



**IPCC WGII
Fourth Assessment Report
Climate Change Impacts, Adaptation and Vulnerability
*Government and Expert Review of Second Order Draft***

Specific Comments

**EXPERT REVIEW COMMENTS
SUMMARY FOR POLICY MAKERS**

Author responses – December 2006

August 2006

Late comments appended to bottom of file 31st August

Discussion of expert review comments and record keeping

IT IS RECOMMENDED THAT:

- AUTHORS BEGIN WORK ON THE COMMENTS IMMEDIATELY. SUBSTANTIVE COMMENTS NEED TO BE SEPARATED FROM NON-SUBSTANTIVE, AND THE TWO SHOULD BE TREATED DIFFERENTLY
- CONTACT IS MADE BETWEEN AUTHORS AND THEIR REVIEW EDITORS IN AUGUST

Substantive comments

- The chapter writing team should discuss all substantive expert review comments, by email and/or at Cape Town.
- Substantive comments require full and proper consideration. The *Principles Governing IPCC Work* state that:
 - genuine controversies should be reflected adequately in the text of the Report and
 - it is the role of the Review Editors to advise the lead authors on how to handle contentious/controversial issues
- You must record the outcome of these discussions in this document, under the column 'Notes of the Writing Team'.

Non-substantive comments

- For non-substantive comments, a very brief entry should be made in the column 'Notes of the Writing Team'. The following terms are acceptable:
 - Addressed
 - Not applicable
 - Text removed
 - A tick to denote a comment has been addressed (somewhere on the document this should be stated)

General

- The record should be kept in this document, ideally electronically.
- The document becomes part of the traceable account of the Working Group II Fourth Assessment. When completed to the satisfaction of the Review Editors, a copy should be returned to the TSU by the **8th December 2006**.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-1	A	0				While I understand that the ordering of topics in the SPM matches the ordering of the questions asked, when preparing a report for decision makers, the general recommendation is often to start with the results, and then work back through the supporting information and techniques--so just the exact opposite ordering as is used. While it may well make sense for the TS to be in this order, the Bureau should really consider if this ordering is the best way to get across the main messages of the report. At the very least, some sort of brief summary of the key findings should be up front--that is, saying that impacts are already evident, will become much more significant by mid-century, and likely dangerous by the end of the century. (Michael MacCracken, Climate Institute)	The main findings of the report are clearly highlighted by the bold statements.
E-SPM-2	A	0				While I understand that guidance was given to indicate what impacts are associated with what scenarios, this is not done well in the SPM and TS. It seems to me if a range is going to be given that covers all scenarios, then one does not have to say that this covers all scenarios--just say the projected change is x to y% or something. Only if there is a significant and real difference between results of different scenarios should scenarios be mentioned--and in this case one should basically say, for example, something like a result ranges from about 5-10% for the lowest emissions scenarios to 25-40% for the highest--that is, there must be a real and inspiring difference. In that virtually all scenarios give the same results out to nearly mid-century, impacts prior to that time really do not need to indicate what scenario the result is from. (Michael MacCracken, Climate Institute)	Scenario names are provided now when specific scenarios are used, otherwise a range is assumed.
E-SPM-3	A	0				There were a number of places where "or" was used in a list of examples, when all of the list will occur or is likely--should be using "and" (Michael MacCracken, Climate Institute)	Now rectified in FGD SPM
E-SPM-4	A	0				There is very little reference in the SPM about time scales and rates of change. It is often left to the interpretation of the reader whether we are talking about impacts by 2100, or longer term, or nearer term. In many cases, the rate of change is likely to matter at least as much as the absolute change, but this seems to have been lost in many occasions. It was an important message in the TAR, and I'm not aware of the literature having backed away from it. It would also be helpful to have more systematic attention paid in the underlying chapters to the influence of rates of change, so that the TS and SPM can summarise and refer to this important issue in its own right. (Andy Reisinger, IPCC SYR TSU)	Time scales and the magnitude of temperature changes are indicated in Tables 1 and 2. Further information can be found in the underlying chapters
E-	A	0				There is no discussion of uncertainty in the body of the SPM, even though the SPM	Uncertainty language used extensively and

