



IPCC Synthesis Report Fourth Assessment Report

Formal Government and Expert Review of First Order Draft

EXPERT and GOVERNMENT COMMENTS – TOPIC 5

All Batches (July 27, 2007)

Review Editors:

David Wratt, New Zealand
Olav Hohmeyer, Germany

IPCC Synthesis Report - Fourth Assessment Report (All comments – Topic 5 – July 27, 2007)

Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-1	E-5-1	A	0				Use of 'risk' and 'vulnerability' here are confusing. Risk is not defined in the glossary. In some cases, vulnerability is used where risk should be used. (Lisa Schipper, Southeast Asia START Regional Centre, Chulalongkorn University)	Risk defined in text; more care taken to use correctly.
5-2	E-5-2	A	0				Topic on long term perspective is well organized and properly conservative - no specific comments (Michael Brady, Natural Resources Canada - Canadian Forest Service)	Thanks
5-3	E-5-3	A	0				Topic 5 contains some interesting material. However, there is much repetition and overlap with the previous topics. I suggest that better integration with the previous topics is needed. (Jürgen Willebrand, Leibniz Institut für Meereswissenschaften)	Repetition eliminated across topics and within 5
5-4	E-5-4	A	0				The opening pages of this Topic have a completely different tone than the rest of the document--they all should have the tone of urgency expressed here--the other sections are simply too cautious. (Michael MacCracken, Climate Institute)	Compliment noted with appreciation; tone elsewhere reflects author team perspective from underlying reports and in the context of different topics.
5-5	E-5-5	A	0				message is clear. It is fine with the draft (Hisayoshi Morisugi, Japan Research Institute)	Thanks.
5-6	E-5-6	A	0				Many statements in this Topic reiterate those in the previous, especially in Topic 4. A common (parallel redaction) of the topics is desirable. (Roman Corobov, Modern institute for humanities)	Repetition reduced, but time frame distinction generates apparent overlap; Topic 4 intro handles
5-7	G-5-1	A	0				We suggest the scope and structure of the topic be set out briefly in introductory text, before section 5.1, e.g.: "In this topic we consider, from a long-term perspective, scientific and socio-economic aspects relevant to adaptation and mitigation, consistent with the objectives and provisions of the Convention and in the context of sustainable development." (Government of New Zealand)	Intro to Topic 4 handles this
5-8	G-5-2	A	0				This is an important topic and the authors may wish to further consider what are the key finding which the science in the AR4 has for this area. (Government of Ireland)	Tried to make story more apparent.
5-9	G-5-3	A	0				It isn't clear why this topic needs to be standalone, instead of being folded into the previous topics. There is a great deal of redundancy and overlap with the other adaptation and mitigation discussions. Also, some of the decision framework material here would be more useful if integrated into the other discussions. At the moment, the reader is forced to synthesize this material on one's own with the material covered in the previous topics. The report would be more effective if the overlapping pieces across topics were combined and reconciled. (Government of United States)	Topic is required under the Plenary approved outline for the report

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-10	G-5-4	A	0				It is suggested to include under topic 5 the following very policy relevant information: Valuations of the co-benefits of mitigation and adaptation depend on assumed and realised development pathways, choices regarding multiple metrics of climate risks (e.g. goods and services traded in markets, human lives, species lost, inequities altered), and depend on spatial and temporal scales. (WGII 17.2, 18.6; WGIII 11.8). Such information might help to better address the scope as agreed by session 22 in Dehli. (Government of Austria)	Tried to add where appropriate subject to page limitation
5-11	G-5-5	A	0				It is noted that the SYR does not include information on benefits and avoided damage with regard to mitigation/adaptation as agreed by IPCC Plenary 22 in Dehli but only on costs. It is expected that the report includes the best available information on a comparison of marginal abatement costs versus social costs of carbon, building on the material assessed by working groups II and III. (Government of Austria)	Added
5-12	G-5-6	A	0				Important topic, this is the only topic where a real synthesis has been achieved and some important cross-cutting themes (e.g. Art. 2) are treated in an integrated way, adding added value to the WG reports and their Summaries - this can even be expanded to strengthen this. E.g. the issue of timing/lags and related question of how certain impacts that would be triggered now but would occur beyond 2100 can be avoided by mitigation now. (Government of Germany)	Lack of space In 5.7 and will be kept
5-13	G-5-7	A	0				General comment: We suggest providing a definition of "long term", to better delineate this section from the previous one and to avoid confusion (the timeframes 2050 and 2100 are used about equally). WGIII specifies "long term" as 2030 and beyond. (Government of Canada)	Topic 4 intro
5-14	G-5-1	B	0				This topic should discuss the relationship between the costs of impacts, adaptation and mitigation. It should provide quantitative information and comparison where possible, discuss the limitations of this data and highlight where gaps exist. Costs on inaction are quantified in WG3's SPM (section C) but not brought out clearly in the SYR. (Government of United Kingdom)	Re draft of 5.7
5-15	G-5-1	C	0				" Topic 5 should also include the long term perspective about climate change that is actually in topic 3 (section 3.2.3) " (Government of Belgium)	Done
5-16	G-5-8	A	1	0			The text in this page could be shortened and strenghted to provide highight points (Government of Ireland)	Done
5-17	G-5-9	A	1	1	1	3	This title is so long and unclear should be changed. (Government of United States)	Topic heading is as approved by the IPCC Panel

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-18	G-5-10	A	1	1	1	3	The title of this topic is too long. We suggest the title be simply "The long term perspective" and the scope and structure of the topic be set out briefly in introductory text, before section 5.1, e.g.: "In this topic we consider, from a long-term perspective, scientific and socio-economic aspects relevant to adaptation and mitigation, consistent with the objectives and provisions of the Convention and in the context of sustainable development." (Government of New Zealand)	Topic heading is as approved by the IPCC Panel
5-19	E-5-1	B	1	1	2	4	The best way to portray risks for key vulnerabilities, and other more local impacts is to illustrate the likelihood consequence relationship as the likelihood of exceeding a given level of impact or vulnerability (expressed as a threshold), allowing such risks to be estimated for a set of underlying scenario assumptions (e.g. policy, non-policy). This type of analysis is described in WGII Chapter 2, WGIII Chapter 3, with supporting evidence from WGII Chapter 19 and could be better synthesised here. This does not preclude non-climate drivers from being incorporated into such an analysis but it the starting point for climate change. (Roger Jones, CSIRO)	Cross ref WGII C2 and not literature basis at present
5-20	G-5-11	A	1	3	1	3	Replace "Convention" by "Climate Change Convention" (Government of Republic of Benin)	Topic heading is as approved by the IPCC Panel
5-21	G-5-14	A	1	7	1	21	At end of line 21 the authors need to insert the following to clearly explain the approach taken in the AR4: "The approach used to assess risk in the AR4 is a qualitative rather than quantitative procedure and based upon the framework developed in the TAR of assessing key vulnerabilities" (Government of Australia)	Reject as not only qualitative and framework not from TAR
5-22	E-5-7	A	1	7			section 5.1 Risk Mangemnet perspective - Why has the risk mangemnet perspective discussed in this topic. It seems equally applicale to topic 4 also. (Upasna Sharma, Indian Institute of Technology, Bombay)	Frames the long term
5-23	E-5-8	A	1	7			Para. 5.1, this an important issue. The treatment of this issue in this paragraph did not even touch on the uncertainties and consequences of the proposed policies and measures addressed in the WGIII report. (Mohammed Alfehaid, Ministry of Petroleum)	Added text to explain
5-24	E-5-9	A	1	7			General comment on this sub-section: it should refer to WGII 20.5 to reflect the value of disaster risk reduction/management as a no-regret adaptation option or a ready-to-use starting option for adaptation to longer term changes. (Silvia Llosa, International Strategy for Disaster Reduction)	Too specific rejected
5-25	G-5-12	A	1	7			Section 5.1 - this is an important section - and shows that topic 3 should be improved to be useful exactly for this risk management perspective. (Government of Germany)	Noted

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5-26	G-5-13	A	1	7			Para. 5.1, this an important issue. The treatment of this issue in this paragraph did not even touch on the uncertainties and consequences of the proposed policies and measures addressed in the WGIII report. (Government of Kingdom of Saudi Arabia)	As above – 5-8E
5-27	G-5-16	A	1	9	1	9	It is noted that the authors have changed this finding from that in the WG3 SPM by including adaptation. In the WG3 SPM, this finding was explicitly dealing with setting the appropriate level of global mitigation efforts, If adaptation is to be added into the finding it should be considered carefully and referenced to the AR4. (Government of Australia)	Ref to WGII SPM and WGII C20.9 no change required to text
5-28	E-5-10	A	1	9	1	12	Too long a sentence. May be rewritten as "Decision on appropriate level of adaptation and mitigation over time is a risk management process. It needs to take into account actual and avoided climate change induced damages, cobenefits, sustainability, equity and attitudes to risk". (Joyashree Roy, Jadavpur University)	Reject – content lost; damages avoided expanded later
5-29	G-5-15	A	1	9	1	12	The original WG III SPM text on which this sentence is based, in fact referred to decision making only about mitigation: "Decision-making about the appropriate level of global mitigation over time involves ...". Introducing adaptation into the decision areas in this SYR ("Decision-making about the appropriate level of adaptation and global mitigation over time involves ...") makes the following text, where adaptation and mitigation are both mentioned again, seem redundant. We suggest the best solution is to have: "Decision-making about the appropriate response to climate change over time involves an iterative risk management process that includes both mitigation and adaptation, taking into account ...". An alternative would be: "Decision-making about the appropriate level of adaptation and global mitigation over time involves an iterative risk management process that takes into account ..." (Government of New Zealand)	See above, Text change not accepted.
5-30	E-5-11	A	1	9			To replace 'appropriate level of adaptation and global mitigation' by 'confronting climate change'. (Roman Corobov, Modern institute for humanities)	Language changed
5-31	G-5-17	A	1	10	1	10	Delete the word "risk", as other management process may be involved (sustainability and equity are mentionned in the following line). (Government of France)	Want to emphasize risk
5-32	E-5-12	A	1	11			Adaptation decision-making needs to consider the opportunities presented by changing climate as well as negative impacts. Therefore "damages" should be changed to "impacts", which can be either positive or negative. (Donald Lemmen, Natural Resources Canada)	Done

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5-33	G-5-18	A	1	11			Change "damages" to "impacts" such that the benefits of climate change (positive impacts) are recognized in decision-making. (Government of Canada)	Done
5-34	G-5-19	A	1	14	1	17	Rephrase to indicate that its not the "most likely projected climate change under specific scenarios" that is required, but rather the impacts and opportunities arising from those changes. Proposed rewording: "... but their application requires information about not only the impacts and opportunities resulting from the most likely projected climate change under specific scenarios, but also those arising from lower-probability but higher-consequence events. (Government of Canada)	Done
5-35	G-5-20	A	1	16			This line should refer to "climate change impacts under" not "climate change under..." (Government of Canada)	Done
5-36	G-5-21	A	1	17	1	17	Replace "is" by "may be defined as". In other contexts (see same page, line 27 "the magnitude of impacts and risks" or line 31, "the risk of very large impacts" or footnote 1 "the notion of risk and the possibility of crossing thresholds of irreversible change"), risk may have a different meaning, such as the consideration of both the likelihood and the nature and magnitude (expressed in appropriate units) of the impacts. (Government of France)	Care taken to clean up language
5-37	G-5-22	A	1	17	1	18	For clarity, change to "Risk is generally understood as the product of the likelihood of an event and its consequences." (Government of European Community)	Language changed in line with this comment
5-38	G-5-23	A	1	18	1	20	It is not clear why the term "important opportunity" is included here. The WG2 SPM (and WG2 Chapter 19) speak of "key vulnerabilities" only. (Government of European Community)	Care take
5-39	G-5-24	A	1	18	1	20	"That are path dependent and site specific" this text should be deleted or modified with clearer wording. As it is unclear exactly what a path dependent human system is, the authors should provide better wording or delete due to it not being clear. Stating simply "dependent on characteristics of human systems." relays the message just as well. (Government of Canada)	Language changed
5-40	G-5-25	A	1	19	1	19	The authors need to explain what an "important opportunity" refers to. (Government of Australia)	Language changed
5-41	E-5-13	A	1	20	1	20	What is meant by the term "path dependent" in this situation? How does it differ from "site-specific"? (Robert Siveter, IPIECA)	Language changed – development path is meant

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5-42	E-5-2	B	1	20			WGII 2.2.6 also supports this point. (Roger Jones, CSIRO)	Yes
5-43	G-5-27	A	1	23	4	21	Recommend that this section be deleted on the following grounds: 1) The material contained in this section (and in 5.9) is not mandated in the scoping paper outline and is yet another section (the third!) focused on impacts in a report that has far exceeded page limits called for in the scoping paper or the rules of procedure. 2) Much of the material in this section is a presentation of entirely new discussion not previously summarized in this AR4. This is inappropriate for the SYR. 3) The discussion of reasons for concern does not adhere to what should be rigorous scientific standards for inclusion of material in this synthesis. For example, the discussion of the reasons for concern in the TAR was careful to explain its reasoning for only looking at temperature as an indicator because of "problems relating impacts to the level of with GHG concentration levels." Page 1, lines 26-32 claims significant advances in our understanding of the magnitude of impacts and risks associated with temperature and CO2 that is not supported in any of the references and not elaborated in any of the five descriptions of advances since the TAR. Consider the treatment of unique and threatened systems: In the TAR, an effort was made to clearly identify unique and threatened entities that "are restricted to relatively narrow geographic ranges." On page 2, lines 16-21, a general statement about the impact of "significantly high adverse effects of climate change" on ecosystems, biodiversity, water, and food supply is provided with no specificity on the subset of those categories that is unique and threatened. In addition, the section makes many statements that don't seem to be directly supported by the references. Where in the report has it been determined that observed effects of climate change on unique and vulnerable systems consistent with the expected effects of warming has "increased confidence in projected effects?" If these statements are to be included, provide specific references (down to the subsection) so a determination can be made whether or not the language and intent exists in the underlying report and is being adhered to. Taken together, this is ample justification for considering deletion of this section in the Synthesis. (Government of United States)	Not accepted. Many government supported. 1) A2 and KV are mandated and CCT s need to given attention throughout 2) WGII Material C19 3) Reasoning found to sound and not repeated here WGII SPM and WGII C19 4) Observed effects vs confidence in projected effects: all statements will be linked to WG text
5-44	E-5-14	A	1	23			Section 5.2 has "long-term perspectives" in its title, but with the execption of the Greenland ice sheet essentially only the 21st century is discussed. The meaning of "long-term" should be specified. (Jürgen Willebrand, Leibniz Institut für Meereswissenschaften)	Done in intro to Topic 4
5-45	G-5-26	A	1	23			Section 5.2: This section provides a very important discussion of the progress in assessing major risks from climate change since the TAR. In the TAR, the discussion of these "reasons for concern" was accompanied with a figure, generally dubbed the "burning embers diagram" (see TAR SYR Fig. SPM-3 and Fig. 6-3). Is it possible to have an update of this widely cited figure being included in the AR4 SYR as well, based on the text in SYR Section 5.2 and WG 2 Section 19.3.7.	Considered, but not supported by the author team at large

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							(Government of European Community)	
5-46	G-5-28	A	1	23			Most of Section 5.2 applies to both short-term and longer-term perspectives, e.g. impacts for 1 or 1.5 C global warming are mentioned. Later Sections refer to mitigation efforts over the next 2-3 decades and GDP losses by 2030. This should be recognised by the authors who should ensure that the duplication in the findings on impacts between topic 4 and 5, without any real value add in section 5 is reduced. It would be most useful if authors could create a consistent method of tabulating these vulnerabilities, impacts and risks - for this section and for previous sections. (Government of Australia)	Intro to Topic 4 clarifies distinction; duplications have been minimized.
5-47	E-5-15	A	1	25	1	25	To replace "assessed" with "presented" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Rejected – the reports assess.
5-48	G-5-29	A	1	25	1	26	The authors need to change this sentence to reflect that the "reasons for concern" have not changed between the AR4 and the TAR, but have gotten stronger and are supported by new evidence. (Government of Australia)	Redrafted
5-49	E-5-16	A	1	25	1	32	This is a very essential statement--it needs to be the opening paragraph of the Summary for Policymakers as it provides the best overall summary of what we know and the predicament that we face. (Michael MacCracken, Climate Institute)	Done
5-50	G-5-30	A	1	26	1	26	Please remove the quotation marks from around 'reasons for concern'. They are not needed at this point and are not consistent with useage elsewhere in the SYR. (Government of New Zealand)	This is the first mention, and the quotes make it clear that it is from the TAR.
5-51	E-5-17	A	1	26	1	28	I find point (1) to be misleading in total report context I would amend end to say "climate change and variability," or other words that say we have improving information on what is going on with the observed changes in climate and this is not only variability (Bruce McCarl, Texas A&M Univesity)	Text altered.
5-52	G-5-2	C	1	26	1	28	The (1) from the list is very difficult to understand, it is hard to understand the link of "including variability" with the first part of the sentence. It should be rephrased (Government of Belgium)	Reworked, but variability important
5-53	E-5-18	A	1	27	1	28	The reference to "increases in global mean temperature and CO2" is not the best wording. "increases in CO2", "climate change associated with increased CO2" or "anthropogenic climate change" would be better. (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Really mean both.
5-54	E-5-19	A	1	29	1	31	This statement about the importance of risks on multi-century time scales is very important and shows the value of a synthesis report. There is rather little in the rest of the report on	ROCs have long term and so does 5.7. Reject

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							multi-century time scales other than sea level rise and ice sheets. Perhaps more should be added elsewhere in the report on risks to the biosphere over multi-century time scales. (Daniel Murphy, NOAA Earth System Research Laboratory)	
5-55	G-5-31	A	1	29	1	31	Rewrite item #3 to make it clearer: "(3) growing evidence that unmitigated emissions over the 21st century could increase the risk of very large impacts on the climate system on multiple century time scales." (Government of United States)	Change to WGII C19 text "growing evidence that the risk of very large impacts on multiple century time scales ¹ . is very likely to continue to increase as long as greenhouse gas concentrations and temperature continue to increase"
5-56	E-5-20	A	1	30	1	30	"Unmitigated emissions" under which scenario? For example, SRES scenario B1 shows CO2 emissions peaking in mid-century, then declining to about half the current level by 2100, which should be consistent with a pathway to stabilization at 550 ppm or less. Would these "unmitigated emissions" commit the climate system to the risk of very large impacts on multiple century time scales? The authors appear to be thinking about steadily rising emissions, such as in SRES scenario A2. If so, they should clearly state this assumption. (Robert Siveter, IPIECA)	Sentence replaces by WGII C19 text see above..
5-57	G-5-32	A	1	30	1	30	"Unmitigated emissions" under which scenario? For example, SRES scenario B1 shows CO2 emissions peaking in mid-century, then declining to about half the current level by 2100, which should be consistent with a pathway to stabilization at 550 ppm or less. Would these "unmitigated emissions" commit the climate system to the risk of very large impacts on multiple century time scales? The authors appear to be thinking about steadily rising emissions, such as in SRES scenario A2. If so, they should clearly state this assumption. (Government of United States)	See above.
5-58	E-5-21	A	1	31	1	32	Consider moving the footnoted (2) references to those given in the parenthesis. Possibly add reference to WG I 10.7. (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Footnote revised.
5-59	E-5-22	A	1	31			Change "multiple century" to "multi-centennial" (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Rejected – difficult language
5-60	G-5-3	C	1	34	1	36	"vulnerability is a function of exposure and sensitivity" : We think that this is a (rather complicated and maybe debatable) definition, not a "finding". Please rephrase or remove (Government of Belgium)	It is a TAR conclusion; so noted now.
5-61	E-5-23	A	1	39			Conlusion strongly supported (Robert Kay, Coastal Zone Management Pty Ltd)	Thanks

