM Figure 5 considerably redrafted
9285	Entire Report	0	0	0		Some important topics require a deeper development in the report and its SPM, especially deoxygenation and salinity trends, resilience capacity of some ecosystems (especially coral reefs), role played by education in decision process and local adaptation measures. [Government of France, France]	Thank you. Taken into account in the development of SPM.
9287	Entire Report	0	0	0		Figures from the SPM are informative and appropriate. Yet they could be improved to make them easier to understand. France also suggest to remove Figure SPM. 5. [Government of France, France]	SPM Figure 5 considerably redrafted
9289	Entire Report	0	0	0		Governance issues should be further developed. In the current state of the report they are mainly related to acidification (as in 1.7; or Box 5,5) and should not be limited to this aspect of ocean change. [Government of France, France]	Governance is now discussed extensively in chapter 4 in the context of human responses to sea level rise and extreme sea levels.
9291	Entire Report	0	0	0		Concrete examples illustrating adaptation measures and theoretical concepts' efficiency could greatly improve the quality of the report. [Government of France, France]	see response to comment 9289
9293	Entire Report	0	0	0		Even though it is not the main object of this governmental review, we found several inconsistencies throughout the report: units and appelations should be harmonized, acronyms defined, and spelling mistakes corrected. [Government of France, France]	Editorial – copyedit to be completed prior to publication
9881	Entire Report	0	0	0		We suggest to add to the glossary definitions proper to ocean science such as « stratification » ; « pelagic », or « benthic ». [Government of France, France]	I believe the definitions are in the chapters and Glossary as well ("benthos" - p AI4, "pelagic" - p AI-24 ,and "stratification" - p- A29) as well as in other IPCC docs.
9883	Entire Report	0	0	0		In the glossary (Confidence), the referenced section should be 1,9,3 instead of 1,8,3. [Government of France, France]	Well spotted BUT the actual section is 1.9.2 all across the report and sitting at page 1-42 (or p 85 of the Final Report's pdf.
9951	Entire Report	0	0	0		Chapter 7. A very interesting and synthetic summary addressing the key problems. [Úrsula Oswald Spring, Mexico]	Thank you for your positive feetback
9953	Entire Report	5	17	5	19	Chapter 7: 5/17: For hurricane Maria it is important to include Puerto Rica, due to the high death toll and the cuantious economic losses. [Úrsula Oswald Spring, Mexico]	Accepted - text added

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10029	Entire Report	0	0	0		The discussion of geoengineering options is important, howeever both the IPCC and UNFCCC have both been remiss in overstating these options. Almost all of these options (including CCS) have not been run at any scale, and many are theoretical at best. By over promoting these approaches without clearly outlining the risk, costs (including greenhouse gas emissions) meaningful action is delayed/not taken. In this document disucssions of geoengineering and CCS options need to have an explicit discussion on the current state of the techonology, its costs (including greenhouse gase emissions) and its scalability. Ideally something akin to the confidence and certainty levels used throughout the document should be applied, otherwise at best we are passing off speculation as science. [Tommy Moore, United States of America]	Noted: This is outside the scope of SROCC. From section 1.6.1: "Other measures have been proposed, including solar radiation management and several other forms of carbon dioxide removal, but these are not addressed in SROCC as they are covered in other products of the IPCC Sixth Assessment Cycle (SR1.5 and AR6 Working Group III) and are outside the scope of SROCC."
10071	Entire Report	0	0	0		Why not contribute to a better understanding of policymakers and the general public by avoiding the density of this technical manuscript and making it easy to read? I do not think Policymakers from around the world can appreciate the importance of the mentioned findings in the way it is written the Executive Summary. To be honest, it took me a week to start checking this report (and I really wanted to do it). However, the first paragraphs tired my understanding so much that I had to find inspiration in other sources. Overall, I find it more difficult to read all the Executive Summaries than the rest of the chapters. [Elsa Arellano-Torres, Mexico]	Taken into account.
10991	Entire Report	0	0	0		I worry that terms like "biodiversity", "species" and "biomass" have been used throughout to predominately describe macro-organisms. Unless defined otherwise, I would have hoped that the terms biodiversity/species should refer to both micro- and macro-organisms. Many of the statements claimed under these terms are not equally true for micro- and macro-organisms. While macro-organisms are of course more visible and are of more direct relevance / concern to our societies, the importance of micro-organisms within ecosystems, and the impact of climate change on these communities and their ecological function also needs to be addressed. These communities are the powerhouses of all ecosystems, and one consideration for chapters 2, 3 and 5 would be to include sections on the expected implications of continued climate change on the microbial communities of some of the highlighted niches. This has been touched on with respect to mountain freshwater streams, but it is lacking elsewhere. Microorgansims unquestionably account for the greatest diversity in any ecosystem, however studies that measure changes in these communities as a result of climate change are admitedly limited. It is not however, accurate to say that we will see blanket "diversity loss" with climate warming, as, with respects to microorganisms, it is not clear whether this also follows true. For example, the microbial communities of thawing permafrost develop to resemble those sampled from the active layer, which has been found to support more diverse (eg https://doi.org/10.1038/s41396-018-0176-z) and active (eg https://doi.org/10.1016/j.soilbio.2015.04.009) microbial communities. What will happen to the microbial communities of the oceans is at the moment unclear (eg https://doi.org/10.3389/fmicb.2017.01599). [Karen Cameron, United Kingdom (of Great Britain and Northern Ireland)]	Microbes as part of the marine biodiversity are assessed in Ch5, especially in open ocean ecosystems.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11291	Entire Report	0	0	0		Overall, the report is weak on its coverage on the potential scope for evolutionary adaptation. The brief mentions of the topic are out of date miss the science-based, policy-relevant steps that could be taken to foster evolutionary adaptation. Some of the most exciting and high-confidence findings at the interface of ecology and evolutionary biology have included demonstration of the potential speed and power of evolution to shape traits on ecological (and policy-relevant) time scales. Evidence connecting rapid climate-mediated adaptation has been rapidly accumulating in oceanic, riverine, and terrestrial systems. Of course, evolution is not magic, and there are limits to the scope and speed of adaptive shifts in traits shaped by climate. Nevertheless, the demonstrated potential capacity for evolutionary rescue in some wild species is policy-relevant because it can be fostered by maintaining populations that are large, connected and with reduced exposure to other anthropogenic stressors (See recent Science paper by Mills et al. 2018). Thus, it is separate from “assisted evolution”, a different topic discussed to some extent in the document. Many of my comments on the document provide an overview of the conceptual advances, and several of the recent key scientific publications on this topic. The full list of references are provided in the next TWO comments. [L. Scott Mills, United States of America]	Taken into account. There are limited literature in general on evolutionary responses of marine species to climate change, thus the chapter focuses the assessment on area where more scientific literature on this topic is available, such as coral reefs.
11293	Entire Report	0	0	0		REFERENCES ADDED TO VARIOUS PARTS OF REPORT PART 1 Bay, R.A., N.H. Rose, C.A. Logan, and S.R. Palumbi. 2017. Genomic models predict successful coral adaptation if future ocean warming rates are reduced. Science Advances 3:e1701413. Bell, G. 2017. Evolutionary Rescue. Annual Review of Ecology, Evolution, and Systematics 48:605-627. Campbell-Staton, S.C., Cheviron, Z.A., Rochette, N., Catchen, J., Losos, J.B. & Edwards, S.V. (2017) Winter storms drive rapid phenotypic, regulatory, and genomic shifts in the green anole lizard. Science, 357, 495-498. Carlson, S.M., C.J. Cunningham, and P.A.H. Westley. 2014. Evolutionary rescue in a changing world. Trends in Ecology & Evolution 29:521-530. Cohen, J.M., M.J. Lajeunesse, and J.R. Rohr. 2018. A global synthesis of animal phenological responses to climate change. Nature Climate Change 8:224-228. Diamond, S. E., L. Chick, A. Perez, S. A. Strickler, and R. A. Martin. 2017. Rapid evolution of ant thermal tolerance across an urban-rural temperature cline. Biological Journal of the Linnean Society 121:248-257. Hendry, A.P. 2016. Eco-Evolutionary Dynamics. Princeton University Press. Hinners, J., A. Kremp, I. Hense. 2017. Evolution in temperature-dependent phytoplankton traits revealed from a sediment archive: do reaction norms tell the whole story? Proc. R. Soc. B 284:2017888. : [L. Scott Mills, United States of America]	Thank you.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11295	Entire Report	0	0	0		PART 2 of REFERENCES ADDED: Jones, M.R., L.S. Mills, P. C. Alves, C. M. Callahan, J. M. Alves, D. J. R. Lafferty, F. M. Jiggins, J. D. Jensen, J. Melo-Ferreira, J. M. Good. 2018. Adaptive introgression underlies polymorphic seasonal camouflage in snowshoe hares. Science. 360: 1355–1358. Kovach, R.P., A.J. Gharrett, and D.A. Tallmon. 2012. Genetic change for earlier migration timing in a pink salmon population. Proceedings of the Royal Society 279:3870-3878. Manhard, C.V., J.E. Joyce, and A.J. Gharrett. 2017. Evolution of phenology in a salmonid population: a potential adaptive response to climate change. Canadian Journal of Fisheries and Aquatic Science 74:1519-1527. Mills, L. S., E. V. Bragina, A.V. Kumar, M. Zimova, D.J. R. Lafferty, J. Feltner, B M. Davis, K Hackländer, P C. Alves, J. M. Good, J Melo-Ferreira, A Dietz, A V. Abramov, N Lopatina, K Fay. 2018. Winter color polymorphisms identify global hot spots for evolutionary rescue from climate change. Science 359:1033-1036. Pepsiniet al 2013 (in draft report) Reed, T. E., S. Jenouvrier, and M. E. Visser. 2013. Phenological mismatch strongly affects individual fitness but not population demography in a woodland passerine. Journal of Animal Ecology 82:131-144. Van Oppen et al 2015 (in draft report) Zimmer, Carl and Emlen, Douglas (2015) Evolution: Making Sense of Life, Second Edition. Macmillan, New York. ISBN-10: 1-936221-55-1; ISBN-13: 978-1-936221-55-4. [L. Scott Mills, United States of America]	Thank you.
11523	Entire Report	1	1	20	17	Each chapter would be most useful if structured and mapped explicitly to the agreed structure of the AR6 reports: for this report mainly WG1 and WG2. Some of this is already reflected in the 'flow' and structure of the chapter. But headings like "Physical Science Basis" , "Impacts", "Adaptation", "Vulnerability" to provide the reader with more accessible "mapping" to back to AR5 and forward to AR6, and at least approximate correlation to WGs 1 and 2 [William Howard, Australia]	Rejected - each chapter determined their own strructure
11565	Entire Report	1	1	20	20	Avoid saying " 'X' *will* happen." In the context of climate projections statements about the future are usually scenario-dependent, so we don't know what *will* happen. We can say what *is likely to* happen under a specific set of circumstances (a set of scenarios). The word "will" also indicates a prediction or forecast; CMIP projections are not forecasts. An important role for IPCC is communicating the difference between predictions or forecasts, and projections or scenarios. Finally, presenting any outcome as what *will* happen communicates a foregone conclusion about which we cannot do anything. That is the opposite of what (I think) IPCC is trying to communicate to policymakers and citizens. [William Howard, Australia]	Accepted and taken into account especially in SPM
11717	Entire Report	0	0	0		Definition of mountain region and high mountain region shall be provided (may be separation by defining elevation). High mountain region shall be again differentiated by definition into high mountain and high mountain Asia. Further, mountain region shall also be differented by definition into mountain and mountain Asia. Degree of impact of climate change is different in these region. The conclusion shall not be the average of degree of impact/drivers in these regions. The results shall be presented correspondingly in these regions separately. Althoug Climate change is global phenomenon, the policymaker wants to know the degree of impact in his/her region. [Maheswor shrestha, Nepal]	Taken into account; High Mountains defined in introduction

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
11803	Entire Report	0	0	0	0	In general IPCC documents are the best, but you only write for scientists or decision makers, IPCC needs a space to enter the mind of the common citizen to explain why the current production system and the lifestyle we have is part of the destruction of the planet. [Fátima Castaneda Castaneda Mena, Guatemala]	Taken into account: FAQs have covered this
12023	Entire Report	0	0	0		The Chinese government thanks the Bureau members of the Intergovernmental Panel on Climate Change (IPCC) Working Group I (WGI) and Working Group II (WGII), the lead authors (LAs) of the Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) and the Technical Support Unit (TSU) of WGII for their efforts in preparing the present report. In order to enhance the assessment in scientific, comprehensive and balanced terms, our government wishes to make the following comments on the said report in a hope that they can be adopted in the process of its revision. 1. The misrepresentation of China's sovereignty. It is suggested that the expression "Hong Kong" in the report (including endnotes, etc.) be changed to "Hong Kong Special Administrative Region of China", that the expression "Macao" in the report (including endnotes, etc.) be changed to " Macao Special Administrative Region of China" and that the expression "Taiwan" in the report (including endnotes, etc.) be changed to "Taiwan Province of China". 2. Selected concepts in the report. It is suggested that selected concepts in the report (eg, cryosphere) be consistent with what is defined in the IPCC AR5 and previous reports, while some of the new terms that are specifically referred to in the report (e.g. high mountain regions, snow lines) be clearly defined. 3. The elements assessed. There being inconsistent conclusions and cross-duplication between chapters of the report, it is suggested that the chapter CLAs enhance coordination. In addition, the present special report should reflect the latest scientific findings since AR5. However, some of the key conclusions of the report cite the literature dated before 2010. It is suggested that lead authors further assess the latest published findings, while increasing the citation of literature from developing countries and in non-English languages. 4. The length and figures/tables of the report. The full report and its Summary for Policymakers (SPM) both far exceed the lengths determined by the IPCC Panel. So it is suggested that deletion and condensation be made. The figures and tables currently therein, which are too fragmented, are suggested to be carefully reprocessed or redesigned as contained in the SPM and the underlying report for an improved readability. At the same time, in order to avoid unnecessary disputes, it is suggested that all maps containing	The naming convention will be in accordance with the Standard United Nations naming conventions. 2. New terms and concepts are defined either in the chapters or in the glossary 3. The CLAs take this comment on board and checked for inconsistency and cross-duplication. Although the assessment focuses on literature since AR5, earlier literature is inlcuded where it is relevant. 4. We have taken this comment on board. Further national boundaries are removed 5. Agreed. However low confidence statements are included where they have high significance for the policy relevant statements in the SPM.
12441	Entire Report	0	0	0		Permafrost is treated in both Chapters 2 (Mountain Permafrost) and Chapter 3 (Circumpolar and sub-polar permafrost areas). Please ensure that in the summary text and products, it is clearly specified whether statements refer to Mountain Permafrost, Circumpolar Permafrost, or all permafrost regions of the world. Currently, this is not entirely clear, and could be a source of major confusion. For clarity, please also consider (even if that adds to overall length) to make this more specific within the chapters themselves. [Government of Germany, Germany]	Accepted; we have clarified this in the appropriate places in the chapters stated and throughout the report