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-5						Appendix discusses the terms used to quantify uncertainty. The levels of uncertainty associated with many of the statements made in the SPM are given in the Technical Summary. They should be repeated in the SPM, since this is the most widely read and widely quoted part of any IPCC report. (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	consistently in FGD SPM
E-SPM-6	A	0				There is inconsistent and sometimes implausible treatment of the timing of the suggested impacts, and often the way sentences are phrased there is an implication that something will happen in a particular year. For example, there are many cases in the SPM and TS where statements are made that say something like: (a) "by 2050" which should be changed to say "by mid-century" or something similar (b) that say "by 2080", when what is meant, I believe, is by the last two decades of the 21st century--so say "by the end of the century", etc. For the fresh reader to all of this, one has to be very careful in giving dates--there are even cases of saying something from a model run that gets very precise--the dates need to be smoothed out. (Michael MacCracken, Climate Institute)	Accepted
E-SPM-7	A	0				There are a number of cases where numbers are given that are too precise--up to 3 significant figures for example. For the SPM, and even the TS, I would urge some rounding. For example, instead of saying "around 29% say "up to about 30%" or instead of saying "increased from 47% to 65%" say "increased from about half to about two-thirds"--quite often in these cases, the precision indicated just does not seem plausible in looking ahead a hundred years or so. Especially for the general reader, try to get away from sounding so precise on numbers, as it will be expected there is some basis for them, when often they are the result of one or a few plausible model results, and no more. (Michael MacCracken, Climate Institute)	Accepted and advice followed
E-SPM-8	A	0				The WG chairs should encourage the authors to give at least the sign of impacts to be expected by limiting as much as possible the use of the word "change" as a verb--as, for example, saying that 'water resources will change'--much preferred would be to say increase or decrease, etc. (Michael MacCracken, Climate Institute)	This has been achieved in the majority of cases
E-SPM-9	A	0				The summary does not address linkages between climate change and El Niño (Silvia Llosa, ISDR System)	Still doesn't
E-SPM-10	A	0				The SPM does a very good job in lifting key messages out of a very broad range of information in the TS and underlying chapters. The only problem is that it sometimes does too good a job: Often the SPM is the only place where the relevant summary information is actually found, and the TS and underlying chapters support	Every effort has been made to ensure the SPM is fully supported by the underlying text in the chapters and the TS

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						<p>some of the most important statements only by implication, but not explicitly. This makes the SPM very vulnerable to challenge. If key findings are contained only in the SPM, it also becomes difficult to lift those statements into the Synthesis Report if we cannot back them up by clear, systematic and direct references to specific sections of WG2 chapters. I have struggled and failed to find explicit support in the TS or executive summaries of underlying chapters for some of the most powerful (even if intuitively correct) statements of the SPM. Examples are the temperature bands of aggregate impacts on page 7 (there is no systematic reference to those temperature bands in the TS or executive summaries of the underlying chapters), most vulnerable regions on page 9 (how was this statement arrived at, if it is not found in the TS?), and impacts under stabilisation scenarios (the information in the underlying chapter is quite weak for such a high level statement in the SPM; the lack of systematic attention of the underlying chapters on impacts relative to temperature bands, GHG concentration levels, or rates of changes, makes this statement somewhat vulnerable). At least the TS would have to fully and explicitly support those key SPM statements. In addition, it would be very helpful if the executive summaries of relevant chapters contained clear and explicit statements for sectors and regions for relevant temperature bands that can then provide a demonstrable line-of-sight from the SPM back to the underlying report. If the underlying chapters don't make those key statements in their executive summaries, one could draw the conclusions that the chapter authors are not confident about making such statements. (Andy Reisinger, IPCC SYR TSU)</p>	
E-SPM-11	A	0				<p>The lexicons of confidence and uncertainty are frequently not used, particularly in the SPM and TS where I have checked. The authors should REQUIRE that the words "may", "could", "should", etc. be replaced by such phrases as "is likely to", "is very likely that", "it is possible that", etc. Use of the former set of words tells the reader nothing at all--the sentences come across as being completely speculative. I have identified these spots in the text in the comments below, often without recommending the identical change as each needs to be evaluated by the authors. (Michael MacCracken, Climate Institute)</p>	Accepted and advice followed
E-SPM-12	A	0				<p>Perhaps the key issue for policymakers is the interpretation of article 2 of the FCCC. There is some discussion of DAI in ch 19, but none of this discussion explicitly gets into the SPM. Indeed there is a reference to Article 2 on page 7 where it is suggested that only some of the impacts defined in Article 2 are even considered in the report. (Michael Manton, Monash University)</p>	DAI now in SPM