1 Both past and future anthropogenic carbon dioxide emissions will continue to contribute to warming and sea level rise for more than a millennium. { WGI 7.3, 10.3, SPM}
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5-62	E-5-25	A	1	41	1	41	"Climte risks and associated vulnerabilities....." From footnote 3 it seems that vulnerabilities are same as impacts. Is that so? (Upasna Sharma, Indian Institute of Technology, Bombay)	No; language has been clarified earlier and in glossary
5-63	G-5-33	A	1	41	1	41	The phrase "climate opportunities" has not been used previously in the SYR and needs to be explained here. (Government of Australia)	Change to "climate impacts" which can be pos or negative.
5-64	E-5-24	A	1	41	1	43	I agree that no metric can describe the diversity of key vulnerabilities, but 'key vulnerabilitues' is not explained in this section. What does it mean? Why don't you put current footnote 4 after the first mention of key vulnerabilities. Only, the footnote should refer to section 5.9 rather than 5.8. I think section 5.9 should come up front - as the first section in the Topic. (Lisa Schipper, Southeast Asia START Regional Centre, Chulalongkorn University)	Done now in Topic 3
5-65	E-5-26	A	1	43	1	43	Please change as follows: Nor can single metric suport their ranking up to now. Hence, a projection of the different metrics on a joint matrix is still challenging research. (Wilhelm Windhorst, Ecology Centre, Kiel University)	Language changed for clarity, but not exactly as here.
5-66	E-5-27	A	1				Note at bottom 'numeraires'? (Michel Rixen, NATO Undersea Research Center)	Numeraires gone
5-67	G-5-34	A	1				The split between short-term (topic 4) and long-term (topic 5) responses is very clunky - it leads to significant duplication of concepts and text. Topic 5 is easier to read, applies to both short-term and long-term impacts, and is more comprehensive and more policy-relevant than topic 4. We recommend that where there are areas of significant overlap (such as in the discussion of mitigation options in the medium-long term; and the relationship between adaptation and mitigation) the text is rationalised and uses the structure of Topic 5 as the base. (Government of Australia)	Coordination with Topic 4 has been improved.
5-68	E-5-28	A	2	3	2	3	which also determine the adaptive capacity of which system?????. Please add an specification otherwise it is to vague. (Wilhelm Windhorst, Ecology Centre, Kiel University)	Text deleted
5-69	E-5-30	A	2	3	2	3	"...development status, which also determines adaptive capacity." While adaptive capacity is certainly related to development status but it is more than simply development status. Is it then correct to subsume it under developmnet status as the statement seems to do? (Upasna Sharma, Indian Institute of Technology, Bombay)	Text deleted
5-70	E-5-29	A	2	3			determine not determines (Robert Jefferies, University of Toronto)	Text deleted
5-71	G-5-35	A	2	4	2	4	Footnote 4 needs to list the seven criteria used for determining "key vulnerabilities" as they inform the reading of all of section 5.2. In addition, the authors must include the explanation of key vulnerabilities found in section 19.1.2.2 of Working Group 2 along the	Will be listed in Topic 3 and if not will appear here Will propose footnote in Topic 3

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							following lines: "The assessment of key vulnerabilities involves substantial scientific uncertainties as well as value judgements. It requires consideration of the response of biophysical and socio-economic systems to changes in climatic and non-climatic conditions over time (e.g., changes in population, economy, or technology), important non-climatic developments that affect adaptive capacity, the potential for effective adaptation across regions, sectors and social groupings, value judgments about the acceptability of potential risks, and potential adaptation and mitigation measures". (Government of Australia)	to deal with 19.2.2. text proposed.
5-72	E-5-31	A	2	4			Perhaps add here ... rate and magnitude of climate change, intervals between weather extremes and development status .. (Paul Epstein, Harvard Medical School)	Text deleted
5-73	G-5-39	A	2	6	2	6	Suggest adding to the beginning of the paragraph by means of an introduction the following text, simplified from text in the WGII Technical Summary (page 67): "Some Key Vulnerabilities may be linked to thresholds that cause a system to shift from one state to another, while other Key Vulnerabilities will have thresholds that are defined subjectively." This conveys an important distinction and the fact that many Key Vulnerabilities have subjective thresholds is the reason why it is not possible to set hard and fast thresholds for when impacts become 'significant' - a discussion that is taken up in the next paragraph in the discussion of Reasons for Concern. (Government of Canada)	Added to preceding para
5-74	G-5-40	A	2	6	2	6	Consider adding a header for the five "reasons of concern". (Government of United States)	Rejected for space reasons
5-75	E-5-32	A	2	6	2	9	Please consider adding an updated figure akin the one in TAR on the five reasons for concern (e.g. TAR WG II SPM, figure SPM-2, right-hand side, the "burning embers"). Ideally one would show both the TAR-figure and its updated AR4-version. Note that a figure of the latter kind was circulated in the Brussels plenary in April. (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Considered, but not supported by the author team at large
5-76	G-5-38	A	2	6	2	9	The discussion of the Reasons for Concern is a very valuable expansion of the discussion on this topic in the summary products from WGII. Very little is said in the Synthesis Report SPM on the Reasons for Concern either and yet by its very nature, it is one of the most useful 'synthesis' products coming out of the IPCC assessment process. Therefore, we would strongly urge this section be maintained in this Synthesis Report without any significant deletions. (Government of Canada)	Will reflect in SPM Examples that overlap with Topic 3 will be removed
5-77	G-5-37	A	2	6	4	14	This section essentially provides a verbal update of the TAR "Burning Embers" diagram. It would be extremely useful if this description were accompanied by an updated figure that will allow decision makers to see quickly how understanding of these issues has	Considered, but not supported by the author team at large

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							evolved since the TAR. (Government of Canada)	
5-78	G-5-36	A	2	6	4	21	Very important section on updated information on the reasons for concern. a figure that illustrates this update by including the burning ambers figure from the TAR (figure SPM-2 of the TAR WG II report (and included in SPM 3 of the Synthesis Report of the TAR,)), using the "burning-ember" framework to show how the reasons for concern increase with temperature) should be included with high priority, as this figure from TAR is one of the most widely used, and an update of it in the AR4 is therefore necessary. This should include the figure from TAR and updated next to it, for better comparison. (Government of Germany)	Considered, but not supported by the author team at large
5-79	E-5-33	A	2	11	2	26	This section overstates the harm, probably due to the underlying documents. How can one argue for a species extinction of 40% when virtually all these same species were present during the last, warmer interglacial just 125K years ago, and some such as corals, were far more widely distributed during the much warmer mid-cretaceous when CO2 was 2-4 X higher (NOAA). Corals of the same/similar species thrive in the very warm Red Sea and it is likely, even at extreme temps of the forecasts that corals will inhabit even the warmest regions while their range expands as did in past warm periods. The text here is not credible. The appropriate view is in my US Congressional testimony available at: http://www.climatechangeffects.info/Documents/StatementJohnEverett.htm (John Everett, Ocean Associates, Inc.)	Material drawn from underlying reports; Topic 3 authors alerted to the comment.
5-80	G-5-42	A	2	11	2	26	It is not clear what 'significantly high' adverse events might be (but doubly confusing that the previous example was of high-mountain communities), nor what 'species at lower temperatures' are (or is that at lesser levels of global warming?). The link between the bullet points and the paragraph above is also not made, and there is substantial redundancy in the bullet points. Would the intent of the authors be conveyed by text that read: "... Levels of adverse impacts are with very high confidence projected to increase with global mean temperatures. {WGII 2.4, SPM} [new para] New findings since the TAR are: <ul style="list-style-type: none"> • Above 1.5-2.5oC 5 global average temperature increase, predominantly negative effects on biodiversity and ecosystem services such as water and food supply are projected. Above 3.5-4oC warming significant (>40%) extinctions are projected. {SYR 3.3; WGII 4.4, SPM} • There is a high risk of widespread adverse effects to corals: increases of 1-3oC in global average temperature are projected to result in more frequent coral bleaching events and increases of over 2.5-3.0oC projected to result in widespread coral mortality. {WGII6.4} (Government of New Zealand)	Text to be redrafted and bullet points replaced by summary text. Confusing text dropped/

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-81	G-5-41	A	2	11	4	21	These sections of the text (risks to systems, risks of extreme weather, distribution of impacts, net aggregate impacts, and risks of abrupt or irreversible changes) are particularly important and we are pleased to see them so clearly stated. (Government of New Zealand)	Thanks
5-82	G-5-4	C	2	11	4	21	" In order to have a more clear representations of the impacts, could include a map that shows the different vulnerabilities as attributed to main regions of concern " (Government of Belgium)	Good idea, but no time or space
5-83	E-5-34	A	2	11			Add non-linear changes in ecosystem integrity, services and functions. Also true for P4 on risks of large-scale singularities. Forests and coral reefs under multiple stresses and might add the 'metapoint' that systems may withstand one or two but can collapse with multiple. (Paul Epstein, Harvard Medical School)	Text revised, but constrained by underlying reports.
5-84	E-5-36	A	2	13	2	13	After 'ecosystems' add 'and river flows and catchments in semi-arid and arid lands' (David White, ASIT Consulting)	Text revised.
5-85	E-5-35	A	2	13	2	14	I find "This has increased confidence in projected effects" to be unclear. Suggest "This has has increased confidence in our ability to project effects into the future". (Steve Sawyer, Global Wind Energy Council)	Language clarified
5-86	G-5-43	A	2	13	2	14	This statement does not appear in the referenced chapter. How does one go from a correlation of observed current changes and expected effects of warming to an increased confidence in projected effects? Please provide specific reference (WG II 2.4.?.?) or delete. This synthesis report is not the place to make entirely new statements or to dig deeply into chapters to make points not included in previous chapter exec summaries or WG report summaries. (Government of United States)	Text replaced with TS language which makes same point
5-87	G-5-44	A	2	13	2	41	The structure of this sub-section on the "Distribution of impacts and vulnerabilities" is very clear and usefully highlights new and strengthened findings from the TAR. This format should be replicated in the other sub-sections of section 5.2. (Government of Australia)	Tried this approach
5-88	G-5-47	A	2	16	2	16	The basis for the qualifier "Significantly high" needs to be explained by the authors. (Government of Australia)	Text redrafted
5-89	E-5-37	A	2	16	2	18	Sentence unclear (Paula Harrison, Oxford University Centre for the Environment)	Text redrafted
5-90	E-5-38	A	2	16	2	18	Sentence is awkwardly phrased. (Michael MacCracken, Climate Institute)	Redrafted

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-91	E-5-39	A	2	16	2	18	I find this sentence obscure and difficult to read. Suggest: "New findings since the TAR include: significant, large adverse effects of climate change on ecosystems and species at lower temperatures; and prediction of significant extinctions as a consequence of climate change." (Steve Sawyer, Global Wind Energy Council)	Text redrafted
5-92	G-5-45	A	2	16	2	18	Unclear wording. (Government of European Community)	Text redrafted
5-93	G-5-48	A	2	16	2	18	The authors need to rewrite this sentence more clearly, as at present the reference to "lower temperatures" is ambiguous. (Government of Australia)	Text redrafted
5-94	G-5-46	A	2	16	2	21	This statement is unclear. What is meant by "lower temperatures"? Less warming? Actual cooling? Also, what does "significantly high adverse effects" mean? (Government of United States)	Text redrafted
5-95	E-5-40	A	2	17	2	17	Is it "lower temperatures" or "lower latitudes" ?! (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Text redrafted
5-96	G-5-49	A	2	18	2	18	The footnote (5) might better read: "Unless otherwise stated, temperature changes are relative to the 1980-1999 global average" (Government of New Zealand)	Done
5-97	G-5-50	A	2	19	2	20	The inclusion of "ecosystem services such as water and food supply" under the heading "Risk to unique and threatened systems", seems incongruous. The authors need to consider whether such a broad inclusion is useful. (Government of Australia)	Text to be redrafted. This point removed from unique systems
5-98	E-5-41	A	2	20	2	20	In other topics it was outlined that the availability of ecosystem services will not be reduced everywhere, as there is a great regional variation. In order to avoid inconsistencies, please rephrase as follows. ... are projected, while the occurrence of considerable variations especially on the local level has to be expected. (Wilhelm Windhorst, Ecology Centre, Kiel University)	Point dropped due lack of space
5-99	G-5-51	A	2	20	2	21	For consistency with the WG 2 Table SPM-1, add "around the globe" after "extinctions". (Government of European Community)	Text redrafted
5-100	E-5-42	A	2	21			Extinction of what? 40% of all species? Is this meaningful? Can we split this into e.g. Mammals, insects, microbes, etc (Michel Rixen, NATO Undersea Research Center)	Text redrafted
5-101	E-5-45	A	2	22	2	25	Add "if there is not thermal adaptation or acclimatisation by corals and their symbionts." This important caveat is in the text of WG II, Chapter 6.4.1.5, and needs to be included if coral bleaching is identified as a major impact. The section also indicates that: "There is limited	WGII assessment accounts for this. Rejected as unbalanced

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							ecological and genetic evidence for adaptation of corals to warmer conditions." (Robert Siveter, IPIECA)	
5-102	G-5-53	A	2	22	2	25	Add "if there is not thermal adaptation or acclimatization by corals and their symbionts." This important caveat is in the text of WG2 Chapter 6.4.1.5, and needs to be included if coral bleaching is identified as a major impact. The section also indicates that: "There is limited ecological and genetic evidence for adaptation of corals to warmer conditions." (Government of United States)	WGII assessment accounts for this. Rejected as unbalanced
5-103	E-5-43	A	2	22	2	26	This bullet needs to also include mention of the pace of ocean acidification and its likely adverse consequences. (Michael MacCracken, Climate Institute)	Topic 3.3 mentions this issue. Level of confidence not high enough to include here
5-104	E-5-44	A	2	22	2	26	it would be more sensible to qualify this statement by 'in some localities'. This is not a uniform global process (Thomas Spencer, University of Cambridge)	Text redrafted
5-105	G-5-52	A	2	22	2	26	For consistency with the WG 2 Table SPM-1, change "1-3°C" to "0-2.5°C". Furthermore, add "ocean acidification" as additional risk to "increasing sea surface temperatures". (Government of European Community)	Refer to Topic 3 Topic 3.3 mentions this issue
5-106	G-5-54	A	2	23	2	23	Is the 1-3°C increases in air or sea temperatures? (Government of United States)	Global Mean Surface Temperature TSU to check usage across SYR
5-107	E-5-46	A	2	24	2	24	Add: "...in more frequent coral bleaching AND DEATH events and increases...." (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	Limited number of illustrative examples
5-108	G-5-55	A	2	28	2	30	Systems are vulnerable to (changes in) extreme events, not to their effects. Therefore, delete "the effects of". (Government of European Community)	Think they are vulnerable to effects, as well.
5-109	E-5-47	A	2	28			A missing point under this heading is the change in dominance from snow to rain the the annual precipitation of arctic and alpine areas. This affect the sustainability of snowbed ecosystems, increases summer draught, and affects permafrost. A strong threat to alpine biodiversity! (Ulf Molau, Göteborg University)	Limited number of examples from underlying reports
5-110	G-5-56	A	2	29	2	29	Editing: delete "with warming" as it is not necessary. (Government of Australia)	Text redrafted
5-111	E-5-48	A	2	31	2	32	To replace ' to climate extremes' by 'to them'. (Roman Corobov, Modern institute for humanities)	Text redrafted
5-112	E-5-50	A	2	31	2	32	"Recent extreme climate events have demonstratedcountries." Llanguage seesm ambiguous.	Text redrafted

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Upasna Sharma, Indian Institute of Technology, Bombay)	
5-113	G-5-57	A	2	31	2	33	Unclear if we are now more sensitive to extreme events, or we now have more information on our sensitivity to extreme events, or both. Please indicate where specifically this language is drawn from and clarify. (Government of United States)	Higher sensitivity than assessed in TAR, Reference check.
5-114	G-5-58	A	2	31	2	33	Higher than what? Suggest to add "than assessed in the TAR". (Government of European Community)	Text redrafted
5-115	E-5-49	A	2	31	3	6	These are all excellent points that need to be featured at the start of the SPM. (Michael MacCracken, Climate Institute)	They are
5-116	E-5-51	A	2	32	2	32	"extremes" or "changes" ?! (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Text redrafted
5-117	G-5-59	A	2	34	2	38	This statement is less cautious than the WGI analysis of the various studies devoted to the tropical cyclones and than the SYR SMP, page 9, lines 25-26. The increase of cyclones damages is less certain than the risks mentionned in the other bullets (Government of France)	Text to be redrafted. (Substance of comment is wrong)
5-118	G-5-60	A	2	35	2	35	"now"—as opposed to when? Is this new with this IPCC report? (Government of United States)	Yes
5-119	E-5-52	A	2	36	2	36	Add: "....more intense rainfall inland, FLOODS and stronger...." (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	Limited examples because of space
5-120	E-5-53	A	2	37	2	37	To add "of" after "risk", i.e. "risk of water- and ..." (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Text redrafted
5-121	E-5-54	A	2	37	2	37	Insert: "of" after "risk". (So reads: "....crop production, infrastructure and increased risk of water- and food-borne diseases." (Pat Finnegan, Grian)	Text redrafted
5-122	E-5-58	A	2	37	2	37	"of" needs to be inserted before "water" (Jon Egill Kristjansson, University of Oslo)	Text redrafted
5-123	E-5-56	A	2	37	2	38	in addition to water- and food-borne diseases, include "injury and deaths, and psychosocial disorders of displaced people". (Hisashi Ogawa, World Health Organization Regional Office for the Western Pacific)	Limited space and examples
5-124	E-5-55	A	2	37			Insert "of" after "risk" (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Text redrafted

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-125	E-5-57	A	2	37			add "of" after "risk" (Hartmut Grassl, Max Planck Institute for Meteorology)	Text redrafted
5-126	E-5-59	A	2	39	2	39	Replace 'water with 'surface and groundwater' (David White, ASIT Consulting)	Text redrafted
5-127	G-5-61	A	2	39	2	39	The authors need to add "is expected" or some other phrase to this point as it is just a fragment now. Same is true of every one of the remaining bullets in this section. (Government of United States)	Text deleted due space limitations
5-128	E-5-60	A	2	39			need to add "is expected" or some other phrase to this point as it is a fragment just now. Same is true of every one of the remaining bullets in this section. (Bruce McCarl, Texas A&M Univesity)	Text deleted due space limitations
5-129	E-5-61	A	2	42	2	43	Eliminate this bullet because it is included in the second bullet. (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	From the TAR
5-130	E-5-62	A	2	44	2	44	Change "floods" to "flooding" (Michael MacCracken, Climate Institute)	Text redrafted
5-131	E-5-63	A	2		3		Some of the examples used in Capter 3 reappear on pages 2-3 in Chapter 5. The editorial commity may want to review all chapters to see if there is an opportunity to streamline while maintaining the relevancy, understandability and meaning. (Ian Church, Yukon Government)	Done
5-132	E-5-64	A	3	1			It is not clear why earlier melting of snowpacks increases flooding, at least if other aspects of the seasonal cycle similarly occur earlier. Faster melting of snowpacks would. (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Text deleted due space limitations but comment is correct
5-133	E-5-65	A	3	1			How about the risk and uncertainty created by the difficulty of quantifying ancillary benefits (as mentioned above) [TSU note: See Comment E-4-237-A]. Needs to be mentioned here, as a reason why energy efficient solutions are not more easily chosen (Philippine de T'Serclaes, International Energy Agency)	Limited space
5-134	G-5-62	A	3	3	3	3	How did heat waves jump from more likely than not to very likely? Were these assessed in different ways depending on the context? If so, then each context needs to be clearly laid out, or this report will be easily read as having internal contradictions. (Government of United States)	Text deleted due space limitations
5-135	E-5-6Fr6	A	3	4	3	4	Add: "...increased HUMAN mortality , increased water...." (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	Text redrafted
5-136	G-5-63	A	3	4	3	4	Increased mortality of what/whom for what reasons? (Government of United States)	Text redrafted