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
12443	Entire Report	0	0	0		The whole report, in particular the SPM and chapter 4, lack adequate discussion and representation of post-2100 sea-level rise, and the long-term sea-level commitment that is inherent in different emission pathways and policy goals, including current NDCs and overshoot pathways to 1.5C/2C and beyond. It is very clear that SL will continue to rise for decades to millennia, depending on the amount of global warming. The year 2100 sea level rise is not a sufficient measure to inform policymakers about the risks of various warming levels/emissions pathways. Please revise Chapter 4 (and the sea-level contribution discussion in chapters 2 and 3 respectively) to represent post-2100 sea-level-developments, and make sure that relevant information, including graphics extending beyond 2100, are included in the SPM. cf Clark et al., 2018 doi.org/10.1038/s41558-018-0226-6. This is a major shortcoming of the current draft which needs to be addressed before the FGD. [Government of Germany, Germany]	Chapter 4 has greatly expanded and improved the discussion of long term sea level rise (>year 2100)
12445	Entire Report	0	0	0		The SROCC needs to better incorporate and build upon the findings of SR1.5. Apart from a cursory mentioning in Chapter 1, there is hardly any reference to the important findings of that report, even for the very core issues of the SROCC such as (long-term) sea level rise commitment, potential crossing of the Antarctic tipping point between 1.5C and 2C, the fate of coral reefs or tropical and low-lying glaciers, or the important difference in ocean acidification. The SROCC does not even mention the (upcoming) RCP1.9, and has a flawed representation of RCP2.6 GMT-rise (cf our comment to SPM page 4). While it is clear that this report can not repeat all important findings of the SR1.5, the current neglect could create the impression that there is no difference between a 1.5C and 2C-world, which is clearly not the case especially for the Cryosphere, long term Sea-Level-Rise and vulnerable Ocean-Ecosystems. This is a major shortcoming of the current draft which needs to be addressed before the FGD. [Government of Germany, Germany]	Noted: linkages to SR1.5 have been improved in the Final Government Draft (we note that SR1.5 was only released shortly before the SOD deadline). SROCC does not assess RCP1.9 as there is insufficient data at present (see cross-chapter box 1 in chapter 1). The representation of RCP2.6 and RCP8.5 GMSAT on SPM.1 has been improved and is now shown as a continuous time series, with data traceable to cross-chapter box 1 in chapter 1).
12447	Entire Report	0	0	0		Knowledge gaps: we appreciate the diligent reporting of knowledge gaps done in the report. That is very helpful to identify research gaps, and also to better understand areas of uncertainty. However, when summarizing knowledge gaps, please bear in mind that reports are also read by non-scientists, and some policy makers may not fully comprehend the effect of such knowledge gaps on the robustness and reach of the IPCC-findings. It may be helpful to chose formulations in a way that avoids the impression that existing knowledge gaps preclude robust conclusions, or exclude certain areas or regions (unless, of course, that is really the case). [Government of Germany, Germany]	Accepted: the final version makes it clear that robust conclusions can be made on many issues and highlights the uncertainty in the other ones.
12449	Entire Report	0	0	0		The inclusion of Chapter 6 in the outline of this report clearly highlights the importance both the scientific community and policymakers place on knowledge of (potential) tipping points, abrupt changes, compound events and high risk-low probability events and their anticipation and management. While a lot of information can be found in the report as a whole, we miss conclusive information and a more convincing framing in the summary sections (ES and SPM) of the SROCC. Please make sure that important information such the potential onset of the WAIS disintegration and its consequence, and other relevant processes gets lifted to the summary products and included in the headline statements where appropriate. Important messages about increased risk contained in figure SPM.4 should be spelled out in the text as well. Please consider to draft a standalone section on potential irreversible disintegration of the large Ice Sheets, similar to B7 discussing the AMOC slowdown. [Government of Germany, Germany]	These issues are to be drawn out in the SPM where there is sufficient scientific evidence to make robust statements.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
12451	Entire Report	0	0	0		We want to thank the SROCC author team, the Co-Chairs and TSUs for their massive efforts in pulling the SOD together and providing a first draft of the SPM. The SROCC-SOD provides a very robust overview and analysis of the timely issues of the Ocean and Cryosphere in a Changing Climate. We fully support the IPCC in its endeavor to provide comprehensive, up-to-date and policy relevant assessments of the current knowledge without being policy prescriptive. We wish to express our deep gratitude to all involved and the scientific community as a whole for their continued and voluntary support in producing these valuable reports. [Government of Germany, Germany]	Thank you
12453	Entire Report	0	0	0		The report is almost twice as long as the page count given in the plenary approved outline, which makes reviewing its conclusions very challenging. Authors should be encouraged to streamline, and follow a more consistent structure. For example, the substantive sections within each chapter could present the key arguments at the beginning. Debates about data sources and different methodologies should come second (i.e. they support the discussion rather than being its central point) - and could partly be moved to an Annex. At times sections provide lots of detailed information up-front, that is not always synthesized at the end of the section. [Government of Germany, Germany]	Agreed. Taken into account.
12455	Entire Report	0	0	0		The concept of adaptive capacity and limits to adaptation is dynamic and subjective (what risk is considered "inacceptable") - please ensure that across the report and SPM the impression of fixed limits is avoided, or accompanied by a clear reference, such as "current adaptive measures", or specific thresholds of warming etc. [Government of Germany, Germany]	Accepted: The report provides a definition and in SPM, we have taken care of the comments
12457	Entire Report	0	0	0		The important issue of temporal and long-term changes resulting from temporary overshoot of the 1.5 and 2C temperature limits, and risk adjacent to peak-and-decline-temperature pathways seem to be missing almost entirely from the report. Please include an assessment of committed changes due to continued high anthropogenic forcing for the coming years, and discuss the implications for ecosystems and the climate system components relevant to this report of (rapid) increases followed by steep decreases in ambient CO2-concentrations/forcing over the course of the 21st century, as these are plausible scenarios with very specific risks that are not limited to the case of limiting warming to 1.5C which has been discussed in the SR1.5. This is also crucial to provide a more balanced assessment of mitigation and adaptation responses in the SROCC. [Government of Germany, Germany]	Noted: the SROCC report focuses on contrasting RCP2.6 and RCP8.5 scenarios. There is currently not enough information on RCP1.9 to be able to assess ocean and cryosphere changes under this scenario, or other scenarios with rapid increases followed by rapid decareses in CO2 concentrations.
12459	Entire Report	0	0	0		The terms "relocation, migration, retreat, resettlement, displacement, mobility etc." as well as the assorted characteristics/variables such as short-term and long-term, forced-voluntary, spontaneous-planned, etc. have to be coherently defined, distinguished and applied in the whole document. [Government of Germany, Germany]	Definitions of several of the suggested terms (e.g., 'Human mobility', '(Internal) Displacement (of humans)', 'Migration (of humans)' and 'Planned relocation (of humans)' - including 'resettlement' and 'managed retreat') have been included in the Glossary, and care was taken to apply these concepts consistently throughout the report.
12461	Entire Report	0	0	0		Glossary p.19, entry "mitigation": suggest to specify "Mitigation of GHG concentration/or: GHG emissions", as "Mitigation of Climate change" is unprecise and the boundaries to adaptation and Solar Radiation Management could become blurred. The notion "mitigation" should be concentrated on the root causes of climate change. [Government of Germany, Germany]	Coherent with other Reports of the 6th IPCC Assessment Cycle, the heading of the term remains "Mitigation (of climate change)", as in previous Reports and as used by all IPCC Working Groups.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
12463	Entire Report	0	0	0		Glossary: The definition of "cryosphere" is missing in the glossary [Government of Germany, Germany]	Accepted: cryosphere is now part of the glossary.
12465	Entire Report	0	0	0		Glossary: the definition of "Elevation Dependent Warming" is missing in glossary [Government of Germany, Germany]	A definition for "Elevation Dependent Warming" (EDW) has been included in the Glossary (page AI-10 of the SPM).
12467	Entire Report	0	0	0		Impact definition: The definition of "impacts" in the (updated SR1.5/AR6) glossary and hence its use in the report deviates from the definition of "impacts" in AR5 WG2 glossary. The definition of "impacts" in SROCC glossary refers to "realized risks", rather than "effects on natural and human systems" which is more neutral and can refer to positive and negative effects, and to change in general without prejudging or qualifying those changes in terms of their "potential for danger" (aka hazard). We have several issues with this definition: 1) it seems to wrap most climate "impact" research in the natural sphere, e.g. ecosystem modelling or hydrology, into the category "hazard". This needs to be made more clear to the reader, also in the light of balancing the information provided: it seems disproportionate in a report that is aimed at examining risk from climate change to - at least conceptually and visually - reduce the actual properties and potential consequences of a changing climate to 1/3 of the scope; 2) it leads to inconsistent use of the word impact (effect, consequence) and raises the question how impacts will be assessed, as most current "impact" models will only inform you about the changes on the natural and biological side (now called a hazard) without considering (changes in) vulnerability and exposure, hence they can not inform about risk but only about one component of risk, and are therefore not suitable to assess (future) risks and impacts; 3) it is not clear what is meant by "realized risk" with regard to the future. While the term "realized risk" is intuitive for past situations, the word "realized" carries a historical notion and needs to be explained with respect to projections for the future. It it also necessary to find consistent wording for the outcomes of impact models, something like "potential impacts" or "potential effects of a change in hazard from...", and remove/substitute all uses of the word "impact" that refer to future situations from the report including the summary. 4) With the new definition of impacts as realized risk, there is a need to find a consistent framing for outcomes that are or may be positive - in theory, you'd have to develop an "opportunity propeller" similar to the risk propeller to convey potential benefits of climate change. Still, the issue of how to address a change that can not be prejudge as being potentially dangerous or beneficial remains. Please revisit the definitions in the Glossary, provide some more context regarding the different use of the word impact (from AR4 to AR5 and the current cycle, but also between WGI and WGII) and make sure that the terminology is consistent throughout the report. As we are still early in the 6th assessment cycle, we urge the authors and Co-Chairs to address this conceptual shortcoming and provide clear guidance for the use of terminology, and ensure its consistent use throughout the report. [Government of Germany, Germany]	Although we understand the criticism, the glossary aims to be consisten across IPCC documents, embrace the evolution of the terminology and reflect the meaning/terminology used by CLAs, Las and Cas across SROCC.
12469	Entire Report	0	0	0		Please make sure that changes to concepts and definitions (glossary) compared to AR5 are highlighted and clearly explained in chapter 1, and as appropriate also in the introduction of other chapters. Resulting changes in terminology or conceptual approaches need to be applied consistently throughout the report, and if there is a conflict with the underlying literature using a different definition or concept, it needs to be spelled out clearly. One example is the new definition of "impacts" (see also our comment to that definition) that was introduced in the SR1.5. [Government of Germany, Germany]	Additional attention was given to ensure consistency, including an amendment to the "impacts" definition.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
12471	Entire Report	0	0	0		The way "loss and damage" is referred to in the cross-chapter box 1, and indeed in the whole report, is not in line with the definition provided in the Glossary. In all instances where "loss and damage" (lower case letters) is used, it should refer to either losses or damages or both. In line with the framing of the cross-chapter box 1 and with the wording in the outline of AR6, we suggest using "residual risks and associated losses" to avoid the politically sensitive and ill-defined terminology "Loss and Damage". We'd strongly encourage the authors to consider rephrasing the relevant sentences accordingly, such as Ch1 p.15, l.9 and 13; Ch1 p.16, l.15; Ch1, p.23, l.48; Ch1, p.26, l.50; CCB, p.9, l.39 [Government of Germany, Germany]	Taken into account – text revised. Cross-chapter box 1 and chapter 1 have been revised to make clear that the term loss and damage is used in the political sphere and that scientific assessments of it relate to the appraisal of residual risks but are not exactly the same. This is in line with the treatment of the term in the Glossary. Glossary accommodates both the general terms losses and damages, as well as L&D in the sense of FCCC.
12473	Entire Report	0	0	0		If the concept "limits to adaptation" is used, the wording often conveys general messages whereas the definition builds on the concept of risk tolerance which is very context-specific and dependent on the climate scenario. In many cases, qualifiers or further explanations my help the reader to better understand the issues, such as SPM, p.8, l.34-36; SPM, p.9, l.27-29; Ch1, p.24, l.24-26; CCB7, p.9, l.38; CCB7, p.10, l.1. [Government of Germany, Germany]	Thansk and Noted: This has been taken in SPM
13225	Entire Report	0	0	0		The draft report is currently significantly over the page limits agreed in the outline and some work will be needed to reduce the chapters to the key points. We have suggested areas where text could be shortened. [Government of United Kingdom (of Great Britain and Northern Ireland), United Kingdom (of Great Britain and Northern Ireland)]	Agreed. Taken into account.
13227	Entire Report	0	0	0		We also suggest that CLAs and LAs coordinate across chapters as a number of topics are considered in depth in more than one chapter leading to some duplication and inconsistency in messages. This would also help reduce the length of the report. Examples of topics that have been considered in multiple places are: sea-level rise, ocean circulation (AMOC), permafrost, ice melt, and risk and uncertainty. [Government of United Kingdom (of Great Britain and Northern Ireland), United Kingdom (of Great Britain and Northern Ireland)]	Accepted; we have sought to cross-link material in a more coherent way in the revised report, so as to reduce duplication and to streamline the messaging.
13229	Entire Report	0	0	0		More prominence should be given to synergies between adaptation and mitigation throughout the report. Also, at the moment, the balance is heavily weighted towards adaptation, and fundamental messages around the importance of tackling emissions are lost. [Government of United Kingdom (of Great Britain and Northern Ireland), United Kingdom (of Great Britain and Northern Ireland)]	Noted: the SROCC approved outline gives only limited scope for assessing mitigation itself. The report does however contrast RCP2.6 and RCP8.5 scenarios, and this is now more clearly expressed as the difference between high and low mitigation futures.
13231	Entire Report	0	0	0		It would be easier to read if key messages on extremes, tipping points and risks are captured in one place. At the moment, they're scattered across the report making it difficult to capture the full picture and for some topics, there are discussions in multiple places. [Government of United Kingdom (of Great Britain and Northern Ireland), United Kingdom (of Great Britain and Northern Ireland)]	Accepted: we have strived to do this in the SPM