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-13	A	0				In general, substantial editing is needed to smooth the text so it really reads well and so the statements are literally true. There are a number of cases where subjects and verbs simply do not match, etc. (Michael MacCracken, Climate Institute)	Done – every effort has been made to produce a polished document
E-SPM-14	A	0				In general the tone of the summary is overly reassuring. Repeatedly it plays down adverse climate change impacts and, to the point of ridicule, attempts to balance a negative with a positive - however questionable or trivial. This approach undermines the credibility of the whole document. There is clearly a value in assigning standardisation of definition to terms such as degrees of confidence or likelihood. Perhaps there needs also to be a standardisation of significance of impact. This would serve to put in proper context some of the really minor so-called positive benefits which are suggested as accruing from climate change. It might create better balance and restore some credibility to the document. (James Curran, Scottish Environment Protection Agency)	Every effort has been made to ensure the SPM is as balanced as possible
E-SPM-15	A	0				In addition, it is necessary to inform about why the climatic changes and who or which are the agents that promote these changes. (Juan F. Gallardo Lancho, CSIC)	Not sure what this means. WG1 covers the science of climate change
E-SPM-16	A	0				I think the phrase "human systems" will be quite confusing to many lay readers (e.g., does it mean the human circulation system?). I would urge replacement of it by saying "societal systems" or "economic and resource systems" or something similar. (Michael MacCracken, Climate Institute)	Human systems are now mentioned together with managed systems so the meaning is now quite clear
E-SPM-17	A	1	1	1	1	In general, I think the language is too complicated and some of the messages confusing in the SPM, even though it is the most important chapter. By putting in the minor aspects of climate change impacts (like ion concentrations in lakes) downplays the real climate impacts that affects policy-makers like water availability, extreme events, coastal erosion etc. Please refine to the most important issues to have more impact. (Ben McNeil, University of New South Wales)	Accepted and advice followed
E-SPM-18	A	1		19		Our comments on the SPM also pertain, for the most part, to the corresponding sections in the Technical Summary and the underlying chapters. We would appreciate if these comments were, therefore, also conveyed to the authors of those parts of the AR4. (Indur Goklany, US Department of the Interior)	Done
E-SPM-19	A	1		19		Following are the references that were noted in our comments but for which citations were not provided, and don't seem to be in the report. Most of them are available at http://members.cox.net/igoklany/ :	OK

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						<p>Goklany, IM. 1998. Saving Habitat and Conserving Biodiversity on a Crowded Planet. BioScience 48 (1998): 941-953.</p> <p>Goklany, IM. 2000. Economic Growth and the State of Humanity. Political Economy Research Center, Policy Study 21. March 2001.</p> <p>Goklany, IM. 2003. Relative Contributions of Global Warming to Various Climate Sensitive Risks, and Their Implications for Adaptation and Mitigation. Energy & Environment 14: 797-822.</p> <p>Goklany, IM. 2005a. A Climate Policy for the Short and Medium Term: Stabilization or Adaptation? Energy & Environment 16: 667-680.</p> <p>Goklany, IM. 2005b. Is Climate Change the 21st Century's Most Urgent Environmental Problem? Lindenwood Economic Policy Lecture, Series 7, Lindenwood University, St. Charles, MO, also forthcoming in Society (Transaction Publications)]</p> <p>Goklany, IM. 2005c. Is a Richer-but-warmer World Better than Poorer-but-cooler Worlds? 25th Annual North American Conference of the US Association for Energy Economics/International Association of Energy Economics, September 21-23, 2005.</p> <p>Goklany, IM. 2006a. Integrated Strategies to Reduce Vulnerability and Advance Adaptation, Mitigation, and Sustainable Development. Mitigation and Adaptation Response Strategies for Global Change, forthcoming.</p> <p>Goklany, IM. 2006b. Death and Death Rates Due to Extreme Weather Events: Global and U.S. Trends, 1900-2004, Climate Change and Disaster Losses Workshop, 25-26 May 2006, Hohenkammer, Germany.</p> <p>Levy, P.E., et al. (2004). Modelling the impact of future changes in climate, CO2 concentration and land use on natural ecosystems and the terrestrial carbon sink. Global Environmental Change 14 (1): 21-30 (Indur Goklany, US Department of the Interior)</p>	
E-SPM-	A	3	1	22	30	"a general comment to the SPM: the vulnerability of alpine ecosystems and the high risk for species extinctions in mountain or alpine environments is not	Mountain ecosystems are highlighted as being particularly vulnerable p15 line 5