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-137	G-5-5	C	3	8	3	8	"Distribution of impacts and vulnerabilities" is a strange name for a "cause for concern" (in spite of its use for TAR). Our impression is that the "concern" is the potential for "regional vulnerability hot spots", or simply "uneven distribution of impact (Government of Belgium)	Maintaining the TAR language
5-138	G-5-64	A	3	10	3	10	Editing: replace "prediction" with "projection" (Government of Australia)	Text redrafted
5-139	E-5-67	A	3	10	3	11	The regional precip predictions are being used by planners. In the light of the comment above for topic 2 p7 how much weight should planners put on the regional predictions, given the differences in the model outputs ? (David Fisher, NRCan)	A lot...in framing their risks
5-140	E-5-68	A	3	14	3	26	There needs to be a bullet on ocean acidification. (Michael MacCracken, Climate Institute)	Refer to Topic 3 for coverage
5-141	E-5-69	A	3	14			Some indication on the possible magnitude of the effect on future water availability would be very useful. (Toufiq Siddiqi, Global Environment and Energy in the 21st Century)	See tables in topic 3
5-142	G-5-66	A	3	15	3	15	It is suggested to change the word "affecting" to "which might affect". (Government of China)	Literature is more definitive. Reject. Use which would affect
5-143	G-5-65	A	3	15	3	16	Should give the example of the Mediterranean Basin for which water problems will be increasing. (Government of United States)	Med basin not glacially fed water supply in general. Reject
5-144	G-5-67	A	3	16	3	16	For "temperature thresholds" is not yet well studied, it is therefore suggested to delete this sentence. (Government of China)	No specific threshold identified but thresholds exist in literature. Reject.
5-145	E-5-70	A	3	17	3	17	After 'place to place' insert 'and are exacerbated by groundwater depletion through increased extraction' (David White, ASIT Consulting)	Text redrafted
5-146	E-5-71	A	3	18			It would be helpful to indicate a likely range for crop losses in low latitude regions. (Toufiq Siddiqi, Global Environment and Energy in the 21st Century)	See table
5-147	E-5-72	A	3	20	3	20	Insert ', duration and intensity' after 'frequency' of droughts (David White, ASIT Consulting)	Text redrafted
5-148	E-5-73	A	3	22	3	22	Do not exacerbate statements within the document, which refer to the same aspect. On page 2 of topic 5 in line 11/12 it says: 'observed effects of climate change...' without connotation, one page later, it says: 'Observed adverse impacts of climate change...'. I don't think it is necessary to use the word 'adverse' in the context of 'observed impacts'. The statement in this paragraph is strong enough without exaggerating what we observed so far.	Consistency was a criterion for revision.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Gian-Reto Walther, University of Bayreuth)	
5-149	E-5-74	A	3	23	3	24	write tropical instead of inter-tropical (Georg Kaser, Geography)	Text redrafted
5-150	E-5-75	A	3	23	3	24	What does "intertropical" mean--maybe say "tropical and subtropical" (Michael MacCracken, Climate Institute)	Text redrafted
5-151	E-5-76	A	3	23	3	24	"Inter-tropical" should be "Intra-tropical" (?) (James Crampton, GNS Science)	Text redrafted
5-152	E-5-77	A	3	25	3	26	only few of the tropical glaciers will disappear with a 1 °C warming (see WGI 4.5), most of the them, that are in the SA Andes, are still too big. Therefore write "some of these glaciers" instead of "these glaciers" (Georg Kaser, Geography)	Text deleted due space limitations but comment is correct
5-153	G-5-68	A	3	29	3	29	What characterizes a "mega-delta"? Geographic size or population? (Government of United States)	This is a cross cutting theme in WGII
5-154	E-5-78	A	3	32	3	35	Mention should also be made of the threat to coastal cities, especially those vulnerable to storm surge from tropical cyclones. Given how much sea level could rise, it is not just a few communities that are at risk. (Michael MacCracken, Climate Institute)	Limited space
5-155	E-5-79	A	3	32	3	35	how does sea level rise directly impact fisheries? (Thomas Spencer, University of Cambridge)	Spawning grounds.
5-156	E-5-80	A	3	33	3	34	Add: "..... Communities and as well WILL PROVOKE heavily impact ON coral reefs, fisheries, TOURISM, and other marine-based..." (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	Text redrafted
5-157	E-5-82	A	3	34	3	34	To add "of" after "large part", i.e. "large part of the local ..." (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Text redrafted
5-158	E-5-81	A	3	34	3	35	Write "a large part of the local economies" rather than "a large part the local economies" (Marco Mazzotti, ETH Zurich)	Text redrafted
5-159	E-5-83	A	3	34			add "of" at the end of line (Hartmut Grassl, Max Planck Institute for Meteorology)	Text redrafted
5-160	E-5-3	B	3	34			part of (Effiom Antia, University of Calabar)	Text redrafted
5-161	E-5-84	A	3	37	3	41	Weakening and importance of MOC meridional overturning circulation (Northatlantic Thermohaline Circulation) is also assessed differently (lower risk) compared to TAR. Might be also mentioned here (see also page 4 line 7-21)	Not discussed in this section due to lack of space and dealt with in following RoC

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Markus Erhard, European Environment Agency)	
5-162	G-5-69	A	3	40	3	40	Are deaths due to cold exposure a big issue? It seems to get similar attention as deaths and health problems from high temperatures. (Government of Sweden)	Underlying report material used
5-163	G-5-71	A	3	43	3	46	It is important to distinguish between scientific uncertainty and value judgements here. "Climate sensitivity" has a single true value, even though we do not currently know it exactly. The choice of the intertemporal discount rate (more specifically: on the pure rate of time preference), in contrast, largely reflects a value judgements on the importance of future generations compared to current generations, for which no single "true" value exists. These differences need to be discussed explicitly (see WG 2 Chapter 19.1.2.2. and WG 2 Box 19.3). (Government of European Community)	Replace with TS text 5.3 to replace use of "uncertainty" in this context. Climate sensitivity may not have a single value over time.
5-164	E-5-85	A	3	43	3	49	This paragraph needs to be rephrased to make it clearer (Richard Anyah, Rutgers University)	Done
5-165	E-5-86	A	3	43	4	5	The phrase "... there is some evidence that initial market benefits from climate change will peak at a lower magnitude and therefore sooner than was concluded in the TAR." is vague. It should either be substantiated with specifics or dropped. Similarly, no evidence is provided for the claims that previously neglected aspects of climate change may be very significant, or that it is likely that "... there will be higher damages for larger magnitudes of global mean temperature increases than estimated in the TAR." These points are too important to be presented as simple assertions. Policymakers need to see the bases for these claims. (Robert Siveter, IPIECA)	Replaced with TS text 5.3 to replace use of "uncertainty" in this context.
5-166	E-5-87	A	3	43	4	5	Please add that most estimates of the net aggregate impacts are positive. (Richard Tol, ESRI)	Replace with TS text 5.3 to replace use of "uncertainty" in this context.
5-167	G-5-70	A	3	43	4	5	The phrase "... there is some evidence that initial market benefits from climate change will peak at a lower magnitude and therefore sooner than was concluded in the TAR" is vague. It should either be substantiated with specifics or dropped. Similarly, no evidence is provided for the claims that previously neglected aspects of climate change may be very significant, or that it is likely that "... there will be higher damages for larger magnitudes of global mean temperature increases than estimated in the TAR." These points are too important to be presented as simple assertions. Policymakers need to see the bases for these claims. (Government of United States)	Replace with TS text 5.3 to replace use of "uncertainty" in this context.
5-168	G-5-72	A	3	45	3	46	It is inappropriate to associate "enormous uncertainty" with discount rates. The choice of discount rate involves judgment by decisionmakers, which is very different from a	Replace with TS text 5.3 to replace use of "uncertainty" in

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							measurable quantity like climate sensitivity where genuine scientific uncertainty exists. (Government of United States)	this context.
5-169	G-5-75	A	3	46	3	46	Is the "increased vulnerability" relative to the TAR or relative to other regions? (Government of United States)	Relative to TAR, but sentence removed in redrafting.
5-170	G-5-76	A	3	46	3	46	'Disaggregates' is not in the glossary; it may be better to write: " Because disaggregation by region shows ..." (Government of New Zealand)	Language changed
5-171	G-5-73	A	3	46	3	49	This sentence is not clear. Will peak at lower magnitude and sooner. This statement does not appear in the referenced chapter. This is a new conclusion because it combines two ideas not previously combined in the referenced chapters. In general, please reference to third level headers to find the material more easily. This synthesis report is not the place to make entirely new statements or to dig deeply into chapters to make points not included in previous WG report summaries. (Government of United States)	Peak at a lower temperature increase. Redrafted.
5-172	G-5-74	A	3	46	3	49	The text in brackets ("particularly when ...weights") would better go at the end of the sentence. (Government of New Zealand)	Text deleted; substitute provided
5-173	G-5-77	A	4	1	4	1	Are "the damage from increased cyclone intensity" properly estimated ? (Government of France)	Text deleted; substitute provided
5-174	G-5-78	A	4	3	4	3	What is meant by "very significant"? (Government of Australia)	Text deleted; substitute provided
5-175	G-5-79	A	4	3	4	3	To avoid any implication of prescription replace "neglected" with "unassessed". (Government of Australia)	Text deleted; substitute provided
5-176	E-5-90	A	4	7	4	7	Possibly the most poorly understood candidate for abrupt change is the ENSO system of the Pacific tropics. It is being to look like it "switched on " about 4000 years ago with a "Mega El Nino" that has been blamed for the demise of several agricultural civilizations. ENSO by its very nature is unstable and not well understood. (David Fisher, NRCAN)	Limited to underlying reports.
5-177	G-5-81	A	4	7	4	7	Is the highly technical word 'singularities' really necessary here, or could the text read: "Risks of large scale abrupt or irreversible changes." ? (Government of New Zealand)	Singularity is retained here to link back to TAR RoC
5-178	G-5-83	A	4	7	4	7	In Footnote 6, are extinctions necessarily examples of singularities? Can't an extinction happen smoothly, with steadily decreasing numbers of individuals in a species, till then there are none?	Yes, and No. and it is irreversible.

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							(Government of United States)	
5-179	E-5-88	A	4	7	4	16	You need to mention here the recent observations of increased melt and discharge of ice from Greenland even it isn't modelled yet. (Steve Sawyer, Global Wind Energy Council)	Language carefully negotiated with WG1 and WG2
5-180	E-5-89	A	4	7	4	21	This part repeats many arguments of the preceding topics, hence it should be shortened. (Wilhelm Windhorst, Ecology Centre, Kiel University)	Text redrafted
5-181	E-5-91	A	4	7	4	21	Mention needs to be made here of the risk of ocean acidification and the potential collapse of the marine food chain. (Michael MacCracken, Climate Institute)	Text redrafted with careful negotiation with WG1 and WG2
5-182	G-5-80	A	4	7	4	21	These lines are highly redundant with Topic 3.4. (Government of United States)	Redrafted to reduce overlap.
5-183	G-5-82	A	4	7	4	21	include more detailed information, e.g. risk of methane release (from permafrost melting, from wetlands, and from oceans), on West-Antarctic-Ice Sheet, on biosphere feedbacks - to give a more complete picture on risks of large-scale singularities and feedbacks. (Government of Germany)	Refer to Table 19.1 in redraft and give example from WGII
5-184	E-5-92	A	4	9	4	12	There simply is not the basis to dismiss this potential. The ice sheet models are acknowledged to be seriously deficient and unable to explain observed sea level rise--and the assertion that it could take millennia is based solely on the deficient ice sheet models. As is made clear in the subsequent statements, there is just no basis for such sanguine statements. (Michael MacCracken, Climate Institute)	Phrase added on recent ice loss in relation to risk of century scale losses
5-185	G-5-84	A	4	12	4	15	Explain what is the ice dynamical processes that are referred to in this paragraph. It is not clear. Needs more explanation of what is in and what is out. (Government of United States)	WGI for footnote needed
5-186	G-5-85	A	4	13	4	15	Consider changing "the ice sheets" to "both the Greenland and Antarctic ice sheets" and removing ", and could also lead to contributions from Antarctica". (Government of United States)	Yes to first and reject second as this is the point
5-187	E-5-93	A	4	15	4	16	Comment: "Complete deglaciation...irreversible." This statement is speculative and does not add to the credibility of the report, I suggest that it should be removed. (Maria Rosa Paiva , Universidade Nova de Lisboa [New University of Lisbon])	This is in the WGI assessment. Rejected
5-188	E-5-94	A	4	15	4	16	...complete deglaciation of Greenland ... could be irreversible: This statement should be accompanied by a time scale, eg minimum time for rebuilding the ice sheet which is probably o(10.000) years. (Jürgen Willebrand, Leibniz Institut für Meereswissenschaften)	Time scale not available from WGI

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-189	E-5-95	A	4	16	4	16	The statement here are simply indefensible. The notion that the deglaciation would take millennia comes from models that only treat the surface heat balance--whereas paleoclimatic data make clear that much more rapid change can occur. In addition, there is no basis for even hinting that the process is reversible, so "could be" should be changed to "very likely" or something similar. (Michael MacCracken, Climate Institute)	Text refers to century time scale risk and we cannot go further than WGI permits.
5-190	E-5-96	A	4	16	4	18	Explain why species are now at far greater risk of extinction with warming over 2 C than in the geological past. (Marcel Marchand, Delft Hydraulics)	Point deleted to save space but the reviewers point is not consistent with the WGII assessment
5-191	G-5-86	A	4	16	4	18	The phrase "than in the geological past" is confusing. By including this phrase it seems that the authors are implying that the assessed marine species are currently at increased risk of extinction due to warming and a reduction in their adaptive capacity. The authors need to clarify this sentence. (Government of Australia)	Sentence has been deleted due to space limitations
5-192	E-5-97	A	4	16			Delete the words "over millennia" since it repeats, and somewhat conflicts with what occurs above, where the possibility of century timescales has been mentioned as well. Also, after "irreversible" add: "Complete disintegration of the West Antarctic ice sheet would raise sea level by about 5m". (Michael Oppenheimer, Princeton University)	WGI does not want mention of WAIS
5-193	E-5-98	A	4	17	4	17	Change "far greater risk" to "increased risk". Increased risk is all that is claimed in WG II's SPM or in Table SYR 3.2. (Robert Siveter, IPIECA)	Text redrafted
5-194	G-5-87	A	4	17	4	17	Change "far greater risk" to "increased risk". Increased risk is all that is claimed in the WG2 SPM or in Table SYR 3.2. (Government of United States)	Text redrafted
5-195	E-5-99	A	4	18	4	20	It needs to be mentioned that the meltback could occur over the first half of the 20th century--already the observed change is occurring faster than models can explain. (Michael MacCracken, Climate Institute)	Obs added but not statement possible on models
5-196	E-5-101	A	4	23	4	23	Suggest to change to "Adaptation and mitigation": the section is not only about the interrelationships, but also adaptation separately and mitigation separately. (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected- heading is given by bplenary?
5-197	G-5-88	A	4	23	4	23	Suggest to change to "Adaptation and mitigation": the section is not only about the interrelationships, but also adaptation separately and mitigation separately. (Government of Hungary)	Rejected-heading given by plenary
5-198	E-5-4	B	4	23	5	22	More could be added here on the dynamics of adaptation and mitigation, with perhaps some changes to Figure 5.1. Compared to the discussion on mitigation that on adaptation is too	Cannot accommodate without expanding space requirements and

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
							<p>brief and several more points could be added. I would like at least one more headline and some supporting text. These need to deal with process a little better to determine changes over a range of time horizons rather than relying on snapshots, which are restrictive in illustrating risk and risk management.</p> <p>In the short term, adaptation will be required to address most of the change experienced out to say 2030 (where about 85% of warming cannot be avoided).</p> <p>Adaptation needs to cope with the rate as well as the magnitude of change – the rate of change will flatten out at basically the same time that emissions begin to taper off and reverse sign – early to mid century if stabilisation pathways are followed, later if not (Not sure whether this is more relevant here or earlier).</p> <p>Even if adaptation is required to take advantage of changing conditions which are beneficial, the rate of change will affect adjustment costs.</p> <p>Adaptation needs to take a whole of climate approach, incorporating ongoing climate variability in addition to factoring non-climatic drivers of change into its considerations.</p> <p>Also suggest a change to Figure 5.1. The boxes on risks reduced through mitigation and adaptation are essentially buckets which are double-dipped into (which might be relevant to costs). However, a more dynamic picture would be to suggest that adaptation reduces the lower part of risk (to its practical limits), and mitigation reduces the upper part of risk, leaving a residual in the centre. It could also illustrate the difference between short and long-term mix under the two scenarios by showing two boxes for each (four in total). In both the short-term would be similar with only marginal differences between mitigation; in the long-term boxes, mitigation benefits would be larger in the blue example.</p> <p>(Roger Jones, CSIRO)</p>	<p>not essential to convey accurately the AR4 findings in this area.</p> <p>Old Figure 5.1 deleted.</p>
5-199	E-5-100	A	4	23			<p>What is a principal difference between 5.3 and 4.4? With practically the same title, there are different moments in interpretation. If there are no differences, to discuss this question in one place is better. If yes, to explain observed differences in interpretation.</p> <p>(Roman Corobov, Modern institute for humanities)</p>	Accepted-Text from Topic 4.4. has been imported here
5-200	E-5-102	A	4	23			<p>Concept of "The relationship between adaptation and mitigation" is quite important, but it is not clear how we can combine mitigation and adaptation.</p> <p>(Toshihiko Masui, National Institute for Environmental Studies)</p>	Mitigation and adaptation can be combined in a portfolio of climate responses (even though they do not have to be combined in the same action)
5-201	G-5-89	A	4	23			<p>Section 5.3 - important section. In general, this section does a better job in explaining the relationship between adaptation and mitigation than the corresponding section in topic 4. Restructuring could help to avoid duplication and include the whole story of relationship between adaptation and mitigation here.</p> <p>(Government of Germany)</p>	Agreed
5-202	G-5-90	A	4	23			<p>In the discussion of the relationship between adaptation and mitigation in section 5.3, it is not made clear that adaptation and mitigation address different components of total risk,</p>	<p>See 5-198</p> <p>Old Figure 5.1 deleted.</p>

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							(although it is alluded to in Figure 5.1). Adaptation will adjust to the lower part of the range of change that is committed to in the first instance and will be encountered. Mitigation reduces the likelihood of the higher consequence, long term outcomes. In Figure 5.1 this could be shown as adaptation risks reduced being bottom up in the lower boxes, mitigation risks from the top down and residual risks in the centre, the vertical range being equivalent to the range of uncertainty in climate change. (Government of Australia)	
5-203	E-5-103	A	4	26	4	30	It seems, this statement does not agree with the following text where mitigation is considered as a primary measure (avoiding the unmanageable) and adaptation is considered as a secondary, or resulting measure (managing the unavoidable). Such a logicity is more sound from the history of confronting climate change, as well as from FCCC activities. (Roman Corobov, Modern institute for humanities)	Rejected- both mitigation and adaptation reduce impacts (even if in different ways)
5-204	E-5-104	A	4	29	4	29	From the G 8 - preparatory conference 'Avoiding Dangerous Climate Change' in Exeter (2005) we know that the challenge is to avoid the unmanageable and to manage the unavoidable. The large scale irreversibilities described there are unmanageable. To reflect this please add: 'lead to irreversibilites and unmanageable effects and thus to a magnitude of climate change ...' (Manfred Treber, Germanwatch)	Rejected-not compatible with approved language
5-205	G-5-92	A	4	29	4	29	Add "at all" after "if it is possible". (Government of European Community)	Accepted
5-206	G-5-91	A	4	29	4	31	To make the statement stronger, please delete "if it is possible" and add "is not possible or". As shown in figure 5.1 not all impacts can be dealt with. (Government of Germany)	Rejected- see comment above
5-207	E-5-105	A	4	34	4	34	I don't think the word 'residual', i.e., 'left over', works here...it belittles the fact that this is what WILL be inflicted upon people and ecosystems even with adaptation measures. Suggest 'unavoidable' impacts expresses the case better, both in this sentence and subsequently, and especially in figure 5.1 (Steve Sawyer, Global Wind Energy Council)	Accepted
5-208	G-5-93	A	4	34	4	34	Delete "resulting" and simply mention "adaptation needs" (Government of Republic of Benin)	Rejected-departs from approved language
5-209	E-5-106	A	4	35	4	35	To replace "This" with "It" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Accepted
5-210	E-5-107	A	4	36	4	36	The word "a" should be removed (Jon Egill Kristjansson, University of Oslo)	Accepted
5-211	E-5-108	A	4	36			delete "a" before "two" (Hartmut Grassl, Max Planck Institute for Meteorology)	Accepted

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5-212	E-5-5	B	4	36			a two-fold alternative (Effiom Antia, University of Calabar)	Rejected-departs from approved language
5-213	E-5-110	A	4	37	4	37	"at" should be 'in' (Jon Egill Kristjansson, University of Oslo)	Accepted
5-214	G-5-94	A	4	37	4	37	Should this sentence be referring to SECTION 5.6? In any case, the sentence as is unclear. Perhaps what is meant is that more specific information about the timing and scale of mitigation to meet different objectives is dealt with in section 5.6, although that does not really describe what is covered in Section 5.6. Not clear. (Government of Canada)	Accepted
5-215	G-5-95	A	4	37	4	37	Instead of "... is described at 5.6." could we please have " ... is described in Section 5.6." (Government of New Zealand)	Accepted
5-216	E-5-109	A	4	37			substitute "in" for "at" after "described" (Hartmut Grassl, Max Planck Institute for Meteorology)	Accepted
5-217	E-5-111	A	5	1	5	2	The two sets of bars need to be sized differently as they are nowhere near equivalent. What is shown is more or less the likely fractional change--not nearly the absolute one, which is what should be indicated by the vertical heights of the bars--they are not equal. The right bar should be many times higher than the left bar, giving an indication of the magnitude of the absolute changes that would be needed. (Michael MacCracken, Climate Institute)	Old Figure 5.1 deleted.
5-218	G-5-96	A	5	1	5	10	The title needs to include the word "Hypothetical" or words "Generic illustration". Further, the top part of the figure may not be necessary to convey the main points of the figure, which is that greater mitigation action can lead to greater reductions in risks of impacts; that adaptation may have a larger role to play in reducing risks depending on how much mitigation action is taken; and that residual impacts will be the result of those impacts not addressed by the portfolio of adaptation and mitigation. Authors should consider making use of Figure 2.1 of the WG2 SPM to convey the time dimensions of when adaptation and mitigation can play a role in reducing the risks of climate change. Currently the bottom part of the figure has no time dimension, and thus says nothing about how adaptation may need to play a role in the near term, whereas mitigation has a role (in addition to adaptation) for longer term risk reduction. (Government of United States)	Old Figure 5.1 deleted.
5-219	G-5-98	A	5	3	5	10	Figure caption. A sentence needs to be added to the caption to complement that of sentence 4, about stabilization at low levels, providing a statement about the implications of stabilization at high levels. Also, need to add a sentence to end of caption noting the lack of units on the lower figures. "Similarly, there are no units on the boxes showing risk reduction through mitigation and adaptation although the relative size of the internal	Old Figure 5.1 deleted.