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
13233	Entire Report	0	0	0		I think that the FAQ has missed an opportunity to be really useful. With such a dense, wordy report, the FAQs could have had a really important role to play in address common misconceptions or misunderstandings in a shorter, snappier and more easy to digest format. Instead, there is only one question, with a dense answer. Perhaps it would be more useful break this down into a series of smaller questions, e.g., why 2 degrees? what is the difference between 1.5 and 2 degrees? Won't animals just adapt and we'll have different ecosystems? [Government of United Kingdom (of Great Britain and Northern Ireland), United Kingdom (of Great Britain and Northern Ireland)]	Noted: the space limitation did not enable us to consider further FAQs
13235	Entire Report	0	0	0		Check for and ensure consistency in language to describe the polar regions. Throughout the report the polar regions are variably referred to as "polar regions", "the polar regions" and on at least one occasion "some polar regions". [Government of United Kingdom (of Great Britain and Northern Ireland), United Kingdom (of Great Britain and Northern Ireland)]	Accepted; we have checked the terminology, and corrected places where needed.
13237	Entire Report	0	0	0		This is in relation to all figures used. 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), United Kingdom (of Great Britain and Northern Ireland)]	The figures use the IPCC colour palette.
15197	Entire Report	0	0	0		We would like to thank the SROCC author team for preparing the SOD. While we note great improvements compared to the FOD, we are also still missing adequate coverage of several key issues listed in the approved outline and particularly relevant for LDCs. In the following, we will provide more specific comments on the indivual issues. [Government of Gambia, Gambia]	Noted
15199	Entire Report	0	0	0		While IPCC SR1.5 was specifically tasked to cover all aspects related to 1.5 degC of global warming, the corresponding discussion/assessment of cryosphere and ocean specific aspects must not be absent in the SROCC. Currently, a specific 1.5 degC assesment is pretty much non-existent throughout the report and references to existing SR1.5 assessments are missing. This needs to be addressed as applicable and address research gaps identified in the SR1.5. [Government of Gambia, Gambia]	Noted- Accepted where possible
15201	Entire Report	0	0	0		The IPCC SR1.5 has covered all aspect related to 1.5°C of global warming, but the corresponding discussion/assessment of cryosphere and ocean specific aspects must not be missing in the SROCC. Currently, a specific 1.5°C assesment is almost entirely absent throughout the report and references to existing SR1.5 assessments are missing. Specifically, the 1.5SR has fallen short to provide sufficient information on glaciers and impacts in mountainous regions. In the approval plenary of the 1.5SR, it has therefore been promised that such analysis that is highly relevantfor mountainous LDCs, would be carried out in the SROCC. Please expand the 1.5°C assessments/referencing across all chapters and make sure that agreements from the scoping sessions are kept. [Government of Gambia, Gambia]	Taken into account - assessment of effects of 1.5 deg warming are given where possible, however, projections found in the literature typically provide only responses to RCP scenarios rather than a fixed temperature increase, therefore in most cases there is no literature to be included.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
15203	Entire Report	0	0	0		The way the issue of Loss and Damage is dealt with in this report is very concerning. The 1.5SR included a Box on Loss and Damage and it is unclear, why this report is pretty much ignoring Loss and Damage altogether apart from the framing and a small section in Chapter 6. Limits to adaptation to the drastic changes to the cryosphere including glacier and permafrost melt as well as ocean impacts are already apparent. This issue needs much greater consideration including in the SPM and a full cross chapter box is warranted on the issue. [Government of Gambia, Gambia]	Taken into account – text revised. The treatment of loss and damage within SROCC has been clarified in cross-chapter box 1.
15205	Entire Report	0	0	0		The way in which the concept of transformational adaptation is deployed in this report is a concern. It is clear that this concept has value in itself, but it is of utmost importance to point out that suggested transformational adaptation measures can come at significant costs and losses, which would have been considered intolerable in the absence of climate change and the existential need to act e.g. when they include relocation. It is clear that transformational adaptation measures such as relocation can infer economic as well as non-economic losses by themselves McNamara et al. 2016). Whether such measures can be considered adaptation, or are in fact responses to Loss and Damage, clearly represents a value judgement. In order to avoid being policy prescriptive, the IPCC therefore should not use this concept in its current form but rather lay out the assumptions transparently to leave the choice to policy makers. [Government of Gambia, Gambia]	Taken into account – text revised. The conceptual and empirical difficulties with transformation are clarified in chapter 1, cross-chapter box 1, chapter 4 and other places. The fact that relocation may or may not be considered adaptation – depending on context and judgement -- is explicitly discussed in chapter 4. Chapter 6 treats the governance of transformation - so this issue is dealt with.
15207	Entire Report	0	0	0		In general, adaptation is of key importance for LDC countries being among the most vulnerable to the impacts of climate change including sea level and cryosphere changes. In order to facilitate successful adaptation, however, estimates about the costs of adaptation including in high mountainous as well as coastal LDCs is of key relevance. Please provide cost estimates for adaptation including in particular on sea level rise. [Government of Gambia, Gambia]	Taken into account- covered to the extent possible in different sections of High Mountain Areas and Seal Level rise though estmiating the deteiled cost of adaptation is difficult as adaptation is context specific and cost of adaptation varies.
15267	Entire Report	0	2	0		General Comment - specialist language and readability Effort is required to make content accessible to non-specialists. In particular for summary for policymakers and introduction to all chapters. Example in the SPM: "Anthropogenic forcing has been the dominant cause of global mean steric sea level rise", "species extinctions may be slowed in terrestrial ecosystems by microclimate refugia", "benthic communities". [EUCE, Belgium]	Taken into account.
15269	Entire Report	0	1	0		General Comment: ensure joined-up treatment of OCC issues covered in more than one chapter A number of very important OCC issues receive in-depth treatment in more than one chapter. These should be looked at from a cross-chapter perspective to ensure duplication and mixed messages is avoided (hopefully saving space). In addition, the main points could be captured in Ch1. Major examples include: Permafrost: 2.2 & 3.4 inter alia Ice melting and SLR: 2.2, 3.3 & 4 Ice melt and oceans (inc ocean circulation): 3.2, 4 & 5 Risk and uncertainty: (see separate comment on this) [EUCE, Belgium]	Taken into account. Cross-chapter linkages are highlighted where appropriate.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
15271	Entire Report	1	3	0		General Comment - extremes, tipping points and risks in the main chapters (see also comments on how these issues are captured in the SPM) The report's in-depth treatment of these issues, and effort to build upon the work of the SREX, is most welcome. However, it would be good to make an effort to increase the coherence of this material across the report - so that readers are not faced with similar (but not identical) material in multiple places. The main messages seem to be in Cross Chapter boxes 1 & 4, Section 4.3, Section 2.3.2, Chapter 6, but surely elsewhere too. It should be clearer that one place (Ch1 or Ch6) provides the main messages that are broadly applicable across chapters. The individual chapters should provide only additional information applicable to their specific areas. See also our general comment on exploring ways to combine the more general insights on mitigation and adaptation from both SRCCL and SROCC (including on aspects of risk & uncertainty and how to deal with them). [EUCE, Belgium]	See table 6.1
15273	Entire Report	0	0	0		More prominence should be given to synergies between adaptation and mitigation. [EUCE, Belgium]	Accepted. Chapter 4 has added some brief but clear statements on the adpatation/mitigation relationship
15275	Entire Report	0	0	0		The breakdown of adaptation into sub-categories (protection, acommodation, retreat, advance, etc.) probably creates more confusion than it solves. Also, these sub-categories are not defined in the Glossary and seem to arise from a single study. Worth keeping? Widely used in SPM too, so it is given prominence. [EUCE, Belgium]	We believe the distinctions among these terms and the governance issues each raises are critically important for Chapter 4's discussion. They are also becoming widespread in the literature. We are considering adding those not currently in the glossary to it.
15905	Entire Report	0	0	0		General Comment - length & structure The report is several times longer than the intended page count. Authors should be encouraged to streamline. For example, the substantive sections within each chapter should present the key arguments at the beginning. Debates about data sources and different methodologies should come second (i.e. they support the discussion rather than being its central point) - and could possibly be moved to an annex. At times sections seem to take an opposite approach, providing lots of detailed information up-front, that is not always synthesised at the end of the section. [EUCE, Belgium]	Taken into account - many chapter parts have been thoroughly revised but in some cases it seemed more appropriate to detail the physical changes first
16183	Entire Report	0	0	0		Heartfelt thanks to everyone involved in preparing the SROCC SOD, which is a much improved document compared to the FOD. The following comments will hopfully contribute to strengthen the report further, as a couple of key sections of the SOD could still be improved substantially. The current assessment of (long-term) sea level rise and coastal impacts needs particular attention. [Alexander Nauels, Germany]	Due attention is given to sea level rise and coastal impacts
16185	Entire Report	0	0	0		It has to be noted that the current SROCC Chapter drafts are way over the estimated page limits included in the approved outline. Indeed, some chapters, in particular Chapters 3, 4 and 5, appear to be rather long for the purpose of this SR and should be shortened where possible. [Alexander Nauels, Germany]	Chapters 3, 4, and 5 have been revised and shortened
16187	Entire Report	0	0	0		Please ensure a consistent ES structure across all chapters, which is currently not the case. [Alexander Nauels, Germany]	ES is revised and all the chapters are made consistent
16189	Entire Report	0	0	0		While the SSP scenarios have been introduced as complementary pathways to the RCPs in Chapter 1, no SSP analysis is elevated to the SPM, which focuses only on AR5 style RCPs. In general, hardly any presented chapter assessments are based on the SSPs. Please be more clear throughout the assessment which scenarios are used and why (available studies, AR6 focus on SSPs etc). [Alexander Nauels, Germany]	Noted: this report assessed all relevant literature. Most of it uses RCP scenarios and very few SSPs.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
16191	Entire Report	0	0	0		While the assessment of SDG implications has been requested in the approved outline quite prominently, they are only covered in Chapter 01, so far without any statement elevated to the SPM. Please ensure adequate coverage of this crucial cross-chapter topic and provide key findings presented in FAQ1.2 in the SPM. [Alexander Nauels, Germany]	Noted- SDGs covered in different chapters. Except chapter 3, all the chapters covered SDGs moderately. Due to limited literature through assessment of SDGs was not possible.
16193	Entire Report	0	0	0		Throughout the report, the overarching aspects of limits to adaptation should be communicated more promimently still. While the overall assessment has improved compared to the FOD, the topic should receive more attention, in particular in the SPM. In this context and as part of the overall governance assessment, the loss & damage discussion should be strengthened as well, as it is becoming a crucial component under the UNFCCC. [Alexander Nauels, Germany]	Taken into account- Loss and damage is very important. we made efforts to cover the loss and damage. Except chapter 3, all the chapters briefly touched loss and damage. Detailed treatment was not possible due to limited literature on this. Loss and damage also briefly touched in SPM.
16511	Entire Report	0	0	0		Glossary: "Ice Caps": It may confuse outsiders that here "Ice Caps" are referred to "Glaciers" but nothing accordingly is mentionet under "Glaciers". As the term "Ice Caps" had been eliminated in AR5, I suggest to not mention it anymore. [Georg Kaser, Austria]	Accepted
16587	Entire Report	4	0	4		This comment concerns the Glossary (Anex I): In the description of the Carbon Cycle, it should be noted that 1GtC corresponds to 3.667 GtCO2 (not 1Gt = 3.667GtCO2, that leads to confusion) [Jens Rassmann, Belgium]	Edit has been made
16589	Entire Report	19	0	19		The entry "Migrant" exists twice [Jens Rassmann, Belgium]	The entry "migrant" refers to "migration (of humans)", where the term "migrant" is defined as a subterm
17023	Entire Report	1	1	0		First at all, congratulations to all of the authors of this report. This is a great and wonderful work. [Jorge Carrasco, Chile]	Noted
17093	Entire Report	0	0	0	0	Information on glaciers over mountaneous areas, particulalrly in developing countries is still skecth and need to be adequately reflected [Government of United Republic of Tanzania, United Republic of Tanzania]	Taken into account- combined with other comments
17119	Entire Report	1	1	300	70	Sustainable energy such as hydro power energy availability and access is critical for sustainable livelihood of people depending on oceans and seas for their livelihood. Suprisingly that kind of intervention has not been mentioned anyhere over the whole document. Africa need sustainable enegy to adapt the impact of climate change. It could be good a separate section be spared to adress the issue of energy availability and access in developing world as one of sustainable actions to adress climate change to coastal communities. [Government of United Republic of Tanzania, United Republic of Tanzania]	Out of scope
17121	Entire Report	1	1	300	70	The issue of technology was mentioned but they have not put much emphasis that developing world and the people surrounding oceans and seas need tochnology for fishing, preserving food and other uses. If we wand Africa and other developing world to better adapt to the impact of climate change the IPCC should ensure that information regarding the need for technology in Africa is emphasised. [Government of United Republic of Tanzania, United Republic of Tanzania]	Out of scope