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
20						mentioned in the SPM (with the exception of Box SPM-2 under Australia and New Zealand)! This seems to be inconsistent with chapters 1, 4, 9, 10, 11, 12, 14 and the TS, where this is much emphasized!" (Harald Pauli, University of Vienna)	
E-SPM-21	A	3	3	3	7	To avoid the types of controversy that have arisen in the past, I would urge that a sentence be added indicating that the presentation of the findings in the SPM is fully consistent with the science while being phrased and expressed in a manner consistent with the relative likelihood or risk approaches most often used by and familiar to decision makers and policy makers and doing so using the lexicon that has been agreed upon. Indicate that this translation from the hypothesis-testing tradition of science has been carried out through a dialogue between the lead authors and the representatives of the IPCC's member governments that is focused on expressing the significance of the science for decision makers [just as VP Gore's film "An Inconvenient Truth" is a translation of the significance of the science by a policymaker who has been in close contact and conversation with scientists, and is not, per se, a science lesson for scientists]. (Michael MacCracken, Climate Institute)	Lexicon used
E-SPM-22	A	3	6	3	6	To add "Report" after "Assessment" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Not done. It is the Assessment not the Report being mentioned.
E-SPM-23	A	3	20			Before launching into the meat of the SPM, we believe the SPM should define key terms that a reader will encounter. This is critical so that the reader knows what a key term refers to rather than assumes or guesses what the term might encompass. Specifically, Section A1.1 of the appendix should be moved to this point. (Indur Goklany, US Department of the Interior)	The definition of key terms remains at the back of the document as this is reference material.
E-SPM-24	A	3	21	5	48	In the text related to observed impacts, no mention of my proposal regarding the space organization of impacts in the areas of the extra-tropical zones and mountains. (Annick Douguédroit, University de Provence)	Much more emphasis on mountain and extra-tropical regions in FGD SPM
E-SPM-25	A	3	21			Section B. This section includes many changes as "impacts" which are also considered as "changes in the physical climate system (atmosphere, ocean, cryosphere)" by WG1. This does not mean that the WG2 SPM should not refer to them again, but perhaps it would be useful to place more emphasis on impacts resulting from those changes rather than those changes themselves. (Andy Reisinger, IPCC SYR TSU)	Done – emphasis has been placed on impacts and not on WG1 material
E-SPM-	A	3	21			Section B. This is a very important section. I have three overall comments aimed at improving the clarity and defensibility of its findings. Firstly, the current draft tends	Done. Method of attributing (although this phrase is no longer used) is fully described in