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							boxes in the low versus high stabilization scenario is understood to be realistic." This would make it clear that readers should be looking WITHIN rather than ACROSS high and low stabilization boxes when comparing the size of the internal boxes. (Government of Canada)	
5-220	G-5-97	A	5	3			This figure is useful but may provide an impression that Impacts for different stabilisation levels are similar (further work on this may reduce this impression) (Government of Ireland)	Old Figure 5.1 deleted.
5-221	G-5-99	A	5	3			Caption of Figure 5.1: Delete "the risk of " before "residual impacts". Change "might be unavoidable" to "are unavoidable". (Government of European Community)	Old Figure 5.1 deleted.
5-222	E-5-112	A	5	5	5	5	Note the double space between 'red bars' and 'indicate' (David White, ASIT Consulting)	Old Figure 5.1 deleted.
5-223	E-5-113	A	5	5			Fig. 5.1: place "for a high and low stabilisation case respectively" in line 6 after "red bars" in line 5 (Hartmut Grassl, Max Planck Institute for Meteorology)	Old Figure 5.1 deleted.
5-224	E-5-114	A	5	13	5	15	This sentence should not stand alone and must be followed by something which says that mitigation measures are nonetheless important and absolutely necessary to avoid adverse effects of enhanced global warming which would substantially increase adaptation costs in the long run. (Gian-Reto Walther, University of Bayreuth)	Accepted -corrected
5-225	G-5-100	A	5	13	5	15	This statement is incorrect, since some adaptation measures (e.g., changes in urban and regional planning or building codes) also take decades to be effective. Suggest to replace by "Due to inertia in the climate system, the climatic benefits of mitigation measures take several decade to fully manifest, but non-climatic benefits (e.g., reductions in air pollution) would manifest immediately. Some adaptations can be effective in the short term (e.g., changes in planting dates of crops) whereas others take several decades (e.g., changes in urban and regional planning)." (Government of European Community)	Reference to adaptation time scales has been removed from text due to space constraints
5-226	E-5-116	A	5	13	5	17	Comment: reactive natural adaptation (at species, population, community or ecosystem level) is not considered, which nevertheless can occur within short time intervals. (Maria Rosa Paiva , Universidade Nova de Lisboa [New University of Lisbon])	Noted, but limited to underlying reports
5-227	E-5-115	A	5	13	15		Note that, for the same reasons, the benefits of early mitigation would last much longer than those of adaptation. (Leonard Allen Smith, London School of Economics)	Noted, and implicit in text

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-228	E-5-117	A	5	13			" Due to inertia in the climate system, benefits of mitigation measures related investments and policies" in line 17: This very important conclusion has to be reflected in the Summary for Policymakers, as it is important to set the priorities for the short and medium term measures. (Ben Muirheid, International Fertilizer Trade Association (IFA))	Noted, and implicit in text
5-229	E-5-118	A	5	14	5	14	Suggest add a phrase so it reads "to materialise (but which would be ongoing for centuries) than benefits" (John Church, CSIRO)	Rejected because unclear
5-230	G-5-101	A	5	15	5	15	add in front of "required" "possible and". Rational: see the reduced possibility to adapt to CC in figure 5.1. (Government of Germany)	Accepted
5-231	E-5-119	A	5	16	5	16	Insert '-' between 'medium' and 'term' (David White, ASIT Consulting)	Accepted
5-232	E-5-6	B	5	16			medium-term (Effiom Antia, University of Calabar)	Accepted
5-233	E-5-120	A	5	17	5	20	The phrase "major increase in vulnerability" needs to be changed to "major increase in impacts"--given the size of the change postulated, this is not about vulnerability, but the huge changes that will be occurring for the level of change indicated. (Michael MacCracken, Climate Institute)	Agreed
5-234	G-5-102	A	5	17	5	20	This sentence seems out of context here. Suggest to delete. (Government of European Community)	Move to barriers section below
5-235	G-5-6	C	5	17	5	20	4°C above 1980-99 (...) exceeding the adaptive capacity of many systems. The range for widespread impacts given in WG2 19.ES page 2 is 2 to 4 °C. Citing only 4°C would be misleading. Please rephrase and use an appropriate threshold. (Government of Belgium)	See above and check full range eg is 2-4oC correct?
5-236	E-5-122	A	5	18	5	18	Note this temperature would very likely lead eventually to a near complete wastage of the Greenland ice sheet. (John Church, CSIRO)	Not relevant in this context.
5-237	E-5-121	A	5	18			substitute "higher" for "greater" (Hartmut Grassl, Max Planck Institute for Meteorology)	Accepted
5-238	E-5-7	B	5	18			pre-industrial (Effiom Antia, University of Calabar)	Accepted
5-239	E-5-123	A	5	22	5	22	This is a pretty straightforward sentence; should be changed to "Costs, barriers and limitations of adaptation" (Zoltán Somogyi, Hungarian Forest Research Institute)	Rejected-approved language

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Running number	Topic - Comment	Batch	Page	Line	To Page	To Line	Comment	Considerations by the writing team
5-240	G-5-103	A	5	22	5	22	This is a pretty straightforward sentence; should be changed to "Costs, barriers and limitations of adaptation" (Government of Hungary)	Rejected-approved language
5-241	G-5-104	A	5	22	5	22	Suggest to add "significant" before "barriers", analogous to WG 2 TS FGD p. 62, l. 40 (Government of European Community)	Accepted
5-242	E-5-124	A	5	22			(high confidence)' The style of this title is unusual for the report (Michel Rixen, NATO Undersea Research Center)	Rejected
5-243	G-5-106	A	5	24	5	24	for clarification delete "such as for" and insert "such measures like measures for maintenance of " (Government of Germany)	Rejected
5-244	E-5-125	A	5	24	5	28	Suggest this sentence should read, " ...in water storage and supply, or adaptation to sea level rise of several metres, which will eliminate entire nations from the map of the world" (Steve Sawyer, Global Wind Energy Council)	Rejected-would depart from approved language
5-245	E-5-126	A	5	24	5	28	among the cases where adaptations will be ineffective (or at least insufficient) you mention: "such as for biodiversity and natural ecosystems" under "e.g." you may also mention "for temperature sensitive and space/restricted ecosystems" which would be more closely related to what is said before (Harald Pauli, University of Vienna & Austrian Academy of Sciences)	Accepted
5-246	G-5-105	A	5	24	5	28	This sentence reads very awkwardly and is very long. Suggest splitting into separate sentences. Suggest the following: "In some cases, there may not be an effective adaptation measure capable of reducing particular risks. For example, the loss of some sensitive species and ecosystems may be unavoidable through adaptation, and adaptation to sea level rise of several metres may be for practical purposes, ineffective. In other cases, adaptation measures will be less feasible or very costly.....(such as FOR deltaic regions and estuaries). (Government of Canada)	Accepted
5-247	E-5-127	A	5	24			add a comma after "ecosystems" at the end of line (Hartmut Grassl, Max Planck Institute for Meteorology)	Accepted
5-248	E-5-128	A	5	25	5	25	Should it say "polar bear" or "Arctic species"? (Daniel Murphy, NOAA Earth System Research Laboratory)	Rejected. Approved language from WG1
5-249	E-5-130	A	5	25	5	25	Comment: recent genetic findings closely relate polar bears and brown bears. Perhaps another example (instead of polar bear survival) should be included. (Maria Rosa Paiva , Universidade Nova de Lisboa [New University of Lisbon])	In WGII assessment cross reference WGII material
5-250	E-5-129	A	5	25			I am uncomfortable with singling out the polar bear as the lone biological example in this section. While they are charismatic megafauna, and indeed an icon of the climate change	In WGII assessment reference WGII material

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							issue, the reality of their plight is poorly understood by the non-science community. Like many species, polar in recent years have become severely stressed at the southern limit of their range (where most studies have been conducted). Further north populations are stable and may increase given greater sea ice break up supporting larger seal population. Yes - there is the possibility that if climate warming remains unchecked the polar bear could go extinct due to lack of suitable habitat, but the same applies to many species (including humans). I think that by including this singular example we are continuing to mislead readers into a very simplistic view of climate impacts and adaptation. (Donald Lemmen, Natural Resources Canada)	
5-251	E-5-131	A	5	26	5	26	Footnote 8 needs to be brought into the text and put in bold type--this is really critical as it says that one cannot really adapt if large SL change occurs--a completely different message than in the rest of the report. We may well be on that pathway already, so this deserves mention. (Michael MacCracken, Climate Institute)	Rejected; the context in which the footnote is placed in the main text already makes it clear that adaptation to several metres of sea level rise is not feasible in practice
5-252	G-5-108	A	5	28	5	28	"Barriers TO EFFECTIVE ADAPTATION include....., as well as the ADDITIONAL technological, financial.....constraints ON ADAPTATION IN HUMAN SYSTEMS. (add words in caps.) The issue of rate and magnitude of change is surely applicable to all systems, hence the suggestion to add the word ADDITIONAL. (Government of Canada)	Accepted
5-253	G-5-107	A	5	28	5	29	Natural systems have very high capacity for adaptation as seen over and over again in the geological record. If the meaning is "natural systems in their current states", this should be made clear. Work in concept of "exceed the ability to adapt" in place of "inability to adapt". (Government of United States)	Separate natural and human adaptation in text. Limits to natural systems adaptation dealt with in WGII. Will cross reference WGII SPM and C4
5-254	E-5-132	A	5	28	6	2	Statement mentions inability of natural systems to adapt to rate and magnitude of climate change. However, natural systems do adapt (perhaps rather easily) in that they evolve over time in response to changing conditions. The issue is that the way they adapt or evolve may not be to our liking and it is really society that needs to adapt to impacts on natural systems (more an issue of society's adaptive capacity rather than that of natural systems). (Sharon Smith, Geological Survey of Canada)	Extinction is not defined as an adaptation.
5-255	G-5-109	A	5	29	5	30	This list of constraints should include 'institutional'. (Government of New Zealand)	Accepted
5-256	E-5-133	A	5	30	6	2	This paragraph raises many more questions than it answers, including whether it is appropriate to consider adaptation of human and natural systems in the same manner. It is not appropriate to refer to the "adaptive capacity of natural systems" when adaptive capacity is defined in the AR4 glossary as "the whole of capabilities, resources and institutions of a country or region to implement effective adaptation measures". (Donald Lemmen, Natural Resources Canada)	Agree to separate systems.

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5-257	G-5-110	A	5	30	6	2	use of the term "adaptive capacity" in the context of natural systems is not appropriate. Note that Adaptive capacity is defined in the AR4 glossary as "the whole of capabilities, resources and institutions of a country or region to implement effective adaptation measures". Consider using the word "resilience" instead. (Government of Canada)	See above. We use WGII language.
5-258	E-5-134	A	5	30	10	30	Change ""and social and cultural constraints" to "social, political and cultural constraints" (Stefano Caserini, Politecnico di Milano)	Rejected-departs from approved language
5-259	E-5-135	A	5				Suggest to remove text from above the graph. (Zoltán Somogyi, Hungarian Forest Research Institute)	Fig 5.1 removed
5-260	E-5-136	A	5				I do not find figure 5.1 to be effective in graphical communication. I would dump it or rework it. (Bruce McCarl, Texas A&M Univesity)	Fig 5.1 removed
5-261	E-5-137	A	5				Figure 5.1 should be replaced with Figure 5.2 that was found in page 5 of Pre-draft topic 5 and the sentences in page 4 lines 33-37 should be change so as to emphasize the need for mitigation and adaptation, (Mitsutsune Yamaguchi, The University of Tokyo)	Fig 5.1 removed
5-262	E-5-138	A	5				Figure 5.1: This figure is initally difficult to understand, and it has rather low information content. (Jürgen Willebrand, Leibniz Institut für Meereswissenschaften)	Fig 5.1 removed
5-263	E-5-139	A	5				Figure 5.1: The lower half of this figure isn't entirely clear and would be helped by removing the words "Impacts under unmitigated climate change" in the middle of the figure. (Claire Parkinson, NASA Goddard Space Flight Center)	Fig 5.1 removed
5-264	E-5-140	A	5				Figure 5.1 - I almost understand this figure- What I can't seem to find is the "Impacts under unmitigated climate change" - also referred to on line 6 "compared to a case without any climate policy" (Ian Church, Yukon Government)	Fig 5.1 removed
5-265	E-5-141	A	5				Fig 5.1 is hard to follow. What is the "quantity" on the vertical axis. As it is , it does not a good figure (David Fisher, NRCan)	Fig 5.1 removed
5-266	G-5-111	A	5				The axes in Figure 5.1 need to have units and it is not clear which case is which. The figure and the legend need to be revised and a better explanation of the point of it must be included. (Government of United States)	Fig 5.1 removed
5-267	G-5-112	A	5				Suggest to remove text from above the graph. (Government of Hungary)	Fig 5.1 removed

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5-268	G-5-113	A	5				In Figure 5.1, add “Theoretical” to the front of the heading. Considering labeling the graphs with “Low” and “High” at the top of each. Finally, the “high” and “low” on line 6 appear to be reversed since “low” is blue not red. (Government of United States)	Fig 5.1 removed
5-269	G-5-114	A	5				Figure 5.1: These figures could be easily misinterpreted. For example, there is no quantitative analysis to support the relative differences in risks and impacts between the two emissions pathways. However, some commentators may use this diagram to support or reject particular action pathways and timing. The key points, would be better described in the text: for example, both adaptation and mitigation can reduce the risks of climate change impacts, however, there will still be residual impacts that must be managed. Suggest that the figure is deleted. If the figure is retained the title and caption should emphasise much more its illustrative character. (Government of Australia)	Fig 5.1 removed
5-270	G-5-115	A	5				Figure 5.1 comment: Could the two graphs at the top of this figure be labelled at the top "Stabilisation at low concentration" and "Stabilisation at high concentration" (or whatever is appropriate) respectively, and the words "low" and "high" removed from the individual curves? It is disconcerting to have a peak labelled 'low' and a low part of a curve labelled 'high'. At the same time the text "Impacts under unmitigated climate change" needs attention: it is not immediately clear it relates to the tops of the two boxes either side of it, and it relates to a situation without both mitigation and adaptation. Could it not say simply "Impacts without mitigation or adaptation" ? (Government of New Zealand)	Fig 5.1 removed
5-271	G-5-116	A	5				Figure 5.1 - very good and useful figure - should definitely be included in the SPM (at the expense of some figure there that is already included in the SPM of a WG report), as this is just about the only new figure that is not already included in an SPM of the WG. (Government of Germany)	Fig 5.1 removed
5-272	G-5-117	A	5				Despite the clear statement that “This figure is a generic illustration” and “has no units on the response axis”, this figure is misleading. Figures are more powerful than words, and this figure is more powerful than its legend or the discussion referring to it. The figure shows very clearly, for instance, that even under the ‘high scenario’, the residual impacts will be relatively minor (<50%). Things are really quite rosy for the ‘low scenario’, with residual impacts being quite small. If the words describing the concept (p. 4, lines 33-37) are not clear enough, then they should be improved through editing. (Government of United States)	Fig 5.1 removed
5-273	G-5-118	A	5				Consider removing the labels “Quantity” from the Figure 5.1 plots, as they contribute no information. (Government of United States)	Fig 5.1 removed

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5-274	G-5-119	A	6	1	6	2	What does the combination of "high confidence" and "likely" mean? This combination of two uncertainty statements in a single sentence is not meaningful and not foreseen by the IPCC uncertainty guidance paper cited in the introduction. It should therefore be avoided, (Government of European Community)	Sentence deleted
5-275	E-5-143	A	6	4	6	5	"Goals and efforts" or "Efforts to reach a mitigation goal"--efforts alone do not need to and perhaps cannot account for inertia. (Elizabeth L Malone, Pacific Northwest National Laboratory)	Accepted
5-276	E-5-142	A	6	4	6	24	The subtitle refers to inertia in (climate and) socioeconomic systems. The second paragraph however only hints on what this socioeconomic inertia could mean. The subtitle raises expectations that are not met (issues missing include changes in peoples' awareness, policies, learning capacity of societies) (Martin Welp, University of Applied Sciences Eberswalde)	Accepted
5-277	E-5-144	A	6	5	6	5	after ".....to account for inertia in the climate...", should add ".... and eco-socioeconomic systems". One needs to account for the ecosystem time lag as well. (Yves Henocque, Department of Fisheries)	Accepted
5-278	G-5-7	C	6	7	6	12	" Should give the figures for sea level rise from section 3.2.3 here or a least repeat them" (Government of Belgium)	Rejected. Duplication
5-279	G-5-120	A	6	8	6	9	What does "more than several centuries" mean? (Government of European Community)	Rejected-no space to explain
5-280	G-5-122	A	6	9	6	9	Replace "several" by "one" (see SYR SPM, page 9, line 35) (Government of France)	Rejected. Approved language
5-281	E-5-145	A	6	9	6	12	The topic of long-term sea level rise is important, but is poorly presented in this text, which raises more questions than it answers. Replace this text with cross references to the discussion on Pg. 8 of sea level rise after reaching temperature equilibrium and the discussion on Pg. 4 of melting of the Greenland ice sheet. Both discussion are more complete and provide better understanding than this redundant and incomplete text. (Robert Siveter, IPIECA)	Para is balanced at present and covers the inertia question which is not covered on page 4 and is in a different context on page 8. Rejected.
5-282	G-5-121	A	6	9	6	12	The topic of long-term sea-level rise is important, but is poorly presented in this text, which raises more questions than it answers. Replace this text with cross references to the discussion on p. 8 of sea-level rise after reaching temperature equilibrium and the discussion on p. 4 of melting of the Greenland ice sheet. Both discussions are more complete and provide better understanding than this redundant and incomplete text. (Government of United States)	See above
5-283	E-5-146	A	6	11	6	12	Indeed, in paleoclimatic periods the ice sheet contributions have clearly been many times larger than the thermal expansion term. This sentence needs to be much more definitive in	Not the issue here.