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
17123	Entire Report	1	1	300	70	There is a lot of literature generated from international organisation such as FAO, UNDP, UNESCO. These information need to as well included in the contribution of this report rather that depending on peer reviewed papers. Most of these international organisation are working at a grassroot with communities and they may have more detail information with regards to the status of coastal dependent communities. I recommend more avenue for literature review be expanded to extract as much information from diverse sources. [Government of United Republic of Tanzania, United Republic of Tanzania]	Literature assess where appropriate
17339	Entire Report	0	0	0		Throughout the SROCC (and indeed in many other forums), local communities and Indigenous Peoples are lumped together, Indigenous Knowledge and local knowledge are lumped together. This can cause real harm and confusion (particularly in an Arctic context where many small local communities are almost 100% Indigenous) because Indigenous Peoples have very distinct rights and governance structures and experience distinct social and economic disparities and inequities. Indigenous Peoples are tied to the land in ways that local communities are not. These things are muted by lumping with LCs with IPs and LK with IK. There has been much international discussion of this within the Arctic Council, within the UNFCCC, and the IPCC must be cognizant and respectful in how this is dealt with in IPCC reports and assessments. This is something that could be discussed further in a defined process of engaging with IPs on IPCC assessments. [Joanna MacDonald, Canada]	Accepted- In chapter 1 (and in the glossary) we define the specific differences between Indigenous knowledge and local knowledge. Furthermore, we include the perspectives of knowledge holders as contributing authors in the CCB on knowledge systems to represent their ideas for collaborating with sceintific knowledge.
18407	Entire Report	0	0	0		I also believe that taking into account the needs of non-professional readers, the Executive Summary should be more friendly and understandable. [APECS Group Review, Germany]	Chapter 4 has done its best to accurately and transparently key messages in its Executive Summary
18409	Entire Report	0	0	0		A word used in numerous places should be clearly defined as its general use in the report. Definition of Adaptation is somehow much technical in glossary. In my view if we replace with the following one. “Adaptation means to foresee the adverse effects of climate change and taking proper action to prevent or minimize the damage they can cause, or taking advantage of opportunities that may arise”. [APECS Group Review, Germany]	Point taken but the team feels that we need a broader definition to reflect the meaning in the entire report that is also consisten with other IPCC documents.
18411	Entire Report	0	0	0		Word “Mountain” is often use in Chapter 2. Must include in the Glossary. “A mountain is a large landform that rises above the surrounding land in a limited area, usually in the form of a peak”. [APECS Group Review, Germany]	Mountain is defined in chapter 2 and in SPM
21427	Entire Report	0	0	0		Include "biological pump", "microbial carbon pump", "carbonate pump"..... In the glossary. [Rui Zhang, Canada]	The terms biological (carbonate) pump and carbonate pump are defined in the glossary. The term microbial carbon pump is only used in Chapter 5, and so was defined (referenced) in the chapter when first used but was not included in the glossary.
21429	Entire Report	0	0	0		Provide a marine organic carbon cycling figure. [Rui Zhang, Canada]	Rejected - in earlier version of the Chapter 5 development a figure was included of processes around bilogical pump, microbial carbon pump but it received criticism and with space constraints was removed.
21621	Entire Report	0	0	0		Advances in Chapter 3 beyond AR5 should be added [Government of Republic of Korea, Republic of Korea]	Accepted; now added

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
21623	Entire Report	0	0	0		Results based on in-situ observation related to Antarctica are still insufficient, which could be understood due to lack of data, but more efforts should be made regarding this issue. Highly imbalanced comapred to materials provided from Arctic. Satellite remote sensing data help us to figure out general senses of on-going features in Antarctica, but limited to improve our knowledge on detailed physical processes behind, which could be largely resolved by in-situ observations. [Government of Republic of Korea, Republic of Korea]	Accepted. We have sought to improve the balance between Arctic and Antarctic material in the chapter, and also to highlight the disparity in the observational records of the two polar regions.
21903	Entire Report	1	1	223	70	This Chapter reads well in some places, but in others is a little verbose and repetitive. I will try to pick this up in particular sections, but some attention is needed to the product as a coherent whole. [David Schoeman, Australia]	Noted
21905	Entire Report	1	1	223	70	I know the instructions suggest not to worry about typographical and grammatical errors, but this work contains many. It will require a very throrough copy edit. [David Schoeman, Australia]	Noted
22153	Entire Report	0	0	0		"The report presents a comprehensive updated information and knowledge on Climate Change and Oceans since AR5. Ocean and Cryosphere is the perfect example of how climate change resulting from the action of few countries in adversely impacting the integrity rather threatening the survival of the many areas, cultures, biodiversity and economies across the world. The report could be strengthened to provide guidance to Policymakers to take action by adding analysis on the following aspects: a) degree of vulnerability (ocean basis wise) vis a vis ability and capacity of the respective region to adapt / undertake risk mitigation. This aspect is significant from the perspective of CBDRRC, Equity, Climate Justice and Right to Live (for both humans and marine fauna/ flora species); b) identify risk mitigation actions which could be taken up at the global/ regional level; c) it is important to understand that mainstreaming/ integrating climate concerns into developmental sectors requires clear understanding; financial, technological and capacity-building support including exchange of information. This aspect is completely missing in the report and may be included; and, d) it will be useful to access the project database and assessment reports of GEF/STAP/ GEF agencies for International Waters and Biodiversity focal areas to address the data/ information gap for certain regions." [NAYANIKA SINGH, India]	Noted with thanks. Due to space limitation, we could not attend to this.
22201	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). The definition of black carbon as synonym for soot is too sloppy to be used in an influential IPCC report. Even though it is sometimes referred as soot, such references are nowadays recognized as erroneous/imprecise and SROCC should not contribute to perpetuate such a pseudodoxia. [Sergio Henrique Faria, Spain]	It is factually correct (not erroneous) to say that "black carbon is also known as soot".Additional detail is also given.
22203	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). Repetition of "and" at the end of the entry "albedo". [Sergio Henrique Faria, Spain]	Noted. The definition will be updated.
22205	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). For consistency, the entry "Ice caps" should be in singular ("ice cap") as all other similar entries. [Sergio Henrique Faria, Spain]	Noted, ice caps will be changed to ice cap.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
22207	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). The definition of "irreversibility" is unnecessarily complicate, and also incomplete. First, it is based on the concept of "dynamical system", which has not been introduced in the Glossary. Second, the usual definition of dynamical system (which must be taken for granted since no other definition is provided) is too broad to be used in the comparatively narrow and specialized definition of "irreversibility" proposed in the Glossary. Third, why not replacing the physicists' jargons "A perturbed state" and "dynamical system" by simpler expressions more appropriate for a general audience (and actually more suitable to the aims of the Report), like "A changed state" and "climate system"? A positive point of this change is that it would make the definition of "irreversibility" more compatible with the definition of "abrupt climate change". [Sergio Henrique Faria, Spain]	Comments noted, and taken into account in finalising the Glossary.
22209	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). The term "ablation" I defined twice (and not exactly the same) in the Glossary: as an independent entry and as a sub-entry of "mass balance". Only one entry should exist, and the latter should refer to the former. [Sergio Henrique Faria, Spain]	Noted, but "ablation" as used in the mass balance definition explicitly refers to the ablation definition (i.e. the word is italicized), and is defined correctly in both places as mass loss by any of a number of processes.
22211	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). Why does "accumulation" not have an independent definition in the Glossary, like "ablation"? [Sergio Henrique Faria, Spain]	The term "accumulation" is used as commonly defined in the dictionary, so it was not included in the gloassary.
22213	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). The definition of "measurement, reporting and verification (MRV)" is far too narrow and specific.Why distinguishing between "field measurements" and "field observations"? Why excluding other possible data sources? Why limiting the definition of "reporting" exclusively to "reporting to the UNFCCC"? [Sergio Henrique Faria, Spain]	The phrase "measurement, reporting and verification" is explained in the Glossary by giving the meaning of the three words in the context of UN accounting procedures, based on UN REDD (2009). The definitions may seem narrow, but that is necessary for valid international comparability. The distinction between "field measurements" and "field obsservations" is relatively subtle; however, the latter is more general and can include a very wide range iof quantitative and non-quantitative data sources.
22215	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). In the definition of "migration", there is an indentation missing before "migrant". [Sergio Henrique Faria, Spain]	Noted. The missing indentation will be added.
22217	Entire Report	0	0	0		My comment is actually about the Annex I Glossary (I couldn't find this annex in the selction menu of the Excel file). I don't see the reason to introduce an explicit definition of "motivation", seeing that the proposed definition is essentially the generic one that anyone knows and can be found in any dictionary. [Sergio Henrique Faria, Spain]	The term "motivation" is no longer included in the final version of the Glossary

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
22407	Entire Report	1	1	20	17	We would like to thank the authors for their continued hard work in preparing the SOD of this Special Report, the Ocean and Cryosphere in a Changing Climate. The report chapters and SPM are more comprehensive than needed and would benefit from review to make them more concise. The IPCC Plenary asked for a 265 page report, this draft presents us with 900 pages. Suggest authors review the chapters and SPM to reduce length in a manner that provides an evidenced-based, consistent and balanced report. The SPM should be no more than 10 pages, the Executive Summary of each chapter should be no more than 2 pages maximum. Beyond this length it is no longer a summary and will not be read by policymakers. We suggest reviewing the structure of each chapter to clearly set out the purpose, scope, structure and themes of the chapter. This was done very well in Chapter 4 and made the chapter very readable. Other chapters in this special report lacked this and could benefit from following a similar structure to the beginning of the chapters. The category on advances since AR5 and SR1.5 was also useful and would be beneficial in other chapters including in the SPM. Each chapter would be most useful if structured and mapped explicitly to the AR6 reports: for this report mainly WG1 and WG2. Where possible, headings like "Physical Science Basis" , "Impacts", "Adaptation", "Vulnerability" to provide the reader with more accessible "mapping" back to AR5 and forward to AR6, might also be useful. [Government of Australia, Australia]	Noted
22409	Entire Report	1	1	20	20	Suggest the report avoids stating that "X *will* happen" since in the context of climate projections statements about the future are usually scenario-dependent, so we don't know what *will* happen. Suggest the report state what *is likely to* happen under a specific set of circumstances (a set of scenarios). [Government of Australia, Australia]	Accepted and taken into accound, especially in the SPM
22629	Entire Report	0	0	0	0	Within the whole document, the authors typically talk about permafrost thaw. While this is not necessarely wrong, in contrast to permafrost melt, I suggest to use permafrost degradation. It is important o understand the difference. Permafrost is defined by temperature and time (Muller, 1947), hence thaw is indicative for the transition to positive temperatures. However, instabilities, thaw consolidatyion, settlements and changes to the hydrology can already occure earlier because the groudn ice doesn't melt only at 0 degrees, but depending on the soil conditions, the unfrozen water content can be quite significant (e.g. Williams 1964). The term degradation does, in my view, better account for these general changes in the permafrost in response to warming temperatures. [Lukas Arenson, Canada]	Taken into account. Both terms are used depending on the context

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
22661	Entire Report	0	0	0		It is both disappointing and worrying to see how little the report builds on the SR15 findings, which demonstrated how big a difference even half a degree of further warming makes, especially (!) when it comes to impacts on oceans and the cryosphere. Instead of helping policymakers to see the obvious benefits of aiming for 1.5°C, the report blurs the difference between 1.5°C and 2°C, including by making inconsistent references to the RCP2.6 and by completely ignoring newer RCP1.9 scenarios. This is quite a different approach from that taken in the SRCCL, where the RCP2.6 pathways are referred to as “broadly a 2˚target” and RCP1.9 scenarios as “broadly a 1.5˚target” (see the draft SRCCL chapter 2.7.2). The SROCC even at times makes RCP4.5 appear as ‘a lower risk scenario’ or a reasonable middle scenario by being so focused on what are called low emission (RCP2.6) and high emission (RCP8.5) futures. In reality the RCP4.5 would already be a high carbon high risk future too, even if not as extreme as the RCP8.5 (which is quite irrelevant or policymakers anyway, since such a future with no climate policy doesn't exist anymore). While the SR15 made it very clear how critical the next 12 years will be for the future of our marine life and cryosphere (as global emissions would need to be halved by 2030 if we are to have a chance for 1.5°C) this does not come through in this report with the clarity policymakers would now need. The coordinating lead authors should revisit this, ensure that the report is more consistent with the SR15 findings and that the the critical role of near-term decisions becomes more clear in the overall storyline of the report, and especially in the SPM. [Greeenpeace Group Review, Republic of Korea]	Ch5's assessment, wherever appropriate, built on, and refers to SR1.5 with explanation of point-of-departure. The newer scenario analysis using the RCP1.9 scenarios are not available in the literature that we assessed, limiting the use of this scenario in the assessment in Ch5.
22903	Entire Report	1	1	100	70	There are terms mentioned in the Glossary, that needs commenting: The first one is "Global Warming", from previous reports it has now been redefined in a very wrong way. Previously Global Warming, was an entity that could be measured from year to year. However, now it is reliant on artificial calculations and has become a diffuse and theoretical entity. To make sure that future scientists and the public in general will continue to respect the work done by the IPCC, it is essential that the current definition is changed back to the normal and old meaning. The second term that needs to be addressed is "Tipping point", defined as: "A level of change in system properties beyond which a system reorganises, often in a nonlinear manner, and does not return to the initial state even if the drivers of the change are abated. For the climate system, the term refers to a critical threshold when global or regional climate changes from one stable state to another stable state. Tipping points are also used when referring to impact: the term can imply that an impact tipping point is (about to be) reached in a natural or human system." Thire is absolutely no indications or documantations that the Tipping point definition is relevant for the current climate regime on Earth. Were we heading towards a new Ice Age, then the matter would be different. The third term that needs to be addressed is "Temperature overshoot". In the current climate regime, with a documented global warming of only 1.2 +- 0.2 degrees C, over 160 years (e.g., since pre-industrial time), there is no indication, except for the failed numerical prognoses of the IPCC, which are only of theoretical and political interest (and of no significant historical scientific significance) that we will reach a dangerous level of climate change in the near future. [Martin Hovland, Norway]	The definition of "global warming" is not a "diffuse and theoretical entity" that is "reliant on artificial calculations".Instead it is defined in a consistent way, elating tochanges over a 20 year period relating to pre-industrail conditions. The term "Tipping point" is defined in the Glossary; however, it is not the mandate of the Glossary to analyse the relevance of a term but rather to explain its meaning.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
22905	Entire Report	1	1	100	70	In contrast to the IPCC's professional Assessment Reports, which always contain three parts: representing Working Group I (The Physical Science Basis), WG II (Impacts and Adaptation), and WG III (Mitigation of Climate Change), this SROCC, like also the SR1.5-report deviates from this stringent and scientifically based model. Instead, these two 'Special Reports' lack the focus and purely scientific analyses. Instead they are riddled with half-truths and conjectures, as if their basis have een NGO-type of Campaign Alarmistic short-cuts, with very little or no scientific documentation. In this way, the previously professionalism of IPCC reports have been corroded and they are lacking credibility. In the long run (say, these two reports in combination, SR1.5 and SROCC, will be the final reports of IPCC, as it will be just equivalent to reading Campaign Alarmistic reports published for example by Greenpeace and WWF, who base their claims on exaggerated and unscientific statements. I have read through three of the Chapters in this report SOD, and have found an immense amount of such statements, which the knowledgable people of the world will react with distaste and scoff at. This report is therefore on the way to become non-credible and is on its way to the dustbin, if you do not turn round and do major improvements on credibility and scientific documentation of all statements. [Martin Hovland, Norway]	Rejected - this is a scientific assessment based on the peer reviewed literature
23095	Entire Report	0	0	0		There is a need for more coherency in the various chapters on the following aspects : treatment of decadal predictability; treatment of sustainable development / SDGs; treatment of reasons for concern (chapters 4, 5 and 6 have a final summary section linked with that but not 2 and 3). [Valerie Masson-Delmotte, France]	Taken into account
23107	Entire Report	0	0	0		There is a need to be more specific about how projections of changes and risks depend on the type of scenario or the range of projected global warming. The ES of chapters are too generic and lack substance on differences between 2, 3, 4°C of global warming. [Valerie Masson-Delmotte, France]	Taken into account
23113	Entire Report	0	0	0		Please check carefully sentences which include "should", "must", "need to", "is needed" as some sentences are written in a prescriptive way (either to indicate future research to be performed or what policy makers should be doing). The report must keep a neutral and non prescriptive tone. [Valerie Masson-Delmotte, France]	Taken into account
23115	Entire Report	0	0	0		please check carefully sentences including the word" demonstrate". This report is not "demonstrating" things, it is assessing the state of knowledge. [Valerie Masson-Delmotte, France]	Taken into account
23151	Entire Report	0	0	0		Please check carefully the traceability of figures. References related to source information need to be provided. Figures could be improved so that the key messages are more visible without reading the full caption. [Valerie Masson-Delmotte, France]	Accepted
23177	Entire Report	0	0	0		Chapters could consider having some aspects of key knowledge development since AR5 and key knowlege gaps more explicitely treated in ES to feed the SPM on this. [Valerie Masson-Delmotte, France]	Noted
23217	Entire Report	0	0	0		Could chapters have an assessment of enablers and barriers to implementing responses to ocean and cryosphere changes (as done in section 4.4.5.5)? (this would ensure coherency with SR15 on dimensions of feasibility / enabling conditions). [Valerie Masson-Delmotte, France]	Accepted
23319	Entire Report	0	0	0		I congratulate the authors for the quality of the second order draft. I have provided comments to the SPM that are relevant for executive summaries of all chapters. [Valerie Masson-Delmotte, France]	Noted