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter- Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
26						<p>to blur the distinction attribution of observed effects to temperature changes per se and to temperature changes that are due to GHG emissions. It might be better to restructure this section to maintain this important distinction, e.g. by first describing all the effects that are attributed to temperature change per se, followed by a separate sub-section that describes the method for attributing changes to GHG emissions and listing the effects that can on that basis be attributed to GHG emissions. Secondly, the method for attribution used in the underlying chapter is significantly different from the method used by WG1 (not just in the AR4 but also in previous assessments). This does not invalidate the methodology employed here, but raises a question about suitable wording. As I see it, the chapter 1 methodology does not generally demonstrate that there is no alternative physically plausible explanation for the observed changes, because the studies used in this assessment don't check systematically for the role of regional climate patterns and decadal climate variability. Many more model runs, statistical and physical tests would be required to establish this, especially to assess specific modes of oscillation and unforced variability at the relevant local scales. In addition, the methodology does not quantify the amount of variability that is explained by GHG forcing in the model runs, it simply shows that agreement with observations is better with than without forcing in those model runs. Therefore, instead of referring to regional temperature changes as "attributed", it might be better to say that they are "consistent with the signal expected under global warming, and that they are not readily explicable through natural variability as simulated by GCMs". It would help consistency between reports if the word "attribution" were used only where a quantitative assessment is used as the basis for statements that can provide information on the amount of variability that is explained, including by unforced variability (as WG1 has done for changes in the physical climate system). My third overarching comment is that the language is sometimes ambiguous and open to mis (=over) interpretation. For example, stating that something has been attributed to GHG could be read to imply that GHGs are the dominant, if not sole, cause for the observed change. However, there is no evidence or analysis that would demonstrate that GHGs are the sole causes of any the observed effects. It would therefore improve robustness of these findings if suitable qualifiers were inserted in all major statements, along the lines of "GHGs are likely to have contributed to", or "part of the observed changes can be attributed to", "there is a discernible human influence on...". The unqualified attribution statements in the current draft are very open to scientific challenge.</p> <p>(Andy Reisinger, IPCC SYR TSU)</p>	Section B

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-27	A	3	23	3	26	There are quite a number of problems with the phrasing here: (a) it is not at all clear what "regional" means, as compared to "sub-continental", especially as IPCC really defines regions as continents. (b) The phrase "may" or "may not" is quite confusing--for everything is affected--the question is by how much and if the change matters, etc.--and use of "may" really violates the lexicon; (c) I would suggest the following phrasing: "All inhabited continents and all oceans are experiencing increases in surface temperature, primarily as a result of the ongoing emission of greenhouse gases. This section summarizes current knowledge about the extent that these changes in climate have affected the physical, biological, and chemical environments and societal systems." (Michael MacCracken, Climate Institute)	Text removed
E-SPM-28	A	3	23	3	25	The current wording of the WG1 SPM is that an anthropogenic warming signal has "likely been detected in all inhabited continents". By contrast, the WG2 SPM states that the temperature changes are "the result of" GHG emissions. The latter would suggest that they are entirely due to GHG emissions - which is a lot stronger than "detecting an influence" and has insufficient support in WG1 chapter 9. Chapter 1 also does not support such a strong statement, given that chapter 1 does not quantify the amount of variability that can be explained by GHG emissions. The current SOD WG1 draft also puts a strong caveat on attribution at smaller scales and emphasises the role of climate variability linked to internal climate processes; this is an important message that should not get lost. It might be better if the SPM of WG2 referred to the SPM of WG1 for high-level statements and not the underlying chapters, since this risks introducing inconsistencies by allowing readers to pick and choose their own phrase out of those chapters. Given the policy importance of attributing impacts to GHG emissions, it might be best to directly quote the entire relevant WG1 SPM paragraph as introduction to the WG2 SPM section as far as formal and quantified attribution is concerned. An additional sentence could explain that there are additional findings where observed effects are consistent with a global warming signal, and not readily explained by unforced model runs, but where a formal and quantified attribution has not been made. (Andy Reisinger, IPCC SYR TSU)	Statement altered and justification for anthropogenic influence on many physical and biological systems provided
E-SPM-29	A	3	24	3	24	To add "increase in" before "greenhouse gas" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Text removed
E-SPM-30	A	3	24		32	It states in line 24 that increases in surface temperature "are likely" to be the result of GHG emissions, and yet in line 32 it states that "many of the changes are now attributed to temperature increases caused by anthropogenic GHG emissions". This	Text clarified