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							indicating this as the risk that is being taken. (Michael MacCracken, Climate Institute)	
5-284	G-5-123	A	6	12	6	12	Thermal expansion of water? Improve on this shorthand style. (Government of United States)	Rejected; should be clear in new text
5-285	G-5-124	A	6	12	6	12	For clarity insert "to sea level rise" after "contributions". (Government of Australia)	Accepted
5-286	G-5-125	A	6	12	6	12	"...from the melting of ice sheets..." (Government of Canada)	Rejected; point made per underlying reports elsewhere
5-287	G-5-126	A	6	15	6	17	Unclear wording. Suggest to replace by "Early mitigation could avoid lock-in effects from long-lived carbon-intensive infrastructure, which could be very costly to phase out quickly at a later stage. Furthermore, it could avoid the higher adaptation needs and residual impacts associated with higher levels of climate change." Use "could" instead of "would", as not all early mitigation actions prevent lock-in of the system. (Government of European Community)	Accepted
5-288	E-5-147	A	6	15	6	24	Mitigation actions begun in the short term would avoid locking in both long-lived carbon-intensive infrastructure and development pathways, and the higher adaptation needs associated with higher levels of warming- ????. Something is missing from this sentence? What is this supposed to mean? (Lisa Schipper, Southeast Asia START Regional Centre, Chulalongkorn University)	Accepted
5-289	G-5-8	C	6	15	6	24	" A graph would be clearer to explain the concept of overshooting" (Government of Belgium)	Rejected-no space
5-290	G-5-127	A	6	17	6	18	This sentence is confusing for the reader and seems incomplete e.g. 'More stringent' than what? The sequence of logic between the benefits of short-term actions and more stringent scenarios is unclear. (Government of Australia)	Delete sentences beginning on line 17 to 23 and retain correct cross references.
5-291	G-5-128	A	6	17	6	18	This paragraph describes scenarios where the concentrations peak and then drop. It may be useful to highlight the distinction between these, where the concentration peaks, and the others described in the SYR where it is the emissions which peak and then drop. (Government of New Zealand)	Delete sentences beginning on line 17 to 23 and retain correct cross references.
5-292	E-5-148	A	6	20	6	20	The word "for" should be removed (Jon Egill Kristjansson, University of Oslo)	Delete sentences beginning on line 17 to 23 and retain correct cross references.
5-293	E-5-150	A	6	20	6	23	For sea level, the only basis for a statement like this is likely the set of seriously flawed glacial ice sheet models--once deterioration of the ice sheet starts, there are a number of reasons why this could continue and not be reversible--a special statement should be made here	Delete sentences beginning on line 17 to 23 and retain correct cross references.

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							about the ice sheet changes not being reversible on any useful timescale, at least. In addition, ocean acidification's effect on marine life is not reversible and much could happen once that change gets started. Thus, this sentence needs serious reworking. (Michael MacCracken, Climate Institute)	
5-294	G-5-129	A	6	20	6	23	It would be helpful to expand (slightly) on what is meant by "... beginning to be examined." - perhaps by clarifying that it is being examined 'by climate modellers'? If this is correct then the following sentence, which at present is very dogmatic, could be changed to read "Initial results indicate that, in scenarios where concentrations ... the sea level increase never approaches the equilibrium ... " (Government of New Zealand)	Delete sentences beginning on line 17 to 23 and retain correct cross references.
5-295	G-5-130	A	6	20	6	23	For most readers, the meaning of this important sentence explaining the link between concentrations and equilibrium warming is lost due to the confusing structure of the sentence. Suggest that this sentence be redrafted. (Government of Australia)	Delete sentences beginning on line 17 to 23 and retain correct cross references.
5-296	E-5-149	A	6	20	23		Path dependence makes this statement misleading. "Will never approach" makes the statement false (for example in the case of the loss of the greenland ice, 7 meters certainly does "approach" the equilibrium sea level value, even if the additional rise due to thermal expansion is not fully realised. There are less dramatic examples.) (Leonard Allen Smith, London School of Economics)	Delete sentences beginning on line 17 to 23 and retain correct cross references.
5-297	E-5-151	A	6	22			add "or" between "warming" and "level" (Hartmut Grassl, Max Planck Institute for Meteorology)	Delete sentences beginning on line 17 to 23 and retain correct cross references.
5-298	E-5-153	A	6	28	6	25	Change "uncertain" to "highly uncertain." WG I, Chapter 10.4.1 discusses carbon cycle feedbacks in detail indicating that a range of climate models project that by 2100 carbon cycle feedbacks could add between 20 and 220 ppm to atmospheric CO2 concentration and between 0.1 and 1.5 C to temperature rise. The uncertainty range on both CO2 concentration and temperature rise is more than an order of magnitude, which certainly qualifies as highly uncertain. (Robert Siveter, IPIECA)	On page 8: Reject as not consistent with WGI conclusions
5-299	E-5-152	A	6	28	6	28	Suggest reword to "Global emissions must decline from present or peak levels to meet" (John Church, CSIRO)	Take text from WGIII SPM.18
5-300	E-5-154	A	6	28	6	28	"must peak and then decline": though clear what is meant, it is a bit confusing here (Harald Pauli, University of Vienna & Austrian Academy of Sciences)	Take text from WGIII SPM.18
5-301	G-5-132	A	6	28	6	29	The wording "must peak" is misleading for non-native speakers and non-experts. They might think that emissions must reach a threshold, but actually emissions must stay below a certain value, and then decline. Please clarify, e.g. by an explanation in brackets: "...must peak (i.e. must not exceed a certain value) and then decline..."	Take text from WGIII SPM.18

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							(Government of Germany)	
5-302	G-5-131	A	6	28	6	31	This statement is correct, but is phrased in an abstract way and does not clearly show the urgency of action. Add this notion by adding: "In order to reduce future high risks and costs of climate change, emissions need to peak within the coming decades." Combine this with the statement on p. 7, l. 1 to 3. Topic 6, page 4, lines 45 to 49 is much more concrete. (Government of European Community)	Take text from WGIII SPM.18
-303	E-5-155	A	6	29	6	30	This sentence ("The lower the stabilisation level, the more quickly this peak and decline would need to occur and the lower are the long-term equilibrium temperature consequences") can give a misleading, negative impression. I would suggest changing the last half of the sentence either to "and the better are the long-term equilibrium temperature consequences" or "and the lower are the resulting long-term equilibrium temperatures". (Claire Parkinson, NASA Goddard Space Flight Center)	Text not in SPM. agree with change to include the word "resulting" if it were
5-304	E-5-156	A	6	29	6	30	Somehow need to also add that the lower the stabilization level, the greater the cutbacks must be. (Michael MacCracken, Climate Institute)	Take text from WGIII SPM.18
5-305	G-5-133	A	6	29	6	30	This is awkwardly worded. Suggested text: "Lower stabilisation levels will require global emissions to peak and decline more rapidly, and would result in smaller long-term equilibrium temperature increases." (Government of Canada)	Take text from WGIII SPM.18
5-306	G-5-134	A	6	30	6	30	The phrase "and the lower are the long-term equilibrium temperature consequences" is poorly drafted. Suggest that this finding is made a new sentence "Lower stabilisation levels lead to lower long-term equilibrium temperatures and, therefore, lower associated impacts." (Government of Australia)	Take text from WGIII SPM.18
5-307	G-5-135	A	6	33	6	34	After this sentence, it is important to insert the following qualifying statement: "Each scenario represents one feasible pathway. The full range of feasible pathways for stabilization is not shown in Table 5.1 and Figure 5.2. Most of the scenarios assume ideal implementation with full regional, sectoral, technology, and greenhouse gas mitigation measures throughout the 21st century." (Government of United States)	Reject because text based on all scenarios in literature
5-308	E-5-157	A	6	34	6	34	Footnote 9 indicates that information on the transient response is not available--why is this the case? The models calculated the change, so why is the information not available--now or soon? (Michael MacCracken, Climate Institute)	Some information is available in the underlying studies, these were however not assessed in WGI, and can therefore not be used for the SYR

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5-309	G-5-136	A	6	34	6	34	Footnote 9: The term "transient temperature" needs to be defined. In addition, the finding that equilibrium global mean temperature for most of the assessed stabilisation rates, will be reached between 2200-2300 is important and should appear in the body of the SYR. (Government of Australia)	Add transient temperature to glossary FN point repeated in table so does not need to be in main text
5-310	G-5-137	A	7	2	7	3	For accuracy the end of this headline statement should be rephrased in the following way: "and will largely determine the resulting long-term equilibrium temperature changes" (Government of Australia)	Whole phrase removed to shorten section
5-311	E-5-158	A	7	3	7	3	"...equilibrium temperate changes." should read "...equilibrium temperature changes." (Chiu-Ying Lam, Hong Kong Observatory)	Phrase deleted
5-312	G-5-138	A	7	5	7	10	Please provide analytical support for this statement given that numerous emissions pathways can lead to the same stabilization target. The scenarios in Table 5.1 and Figure 5.2 do not define the emissions pathway boundaries for each stabilization target, and therefore they alone don't support the statement. Furthermore, the statement should mention adaptation as well, which will also affect the risk of impacts. (Government of United States)	See above 5-307
5-313	G-5-139	A	7	7	7	12	If indeed the scenarios in Table 5.1 and Figure 5.2 do not define the emissions pathway boundaries for each stabilization target, then this text should be modified to clarify that "the scenarios presented do not define the full range of feasible stabilization pathways for each target." Also, the words "required" and "need" should be removed. (Government of United States)	Reject as present text is relative and hence accurate.
5-314	E-5-159	A	7	7			correct "emissions" to "emission" (Hartmut Grassl, Max Planck Institute for Meteorology)	Agree
5-315	G-5-140	A	7	11	7	11	Change "advances the date when emissions need to peak" to "requires that emissions peak earlier". (Government of United States)	Reject, agreed SPM language
5-316	E-5-160	A	7	11			substitute "larger emission" for "greater emissions" (Hartmut Grassl, Max Planck Institute for Meteorology)	Reject, agreed SPM language
5-317	E-5-162	A	7	14	7	14	In the table caption it is not clear what "post-TAR" is. (Marco Mazzotti, ETH Zurich)	Add to Glossary
5-318	E-5-161	A	7	14	7	16	The rightmost column is so incomplete that a much clearer caveat is needed--providing information from one process only greatly underplays the potential change (as the 20th century and paleoclimatic changes have demonstrated). To be sure not to mislead policymakers, a much clearer and more obvious statement is needed. I would add that note (e) is also much too mild and unclear about the potential rise and needs to be redone.	1) Sentence in notes to make cleared the thermal SLR and where it comes from. 2) Text has been modified in 5.3 to underscore up front the fact that

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							(Michael MacCracken, Climate Institute)	ice sheet contributions could be much larger than thermal expansion 3) The phrase referring to contribution from ice sheets, glaciers and ice caps has been separated by a comma to again emphasise their additional contributions.
5-319	E-5-163	A	7	19	7	20	the sentence "while the corresponding value is 375 ppm ..." does not make sense. Perhaps 375 is the wrong value? (Jon Egill Kristjansson, University of Oslo)	Noted, value is correct. Reason is that aerosols provide a cooling effects. Reference to relevant section in WGI added.
5-320	E-5-164	A	7	21	7	22	Considering the Figure 5-2 (see Topic 5, page 8, line 22), one might choose to quote even here the 10th to 90th percentile corresponding ranges of the scenario distribution, if found useful/relevant. (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Rejected, the underlying chapter has assessed the 15-85 th percentile range
5-321	G-5-141	A	7	23	7	23	Explain climate sensitivity (Government of Sweden)	Add to glossary
5-322	E-5-165	A	7	27	7	27	After 'thermal expansion' insert 'over 100 years' ... or how many years it is meant to refer to (a thousand years is mentioned on the top of the following page). (David White, ASIT Consulting)	Equilibrium time scales added to footnote e
5-323	E-5-166	A	7	30	7	31	This is repeated later on on page 8, line 6-7 (Michel Rixen, NATO Undersea Research Center)	SPM approved text
5-324	G-5-144	A	7	34	7	34	Strike "inexorable." Insert at the beginning of the sentence: "Models show..." Add a time frame for this statement. (Government of United States)	Text redrafted
5-325	G-5-145	A	7	34	7	34	Replace "inexorable" with more common word. (Government of Sweden)	Text redrafted
5-326	G-5-142	A	7	34	7	35	Unclear sentence. It is not clear what is being compared here. (Government of European Community)	Text redrafted
5-327	G-5-143	A	7	34	8	5	The text states that thermal expansion of the ocean will cause an eventual sea level rise much larger than that projected for the 21st century, and by way of examples gives figures for the eventual rise in various cases. But the text does not give the corresponding figures for the rise in the 21st century, so the examples are relatively worthless as a basis for comparison. Please either give the corresponding figures for the	Reject , but text revised to more clearly reflect underlying material

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							21st century or re-word the text so it is clear the figures are given for their own value and not for comparison purposes. (This could be done simply by removing the words "for example" from page 7 line 35.) (Government of New Zealand)	
5-328	E-5-167	A	7				Table 5.1: Table SPM-3: why is the first column called "Category" and not "Scenario"? This is somehow confusing. More in general: what is the relation between the data in this table and those in table SPM-2 and in figure SPM-5? These three objects seem to talk about the same thing, but the report does not say explicitly what their relationship is. (Marco Mazzotti, ETH Zurich)	WGIII SPM Approved table
5-329	E-5-168	A	7				Table 5.1: In view of the strong expectation that there will be additional sea level rise from ice melt, I suggest adding after this sentence the following: "Hence these projected sea-level rise estimates are very conservative." (Claire Parkinson, NASA Goddard Space Flight Center)	Sentence has been added in section 5.3 on ice sheet contribution being in addition to and possibly much larger than thermal expansion. Notes to table also make this clearer, and text in 5.4 uses a comma to again more clearly indicate the additional role of glaciers, ice caps and ice sheets.
5-330	E-5-169	A	7				Table 5.1, Sea level column: This table is very misleading as it ignores any contribution from glaciers and ice sheets. One of the major concerns in the melting of the Greenland Ice Sheet and this table fails to convey this concern and in fact implies we only need to worry about thermal expansion. (John Church, CSIRO)	Sentence has been added in section 5.3 on ice sheet contribution being in addition to and possibly much larger than thermal expansion. Notes to table also make this clearer, and text in 5.4 uses a comma to again more clearly indicate the additional role of glaciers, ice caps and ice sheets.
5-331	E-5-170	A	7				Table 5.1 is excellent and should be protected through government review - its wonderful and concise and the linking of CO ₂ to CO _{2e} to temperature and sea-level outcomes is great. (Jon Barnett, University of Melbourne)	Noted
5-332	E-5-171	A	7				On Table 5.1 itself or its notes, it is preferable and advisable for policy makers to add the regional information on "Peaking year to CO ₂ emissions" and "Change in global CO ₂ emissions in 2050(% of 2000 emissions)". (Ryoichi Komiyama, The Institute of Energy Economics, Japan (IEEJ))	WGIII SPM Approved table
5-333	E-5-172	A	7				On Table 5.1 itself or its notes, it is beneficial to attach additionally the information about the results of energy projection, such as primary energy supply and so forth as the background information, in each scenario of CO ₂ concentration targets. Particularly in order to promote	SPM approved table, can not add additional info due to space limitation

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							the better understanding of climate change for energy policy makers and the other stake holders, the information associated with energy is helpful and indispensable. (Ryoichi Komiyama, The Institute of Energy Economics, Japan (IEEJ))	
5-334	E-5-173	A	7				In order to encourage the insight of policy makers into the difficulties in mitigating CO2 emissions, it is better to additionally describe the shadow price of CO2 emissions (marginal abatement cost of CO2) on Table 5.1 or its notes. (Ryoichi Komiyama, The Institute of Energy Economics, Japan (IEEJ))	SPM approved table. For carbon prices see topic 4.
5-335	G-5-146	A	7				Table 5.1: The important information on the number of assessed studies for each stabilisation level (included in WG3 SPM) should also be included in this table. (Government of Australia)	Add column
5-336	G-5-147	A	7				Table 5.1: This table is very good and highly policy relevant. With respect to the very difficult and crucial political process of comparing the costs of mitigation with the costs of climate change, comparability of Table 5.1 with Table SPM-2 is of utmost importance! Therefore, please provide an additional column with the temperature increase until 2100 relative to 1980-1999! (Government of Germany)	Not in WGI and not available.
5-337	G-5-148	A	7				Table 5.1: There should be a note to column 7 that the global average sea level rise expected at equilibrium will not occur for 1000s of years (as opposed to equilibrium warming, which will occur between 2200-2300). (Government of Australia)	Add to footnote (e) and also to text on long term aspect of thermal expansion. 2200-2300 timeframe not accurate in all cases for temperature stabilization.
5-338	G-5-149	A	7				Table 5.1 is repeated with its legend in the SPM. Where is the benefit added to duplicate completely the text and figure when authors are struggling with page limitations? (Government of United States)	Table has to appear in the report to appear in the SPM.
5-339	G-5-150	A	7				Table 5.1 (Note e): the authors should define "EMIC". (Government of Australia)	Add to glossary
5-340	G-5-151	A	7				Table 5.1 (Note a): this note is important and needs to be included in the body of the report. The authors should also confirm that anthropogenic influences are producing a cooling effect on the global climate system that is equivalent to a reduction in atmospheric concentrations of 80ppm. (Government of Australia)	Referred comment to Topic 2 for confirmation.
5-341	G-5-152	A	7				table 5.1 - include information on contributions from ice-sheets, as they could be larger than that from thermal expansion (see tiopic 5 page 6 line 11-13) (Government of Germany)	No information on ice sheets possible in table. Sentence added in 5.3 emphasising that ice sheet contributions could be

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								much larger than from thermal expansion. Notes to table also make this clearer.
5-342	G-5-153	A	7				Add:"for all long-lived GHG" to the title of the 3rd column of the table (Government of Republic of Benin)	SPM approved table
5-343	G-5-9	C	7				" Table 5.1. Should clarify that the second column does not contain the negative anthropogenic forcings" (Government of Belgium)	Rejected since it does
5-344	E-5-174	A	8	1	8	2	suggest changing "would produce slow sea level rise due to thermal expansion over more than a thousand years of 0.4-1.4m, " to "would produce slow sea level rise of 0.4-1.4m due to thermal expansion over more than a thousand years, " (Chiu-Ying Lam, Hong Kong Observatory)	Rejected, timescale already noted at the end of para
5-345	G-5-154	A	8	4	8	4	The authors should either state what the 2000 atmospheric concentration of greenhouse gases was, or delete this reference to 2000 levels as it is unrealistic. (Government of Australia)	2000 level concentrations are given in the footnote to table 5.1, rejected
5-346	G-5-155	A	8	5	8	5	Suggest changing to: "...expected to ultimately lead to equilibrium sea level rise of an additional 0.3-0.8 m from today's levels." (Government of Canada)	Rejected, text is clear as it is
5-347	E-5-175	A	8	5	8	6	These lines need to be reworded to include the ice sheet contributions. (John Church, CSIRO)	Sentence added in 5.3 emphasising that ice sheet contributions could be much larger than from thermal expansion. Notes to table also make this clearer, and text in 5.4 uses a comma to again more clearly indicate the additional role of glaciers, ice caps and ice sheets.
5-348	G-5-156	A	8	6	8	6	The phrase "in a warmer world" is unnecessary and should be deleted. (Government of Australia)	Deleted
5-349	E-5-176	A	8	6	8	7	The phrase "and do not include contributions from ice sheets, glaciers, or snowcaps" needs to be put in bold font, and an indication given that in the past, the equilibrium sensitivity of sea level to global average temperature changes is something like 10-20 meters per degree, so an order of magnitude higher than indicated in the table. (Michael MacCracken, Climate Institute)	Ice sheet SLR/T sensitivity not in WGI and cannot be included here. Sentence added in 5.3 emphasising that ice sheet contributions could be much larger than from thermal expansion. Notes to table also