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
23325	Entire Report	0	0	0		Issues linked with health impacts (including solastagia) and economic impacts should be better covered in ES to be present with more substance in SPM. [Valerie Masson-Delmotte, France]	Taken into account- health impacts appeared in SPM as well
23329	Entire Report	0	0	0		There is a need for more coherency in the various chapters on the following aspects : treatment of decadal predictability; treatment of sustainable development / SDGs; treatment of reasons for concern (chapters 4, 5 and 6 have a final summary section linked with that but not 2 and 3). [Valerie Masson-Delmotte, France]	Taken into account
23335	Entire Report	0	0	0		Please check carefully sentences which include "should", "must", "need to", "is needed" as some sentences are written in a prescriptive way (either to indicate future research to be performed or what policy makers should be doing). The report must keep a neutral and non prescriptive tone. [Valerie Masson-Delmotte, France]	Taken into account
23337	Entire Report	0	0	0		please check carefully sentences including the word" demonstrate". This report is not "demonstrating" things, it is assessing the state of knowledge. [Valerie Masson-Delmotte, France]	The word 'demonstrate' appeared in different chapters including chapter 3,4, 5. This can be taken care of during editing
23343	Entire Report	0	0	0		I recommend that the references inside x chapter boxes are merged with the references of the corresponding chapter as done for SR15 for coherency. [Valerie Masson-Delmotte, France]	Taken into account
23345	Entire Report	0	0	0		There is a need to think carefully about sectoral information (health, tourism, transport/ shipping, food security,infrastructures) are treated across chapters so as to support information for these sectors in the SPM. It is missing at the moment. [Valerie Masson-Delmotte, France]	Taken into account
23351	Entire Report	0	0	0		Please check carefully the traceability of figures. References related to source information need to be provided. Figures could be improved so that the key messages are more visible without reading the full caption. [Valerie Masson-Delmotte, France]	Taken into account
23353	Entire Report	0	0	0		Treatment of "place attachment" and the notion of "novel climate conditions" seem chapter specific, could it be better coordinated across chapters and reflected in ES/SPM? [Valerie Masson-Delmotte, France]	Noted
23357	Entire Report	0	0	0		Treatment of education across chapters could be harmonized / strengthened and information on this issue uplifted to ES/ SPM. [Valerie Masson-Delmotte, France]	Taken into account
23359	Entire Report	0	0	0		Robust and flexible decision making to be addressed better x chapters and conveyed as a key element of response strategies into SPM (incl. Definition and maybe examples). [Valerie Masson-Delmotte, France]	Taken into account in SPM section C
23365	Entire Report	0	0	0		The SPM needs to convey what is deep uncertainty and what elements of SROCC are linked with that (so this needs explicitely reported in ES from chapters). [Valerie Masson-Delmotte, France]	Noted
23367	Entire Report	0	0	0		Could FAQs have a visual element to help for their use in communication material? [Valerie Masson-Delmotte, France]	Taken into account- In FAQ 1.2, FAQ 2.1, FAQ5.1 have infographic
23373	Entire Report	0	0	0		Could the report touch the issue of education, ocean literacy, cryosphere literacy in the context of a warming world? [Valerie Masson-Delmotte, France]	education campaigns higlighted
23815	Entire Report	0	0	0	0	The New Zealand Government congratulates the authors for their work producing this draft, and thanks them for the opportunity to review it. [Government of New Zealand, New Zealand]	Thank you

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
23845	Entire Report	0	0	0	0	The length of the report vastly exceeds the proposed length mentioned in the outline of the SROCC as annexed to the Decision IPCC/XLIV-2, in which the total number of pages is stipulated as up to 250. Although the number of pages for the Summary for Policy Makers (SPM) is a reviewable volume (21 pages in the current First Order Draft), the current volume of the Second Order Draft of the entire report (851 pages) tends to place a heavy burden on the policy makers, in the endeavor to fully understand the SPM and submit the best quality of government review comment within the allocated review period. Thus, we would appreciate further consideration regarding the length of the special reports in the AR7. [Government of Japan, Japan]	Agreed. Taken into account.
24007	Entire Report	0	0	0		Advances in Chapter 3 beyond AR5 should be added [WON SANG LEE, Republic of Korea]	Accepted; now added
24009	Entire Report	0	0	0		Results based on in-situ observation related to Antarctica are still insufficient, which could be understood due to lack of data, but more efforts should be made regarding this issue. Highly imbalanced comapred to materials provided from Arctic. Satellite remote sensing data help us to figure out general senses of on-going features in Antarctica, but limited to improve our knowledge on detailed physical processes behind, which could be largely resolved by in-situ observations. [WON SANG LEE, Republic of Korea]	Accepted. We have sought to improve the balance between Arctic and Antarctic material in the chapter, and also to highlight the disparity in the observational records of the two polar regions.
24281	Entire Report	0	0	0	0	IPCC calibrated language, such as the terms "high confidence", "medium confidence", etc., could be color-coded. That is, each level of confidence is attributed a color and, when mentioned, the term is presented in its respective color, making it easier for the reader to grasp the level as higher or lower in the scale applied. [Carla Elliff, Brazil]	Style for this is predefined by the IPCC guidance note on the treatment of uncertaitanties.
24413	Entire Report	0	0	0		A tremendous job have been put into this SR to frame all the important changes in the field since AR5. It seems to me that the different chapters have been composed/edited as solitary objects, and that some information is repeated in the different chapters. If chapters are homogenized are homogenized possible text volume can be spared, since information likely can be cross-referenced between the chapters. If though these text parts repeated between the chapters need to be repeated, due to that intention each chapter need to stand as a solitary text, at least references can be used more economically by using same references from similar arguments in the different chapters. [veijo pohjola, Sweden]	Taken into account
24415	Entire Report	0	0	0		References. A large part of the SR are allocated to references. A better re-useage of references in the different chapters/sub-chapters, and being stricter to truffle arguments with references will help to short text, and reference lists. There are arguments that have longer reference lists, than actual text. Perhaps set a maximum of about three references to each argument. I found one argument that had nine references (chapter 3, p34, r22-24). [veijo pohjola, Sweden]	Noted: we have strived to have a better balance in the final version
24417	Entire Report	0	0	0		There are parts of the reports that lack figures/ illustrations that lift the impression of the report. Consider to have a few more illustrations. Something that may bu useful is a map in chapter 1 that show which global areas are part of this report. Specially important to show what is regarded as Arctic in this report, since teh boundaries of the Arctic are different due to what questions is asked. [veijo pohjola, Sweden]	Noted: a lot of efforts have been put in figures. There is a world map in the SPM.
24449	Entire Report	0	0	0		It is to recomend a revision of the use of acronyms in the report. Excessive use of acronyms make the text diffifult to read. Acronyms are useful in specialist litterature, where most readers are used to certian acronyms. But in this case it probably complicates the readering of non-experts. [veijo pohjola, Sweden]	Noted. The need for uses of some acronyms have been reconsidered.

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
24473	Entire Report	0	0	0		There is overlap between section 3.3.1 Ice Sheet Changes + Appendix 3.A.3.1 and Section 4.2.3.1 'Dynamic Contribution of Ice Sheets', especially concerning observed mass balance from GIS and AIS. Some examples are given as separate comments in this review, but I think the chapters in general would benefit of a more clear choice what is discussed in Chapter 3 versus 4 in stead of repeating references to publications. [Eef van Dongen, Switzerland]	Accepted; we have worked to improve the partitioning and complementarity of the material.
25067	Entire Report	0	0	0		Are coastal shelf seas considered in this SROCC? [Zelina Ibrahim, Malaysia]	Coastal shelf seas is not separately assessed as an ecosystem type in Ch5. Instead, it is assessed as other components of the coastal shelf seas (e.g., epipelagic, coastal vegetated ecosystems) are assessed. This is explained in the introduction paragraph of Section 5.3.
25225	Entire Report	0	0	0	0	For some assertions, a combination agreement/evidence statement is used (e.g., page 1-3, line 15) while for most other assertions, a confidence statement is used. It's unclear to me why a confidence cannot be assigned to all assertions and why, instead, an agreement/evidence statemet is used in some cases. I suggest adding a brief explanation to Section 1.9.3 to explain this. Related to this, the "Step 2" panel in Figure 1.4 seems to indicate that the evidence level is always assessed for any particular assertion and it is directly tied to a confidence level. It would help to make a slight modification to this figure to show that there is not always a confidence level provided in the text. Alternatively, if a confidence level can always be provided, please add confidence levels to agreement/evidence statements, where they are missing, throughout the entire report. In this case, Figure 1.4 can then be left as-is. [Denis Felikson, United States of America]	Noted: the chapter 1 text and figure 1.4 have been updated to clarify the process of assessing evidence and agreement, and then where there is enough information available assigning confidence or likelihood.
25541	Entire Report	1	1	300	70	I ORIGINALLY RESERVED THE JANUARY 2-JANUARY 11 PERIOD TO WORK ON THE REPORT BUT A NASTY VIRUS KEPT ME UNABLE TO DO ANYTHING FOR MOST OF THE TIME. MY APOLOGIES FOR DOING SO LITTLE AND MY CONGRATULATIONS FOR YOUR GRET WORK. HAPPY NEW YEAR! [Christophe Deissenberg, Luxembourg]	Hope you recovered well
25563	Entire Report	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, Germany]	Loss and damages covers to the extent possible (based on avaiable evidence) in different chapters and CB9.1

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
25575	Entire Report	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, Germany]	Taken into account- please see SPM Figure 1
25721	Entire Report	0	0	0		A quantitative indication of the economic losses the planet will face if mitigation is not taken up. [Government of India, India]	Taken into account- Economic losses are estimated to the extent possible (based on avaiable evidence) in different chapters and CB9.1
25851	Entire Report	0	0	0		I would like to thank the report compilers for all their efforts so far! [Elizabeth Petrie, United Kingdom (of Great Britain and Northern Ireland)]	Thank you.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
25989	Entire Report	1	1	0		The report should greatly reduce the numer of acronyms. Some only occur a couple of times in a chapter but even those occurring more often should be reduced (either spelled out or often they can just be deleted or shortened - in most cases the context makes clear what it is (e.g. if a section is only aout the Greenland ice sheet, one can just say 'ice sheet' and it is clear. Avoiding acronyms is important for all IPCC reports which should be easily readable for broad audience, and in particular this report which covers both physical and social sciences. Also IPCC report chapters are seldom read from start to end, so individual sections should be readable without flipping back and forth. [Regine Hock, United States of America]	A great suggestion, IMHO
26119	Entire Report	1	1	0		Ice sheet and glacier mass changes are presented in much detail in chapter 2/3 AND (particularly well !) in Chapter 4. Can this substantial overlap/repetition be avoided. All ice sheet mass change may better be kept in chapter 3, while chapter 4 looks at the total rather than partitioning and individual ice sheet components? [Regine Hock, United States of America]	Taken into account- it is taken care of with other comments
27189	Entire Report	0	0	0		The main concern I have is that physical exchanges (heat, freshwater) across the air-sea and air-sea-ice interfaces are barely discussed. I suggested that this issue needed to be addressed when reviewing the FOD Chapter 1. However, little progresss seems to have been made. I guess that the authors will say that air-sea heat exchange is outside the remit of the report. However, this would be inconsistent with the assessment of air-sea CO2 exchange which is included - particularly in Chapters 3 and 5. Air-sea exchanges of heat and carbon are of central importance to the ocean uptake of heat and carbon. So, given that air-sea CO2 fluxes are being considered, it makese sense to include air-sea heat fluxes as well. I therefore urge the authors to include an asessment of research in this important and relevant area. In particular, several studies since AR5 suggest that global mean net heat flux can now be determined at an accuracy sufficient to consider variations in heat uptake by the oceans (Liang and Yu,2016; Liu et al., 2017; Ponte and Piecuch, 2018). Can the panel please assess these papers and provide an informed assessment regarding their significance/accuracy? Note this is not a case of cite my own work as I am not an author on these publications. Liang, X., & Yu, L. (2016). Variations of the global net air-sea heat flux during the “hiatusperiod” (2001–10). Journal of Climate, 29(10), 3647–3660. https://doi.org/10.1175/JCLI-D-15-0626.1 Liu, C., R. P. Allan, M. Mayer, P. Hyder, N. G. Loeb, C. D. Roberts, M. Valdivieso, J. M. Edwards, and P.-L. Vidale (2017), Evaluation of satellite and reanalysis based global net surface energy flux and uncertainty estimates, J. Geophys. Res. Atmos., 122, 6250–6272, doi:10.1002/2017JD026616 Ponte and C. G. Piecuch. (2018) Mechanisms Controlling Global Mean Sea Surface Temperature Determined From a State Estimate. Geophysical Research Letters 45:7, 3221-3227. [Simon Josey, United Kingdom (of Great Britain and Northern Ireland)]	Noted- The physical exchanges with the air-sea inetrface have not been assessed, inpart becasue the view was taken that the new information since the AR5 IPCC report was insufficient to make a new assessment worthwhile among the broad suite of variables and systems that needed to be covered in the overall report.
27283	Entire Report	0	2	21	43	General comment: This report is well-written and clear, but is highly technical in places. The reader would need to be familiar with various RCPs and this should not be assumed. References to end-of-century temperature ranges would be more appropriate. The Report coud also benefit from referring to Paris Agreement temperature ranges and how the achievement of the associated goals would differ through failing to do so [Government of Ireland, Ireland]	Taken into account. A scenario cross-chapter box is now inclucded in the report