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								make this clearer, and text in 5.4 uses a comma to again more clearly indicate the additional role of glaciers, ice caps and ice sheets.
5-350	E-5-177	A	8	6	8	7	Instead of "and do not include contributions from", one could opt for "to which would add possible contributions from". (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Sentence added in 5.3 emphasising that ice sheet contributions could be much larger than from thermal expansion. Notes to table also make this clearer, and text in 5.4 uses a comma to again more clearly indicate the additional role of glaciers, ice caps and ice sheets.
5-351	G-5-157	A	8	8	8	8	This section has not discussed the long time scale response of ice sheets, as such the authors need to provide some explanation of this. (Government of Australia)	The time scales have already been discussed elsewhere (3.2.3, 3.4, 5.2 and 5.3).
5-352	G-5-158	A	8	8	8	10	delete from "that seek to.. "in line 8 till " temperature do not"" in line 10 and insert instead "are not sufficient to". The old wording gives the impression that the fact the mitigation strategies seek to stabilise GHG concentration is criticised. (Government of Germany)	Rejected, stabilization of concentrations will lead to further sea level rise over longer time frames
5-353	E-5-178	A	8	9			It is not clear why "(radiative forcing)" appears in this sentence (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Accepted, moved forcing closer to concentrations
5-354	E-5-179	A	8	11	8	21	The roman numeral"category" ranges for figure 5.2 are different than in fig 5.1 above (David Fisher, NRCan)	Old figure 5.1 has been deleted
5-355	G-5-159	A	8	13	8	14	This first sentence would be clearer if the phrase '...from 2000 to 2100' was added just after "... groups of stabilization scenarios...." (Government of United States)	Accepted
5-356	E-5-180	A	8	21			The last word on the line should be "Emission" not "Emisssions" (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Rejected, should be emissions ranges
5-357	G-5-161	A	8	25	8	26	"Feedbacks" and "Climate carbon cycle coupling" are not explained here, so it may be useful to give a reference back to Section 2.3. (Government of New Zealand)	Reference to 2.3 and 3.2.1 inserted

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5-358	E-5-181	A	8	25	8	34	Again I refer to several, similar comments I made on SYR SPM, topic 2, topic 3 with respect to treating biotic feedbacks.. Here you have to mention that effects from land-use change have been ignored, another reason for underestimating the climate change amplification. I refer again to WGII SPM, p. 6, first par., bullet 2 in TS (FGD, p. 20, section "Ecosystems" in TS.4.1), bullet 2 of ES of WGII chapter 4, and section 4.4.1 (Fig. 4.2), 4.4.10, and 4.4.11. (Andreas Fischlin, Integrative Biology - Systems Ecology)	Rejected for space reasons
5-359	G-5-160	A	8	25	8	34	This paragraph is of critical importance to policymakers and the message that risk managers need to allow for such uncertainties in the climate system response when deciding about mitigation strategies is not at present well brought out in the SPM. Some suggestions for strengthening this paragraph are made. 1) Line 26 - "Climate change is expected to REDUCE THE CAPACITY OF THE LAND AND OCEAN SINKS TO ABSORB CARBON AND THEREFORE to increase....(Add words in CAPS.), 2) Line 28 - delete 'but' and start a new sentence here "Although known to be positive, the magnitude....etc." 3) line 30 - after 'underestimated" add "because climate-carbon cycle feedbacks were not taken into account". (Government of Canada)	Proposed text is not accurate on its own without discussion of timeframes and scenarios, which would add substantially to the paragraph, without changing the overall message. Discussion on carbon cycle is already contained in 2.3 and 3.2.1. Wording revised here to emphasise that stabilisation scenarios have not included full range of carbon cycle feedbacks.
5-360	E-5-183	A	8	26	8	26	"Climate carbon cycle coupling" is confusing here...it sounds obscure, when what is really meant is 'carbon cycle feedbacks', or climate-carbon cycle feedbacks' as extensively discussed in Topic 3, section 3.2.1. Suggest the text is changed accordingly. (Steve Sawyer, Global Wind Energy Council)	Rejected, the first sentence clarifies that the statement is about the feedbacks
5-361	E-5-182	A	8	26	8	28	Here it is described that "Climate carbon cycle coupling is expected to increase the fraction of anthropogenic emissions that remains in the atmosphere as the climate system warms ---".However, according to TAR WG1 Figure 3.10, it is clear that as CO2 concentration increases anthropogenic CO2 uptake increased as well. This information should be added to or combined with current descriptions. (Mitsutsune Yamaguchi, The University of Tokyo)	Reject as text incorporates the net effect of these processes.
5-362	G-5-162	A	8	28	8	28	Add a footnote " This decrease in the CO2 uptake of the ocean comes in addition to the decrease caused by chemical reactions involving dissolved CO2, bicarbonate ions and carbonate ions, as described in box 3.3 of the TAR." (Government of France)	Rejected, because of space limitation
5-363	E-5-184	A	8	30	8	30	Change "might be" to "are likely to"--"might is a useless word, not in the IPCC lexicon, etc.-- use words that have meaning. (Michael MacCracken, Climate Institute)	Rejected, likely would mean that a specific probability can be attached to the statement, which is not given in the underlying report.

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5-364	G-5-163	A	8	30	8	34	This sentence is probably very difficult (for the non-expert) to follow. (Government of Sweden)	Noted, but text retained since it comes directly from WG1-SPM
5-365	G-5-164	A	8	32	8	34	Use of a different metric for emissions over the 21st century is confusing and limits the utility of this finding for readers. In addition, the authors should confirm that this finding is for CO2 rather than CO2-e. (Government of Australia)	Carbon cycle feedbacks are indeed related to CO2 (see also footnote 22)
5-366	E-5-185	A	8	32			The last word of the first line of footnote 10 should be "involve" not "involved" (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Accepted
5-367	E-5-186	A	8	34	8	34	Note 10: at the end of the first line in this note, it should be "...scenario would involve..." not "...scenario would involved..." (Steve Sawyer, Global Wind Energy Council)	Accepted
5-368	G-5-165	A	8	34	8	34	Add "or 27% [15 to 40%]" (Government of European Community)	Rejected, it would not be fully accurate to provide the numbers in this specific way
5-369	E-5-187	A	8				Note 10: the whole note is not clear. (Marco Mazzotti, ETH Zurich)	Rejected, note clarifies the relationship to multigas stabilization scenarios, and also feedbacks for other stabilization levels than given in the body text
5-370	E-5-188	A	8				Note 10 at bottom: 'would involved' (Michel Rixen, NATO Undersea Research Center)	Accepted
5-371	E-5-189	A	8				Footnote, 3rd line: "gases" should be 'gas' (Jon Egill Kristjansson, University of Oslo)	Rejected, more than just one GHG
5-372	E-5-190	A	8				Footnote, 1st line: "involved" should be 'involve' (Jon Egill Kristjansson, University of Oslo)	Accepted
5-373	E-5-191	A	8				Footnote 10, first line: correct "involved" to "involve" (Hartmut Grassl, Max Planck Institute for Meteorology)	Accepted
5-374	G-5-166	A	8				This figure is repeated with its legend in the SPM. Where is the benefit added to duplicate completely the text and figure when authors are struggling with page limitations? (Government of United States)	Must be in report to be in SPM, N'est ce pas?
5-375	E-5-192	A	9	1	9	23	As with the SPM [TSU note: See second comment E-SPM-1110-A], there are number of issues related to costs that should be addressed if only definitionally. (John Nyboer, Simon Fraser University)	Yes.

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5-376	G-5-168	A	9	4	9	5	Suggest rewording to make this clearer: "The macroeconomic cost of mitigation generally rises as the stringency of the stabilization target is increased, and it is relatively higher when derived from baseline scenarios characterized by high emission levels." (Government of United States)	Text altered to take these points.
5-377	G-5-167	A	9	4	9	11	The authors should consider including in the text a reference to the very small reduction of annual average GDP growth rates in Table 5.2, i.e. 0.06-0.12% by 2030 and 0.05-0.12 by 2050? As this may be more relevant than the extremities of GDP reductions. (Government of Australia)	Reject due to space limitations and general impossibility
5-378	E-5-193	A	9	5			substitute "for" for "from" (Hartmut Grassl, Max Planck Institute for Meteorology)	Wording has been revised for clarity.
5-379	E-5-194	A	9	5			"relatively higher from baseline scenarios with high emissions" is a bit confusing. Is "higher for baseline scenarios with higher emissions" what is intended? Same comment has been made on SPM. (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Accepted, text was revised
5-380	G-5-169	A	9	8	9	10	Change sentence to be more precise since averages aren't presented: "Estimated median GDP losses by 2030 are lower and ..." (Government of United States)	Rejected, not only the median costs are lower, but also the tales
5-381	E-5-195	A	9	8			add "in 2050" after "GDP" (Hartmut Grassl, Max Planck Institute for Meteorology)	Reject, 2050 already given in the sentence
5-382	E-5-196	A	9	8			"1% gain" this is just nonsense (Richard Tol, ESRI)	Not all literature is nonsense. This is from the literature.
5-383	G-5-170	A	9	10	9	11	The authors need to explain why they have weakened the language used in the WG3 SPM on this point. Unless there is a specific reason for doing so, suggest reversion to WG3 text (i.e. delete "vary considerably" and replace with "may differ significantly".) (Government of Australia)	Rejected; wording "vary considerably" is from approved WGIII SPM
5-384	G-5-171	A	9	10	9	11	Change sentence to be more precise since averages aren't presented: "For specific countries and sectors, costs vary considerably from the global estimates." (Government of United States)	Rejected, text from approved SPM
5-385	E-5-197	A	9	11	9	11	In Footnote 11, line 5, what does the phrase "lower baselines" mean? If it means smaller changes in climate, say so. In the fifth sentence of the footnote, these modes also do not generally include comprehensive estimates of the costs of impacts--those costs simply are not well known or even knowable. This should be said. (Michael MacCracken, Climate Institute)	Text from SPM
5-386	E-5-198	A	9	12	9	12	The information in Footnote 11 is too important to be relegated to a footnote. It should be included in the body of the report at this point.	Rejected, space limitation

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							(Robert Siveter, IPIECA)	
5-387	E-5-199	A	9	13	9	23	Table 5.2 is unsatisfactory. "Slightly negative" should be replaced by a suitably rounded number, consistent with the numerical accuracy of other values in the table, ie either 0, -0.1 or whatever the number is. Also, footnote b) states that entries show the median and the 10th and 90th percentile ranges, whereas only ranges are shown, and some (e.g. <5.5) do not relate to two percentile limits. Same comment has been made on SPM. (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Rejected, SPM table
5-388	E-5-200	A	9	13	9	23	Same applies as what I said on SPM (see my comments on SPM p. 19, lines 17-20, and p. 20 lines 1 and 11) (Andreas Fischlin, Integrative Biology - Systems Ecology)	Reject, footnote is the right placement for this
5-389	G-5-172	A	9	13	9	23	Where is the benefit added to duplicate completely the table when authors are struggling with page limitations? (Government of United States)	See above.
5-390	G-5-173	A	9	14	9	14	PLease add: "The overall global GDP growth in the baselines is much higher the mitigation costs. The SRES-A1-Scenario Family assumes an average annual growth rate of global GDP of 3.6% per year between 1990 and 2030, which is in line with recent observations. With this annual growth rate, the GDP in 2030 would be 242% of the GDP in the year 2005. A reduction of 3% would result in a GDP of 235% of the GDP in 2005. This means a delay in growth by xx months." (Government of Germany)	Reject because stabilization scenarios are based on a range of baselines and comparing to one is misleading.
5-391	E-5-201	A	9	15	9	16	The layering of the rows should be reversed so as to match Table 5.1 layering--from small to large. (Michael MacCracken, Climate Institute)	Rejected, SPM table
5-392	G-5-174	A	9	19	9	19	Table 5.2 (Note b): Editing: delete "the median and". (Government of Australia)	Accepted
5-393	G-5-175	A	9	19	9	19	Footnote 11: The authors should state that the findings on the cost of mitigation are drawn from top down model studies. (Government of Australia)	Noted, added to footnote 11
5-394	E-5-202	A	9	22	9	23	This is just copied from WG3, but it is wrong there too. The reason that only a few models reported results for this scenario, is that in a number of models this target is infeasible. This implies that the models that do report estimates are a biased sample. (Richard Tol, ESRI)	Reject as qualification on low scenarios is accurately described in footnote d).
5-395	G-5-176	A	9	22	9	23	Full stop after the amended sentence "The number of studies that report GDP figures is relatively small." Delete: "and they generally use low baselines. High emissions baselines generally lead to higher costs." Reason: In the underlying Chapter 3 of WGIII,	Reject as d) is a necessary qualifier. Reasoning provided is incorrect.

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							Fig 3.20 shows that the baselines are NOT generally low, but similar to other studies. The scatter is too broad for such a statement. (Government of Germany)	
5-396	G-5-177	A	9	25	11	4	This section should clearly distinguish itself from the discussion in Topic 4 and the technologies presented in Table 4.2. As is, it appears redundant and, therefore, not necessary. (Government of United States)	Noted, this section is on long-term technology needs for stabilization in contrast to the short-term technology potentials discussed in topic 4.
5-397	E-5-203	A	9	28	9	28	Add ".....deployment of a MITIGATION portfolio of technologies..." (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	Reject, SPM text
5-398	G-5-178	A	9	32	9	34	Don't we need 'more efficient RD&D efforts' in any scenario? Suggest to replace by: "the greater the need for development of and investment in low-greenhouse gas emission technologies ..." (Government of European Community)	Reject, the sentence is highlighting that needs become greater at lower stabilization levels.
5-399	E-5-204	A	9	33	9	33	replace RD&D with R&D (or what does RD&D mean??) (Zoltán Somogyi, Hungarian Forest Research Institute)	Add to glossary
5-400	G-5-179	A	9	33	9	33	replace RD&D with R&D ? (Government of Hungary)	Reject, demonstration is an important part of initial technology development
5-401	G-5-180	A	9	33	9	33	Please define RD&D the first time it is used in Topic 5. (Government of United States)	Added to glossary
5-402	E-5-205	A	9	35	9	35	Note 11: Why in the world would models assume a range of things which we know cannot ever happen in the world, such as fully transparant markets and zero transaction costs? Seems very silly to me. (Steve Sawyer, Global Wind Energy Council)	To investigate what might happen and to examine "perfect" benchmarks as baselines for measurement (e.g., perfectly competitive markets provide a benchmark for efficiency)
5-403	G-5-181	A	9	36	9	36	In Footnote 11, there are two typos: (1) "Costs represent global medians and are ..."; and (2) "Estimated costs will increase if some regions, sectors (e.g. land-use), options or gases are excluded." (Government of United States)	Reject, SPM approved text
5-404	E-5-206	A	9				Table 5.2: it is a bit wierd to have data about GDP reductions that are then negative. I suggest to report GDP changes, which are then either negative or positive, and the meaning is clear. (Marco Mazzotti, ETH Zurich)	Reject, SPM approved text

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5-405	E-5-207	A	9				On Table 5.2 itself or its notes, it is desirable to describe more precisely the unit of GDP growth rates and so forth, namely, to refer more strictly to real or nominal value or the base year. (Ryoichi Komiyama, The Institute of Energy Economics, Japan (IEEJ))	Reject, SPM approved table
5-406	E-5-208	A	9				On Table 5.2 itself or its notes, for the purpose of better understanding for policy makers to macro economic damage, it is helpful to add more concrete information about the regional difference of macro-economic costs, for example to, the difference between industrialized and developing countries. (Ryoichi Komiyama, The Institute of Energy Economics, Japan (IEEJ))	Reject as data not available
5-407	G-5-182	A	9				Table 5.2 comment: The heading to columns 4 and 5 (Range of GDP reduction) is not clear. At least, it is not clear what a minus sign represents in the columns below, and this ambiguity could be removed if the heading was changed to "Range of GDP change (%)" and the signs adjusted accordingly. (Government of New Zealand)	Reject, SPM approved table
5-408	G-5-183	A	9				Table 5.2 comment: Columns 4 and 5 (range of GDP reduction) are not clear. The range needs to be indicated by the word 'to' not by a dash, thus: " -0.6 to 1.2 " OR " -0.6 to +1.2 " , to avoid confusion with the 'minus' sign. Also, it is not clear what a minus sign represents (Government of New Zealand)	Reject, SPM approved table
5-409	G-5-184	A	9				Section 5.6 comment: This section gives a rather optimistic view of what is possible with technology. Although barriers to uptake are mentioned, the heroic assumption is made that incentives will overcome all barriers. A more realistic picture that includes the institutional and behavioural barriers would indicate the need for a great deal of extra work and improved understanding, to address the changes required. (Government of New Zealand)	Figure shows technology needs in long term if barriers are addressed, which is useful information. Considered for Topic 6 subject to space limitations.
5-410	G-5-10	C	9				" Table 5.2: Is it possible to have full range of stabilization scenarios (I-VII) so as to compare table 5.1 and 5.2 more easily" (Government of Belgium)	Not possible as there are not enough low scenarios to provide statistics
5-411	E-5-209	A	10	1	10	24	The above comments are relevant here too. [TSU note: See Comment E-3-18-A] (Anthony Clayton, University of the West Indies)	SPM comment could not be found
5-412	E-5-210	A	10	2	10	3	Research, Development & Demonstration' - remove to the first mention (see comments 25) (Roman Corobov, Modern institute for humanities)	Add to glossary
5-413	E-5-211	A	10	2			RD&D should be defined earlier (Michel Rixen, NATO Undersea Research Center)	See above
5-414	E-5-212	A	10	4			reference to Fig 5.3 is repeated later on on line 10 (Michel Rixen, NATO Undersea Research Center)	Noted, reference is given also in the previous sentence for clarity

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5-415	E-5-213	A	10	4			I would replace "contribution" with "composition and contribution" (Bruce McCarl, Texas A&M Univesity)	Reject, portfolio already indicates that a composition of technologies are shown
5-416	G-5-185	A	10	5	10	15	On line 5, change the word "individual" to "different" to conform to the sentence that begins on line 5 with the first bulleted sentence after paragraph 19 of the WG3 SPM (p. 25). In addition, "individual" in the sentence beginning on line 15 of page 10 also should be changed to "different." The word "individual" does not, in both cases, convey the same meaning as "different." (Government of United States)	Accepted
5-417	G-5-186	A	10	6	10	6	To better capture the discussion in Chapter 3 of this figure (Ch3 p. 51), modify the text to read: "...depends on the baseline development path, available technologies and relative costs, and the analyzed stabilization levels." (Government of United States)	Accepted
5-574	G-5-1	D	10	15	10	24	The National Committee of Atomic Energy (CNEA) carries out different projects. In reference to the pacific use of atomic energy, several projects are being developed, such as the CAREM Project (Low-Power Argentinean Modular Innovative Reactor) which is an improved version of the CAREM-25 reactor; the experimental reactor project; the development of advanced fuels for Argentinean reactors; alternative fuel element for nuclear power plants Atucha I, II and Embalse (storage), and potentially exportable fuel for power plants like the CANDU type. (Government of Argentina)	Noted
5-418	G-5-11	C	10	15	10	32	"majority of reductions (...) from the energy sector (60-80%)". What does this statement refer to ? It would be strange to discuss figure 5.3 only from the viewpoint of technological change, it is not what is done but it may appear to be so, ignoring energy (Government of Belgium)	The text seems clear and explicitly refers to energy as requested by the reviewer
5-419	E-5-216	A	10	16	10	16	Change "energy sector" to "energy production and use". The term energy sector usually applies to the production of energy. A significant part of the 60-80% reduction referred to in this text comes from energy conservation and efficiency in end-use sectors such as industry, buildings and transport. (Robert Siveter, IPIECA)	Accepted as energy supply and use
5-420	G-5-187	A	10	16	10	16	The authors should confirm that the estimated contribution of the energy sector of 60-80% of total emissions reductions is accurate and is reflected in all of the assessed models. (Government of Australia)	Accepted
5-421	G-5-188	A	10	16	10	16	Change "energy sector" to "energy production and use". The term energy sector usually applies to the production of energy. A significant part of the 60-80% reduction referred to in this text comes from energy conservation and efficiency in end-use sectors such as	Change to "Energy supply and use"

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							industry, buildings, and transport (see the discussion in WG3 Chapter 3, pp. 49-50). Also, please state the time period relevant to these statistics and note that the stats apply to cumulative reductions, which appears to be the case. (Government of United States)	
5-422	E-5-214	A	10	16			Same comment as before: a large part of the mitigation potential lies in fact in the improvement of the energy efficiency of the end use sector as it clearly appears on Figure 4.2/Figure SPM 6 ; this should be clearly stated here again. (Jacques Rilling , CSTB)	Rejected, already emphasized in the paragraph.
5-423	E-5-215	A	10	16			Energy sector 60-80%: which items does this include? (Michel Rixen, NATO Undersea Research Center)	Accepted, it includes supply and use
5-424	G-5-189	A	10	18	10	18	Insert after options, “, which are currently deployable,” (Government of United States)	Reject because SPM language and projections take into account development of options in the future
5-425	E-5-217	A	10	18			I would discuss that ag and forest give currently deployable options while innovation and capital stock turnover goes on in development and installation of energy sector items (Bruce McCarl, Texas A&M Univesity)	See above
5-426	E-5-218	A	10	20	10	20	Pls change "low carbon energy sources" to "low carbon energy supply" as CCS is not an energy source (the fossil fuels or biomass that CCS is applied to would be the source of energy). (Kenneth Möllersten, Swedish Energy Agency)	Rejected; sources is the word used in the WGIII SPM. CCS as a whole can be considered an energy source system.
5-427	E-5-221	A	10	21	10	21	Although nuclear energy is expected to play a positive role for low-carbon society, a much more careful analysis is needed by considering the difficulty of constraint to a peaceful use. (Motoyoshi Ikeda, Hokkaido University)	Noted
5-428	E-5-219	A	10	21	10	23	This sentence is not clear and should be rephrased. (Marco Mazzotti, ETH Zurich)	Rejected, SPM approved text
5-429	E-5-220	A	10	21	11	3	In line 21 of page 10 CCS is defined as "CO2 capture and storage", but in Lines 3 and 4 on page 11 it is defined as "carbon capture and storage." I am unsure if this is because it is simply a type-o or if it is because Lines 3 and 4 are in reference to the uptake of CO2 in biomass whereby carbon is ultimately sequestered via biological processes. It seems that there should be reconciliation on this matter..... (Veronica Brieno Rankin, GeoSeq International LLC)	Accepted, changed to CO2 capture and storage consistent with IPCC-SRCCS report
5-430	E-5-222	A	10	23	10	23	Please, what is the meaning of "Modern bioenergy" ? Based in all discussion in the Summary it can be understood either as "second generation biofuels" or as the use of bioenergy in efficient ways, that is other than "traditional biomass use". It is worthwhile to clarify this point. (José Moreira, Institute of Eletrotechnica and Energy)	Delete sentence on line 23-24

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5-431	E-5-225	A	10	23	10	23	Although bioenergy is considered as a strong candidate for low-carbon society, a much more careful analysis is needed for all possible side effects: e.g., a price increase of food leads to more investment and consequent deforestation, which leads to an increase in CO2 emission. (Motoyoshi Ikeda, Hokkaido University)	Delete sentence on line 23-24
5-432	G-5-190	A	10	23	10	23	Why focus solely on bioenergy? What about other forms of renewables, e.g. hydro and marine energy? It is suggested that there not be a "singling out" of bioenergy here. (Government of Canada)	Delete sentence on line 23-24
5-433	G-5-191	A	10	23	10	23	The authors need to explain what they mean by "modern bioenergy". (Government of Australia)	Delete sentence on line 23-24
5-434	E-5-223	A	10	23	10	24	Just based only on Figure 5.2, it is very difficult to understand and ensure the evidence that "bioenergy could contribute substantially contribute to the share of renewable in the mitigation portfolio". It is therefore preferable to eliminate this sentence or add supplementary information for making sure this result. (Ryoichi Komiyama, The Institute of Energy Economics, Japan (IEEJ))	Delete sentence on line 23-24
5-435	E-5-224	A	10	23			I only have this one query from a reading of the PMS and all six Topic chapters. At page 10 of Topic 5, line 23, there is the statement: "Modern bioenergy could contribute substantially to the share of renewable energy in the mitigation portfolio". In itself the statement is correct, but (a) leaves out of account the much larger technical potential for harnessing solar insolation and the oceans; and (b) omits any reference to the possible problems posed in harnessing bioenergy due to constrained land and water availability, competition from food requirements, and natural habitat conservation concerns. (Michael Jefferson, World Renewable Energy Network and Congresses)	Delete sentence on line 23-24
5-436	G-5-193	A	10	26	10	26	The figure header here is unnecessary since it is already below the figure. Also, this format is not consistent with other figures in this report. If the header is kept, it should add "Illustrative" to the beginning. (Government of United States)	Accepted, heading was redrafted
5-437	E-5-226	A	10	26	10	27	What is the vertical dotted line in the 2000-2100 box on the right hand side of the figure? (Steve Sawyer, Global Wind Energy Council)	Noted. The line indicates the relative size of 2030 contributions (x-axis of left panel). No change necessary since the figure and caption are fully consistent with approved SPM WGIII, and also the specific meaning of the line is clear as presented in the graph.
5-438	G-5-192	A	10	26	11	4	there is a contradiction in the figure; in the heading the term "emission reduction" is used, in the explanation the term "forest sink" is used. In the heading the words "and enhancement of removals" should be added. The term "forest sinks" in the agenda might be the right one depending what was calculated: the enhancement of removals or the	Leave as agreed WGIII SPM language. Rejected.

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							reduction of emissions from deforestation as well. if the former is right "forest sinks" is the right term. if the latter is right the term "forest measures" could be used. The same should be checked for the explanatory part of the figure (page 11, line 1). The term "forest measures" seems to be more appropriate than "forest sink enhancement". (Government of Germany)	
5-439	E-5-227	A	10	27			do you need to define ccs in caption (Bruce McCarl, Texas A&M Univesity)	In glossary
5-440	E-5-228	A	10				Remove text from above graph (Zoltán Somogyi, Hungarian Forest Research Institute)	Noted, title was redrafted
5-441	G-5-194	A	10				Remove text from above graph (Government of Hungary)	Noted, title was redrafted
5-442	G-5-195	A	10				Caption of Figure 5.3: Clarification necessary for non-experts, after "...inclusion of these options in the baseline." Insert: "For example, all models show a large share of renewable energies already in the baseline. Therefore, their additional mitigation potential shown here is smaller than their total contribution to emission reductions." (Government of Germany)	Rejected, SPM agreed text (singeling out renewables is not rectified, as other options such as nuclear, afforestation, fossil fuel switch, etc.. all show contributions in the baseline as well)
5-443	G-5-196	A	11	3	11	3	We note the description " Forest sinks include reducing emissions from deforestation. " appears to be inconsistent with the UNFCCC definition of a sink being a process which removes a greenhouse gas from the atmosphere. We presume it is, however, consistent with other IPCC use? (Government of New Zealand)	See 5-438.
5-444	E-5-229	A	11	3	11	4	The sentence seems not to be completed, i.e. - no verb in it? (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Text to be grammaticalized.
5-445	E-5-230	A	11	3	11	4	Something seems to be missing from the sentence "Mitigation" (Jon Egill Kristjansson, University of Oslo)	Text to be grammaticalized.
5-446	G-5-197	A	11	4	11	4	Use of a different metric of emissions over the 21st century is confusing and limits the utility of this finding for readers. (Government of Australia)	Accepted, metric corrected
5-447	G-5-198	A	11	5	11	5	Insert necessary Figure from the underlying Chapter 3 of WG-III, i.e. Figure 3.24. Reason: SYR-Figure 5.3 and the SYR-SPM (Page 20, Lines 26-28) underscore the importance of the energy sector. Therefore, policy makers need to see how different models address this importance of the energy mix. Figure 3.24 of WG-III is an excellent explanation.	A useful suggestion but there is no space.

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							(Government of Germany)	
5-448	E-5-231	A	11	7	11	7	This is a very very important section, and in fact may be the most policy-relevant part of the entire synthesis report. It gives clear guidance to policymakers on the options in terms of fulfilling nations' obligations under Article 2 of the Convention...and it does so without being prescriptive. Excellent. (Steve Sawyer, Global Wind Energy Council)	Thanks
5-449	G-5-199	A	11	7	11	7	This statement is not a proper title of a section. Suggest to add a title "Relationship between mitigation and climate impacts", and use the current title as a headline statement. (Government of European Community)	Change to "Relationship between mitigation and avoided climate impacts". Or similar
5-450	G-5-200	A	11	7			Section 5.7 - very important section, should be kept and expanded, as many other relevant impacts could be named (e.g. mountain glaciers and impacts on water availability)- maybe a new table including avoided impacts for different temperature ranges on different time-scales could be added. (Government of Germany)	Yes but no new table as text best capture story line.
5-451	E-5-232	A	11	9	11	9	"...climate change and its associated impacts..." not '...their associated impacts...' (Steve Sawyer, Global Wind Energy Council)	Done
5-452	G-5-201	A	11	9	11	9	Suggest deletion of "and their associated impacts" as it overcomplicates the sentence and could be read as to imply that all climate change impacts can be determined by human choices. (Government of Australia)	Language changed to avoid confusion
5-453	G-5-202	A	11	13	11	13	substantial difference in climate change can also be expected already in first half of the century. Please reword to make this clear. (Government of Germany)	Accepted
5-454	E-5-233	A	11	18	11	26	This para repeats Figure 5.2 and should be deleted. (Zoltán Somogyi, Hungarian Forest Research Institute)	Shortened; reference to Fig 5.2 made.
5-455	G-5-203	A	11	18	11	26	This para repeats Figure 5.2 and should be deleted. (Government of Hungary)	See 454
5-456	G-5-204	A	11	21	11	21	Suggest deletion of "in contrast" as it implies that the 590-710 ppm stabilisation scenario was the highest level assessed in the AR4, which is not accurate (see Figure 5.2). (Government of Australia)	Accepted
5-457	G-5-205	A	11	28	11	29	This sentence is not clear. How can a "choices between these or other ranges ... reduce, delay, or avoid the risk of a range of key impacts"? Suggest to change to "The choice of emissions scenario, and the associated concentrations and level of climate change,	Accepted content in thoroughly revised text

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							determines the level of climate impacts. Lower emissions avoid, reduce or delay impacts, compared to higher emissions." (Government of European Community)	
5-458	E-5-234	A	11	28	11	31	This is again repetition and evident; should be deleted (Zoltán Somogyi, Hungarian Forest Research Institute)	Done
5-459	G-5-206	A	11	28	11	31	This is again repetition and evident; should be deleted (Government of Hungary)	Done
5-460	G-5-207	A	11	30	11	31	This sentence is not very clear. Suggest to change to "Climate impacts vary significantly across regions, depending on the regional changes in climate, the sensitivity to those changes, and adaptive capacity." (Government of European Community)	Deleted
5-461	G-5-208	A	11	33	11	46	The selection of impacts projected for various levels of warming, given here seems arbitrary. This has already been addressed in Topic 3 and at Figure 3.2. Suggest that the authors either provide a criteria for this selection or simply cite Topic 3. (Government of Australia)	Added criteria
5-462	G-5-210	A	11	33	11	46	In the interest of facilitating authors' ability to meet required page limits and to reduce repetition in the text, this material should be deleted. The information presented here is already contained in Table 3.2, which serves to provide illustrative thresholds. The material as presented in this text does not indicate that the thresholds are illustrative, or present the uncertainties associated with linking specific impacts to specific temperatures and with how the rate of warming might influence outcomes. (Government of United States)	List shortened and language to reflect uncertainties
5-463	G-5-12	C	11	33	11	46	It should be mentioned that these are examples. It is not a complete list of impacts that could be avoided (or not) (see e.g. WG2 Table SPM 1, which still shows examples but more than here) (Government of Belgium)	Should be clear that these are just examples.
5-464	G-5-13	C	11	33	11	46	" Should clarify that that these bullet points are only a list of examples" (Government of Belgium)	Same as 463
5-465	G-5-209	A	11	33	12	12	Since these are estimates, it isn't appropriate to describe the avoided impacts with "would." Suggest using "could" or modifying all the statements so they are about risk— e.g., "would reduce the risk of..." These statements do not come from integrated assessments looking at these temperature thresholds; there is no confidence level; and Table 3.2 should not be used as a strict reading of which impacts would be avoided by avoiding certain temperature thresholds. (Government of United States)	Accept

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5-466	E-5-235	A	11	34	11	34	Change "would" to "could." As indicated above on lines 29-30, little is know about system-specific thresholds. Using the "would" implies a certainty that is unjustified. (Robert Siveter, IPIECA)	Accept
5-467	G-5-211	A	11	34	11	34	Change "would" to "could." As indicated above on lines 29-30, little is know about system-specific thresholds. Using the "would" implies a certainty that is unjustified. (Government of United States)	Accept
5-468	E-5-236	A	11	37	11	37	suggest "and commit the world to sea level rise of meteres and the displacement of tens to hundreds of millions of people" (John Church, CSIRO)	See 5-318
5-469	E-5-237	A	11	37	11	37	I will be interested to see how the figure of 30% is calculated. It seems remarkably precise. (Thomas Spencer, University of Cambridge)	"up to 30%" is not very precise
5-470	G-5-213	A	11	38	11	38	Add here an additional bullet: "limit the amount of the terrestrial biosphere becoming a net carbon source to <40%." This would seem to be an important point to emphasize to policymakers, that the magnitude of positive feedbacks in the climate system response to warming could be ameliorated to some extent through mitigation. (Government of Canada)	Decline to page length
5-471	G-5-212	A	11	38	12	12	This text ignores uncertainties associated with impacts associated with rates of climate change, inconsistencies across sectors and studies, feedbacks from impacts to socio-economic conditions, and the degree to which adaptation is captured. These are important elements that should be noted and reduce the certainty of these statements. (Government of United States)	See 5-462
5-472	E-5-238	A	11	39	11	39	Change "would" to "could." As indicated above on lines 29-30, little is know about system-specific thresholds. Using the "would" implies a certainty that is unjustified. (Robert Siveter, IPIECA)	Accept
5-473	G-5-214	A	11	40	11	40	Change "would" to "could." As indicated above on lines 29-30, little is know about system-specific thresholds. Using the "would" implies a certainty that is unjustified. (Government of United States)	Accept
5-474	E-5-239	A	11	41	11	41	The expression "assessed so far" is not clear. (Marco Mazzotti, ETH Zurich)	Deleted, but not sure why not.
5-475	E-5-240	A	11	43	11	43	Delete "including widespread coral mortality." As indicated in WG II, Chapter 6.4.1.5, there is some evidence that coral are able to adapt to higher temperatures. (Robert Siveter, IPIECA)	Disagree with reasoning, corals removed for space reasons
5-476	G-5-215	A	11	43	11	43	Delete "including widespread coral mortality." As indicated in WG2 Chapter 6.4.1.5, there is some evidence that coral are able to adapt to higher temperatures. (Government of United States)	See above

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5-477	G-5-216	A	11	44	11	44	This bullet point does not adequately reflect the findings from WG 2 Chapter 5 Executive Summary and WG 2 Table SPM-1. Suggest to replace by "limit productivity losses for major cereals in low latitudes". (Government of European Community)	Text reworded
5-478	E-5-241	A	11	45	11	46	Change "coastal people flooded" to "people directly affected by coastal flooding" (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Done
5-479	G-5-217	A	11	48	12	3	Suggest to add "increased morbidity and mortality from heat waves, floods and droughts" to this list, since this impact is also mentioned in WG 2 Table SPM-1 and SYR Table SPM-2 / Table 3.2 (Government of European Community)	Specific examples deleted since this is dealt with in 3.3.
5-480	E-5-242	A	12	5	12	5	This paragraph repeats information that is in preceding chapters. (Roman Corobov, Modern institute for humanities)	Deleted text
5-481	E-5-243	A	12	5	12	8	Comment: This paragraph partially repeats the statement on page 4, lines 15 - 16, please see comment 27. (Maria Rosa Paiva , Universidade Nova de Lisboa [New University of Lisbon])	Deleted text
5-482	G-5-218	A	12	5	12	8	This sentence is not very clear. Suggest to change to "Most of the impacts above could occur during the 21st century, depending on the magnitude of warming. Additional impacts could occur over longer (multi-century to millennial) time scales, such as ...". (Government of European Community)	Deleted text
5-483	E-5-244	A	12	6	12	6	Suggest "much longer (hundreds of years to several millenia) time scales" (John Church, CSIRO)	Deleted text
5-484	E-5-245	A	12	6	12	10	Excellent wording. Supported. (Robert Kay, Coastal Zone Management Pty Ltd)	Sorry - Deleted text
5-485	G-5-219	A	12	8	12	8	The bracket 1.9 to 4.6 °C is too large to be policy relevant (Government of France)	Deleted text
5-486	E-5-246	A	12	8			Using "1.9 to 4.6°C above pre-industrial levels" is misleading for two reasons: 1) false precision and 2) it doesn't follow the rest of the text in emphasizing 1980-99 baseline and putting preindustrial in parentheses. WGII used 1-4°C vs. present to make much the same point. (Michael Oppenheimer, Princeton University)	Para lines 5-12 deleted to avoid repetition with 5.4 and lines 10-12 moved to earlier section with thermal expansion SLR discussion.
5-487	E-5-247	A	12	10	12	10	Suggest need to add the glacier and the ice sheet contributions. (John Church, CSIRO)	See 5-318
5-488	E-5-249	A	12	14	12	14	to mention the word 'weighed' in this context is critical. Is there really a choice between mitigation and adaptation? I don't think that there is a risk, that too much is invested in mitigation options in the present political environment. In contrast, any such statement is (ab-	Deleted text

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)used to impede mitigation options. I suggest to use the word 'considered' rather than 'weighed'. (Gian-Reto Walther, University of Bayreuth)	
5-489	G-5-221	A	12	14	12	14	5.5 of this document? (Government of United States)	Yes, Deleted text
5-490	E-5-250	A	12	14	12	16	The co-benefits between mitigation and sustainable development (e.g. improvement in air quality -> health) have been mentioned earlier. It would be appropriate to mention them here as well: "The costs of mitigation, assessed in 5.5, need to be weighed within a risk management perspective against the specific impacts, the necessary investments in adaptation, the co-benefits of mitigation and adaptation efforts, CO-BENEFITS WITH SUSTAINABLE DEVELOPMENT GOALS, and the avoided damages from climate change. (Martin Welp, University of Applied Sciences Eberswalde)	Text deleted and modified earlier in 5.7
5-491	G-5-14	C	12	14	12	16	What is the meaning of "need to be weighed within risk management" here ? It may be supposed that it relates to "product of likelihood and consequence" as explained in the beginning of this topic. In this case, saying that it "need" to use risk management (Government of Belgium)	Text deleted and modified earlier in 5.7
5-492	G-5-220	A	12	14	12	22	This paragraph is lost here and in any case a section headed "Many impacts can be avoided, reduced or delayed by mitigation" is not the most appropriate place for it. We suggest that it could be more appropriately placed, with very little modification, as a follow-on paragraph at the end of Section 5.1. (Government of New Zealand)	Text deleted and modified earlier in 5.7
5-493	E-5-248	A	12	14			would better read "need to be weighted, where possible" . In fact this is often not possible in many risk management situations. It does not prevent risk management. (Leonard Allen Smith, London School of Economics)	Text deleted and modified earlier in 5.7
5-494	G-5-222	A	12	16	12	16	For clarity suggest that the final clause in the sentence is rephrased in the following way, "and the damages avoided due to reduced levels of climate change". (Government of Australia)	Text deleted and modified earlier in 5.7
5-495	E-5-251	A	12	19	12	19	"high agreement, much evidence" ... of or for what? (James Crampton, GNS Science)	Text deleted and modified earlier in 5.7
5-496	G-5-223	A	12	19	12	22	The wording of this sentence wrongly suggests a deterministic or causal relationship between climate sensitivity and the timing and level of mitigation. Suggest to change to "Given current uncertainties about climate sensitivity, carbon-cycle feedbacks, and other climate parameters, strategies for meeting a specific temperature level with high probability require earlier and more stringent mitigation than strategies aiming to meet the same temperature level with lower probability." (Government of European Community)	Text deleted and modified earlier in 5.7