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27285	Entire Report	0	2	21	32	The Report is quite concise but nevertheless has a degree of repetition which could be reduced. References to very specific tems and areas which are clearly familiar to the Authors could be made more generic [Government of Ireland, Ireland]	Noted- Thank you.
27287	Entire Report	0	2	21	43	The report has a strong adaptation focus but this could be managed in a manner which recognises the low emissions goals of the Paris Agreement. Recognising that the ocean is a buffer for CO2, it may be worth including some text on how the ocean will respond to negative emissions which are seen as essential to achieving ambitious temperature goals [Government of Ireland, Ireland]	Taken into account, particularly in Section 5.4.2 of CH5.
27289	Entire Report	0	2	21	43	There are areas in the Report which alternate between oceans and cryosphere repeatedly. This could be amended to improve readability [Government of Ireland, Ireland]	Structure was fixed in approval of scope
27291	Entire Report	0	2	21	43	A key element of this report relates to the transfer of water from the cryosphere to the oceans. The message of how this will impact on sea level rise is a very important one. Some quantification of the total amount of water contained in the cryosphere would be of interest. Additionally, any data on changes in this figure over the last centuries or milennia, particularly in relation to the cryosphere prior to the industrial revolution, would be very helpful [Government of Ireland, Ireland]	See final SPM
27383	Entire Report	0	2	21	43	A key crossover with the Land Report is the accumulation of carbon. The ocean is a key sink for CO2. Some estimate of this accumulation since industrial era started should be provided as framing information. Projections for further uptake until net zero is achieved would be of value under future pathways. Also the impacts of degassing of ocean CO2 on negative emissions warrant mention. [Government of Ireland, Ireland]	Taken into account, particularly in Section 5.5.1 of CH5.
27385	Entire Report	0	0	0		Nepal welcomes to provide the comments and suggestion on the SROCC [Government of Nepal, Nepal]	Thank you.
27387	Entire Report	0	0	0		Nepal would like to request to mention the name of Mt. Everest (Sagarmatha) under the introductory topic as it is the highest peak in the world. Specify the need of insitu observations in the mountaineous regions to fullfill the current gaps [Government of Nepal, Nepal]	Taken into account- the Himalaya has appeared prominantly in Chater 2 and in SPM. In need of insitu measurement is discussed in section 2.2.2
27425	Entire Report	74	0	76		Please add the the following observed trend values of mean annual maximum temperature from 1971-2014 (Analysis with past observed grided data) for the reference of Nepal. Please put the following values for Nepal in the table Appendix 2.A Supplementary Material ,2.A.1 details of studies on temperature and observation projections (Domain- Country Nepal; Variable- Mean Annual Maximum Temperature;Time Period - 1971-2014; Scenerio- Past; Method; In situ (grided); Reference- DHM(2017), WMO standard observed data) Change values for the table are given in the following rows. [Government of Nepal, Nepal]	Noted- The comments suggested (trends/year) is very high (i.e. 0.86 oC/year). The detail reference is not provided, but we found a report in DHM.gov.np. The report is not a scientific publication and consider as a grey literature. We could not pin point the trend from this report on the chapter 02, but there are some literature from Nepal which is included which shows temperature trend (Nepal, 2016). This finding contradicts with findings from other literatures.
27427	Entire Report	0	0	0		+0.86 oC /yr (High-Himalayas: >4000m) [Government of Nepal, Nepal]	Rejected- The comments suggested (trends/year) is very high (i.e. 0.86 oC/year). The detail reference is not provided, but we found a report in DHM.gov.np. The report is not a scientific publication and consider as a grey literature. We could not pin point the trend from this report on the chapter 02, but there are some literature from Nepal which is included which shows temperature trend (Nepal, 2016). This finding contradicts with findings from other literatures.

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27429	Entire Report	0	0	0		+0.68 oC /yr (High-Mountains: 2200-4000m) [Government of Nepal, Nepal]	Rejected- The detail reference is not provided, but we found a report in DHM.gov.np. The report is not a scientific publication and consider as a grey literature. We could not pin point the trend from this report on the chapter 02, but there are some literature from Nepal which is included which shows temperature trend (Nepal, 2016). This contradict with findings from other literatures.
27431	Entire Report	0	0	0		+ 0.52oC/yr (Mid-Mountains:1000-2500masl) [Government of Nepal, Nepal]	Rejected- The detail reference is not provided, but we found a report in DHM.gov.np. The report is not a scientific publication and consider as a grey literature. We could not pin point the trend from this report on the chapter 02, but there are some literature from Nepal which is included which shows temperature trend (Nepal, 2016). This contradicts with findings from other literatures.
27433	Entire Report	0	0	0		+0.03 oC /yr (Siwaliks: 200-1500m) [Government of Nepal, Nepal]	Rejected - The detail reference is not provided, but we found a report in DHM.gov.np. The report is not a scientific publication and consider as a grey literature. We could not pin point the trend from this report on the chapter 02, but there are some literature from Nepal which is included which shows temperature trend (Nepal, 2016). This contradicts with findings from other literatures.
27435	Entire Report	0	0	0		+0.021oC /yr (Terai: 59-200m) [Government of Nepal, Nepal]	Rejected - The detail reference is not provided, but we found a report in DHM.gov.np. The suggested report is not a scientific publication and consider as a grey literature. We could not pin point the trend from this report on the chapter 02, but there are some literature from Nepal which is included which shows temperature trend (Nepal, 2016). This contradicts with findings from other literatures.
27565	Entire Report	0	0	0		Glossary: Concering the terms "timing of biological events" which is the SPM, and "phenology" which is used in the chapters. We believe that these terms are meant as synonymous 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". Please include these terms in the glossary. [Government of Norway, Norway]	timing of biological events is considered self-explanatory, and the meaning of the word "phenology" is explained where it is used.

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27567	Entire Report	0	0	0		It should be clear throughout the whole report, including SPM, when the text refers to coral reefs in general, and when it refers to specific types of corals: either coral reefs in tropical areas i.e. warm-water coral reefs, which can be symbiontic in shallow water or non-symbiontic in deeper water, or so called cold-water coral reefs living in deeper water in more temperate/boreal areas. The destinction is important because the first type is susceptible to coral bleaching, where the symbiotic algae is expelled at high water temperatures. The other two types can still be negatively affected by high water temperatures (and other changes associated with climate change), but since they have no symbiont they will not experience bleaching. There is often confusing around this theme in media and the public, both causes of coral reef die back or threats to coral reefs and which types of coral reefs are affected, and thus there is necessity to avoid misunderstanding in this report. Please use established scientific terms for the different types of coral reefs consistently throughout this report, and also other IPCC reports. The avereage reader will not read the whole report, but select parts, it is therefore essential that there is no room for misunderstanding which type of coral reef is refered two in each separate paragraph/sentence. "Coral reefs" should only be used for claims and statements that encompass all coral reef types. Managers in countries with different types of coral reefs need to be able to easily find relevant information on drivers, impacts and possible adaptation measures mentioned in the report, for the type of coral reef existing in their countries. [Government of Norway, Norway]	Taken into account.
27905	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “lahar” (which appears in Figure SPM.2, Summary for Policymakers, page 6) [Gerson Fernandino, Brazil]	Lahars have been defined in Chapter 2 (p2-40) as "mixtures of meltwater and volcanic debris". It was not considered necessary to include the definition in the Glossary.
27907	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “avalanche” and “snow avalanche” (which appears in Figure SPM.2, Summary for Policymakers, page 6) [Gerson Fernandino, Brazil]	The term "Avalanche" has been included in the Glossary. However, it was not considered necessary to define the specific case of "snow avalanche".
27909	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “landslide” (which appears in Figure SPM.2, Summary for Policymakers, page 6) [Gerson Fernandino, Brazil]	It was not considered necessary to define "landslide", since standard dictionary definitions apply for the words and the term has been consistently adopted based on either AR5, SR15 or SRCCL Glossaries
27911	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “driver” (which appears in Figure SPM.2, Summary for Policymakers, page 6) [Gerson Fernandino, Brazil]	A definition for "Driver" has been included in the Glossary (page AI-9 of the SPM) and has been adapted from MEA, 2005. Please also refer to Forcing
27913	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “pelagic” (which appears in Summary for Policymakers, page 10, line 25) [Gerson Fernandino, Brazil]	A definition for "pelagic" has been included in the Glossary.
27915	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “primary productivity” (which appears in Summary for Policymakers, page 10, line 26) [Gerson Fernandino, Brazil]	A definition for "primary production" is included in the Glossary."Productivity" is the rate of production (standard dictionary definition)
27917	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “organic matter” (which appears in Summary for Policymakers, page 10, line 27) [Gerson Fernandino, Brazil]	It was not considered necessary to define "organic matter", since standard dictionary definitions apply for the two words
27919	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “food web” (which appears in Summary for Policymakers, page 10, line 37) [Gerson Fernandino, Brazil]	"Food web" could have been included.But its usage does match the standard dictionary definitions of the two words - connecting organisms in terms of what eats what.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
27921	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “abyssal” (which appears in Summary for Policymakers, page 10, line 52) [Gerson Fernandino, Brazil]	The usage of the term "Abyssal" matches the standard dictionary definitions of the word - viz., very deep. A glossary definition was thus not considered necessary.
27923	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “seafloor” (which appears in Summary for Policymakers, page 10, line 52) [Gerson Fernandino, Brazil]	It was not considered necessary to define "seafloor", since standard dictionary definitions apply for the two components of the word ("sea" and "floor")
27925	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “seamount” (which appears in Summary for Policymakers, page 10, line 54) [Gerson Fernandino, Brazil]	It was not considered necessary to define "seamount", since standard dictionary definitions apply for the two components of the word ("sea" and "mount")
27927	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “benthic” (which appears in Summary for Policymakers, page 10, line 55) [Gerson Fernandino, Brazil]	A definition for the term "benthos" (noun) is included in the glossary and contains an explanation for the word "benthic".
27929	Entire Report	1	1	1	1	In Annex I Glossary, include the definition of “atoll” (which appears in Summary for Policymakers, Figure SPM 4. Panels and legends, page 15) [Gerson Fernandino, Brazil]	The standard dictionary definition applies. A glossary definition was thus not considered necessary.
27947	Entire Report	0	0	0		We would like to thank the authors, TSUs and IPCC secretariat for providing us with the SOD of SROCC and its draft SPM. We appreciate the work done on synthesising scientific information on this highly important area in climate change research. [Government of Estonia, Estonia]	Thanks for appreciation
27949	Entire Report	0	0	0		General comment (some related specific comments on SPM are below). The readibility of the entire report should be improved. Overly technical specialist language should be avoided, especially in SPM, and or explained (if repetitevely used then in the Glossary). Also there are some repetitions, that could be removed in order to shorten the text (that longer than the intended page count) and improve its readibility. Issues that are dealt with under several chapters/sections/subsections should be brought together, for example, as cross-chapter boxes or something alike. [Government of Estonia, Estonia]	Taken into account- SPM has revised considerably to improve readability
28419	Entire Report	0	0	0		we appreciate the hard work of the SROCC author team that went into the preparation of the SOD. The draft report has improved greatly, but we still miss comprehensive coverage of several crucial issues from the approved outline. More specific comments on the indivual issues particularly relevant for SIDS will be issued in the following. [Government of Saint Lucia, Saint Lucia]	Thank you - we will examine each and respond accordinlgy.
28421	Entire Report	0	0	0		Key information on the mitigation requirements of 1.5 degC of global warming and expected unavoidable impacts across all climate subsystems have been assessed by IPCC SR1.5. As a minimum, the SROCC has to refer to ocean & cryosphere specific SR1.5 findings, ideally cover 1.5 degC scenarios for these two specific aspects in more detail than SR1.5. Currently, hardly any 1.5 degC specific information is provided throughout the report. From a SIDS perspective, long-term post-2100 sea level rise projections as well as regional information for strong mitigation scenarios is of utmost importance. Existing research has to be assessed and presented with adequate detail. [Government of Saint Lucia, Saint Lucia]	Chapter 4 has enhanced its presentation to include more specific references to 1.5C especially with respect to physical impacts like extremes sea levels and their consequences.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
28423	Entire Report	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, Saint Lucia]	Taken into account, see 4.4.2.5.1 and also 5.4.2.3.2
28425	Entire Report	0	0	0		The SROCC (coastal) adaptation assessment is critically important for SIDS. However, the corresponding cost perspective is still missing from the current assessment and has to be added if available. Also, we note in several instances that a very dangerous transformational adaptation narrative is applied (relocation after limits to adaptation are reached), that has to be removed due to its policy prescriptive nature (eg Figure SPM.4). Please avoid policy prescriptive language at all costs! [Government of Saint Lucia, Saint Lucia]	Chapter 4 has added much additonal material on costs.
28427	Entire Report	0	0	0		The post-2100 perspective on sea level rise is a matter of survival for SIDS. Unfortunately, the SROCC SOD does not provide enough information on this issue. Since the AR5, our understanding of the long-term sea level rise commitment has improved substantially. This is highly policy relevant information that needs to be included in the report. We therefore would like to suggest a figure to be added to the SPM (or an existing one replaced) outlining long-term, post-2100 risks including for sea level. Currently, the authors state that long-term sea level rise is “deeply uncertain”. We do not want to question the authors judgement on this insofar it relates to the absolute magnitude of future sea level rise and potential tipping points and we are sure that the authors will find ways to illustrate the uncertainties in such a figure. However, it is clear that the long-term commitment is several tenth of meters higher in NDC scenarios than it is for scenarios that limit warming to 1.5°C and that near-term action matters a lot to limit long-term sea level rise. We appreciate that the dynamics of potential tipping points in ice sheets are not well constrained. However, it is clear that the risk of crossing such tipping points increases with increasing warming, while there is sufficient knowledge to quantify sea level commitments without triggering Antarctic rapid dynamics. This needs to be spelled out clearly in the report. The ‘deep uncertainty’ therefore mainly has one direction: the risk of an even higher sea level commitment. [Government of Saint Lucia, Saint Lucia]	See response to comment 12443