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5-497	G-5-224	A	12	19	12	22	Suggest that the final part of this paragraph dealing with uncertainties in climate sensitivity is made a new paragraph, as it deals with an overarching uncertainty as to the appropriate level of emissions reductions. (Government of Australia)	Text deleted and modified earlier in 5.7
5-498	E-5-252	A	12	22	12	22	"..mitigation must be (not 'is') earlier and more stringent..." (Steve Sawyer, Global Wind Energy Council)	Text deleted and modified earlier in 5.7
5-499	E-5-253	A	12	26	12	28	"discounted to today" "will grow over time" what does this mean? -- current total costs are likely to grow -- present total costs are likely to fall -- current marginal costs may grow or fall -- present marginal costs are likely to fall -- which of the four are you talking about? (Richard Tol, ESRI)	Approved SPM language and is correct.
5-500	E-5-256	A	12	28	12	29	Insert: "will" after "climate change", change tense of "threatens" to be consistent with "should" and insert "will therefore also " before "impede". (So reads: "Unabated climate change will, with very high confidence, threaten sustainable development and will therefore also impede achievement of....." etc etc) (Pat Finnegan, Grian)	Done
5-501	E-5-254	A	12	28	12	30	Need to specifically say that "unabated climate change" would lead to the inundation of many coastal cities as sea level rises and the likely serious disruption of ocean marine life if the CO2 concentration rises unabated---it is not just the MDGs that are threatened, it is much of life on Earth as we know it. (Michael MacCracken, Climate Institute)	See 5-318
5-502	E-5-255	A	12	28	12	30	It is now evident that Millennium Development Goals (MDG) targets will not be achieved by 2015; therefore, a very high confidence assertion that unabated climate change threatens sustainable development and MDG goals may be self-serving and received negatively by some policy makers as emphasizing a reality that will not be achieved (for other reasons than climate change) by target date. (Peter Liotta, Pell Center for International Relations and Public Policy)	MDGs are 2050 goals
5-503	E-5-257	A	12	29	12	30	I don't understand this - the MDGs will either be achieved (or not) by 2015...certainly the phrase about sustainable development is correct, but the MDGs themselves are time-bound targets which will nor will not be reached by 2015 - and although climate change may be an impediment to reaching those objectives in that time frame, it is unlikely the largest one (Steve Sawyer, Global Wind Energy Council)	Same
5-504	E-5-258	A	12	32	12	35	Mention results from recent literature such as the Stern Report (Germán Poveda, Universidad Nacional de Colombia)	Do not mention specific literature; in the WGII AR4
5-505	G-5-225	A	12	32	12	35	This paragraph in its current location is of limited value – it can be interpreted to suggest that since the costs and benefits of mitigation are comparable then no action should be taken. There is no consideration of environmental outcomes, time frames or the interrelationships between damages, mitigation and adaptation. It should be moved into	Moved

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							section 5.7, which explicitly discusses the costs of mitigation and the need to weigh these through a risk management framework. (Government of Australia)	
5-506	E-5-261	A	12	37	12	37	Add: "...will interact with major global NATURAL RESOURCES AND other environmental concerns...." (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	Done
5-507	G-5-227	A	12	37	12	37	"(...) with major environmental concerns and broader trends BOTH IN GLOBAL, REGIONAL AND LOCAL SCALES (...)" (Government of Hungary)	Noted all scales
5-508	E-5-259	A	12	37	12	40	Misspelled or words omitted? ("may compound" instead of "compounded"? , compounded to be what?). Also, the references as now given are not understandable. (Markku Rummukainen, Swedish Meteorological and Hydrological Institute (SMHI))	Thanks
5-509	E-5-260	A	12	37	12	40	missing from the list are "economically and/or environmentally forced migration, and conflicts over resources." Suggest inserting these two in the list after deforestation. (Steve Sawyer, Global Wind Energy Council)	Not in supporting text
5-510	G-5-226	A	12	37	12	40	Change "major" to "other", since climate change is also a global environmental concern. (Government of European Community)	Done
5-511	E-5-262	A	12	38			Please add 'disaster risk'. (Silvia Llosa, International Strategy for Disaster Reduction)	Done
5-512	E-5-263	A	12	39	12	39	The word 'be' should be inserted between may and compounded (Richard Anyah, Rutgers University)	Done
5-513	E-5-265	A	12	39	12	39	Insert 'be' between 'may' and 'compounded' (David White, ASIT Consulting)	Done
5-514	E-5-267	A	12	39	12	39	"be" needs to be inserted after "may" (Jon Egill Kristjansson, University of Oslo)	Done
5-515	G-5-228	A	12	39	12	39	The authors need to explain in what way mitigation and adaptation measures need to be integrated. (Government of Australia)	See section 5.3
5-516	G-5-229	A	12	39	12	39	Please insert the word 'be' between the words 'may' and 'compounded', thus: " ... impacts may be compounded in the future ...". (Government of New Zealand)	Done
5-517	G-5-230	A	12	39	12	39	Editing: insert "be" after "may". (Government of Australia)	Done

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5-518	E-5-264	A	12	39	12	40	Split paragraph into two sentences and amend second to include reference to dis-benefits compounded by aggregation, as per existing references. (So reads: "Climate change will interact with major global environmental concerns and broader trends, including water, soil and air pollution, health hazards and deforestation. Their combined impacts may be compounded in the future in the absence of integrated mitigation and adaptation measures, likely increasing aggregate net dis-benefits." (Pat Finnegan, Grian)	Sentences split; additional wording not added since it is difficult to understand for non-experts and increasing dis-benefits are clearly implied in the word "compounded" in the existing sentence.
5-519	E-5-266	A	12	39			add "be" after "may" (Hartmut Grassl, Max Planck Institute for Meteorology)	Done
5-520	E-5-8	B	12	39			may be compounded (Effiom Antia, University of Calabar)	Done
5-521	G-5-231	A	12	42	12	42	Delete: "Making developments more sustainable", Insert: MOVING TOWARDS SUSTAINABILITY, either (...)" (Government of Hungary)	Not deemed necessary, but language changed
5-522	E-5-268	A	12	42	12	45	It is hardly worth emphasising here that efforts such as those aimed at making development more sustainable MAY need resources. Of course they will. On the whole, this paragraph adds little in its current formulation. Maybe have another look at what really was the intent of drafting this paragraph? (Jouni Paavola, University of Leeds)	Text altered
5-523	E-5-269	A	12	42	12	45	Consider adding after "can reduce vulnerability" 'and increase resilience' to climate change. (Silvia Llosa, International Strategy for Disaster Reduction)	Resilience not in IPCC parlance
5-524	G-5-232	A	12	44	12	44	delete "may". There are always barriers to overcome. (Government of Germany)	Accepted
5-525	E-5-270	A	12	44	12	45	implementation does not only require (additional?) resources to overcome multiple barriers; shifting priorities e.g. through critical reflection of the existing support system with e.g. subsidies/tax allowances, does not require additional resources, it just changes priorities. (Gian-Reto Walther, University of Bayreuth)	Text altered, but these details not added owing to space constraints
5-526	G-5-233	A	13	1	13	1	Who could define a MORE sustainable development ? If the definition is a development which enhance adaptative and mitigative capacities, the sentence carries no information and should be deleted. (Government of France)	Will be clarified with SPM language
5-527	E-5-271	A	13	1	13	8	Delete this paragraph. It is largely redundant to material presented in SYR 4.2 and 4.4, often using the same exact words. (Robert Siveter, IPIECA)	Reject. Does not overlap with 4.2 and 4.4

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5-528	G-5-234	A	13	1	13	8	Delete this paragraph. It is largely redundant to material presented in SYR 4.2 and 4.4, often using the same exact words. (Government of United States)	See above.
5-529	E-5-272	A	13	2	13	2	thereby' or 'therefore'? (David White, ASIT Consulting)	Thereby
5-530	G-5-235	A	13	2	13	3	Change "vulnerability to climate change" to "risks from climate change" because mitigation reduces the hazard climate change, not vulnerability to that hazard. (Government of European Community)	No, mean vulnerability
5-531	G-5-236	A	13	3	13	7	There seems to be a typo here: "within nations" and "within countries" are largely equivalent. (Government of European Community)	Sentence deleted
5-532	E-5-273	A	13	3	13	8	Indeed--the impacts will hit parts of societies, but there is no clear indication that there is a willingness to give up resources to make amends for all the damage done--might well require huge societal redistribution of resources. (Michael MacCracken, Climate Institute)	Sentence deleted
5-533	E-5-274	A	13	3	13	8	I am surprised not to find 'population growth' mentioned in this context here or in the report in general??? (Gian-Reto Walther, University of Bayreuth)	Sentence deleted
5-534	E-5-275	A	13	4	13	5	Line 4 talks about "within nations" and line 5 about "within countries". This is confusing, and I wonder if "within nations" should be "among nations" or "between nations". (Adrian Simmons, European Centre for Medium-Range Weather Forecasts)	Text changed; sentence deleted
5-535	E-5-276	A	13	8			Please add reference to WGII Ch 20.5 (Silvia Llosa, International Strategy for Disaster Reduction)	References back to earlier sections
5-536	G-5-237	A	13	10	13	11	The first sentence is phrased in technical jargon, the authors need to use more plain language. (Government of Australia)	Tried, but entence deleted
5-537	G-5-238	A	13	12	13	13	The expression "will exceed the capacity to adapt" is phrased as a sweeping generality. The authors should consider whether this language needs to be qualified. (Government of Australia)	Sentence deleted
5-538	G-5-15	C	13	12	13	13	"more likely than not [>50%] that climate risks will exceed the capacity (...) without significant mitigation" is a relatively weak statement. Please confront it with SYR Table 3.2, knowing in addition that the capacity to adapt is limited, in particular, b (Government of Belgium)	See above

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5-539	E-5-277	A	13	13	13	16	Need to change "very likely" to "will not"--consider what will happen to biodiversity, for example--one simply cannot abate all damages at all levels of change. (Michael MacCracken, Climate Institute)	Sentence deleted
5-540	E-5-278	A	13	18			Section 5.9 Key vulnerabilities and Article 2 of the UNFCCC - it may be better to place this discussion along with section 5.2 on key vulnerabilities on page 1. Why are they being discussed separately? (Upasna Sharma, Indian Institute of Technology, Bombay)	Now in Box earlier
5-541	G-5-239	A	13	18			The authors should consider whether section 5.9 should be placed at the start of Topic 5, to provide readers with some context to the whole discussion of vulnerability and "reasons for concern". (Government of Australia)	Done – see box earlier
5-542	G-5-240	A	13	18			Section 5.9: It is not clear how much of this section is necessary, or if it belongs at this point in the SYR. It might be better located at the start of Topic 5 as an explanation of the UNFCCC process within which the IPCC assessments sit, but it would need to be cut back and a number of border policy proscriptive elements deleted. (Government of Australia)	Agreed and going to a Box in 5.2
5-543	G-5-241	A	13	18			Section 5.9 - very important section on an important agreed cross-cutting theme. should be kept. (Government of Germany)	See above
5-544	G-5-243	A	13	21	13	21	Rephrase this line as follow: "Article 2 of the Climate Change Convention (UNFCC) clearly stipulates that its ultimate objective is:" (Government of Republic of Benin)	Text changed
5-545	E-5-279	A	13	21	13	27	In Article 2, there is no "GHG" nor "DAI" - do these really need to be here in the excerpt? They are not used elsewhere. (Lisa Schipper, Southeast Asia START Regional Centre, Chulalongkorn University)	Actual convention language used now
5-546	G-5-242	A	13	21	13	27	These lines purport to articulate "clearly" the "ultimate objective" of the Framework Convention on Climate Change (FCCC) as stated in Article 2. It is also the "ultimate objective" of "any related legal instrument adopted by the Conference of the Parties, such as the Kyoto Protocol." However, the quote, in italics, is only a partial quote of the Article and it is an inaccurate quote, as the words "in accordance with the relevant provisions of the Convention" should be inserted between the words "achieve" and "stabilization" on line 23, page 13. If Article 2 is to be quoted at all in the SYR, it should be quoted in full by the IPCC, as follows: Article 2 - OBJECTIVE. The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such	Agree to full quote

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							a level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner. (Government of United States)	
5-547	E-5-280	A	13	23	13	27	This citation from the Convention is important. However, it contains many terms that are difficult to define, not only "dangerous anthropogenic interference". "Allow ecosystems to adapt naturally" is as important as the previous term, but not addressed here, although the whole report has many statements and evidence that this "natural adaptation" is, and will less and less be allowed, by the rate of climate change. Food production, and sustainability should also be addressed. (Zoltán Somogyi, Hungarian Forest Research Institute)	Yes. Cannot resolve in an IPCC report
5-548	G-5-244	A	13	23	13	27	This citation from the Convention is important. However, it contains many terms that are difficult to define, not only "dangerous anthropogenic interference". "Allow ecosystems to adapt naturally" is as important as the previous term, but not addressed here, although the whole report has many statements and evidence that this "natural adaptation" is, and will less and less be allowed, by the rate of climate change. Food production, and sustainability should also be addressed. (Government of Hungary)	Revised text
5-549	E-5-281	A	13	29	13	46	This para is mainly completely unnecessary, as it is a very general essay about too general issues. Sentences like "This assessment has identified systems, sectors, regions and communities that are particularly vulnerable to climate change" are not necessary as they do not convey any useful information. Suggest to simplify and revise this long para. (Zoltán Somogyi, Hungarian Forest Research Institute)	Revised text deletes this
5-550	G-5-245	A	13	29	13	46	This para is mainly completely unnecessary, as it is a very general essay about too general issues. Sentences like "This assessment has identified systems, sectors, regions and communities that are particularly vulnerable to climate change" are not necessary as they do not convey any useful information. Suggest to simplify and revise this long para. (Government of Hungary)	See 549
5-551	G-5-246	A	13	31			Add here an additional bullet: "limit the amount of the terrestrial biosphere becoming a net carbon source to <40%." This would seem to be an important point to emphasize to policymakers, that the magnitude of positive feedbacks in the climate system response to warming could be ameliorated to some extent through mitigation. (Government of Canada)	Location?
5-552	G-5-247	A	13	32	13	34	The list of attributes at the end of this sentence is largely equivalent with the list in the next paragraph. Suggest to shorten this sentence in favour of the more detailed text in the next paragraph. (Government of European Community)	Covered now in Topic 3.3

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5-553	G-5-248	A	13	32	13	34	The authors need to explain how the conception of systems and sectors that are "particularly" vulnerable to climate change meshes with the identification of "key" vulnerabilities (as discussed in the following paragraph). At present the criteria used for each of these ideas are similar but not uniform, and as such an implication that this discussion is contradictory, can be drawn. (Government of Australia)	See redraft in Box
5-554	G-5-249	A	13	34	13	34	Taking into account the "confidence in assessment" in determining vulnerability seems strange, surely a system's vulnerability is not determined by human knowledge of its vulnerability. Suggest that this sentence is redrafted as follows: "This assessment has identified systems, sectors, regions and communities, which the authors are confident, are particularly vulnerable to climate change taking into account magnitude, timing, irreversibility of possible impacts and potential for adaptation". (Government of Australia)	See redraft in Box. Confidence is taken into account in relation to determination of what is a key vulnerability
5-555	E-5-282	A	13	34	13	37	"...because doing so involves value AND ETHICAL judgements". Besides value judgements ethical dimensions should be highlighted already here. Later on the text refers to fairness, justice, and equity. (Martin Welp, University of Applied Sciences Eberswalde)	See redraft in Box
5-556	G-5-250	A	13	37	13	41	The U.S. Government questions whether the statement that "[s]cience can. . .facilitate informed debate about assessing" "dangerous [anthropogenic] interference" "by offering expert considerations. . ." is appropriate because it would seem that such "debate" would also involve "value judgments." This discussion appears to refer selectively to some words and phrases of Article 2 out of context and ignore others such as "in accordance with the relevant provisions" of the FCCC, "level," "greenhouse gas concentrations in the atmosphere" and "within a timeframe sufficient to allow." For example, a focus on one word, such as "dangerous," ignores the significance of the entire Article, the interconnection of its words, and its impact. Section 5.9 must accurately and fully reflect the three WG SPMs, the underlying assessments, and, most importantly, Article 2. (Government of United States)	Science has this role and PAO includes Article 2 and Key Vulnerabilities. See redraft in Box
5-557	G-5-251	A	13	39	13	39	The authors should reconsider whether discussion of the equity issues involved in the uneven distribution of climate risk, is within their purview. This sentence could be redrafted as follows: "Science can, however, facilitate informed debate about assessing "dangerous interference" by offering expert considerations of the global, regional, and local risks associated with climate change, the uneven distribution of those risks (including the identification of societies and systems that are or will become most vulnerable to climate impacts) and...." (Government of Australia)	Equity stays as it is in literature was assessed and implicit in the discussion of uneven distribution of impacts.
5-558	G-5-252	A	13	41	13	41	For accuracy insert "technical" before "feasibility".	Deleted text

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							(Government of Australia)	
5-559	G-5-253	A	13	45	13	45	Editing: replace "would vary" with "varies". (Government of Australia)	Deleted text
5-560	E-5-283	A	13	48	14	5	These seven criteria, as listed here, are not easily related back to the structure of the Topic 5 document (James Crampton, GNS Science)	Covered in 3.3
5-561	G-5-254	A	14	4	14	5	It should be stated explicitly where key vulnerabilities have been described rather than just referring to "above". (Government of European Community)	Done
5-562	E-5-284	A	14	5	14	12	This makes it sound as if each country will decide what position to take based on what happens on a global basis rather than what might happen on a local basis. Given the slogan "All politics is local", this seems like a very naive viewpoint. We need to be providing policymakers with the information in the form they want, not in a form that will not help them. (Michael MacCracken, Climate Institute)	Tried to change to avoid being naïve
5-563	E-5-287	A	14	7	14	9	Suggestion: given the importance of this statement /paragraph, it should be emphasized (bold). (Maria Rosa Paiva , Universidade Nova de Lisboa [New University of Lisbon])	Tried to elevate without bold
5-564	E-5-285	A	14	7	14	15	This text is very dense. After reading it 3 or 4 times, it started to make sense. Please make an effort to simplify the language. (Daniel Murphy, NOAA Earth System Research Laboratory)	Deleted text
5-565	E-5-286	A	14	7	14	15	This paragraph is more appropriate in Topic 6. (Roman Corobov, Modern institute for humanities)	Do not agree
5-566	E-5-288	A	14	8	14	8	Add: ".....differentiation on a regional AND COUNTRIES basis, often...." because at this moment economic and/or political position isn't realized at regional level, it is at country level. (Cristobal Felix Diaz Morejon, Ministry of Science, Technology and the Environment)	Rejected; country-specific impacts have not been assessed in the SYR; the term "regional" covers a possible distinction between countries where this would be applicable.
5-567	G-5-255	A	14	9	14	12	This sentence is hard to impossible to understand. (Government of European Community)	Deleted text
5-568	E-5-289	A	14	13	14	13	"that" needs to be inserted between "risk" and "society" (Jon Egill Kristjansson, University of Oslo)	Deleted text
5-569	E-5-290	A	14	14	14	15	Insert "both" and "and adaptation" in order to take fuller account of costs. (So reads: ".....associated impacts, taking into account the economic costs of both mitigation and	Deleted text

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							adaptation over a given time frame." (Pat Finnegan, Grian)	
5-570	G-5-256	A	16	38	17	12	The inclusion of the five "reasons for concern" is welcome. However, an additional figure, comparable to those included in the TAR, would be helpful and could convey the same message faster. (Government of Austria)	Considered, but not supported by the author team at large
5-571	G-5-257	A	17	17	17	17	It is suggested to substitute "emission pathways" by "emission scenarios" because this term has already been used in the caption of figure SPM-5 that shows three of the six SRES marker scenarios. (Government of Austria)	SPM language not changed
5-572	G-5-258	A	19				figure SPM-8: The inclusion of the post-SRES baseline range is strongly supported. However, what is missing is the linkage with the actual emission levels of CO2 (see e.g. figure SPM-3). (Government of Austria)	Comment refers to SPM not to Topic 5
5-573	G-5-259	A	19				figure SPM-8: It is noted that some scenarios include emission pathways with negative emissions without providing any explanation. Also the longer report does not include any explanation. It is suggested to provide such information in the caption to this figure. The following wording indicated the messages that should be conveyed: In order to achieve stabilisation at the lower range the emission scenarios include mitigation options that result in negative emissions, e.g. by combining carbon capture and storage with the use of biomass as fuel. (Government of Austria)	Comment refers to SPM not to topic 5.