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
28665	Entire Report	1	1	300	29	Per the above comment, while the report does make the point that many ocean and cryosphere dynamics, and in particular differences in impacts between emission scenarios, only become evident over longer time frames; still too often this report stops at 2100, even when there is research to at least indicate developments beyond that time frame. This unfortunately strengthens the "short-sightedness" and sense that is too common in the policy world that dynamics, and the most extreme impacts (such as SLR) simply come to a halt in 2100. Longer time frames referenced more frequently throughout the SROCC woud be extremely helpful in presenting a more complete picture and stimulating forward-thinking. This includes in terms of inter-generational justice, which seems to be gaining in importance in climate thinking; and has special resonance in the very long response and "recovery" time frames of oceans and cryosphere, per the summary Tabel 6.1 in Chapter 6. [Pam Pearson, Sweden]	Taken into account, and also difficult to response too. The projections now include ice sheet changes to 2300 (Chapter 4).
28667	Entire Report	1	1	300	29	(Per the Instructions, note that this longer Comment appears in several contiguous cells.) A key missing element in SROCC is the explicit comparison of the impact of 1.5 degree emissions pathways, as compared to 2.0 and higher temperature goals and emissions scenarios. This was of course not an explicit charge to the SROCC, but also was not covered extensively in the SR1.5, which deferred to the SROCC multiple times in the final version. Indeed in multiple public statements, as well as personal communications the SR1.5 drafting group and IPCC Bureau made clear that it was “waiting,” in terms of certain cryosphere and oceans dynamics, for the SROCC to address these instead. However, since the SROCC was not directly charged with such a 1.5 comparison, it of course does not appear here either in this (largely excellent) second-order draft. [Pam Pearson, Sweden]	This was not possible due to non-linear response of SLR. Hence use of RCPs
28669	Entire Report	1	1	300	29	Another more sensitive issue is that when the SR1.5 did try to cover some cryosphere dynamics, it frankly did not always fully capture the rather significant different between 1.5 degrees and 2 degrees; especially over time frames beyond 2100, given that many such dynamics do not become apparent until much later. This is partly because the number of participating cryosphere scientists in the drafting group was necessarily rather limited, especially with the SROCC working contemporaneously; and also because the SR1.5 looked beyond 2100 to a far lesser degree than the SROCC naturally does. [Pam Pearson, Sweden]	Noted and this assessment of crospheric change is covered in Chapter 2 and Chapter 3

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
28671	Entire Report	1	1	300	29	As just a partial list by this admittedly non-scientist diplomat, such “1.5 v. 2” important cryosphere dynamics include a) the great ice sheets and committed GMSL (over millennial time frames especially -- based on the paleo record there is actually a rather sharp gradient somewhere between 1.5 and 2 degrees for GMSL, see for example Knutti et al (2015), Figure 1c, which is often showed by Hans-Otto Portner and illustrates this distinct change; b) certainly the risk of WAIS loss or rate of loss; c) potentially Greenland’s reaching a tipping point, though requiring centuries above say the 1.6 degrees identified by Robinson et al (2012); d) recent findings by Wilson et al (2018) that Wilkes appears to have melted extensively in the past at 2 degrees local, which would likely reflect at least 2 degrees GMT; e) for Arctic sea ice, the scientific consensus that ice-free Septembers will occur nearly every year at around 1.7 degrees, and perhaps stretch from July-October at 2 degrees (in contrast to the “at least once per decade, at least once per century” language in the SR1.5; f) estimates (despite large error bars) of carbon release from permafrost at different amounts between 1.5 and 2 degrees, especially beyond 2100; which may greatly impact carbon budgets that will allow the 1.5 degree goal to be met; g) significant differences seen for especially mid-latitude mountain glaciers systems preserved beyond 2100 (Marzeion et al which included RCP 4.5, the closest proxy for Paris, where differences disappear in “noise” at 2100 but emerged more clearly between RCP2.6 and RCP4.5 by 2200-2300); and h) polar ocean acidification and other high latitude ocean ecosystem changes at these two temperature levels, given the more rapid uptake of cold waters as well as freshwater influx and again, greater preservation of multi-year ice at 1.5 degrees per (e), above. [Pam Pearson, Sweden]	From the perspective of Chapter 4, assessment of the most recent literature, in particular the results of newest ice sheet modeling in the context also of the long understood uncertainty in applying the LIG paleoclimate analog, leads us to de-emphasize potential 1.5-2.0C tipping points for the ice sheets due to low confidence in the location of these.
28673	Entire Report	1	1	300	29	This is only a partial list; certainly SROCC authors must have noted more. As a result, I would strongly suggest a very key addition to the final-order draft: a Cross-chapter Box that highlights these and other important differences for “The Cryosphere at 1.5 and 2 Degrees,” highlighting these differences and – in deference to the longer lag times for cryosphere – doing so where possible for 2300 or even, on paleo time scales. The Cross-Chapter Box would draw on both SR1.5, research since and of course the SROCC. (Perhaps also research “missed” by the SR1.5, though without being explicit as criticism – the drafting group for the SR1.5 was not meant after all to be exhaustive, something noted also upon its release, again especially in relation to topics stated to be covered “instead” by the SROCC.) [Pam Pearson, Sweden]	Point well taken. Unfortunately the timing of the Final Draft does allow to add new cross-chapter boxes. In addition, in the CCB, which aims at synthetizing material that is in the main chapters in only few pages, we decided to focus on risk and adaptation issues; as a result, the list of ocean and cryosphere changes at the begining only serves to depict the big picture of CC-related changes, and doesn't intend to be exhaustive.
28675	Entire Report	1	1	300	29	Many of these already are covered within what is again, an excellent SROCC second-order draft! But, their compilation in one Cross-chapter Box would prove enormously helpful: by underscoring the importance of 1.5 degree pathways for oceans and cryosphere, especially the implications for both ecosystems and human society. [Pam Pearson, Sweden]	Rejected. Although an excellent idea, the author team estimated too complex to add a new cross-chapter box at this stage of the process.
28979	Entire Report	0	1	0	1	General comment - Most chapters have paragraph "4.2.3.1.2 Antarctica". Even in the Table of Contents on page 1 the authors use a paragraph depth of 3, while the chapters have a depth of 5. The structure is lost in this way for readers. [Government of Netherlands, Netherlands]	Taken in to account.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
29007	Entire Report	0	2	0	2	The role of wind patterns, wind shear, storms (tropical, extratropical) is of great importance throughout the whole report: in extreme sea levels (Figures 4.9 and 4.10) in Chapter 6 on extremes, and in its relation to NAO (Section 6.5.1.1) and more, scattered throughout the report. Since winds/storms have such profound impacts such as floodings or changes in currents and upwelling of cold/warm water, we suggest to give this topic of wind/storm, both historic and future, more visibility in the report by adding a box combining all important aspects on wind and storms, preferably in ch 6. [Government of Netherlands, Netherlands]	Some assessments of the changing wind pattern and its implications for the ocean are included in Ch5, and also in Chapter 6
29013	Entire Report	0	3	0	3	Historic and future global SST is scarcely mentioned in the report although many impacts are connected to this. Please add more info on this topic to chapter 5 and if possible adopt it in figure SPM.1. [Government of Netherlands, Netherlands]	Deemed out of scope for SROCC and left for comprehensive assessment in AR6
29015	Entire Report	0	0	0		My background is as a former negotiator, albeit one with a science background and who for the past decade has focused on science-policy connections, especially as these relate to cryosphere and polar ocean regions. Comments therefore focus on likely takeaways and level of understanding by policy makers, especially therefore in the SPM and Executive Summary sections. Kindly note that my comments in this regard, while extensive; focus on ensuring this policy-level understanding of an already strong SR. In general, the SPM in particular holds a very high standard in this regard -- strong kudos to drafting team. [Pam Pearson, Sweden]	Noted, with thanks for the positive feedback
29071	Entire Report	0	0	0		As a general comment: when reference is made to certain cryosphere and ocean dynamics, but especially as regards GMSL and rates of SLR, "deeply uncertain" is frequently used, especially with regard to long-term processes. However, this almost exclusively refers to MAXIMUMS in terms of rates and levels of these processes, or to extremes (especially over time). It does not, at least in most cases, mean that SLR, or other impacts might be LESS than the lower bounds noted. The uncertainty in other words is almost always on the high end. For the SROCC's import to be properly understood by the political level and their advisors, it is important to make this distinction clear in the terminology used, especially in the SPM and ES chapter sections. Alternative language might be, "the high end of these estimates," etc. Simply using "deep uncertainty" however leaves open the possibility that low-end estimates are equally uncertain; and (in almost all cases) they are not. Indeed as the above commnt indicates, long-term SLR as a percentage of total change at given temperature levels and ppms on geologic/paleo time scales, is actually less uncertain (with the most extreme example of course being the complete global deglaciation of the Eocene). [Pam Pearson, Sweden]	The reviewer's comment has merit, although the lower bounds are sometimes very uncertain as well because they are dependent on future projection of accumulation. Nevertheless, we have tried to assure that our uses of "deep uncertainty" ("deeply is no longer used) are clearly in reference to processes that determine the high-end, specifically the dynamic contribution. The link between dynamics and the high-end estiamtes is transparent throughout.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
29077	Entire Report	0	0	0		Per the above comment, while the report does make the point that many ocean and cryosphere dynamics, and in particular differences in impacts between emission scenarios, only become evident over longer time frames; still too often this report stops at 2100, even when there is research to at least indicate developments beyond that time frame. This unfortunately strengthens the "short-sightedness" and sense that is too common in the policy world that dynamics, and the most extreme impacts (such as SLR) simply come to a halt in 2100. Longer time frames referenced more frequently throughout the SROCC woud be extremely helpful in presenting a more complete picture and stimulating forward-thinking. This includes in terms of inter-generational justice, which seems to be gaining in importance in climate thinking; and has special resonance in the very long response and "recovery" time frames of oceans and cryosphere, per the summary Tabel 6.1 in Chapter 6. [Pam Pearson, Sweden]	Longer timeframe now considered with respect to e.g. SLR, for which projections to 2300 are now in SPM
29133	Entire Report	0	0	0		Another more sensitive issue is that when the SR1.5 did try to cover some cryosphere dynamics, it frankly did not always fully capture the rather significant different between 1.5 degrees and 2 degrees; especially over time frames beyond 2100, given that many such dynamics do not become apparent until much later. This is partly because the number of participating cryosphere scientists in the drafting group was necessarily rather limited, especially with the SROCC working contemporaneously; and also because the SR1.5 looked beyond 2100 to a far lesser degree than the SROCC naturally does. [Pam Pearson, Sweden]	Noted
29135	Entire Report	0	0	0		As just a partial list by this admittedly non-scientist diplomat, such “1.5 v. 2” important cryosphere dynamics include a) the great ice sheets and committed GMSL (over millennial time frames especially -- based on the paleo record there is actually a rather sharp gradient somewhere between 1.5 and 2 degrees for GMSL, see for example Knutti et al (2015), Figure 1c, which is often showed by Hans-Otto Portner and illustrates this distinct change; b) certainly the risk of WAIS loss or rate of loss; c) potentially Greenland’s reaching a tipping point, though requiring centuries above say the 1.6 degrees identified by Robinson et al (2012); d) recent findings by Wilson et al (2018) that Wilkes appears to have melted extensively in the past at 2 degrees local, which would likely reflect at least 2 degrees GMT; e) for Arctic sea ice, the scientific consensus that ice-free Septembers will occur nearly every year at around 1.7 degrees, and perhaps stretch from July-October at 2 degrees (in contrast to the “at least once per decade, at least once per century” language in the SR1.5; f) estimates (despite large error bars) of carbon release from permafrost at different amounts between 1.5 and 2 degrees, especially beyond 2100; which may greatly impact carbon budgets that will allow the 1.5 degree goal to be met; g) significant differences seen for especially mid-latitude mountain glaciers systems preserved beyond 2100 (Marzeion et al which included RCP 4.5, the closest proxy for Paris, where differences disappear in “noise” at 2100 but emerged more clearly between RCP2.6 and RCP4.5 by 2200-2300); and h) polar ocean acidification and other high latitude ocean ecosystem changes at these two temperature levels, given the more rapid uptake of cold waters as well as freshwater influx and again, greater preservation of multi-year ice at 1.5 degrees per (e), above. [Pam Pearson, Sweden]	Noted; these points have been actioned insofar as possible

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
29137	Entire Report	0	0	0		This is only a partial list; certainly SROCC authors must have noted more. As a result, I would strongly suggest a very key addition to the final-order draft: a Cross-chapter Box that highlights these and other important differences for “The Cryosphere at 1.5 and 2 Degrees,” highlighting these differences and – in deference to the longer lag times for cryosphere – doing so where possible for 2300 or even, on paleo time scales. The Cross-Chapter Box would draw on both SR1.5, research since and of course the SROCC. (Perhaps also research “missed” by the SR1.5, though without being explicit as criticism – the drafting group for the SR1.5 was not meant after all to be exhaustive, something noted also upon its release, again especially in relation to topics stated to be covered “instead” by the SROCC.) [Pam Pearson, Sweden]	Noted, but we have stopped short of adopting this suggestion overtly - the limited space available does not permit inclusion of this specific CCB. We have sought to draw out the relevant material more clearly in the main text however/
29139	Entire Report	0	0	0		Many of these already are covered within what is again, an excellent SROCC second-order draft! But, their compilation in one Cross-chapter Box would prove enormously helpful: by underscoring the importance of 1.5 degree pathways for oceans and cryosphere, especially the implications for both ecosystems and human society. [Pam Pearson, Sweden]	Noted, with thanks for the postiive feedback.
29587	Entire Report	0	0	0		This Comment elates to the Annex, for which there seems to be no provision for offering comments. While the definition of "Geoengineering" does refer to Carbon Dioxide Removal, given the requirements for negative emissions brought forth in the IPCC 1.5 C Special Report, it is surprising that "Carbon Dioxide Removal" and is not presented on its own, and given the notions of "Iron Fertilization" that have been widely discussed, surprising that it also is not given as a separate definition. There is also no mention of "Ocean Restoration", which is apparently not defined (not sure if covered or not) that is proposed by Russ George and criticized by others. [Michael MacCracken, United States of America]	The term "Carbon Dioxide Removal" is now included in the Glossary.
29605	Entire Report	0	0	0		In this round of the IPCC process it seems to me very important to be explaining what understanding of Earth's climatic history says about what the Earth has been like when it was 1.5 to 2 C warmer (and then even warmer). Yes, this is a warming that the nations seem to be saying through adopting these values in the Paris Accord, but the scientific community needs to indicate back to them what paleoclimatic lessons suggest about whether this level of warming is consistent with meeting the full objective of the 1992 UN Framework Convention. It seems to me that an evaluation would suggest that both the temperature increase and the likely sea level rise associated with the warming would cause very serious environmental and societal disruption. This indication that the report says so little about lessons from the paleoclimatic record is very troubling to me--the scientific community just has to speak up and not be quiet about a choice that will lead, over the next couple of centuries to submergences of many of the world's island nations and vast coastland areas, and also disrupting virtually all coastal cities around the world [Michael MacCracken, United States of America]	Taken into account; the need to draw on palaeoclimate perspectives is a point well made, and we have sought to strengthen these aspects of the report in this draft.

SROCC Second Order Draft Government and Expert Review Comments - Entire Report							
Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
30295	Entire Report	0	0	0		Overall the report offers an excellent and authoritative summary to this fast moving field. However, the most glaring problem is the assertion in Chapters 1 and 3 that glacial meltwaters represent the dominant driver for the rise in GMSL (global mean sea level). This statement contradicts the conclusion of Chapter 13 (Sea Level Rise) of the previous IPCC AR5 report that thermal expansion of the ocean contributes 53.2% to rising sea level compared to only 32% from glacial meltwaters from 1993-2010. Therefore, the authors of Chapters 1 and 3 need to address this discrepancy up front. Has the perception of the IPCC changed since the publication of AR5? This issue is very important both for scientists and political organizations since thermal expansion of the deeper ocean will continue unabated regardless of policies to limit greenhouse gas emissions. [Paul Glaser, United States of America]	Accepted; the text has been amended to be clearer on this point.
30297	Entire Report	0	0	0		I was also distressed by several stylistic problems that I have the temerity to point out. The editors need to provide a separate table that defines all acronyms and abbreviations used in the text. In some cases it is advisable to include such a table in individual chapters especially Chapter 3 in which the authors use a large number of abbreviations repeatedly. Although specialists will be familiar with these conventions (e.g. MISI) the general reader will not. I would also recommend breaking up some of the very long and complex sentences that are scattered throughout the text (but especially in Chapter 1) and also clarifying the antecedent of "this" by adding the appropriate word or words after these stand-alone pronouns. [Paul Glaser, United States of America]	Accepted; the Glossary has been updated with technical terms using IPCC protocols for inclusion, and we have minimised insofar as possible the use of opaque acronyms.
30299	Entire Report	0	0	0		The figures are generally outstanding and the authors are to be congratulated for synthesizing so much information into a succinct and stimulating report. [Paul Glaser, United States of America]	Noted; with thanks for the positive feedback
30889	Entire Report	0	0	0		The executive summaries give a nice general, mostly qualitative overview but would be more punchy if key findings would be detailed (specified and quantified), also and especially with respect to solution options by adaptation and mitigation efforts. This would also help the development of the SPM as a stand-alone document. I have indicated where such question marks come up when reading the present ESs. If quantitative statements are not possible for global scale they may still be possible for key regional examples (case studies). Providing semi-quantitative estimates or orders of magnitude would also help to understand better and e.g. differentiate between whether projected mean global or regional changes are by e.g. 5 or 95 %. [Hans-Otto Poertner and WGII TSU, Germany]	Accepted and actioned
31563	Entire Report	0	0	0		Overall, like in Figure 1.1 Panel C, or in Figure 3.12, whenever possible avoid vertical rotations of text. [Hans-Otto Poertner and WGII TSU, Germany]	Noted. Editable figures passed to TSU graphics unit for final production.
31565	Entire Report	0	0	0		Use the official IPCC Colour palette. [Hans-Otto Poertner and WGII TSU, Germany]	Noted. Editable figures passed to TSU graphics unit for final production.
31603	Entire Report	0	0	0		A recurring theme within the Figures, particularly Chapter two, is the distribution of data amongst 12 regions (Lower latitudes, Western canada, New Zealand, etc.). It would be beneficial to the reader for the authors to decide on a homogenous approach to the layout of these data boxes. For example, compare Figures 2.5 and 2.7 - the authors may decide on a uniform order of regions. In some cases, one figure may not have data on a given region, but if the corresponding space is left blank, the gap of information will become evident and this is also beneficial. The naming of these regions should also be uniform. [Hans-Otto Poertner and WGII TSU, Germany]	Taken into account - figures redrawn

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Comment id	Chapter	From page	From line	To page	To line	Comment	Chapter Team Response
31653	Entire Report	0	0	0		For all global maps, whenever possible, it would be better to use a single standarized projection. This should be the Robinson type. [Hans-Otto Poertner and WGII TSU, Germany]	Accepted and actioned
31659	Entire Report	0	0	0		It would be better if all chapters follow a standard way of presenting confidence intervals within figures. See for example Figure 4.7, this is a preferable approach because the shading within the graph and the complementary lines outside of the box makes it easier to see the overall difference between overlapping lines. However, the figure is not optimal - a slight transparency in the shading would allow complete appreciation of the data, and the placement of the side labels can be also improve. But overall, it is better than for example Figure 4.11 where it is more difficult to appreciate the confidence interval lines that are overlapping vertically. [Hans-Otto Poertner and WGII TSU, Germany]	Noted; figures made consistent insofar as possible
31987	Entire Report	0	0	0		In general, authors must bewilling to look beyond 2100 and build a coherent storyline into the next centuries despite progressively increasing uncertainty (which is not a stepwise move into deep uncertainty). This would also mean building on SR1.5 and AR5 SYR (less so AR5 main reports). The long-term commitment resulting from emissions and the non-linearities in responses as well as the likelihood of thresholds initiating such responses are currently either not fully reflected in the report or not sufficiently upfront to have a good chance to be perceived by the policymakers (see https://doi.org/10.1038/s41558-018-0226-6) [Hans-Otto Poertner and WGII TSU, Germany]	Noted. Most assessments focus on the 21st century horizon while the long-term (beyond 21st century) time-scale for sea level rise is also assessed.
32439	Entire Report	0	0	0		General comment about figures: It is very many important figures in the report, but many of them are hard to understang and could be improved. Furthermore, please include a titel on each figure. [Government of Norway, Norway]	Accepted. Figures improved, and editable versions passed to TSU graphics unit for final production.
32463	Entire Report	0	0	0		New technologies for monitoring, data processing, and knowledge extraction might be of paramount importance: (i) to discriminate between natural variability and anthropogenic induced changes; (ii) to detect new trends and possible new deviations from equilibria; (iii) to establish cause-effect relationships; (iv) to transfer knowledge from one geographical area to another. [Michele Capobianco, Italy]	Taken into account.
32465	Entire Report	0	0	0		A key factor for future decision making under uncertainty is the identification of those "patterns" that might actually suggest adaptation interventions as well as trigger a policy change. [Michele Capobianco, Italy]	Taken into account.
32647	Entire Report	0	0	0		Add many more photos to show sea-level rise, such as King Tides, large waves and extreme wave events, etc. [Government of United States of America, United States of America]	no photos were used in our chapter according to instructions fronm TSU.
32649	Entire Report	0	0	0		Disease is only mentioned in a couple of places. This is a much more serious issue than the attention given, especially for avian influenza and transmission from China to Artic to U.S. mainland birds along the Pacific Flyway. Another example includes the seastar wasting disease which appears to be linked to warmer water years. [Government of United States of America, United States of America]	Climate risk on disease through the ocean is assessed in Ch 5 (Section 5.4.2) with focuses on water-borne disease. We did not include the pathogen-disease pathways that are more indirectly linked to the ocean e.g., through bird migrations.
32651	Entire Report	0	0	0		Little information is provided on conservation and effects on species, especially listed species, marine invertebrates. Emphasis is given to ecosystem services and those species important to human populations for food. [Government of United States of America, United States of America]	Some treatment of implications of climate change for conservation of marine species is given in Section 5.5.

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32653	Entire Report	0	0	0		Overall, this report does a good job in describing the interconnected ways in which the ocean and cryosphere are expected to change in a warming climate, and the risks that this will bring to human and natural systems. [Government of United States of America, United States of America]	Thank you.
32655	Entire Report	0	0	0		Not enough emphasis on small islands (oceanic), especially in the SPM. These unique features are intimately linked to the ocean and they should be addressed across the SROCC, not just in the low lying coasts and islands cross-chaper Box 7. As stated in Box 7, "LLIC are at the frontline of the impacts of climate-related changes to the ocean and cryosphere..." [Government of United States of America, United States of America]	Taken into account
32657	Entire Report	0	0	0		Commendations to the leaders of SROCC for the most effective use of cross-chapter text boxes in IPCC history. The numerous text boxes in this report are generally highly integrative and well-written. [Government of United States of America, United States of America]	Thank you.
32659	Entire Report	0	0	0		This document is an amazing feat, and is exceptionally well done overall. [Government of United States of America, United States of America]	Thank you.
32661	Entire Report	0	0	0		The assumed price of carbon per ton should be standardized across the document. In Chapter 5, it is listed as USD $7/mt (page 81) and USD $19/mt (page 85). [Government of United States of America, United States of America]	Taken into account
32663	Entire Report	0	0	0		Monetary values should be given in a consistent and specified currency at a specified point in time (i.e., USD in year 2012). Inconsistency in currency values makes it hard to understand which impacts are relatively more important. [Government of United States of America, United States of America]	Accepted
32665	Entire Report	0	0	0		Consistent with the Paris Agreement, the words "loss and damage" should not capitalized. Loss and damage is a concept, not a proper noun. [Government of United States of America, United States of America]	Taken into account
32667	Entire Report	0	0	0		In several instancees this document associates the words "requires" and "requirement" with the Paris Agreement goals. The Paris Agreement does not have requirements associated with its goals or aims as the case may be. Suggest direct quotes of the Paris Agreement over potentially misleading paraphrasing. [Government of United States of America, United States of America]	Taken into account
32669	Entire Report	0	0	0		In general suggest avoiding use of the words "urgent" and "urgency" as they convey an imperative that is not policy-neutral. It may be a matter of opinion whether and to what degree there is urgency, and from what standpoint. Likewise suggest replacing the word "immediate" with the more technical phrasing "near-term." [Government of United States of America, United States of America]	Taken into account
32671	Entire Report	0	0	0		The document sometimes uses more declarative language and tense than is warranted by the sources of evidence. Suggest referencing evidence base and using conditional tense when characterizing projections and/or their implications. For example, instead of "People who depend on fisheries and related sectors WILL experience ..." replace with "UNDER SUCH PROJECTIONS people who depend on fisheries and related sectors ARE EXPECTED TO experience ..." [Government of United States of America, United States of America]	Taken into account

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32673	Entire Report	0	0	0		For the government and expert review of the second-order draft of the report, the United States solicited comments from experts in and outside the government, including through a notice in the Federal Register. As of the date of closure for submitting comments to the IPCC, the U.S. Government is partially closed and not undertaking routine government business. The comments received in our comment procedure have not gone through any systematic review, and are being providing to the leader authors as expert comments. These comments do not reflect official statements of U.S. climate policy, and the U.S. Government has not taken a view of the overall acceptability of the underlying report at this time. The U.S. Government reserves the right to provide additional comments at a later date as appropriate. [Government of United States of America, United States of America]	Thank you for the effort
32675	Entire Report	0	0	0		In light of references to the Paris Agreement in the report, the U.S. Government reiterates that it intends to withdraw from the Paris Agreement at the earliest opportunity absent the identification of terms that are more favorable to the American people. Submitted comments do not reflect any statement on or change in the U.S. position with respect to the Paris Agreement or climate change policy. [Government of United States of America, United States of America]	Noted

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34149	Entire Report	0	0	0		I have collated the following important citations, which are apparently missing from the drafts. These concern the opportunities to use local and specific climate engineering to ameliorate the effects of global warming in oceans and cryosphere respectively. I hope it will be possible to consider adding these. Can marine cloud brightening reduce coral bleaching? John Latham, Joan Kleypas, Rachel Hauser, Ben Parkes, Alan Gadian Atmospheric Science Letters 14 (4), 214-219, 2013 Glacier arrest John C. Moore et al, Geoengineer polar glaciers to slow sea-level rise, Nature (2018). DOI: 10.1038/d41586-018-03036-4 Glacier methane https://www.nature.com/articles/s41586-018-0800-0 Methane geoengineering Comment on “Review of Methane Mitigation Technologies with Application to Rapid Release of Methane from the Arctic Environmental Science & Technology Vol. 46: , Issue. 24, : Pages. 13552-13553 Publication Date (Web): October 8, 2012 https://doi.org/10.1021/es303074j Review of Methane Mitigation Technologies with Application to Rapid Release of Methane from the Arctic Joshuah K. Stolaroff, Subarna Bhattacharyya, Clara A. Smith, William L. Bourcier, Philip J. Cameron-Smith and Roger D. Aines Environmental Science & Technology Vol. 46: , Issue. 12, : Pages. 6455-6469 Publication Date (Web): May 17, 2012	Taken into account. The SROCC report does not have a mandate to explore geoengineering solutions as potential options to limit the severity/rapidity of climatic change, though we touch on various aspects where relevant.

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