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						seems like a discrepancy in degrees of certainty. The reader is left confused whether it is "likely" or actually attributed. (James Curran, Scottish Environment Protection Agency)	
E-SPM-31	A	3	24			Insert "partly" between "be" and "the". WE believe this is more accurate, since apportion of the warming is due to changes in land use not necessarily related to greenhouse gas emissions (e.g., they could be due to changes in albedo or changes that could modify evapotranspiration), changes in solar radiation, etc. (Indur Goklany, US Department of the Interior)	Text removed
E-SPM-32	A	3	28	3	33	There should be statement here noting that: A. Not all effects are necessarily detrimental. B. Some areas have experienced a cooling. (Indur Goklany, US Department of the Interior)	Section C contains examples of positive impacts of climate change The new Fig SPM-1 does show regions where cooling has been observed and earlier spring planting dates is included as a positive effect page 3.
E-SPM-33	A	3	29	3	29	To be more understandable, I recommend changing "human systems" to "societal systems" or "economic and social systems". At the very least, the phrase "human systems" needs to be defined for the reader. (Michael MacCracken, Climate Institute)	Human systems are now mentioned together with managed systems so the meaning is now quite clear
E-SPM-34	A	3	30	3	30	To agree with the lexicon and so as not to actually have to prove this claim, change "Over 99%" to "Virtually all" (Michael MacCracken, Climate Institute)	Text removed
E-SPM-35	A	3	30	3	31	This text states that over 99% of the observed changes in systems and sectors are consistent with regional temperature trends. Table TS-1 (Pg TS-9) shows that 42 out of 873 studies are not consistent with warming. Does this mean that those studies are for systems or sectors that experienced cooling, or is the >99% figure incorrect? Also, Table 1-12 (Chapter 1, Pg. 69-70), which seems to be the source for the SPM and TS statements, gives different numbers from those quoted in the TS. (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	Text removed
E-SPM-36	A	3	30	3	31	This sentence, whose meaning is not entirely clear, nevertheless strikes me as excessively strong. On the face of it, it seems to imply that regional temperature drives everything. Is there no other significant control for 99% of the considered processes? (Christopher Milly, U.S. Geological Survey)	Text removed
E-SPM-37	A	3	30	3	30	Please make footnote for examples of "non-climatic drivers" for quick and easy understanding for policy makers. (Susumu Nakamaru, Sun Management Institute)	Text removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-38	A	3	30	3	30	It is not clear where the figure of 99% comes from. To be true to the SPM as being a summary, the figure should be contained in the TS and the underlying chapter 1, with a clear derivation there of how the figure was calculated. (Andy Reisinger, IPCC SYR TSU)	Text removed. More detail is given on page 3 lines 20-22.
E-SPM-39	A	3	30			The sentence “Over 99% of observed changes ...” seems too affirmative and is not coincident with the data in Tab.TS-1. It may be modified as wording in Fig.SPM-1 “In most location observed changes in systems and sectors are consistent with regional temperature trends” (Chunzhen Liu, Water Resources Information Center of MWR)	Text removed. More detail is given on page 3 lines 20-22.
E-SPM-40	A	3	31	3	36	Since attribution thus far is a statistical statement, e.g. a judgement of likelihood of cause, it is not appropriate to state that something is or is not “attributed” or “caused” by emissions unless what is meant by this judgement is explained. Is something attributed if it is judged likely? Suggest that these statements on attribution be clarified by either using other terms or by stating the likelihoods associated with the terms. (Haroon Kheshgi, ExxonMobil Research and Engineering Company)	Attribution is no longer used in WG2 but where discernible effects are seen and discusses, likelihood and confidence levels are applied
E-SPM-41	A	3	32	3	33	Strike “caused by anthropogenic greenhouse gas emissions”. Yes, changes are, in general, consistent with temperature increases but that does not mean that they are all necessarily due to greenhouse gas emissions. (Indur Goklany, US Department of the Interior)	Text removed
E-SPM-42	A	3	32	3	32	Change "are now" to "can now be" (Michael MacCracken, Climate Institute)	Text removed
E-SPM-43	A	3	33	22		Some impacts have occurred non-linearly as examples: 1)Forest diebacks after prolonged droughts, insect infestations and fire; 2)Coral reef declines from warming-induced bleaching and diseases (Paul Epstein, Harvard Medical School)	Not sure what the reviewer wants here
E-SPM-44	A	3	33			Some of the observed ecological changes have occurred in a non-linear manner in response to such combined disturbances as prolonged drought, insect infestations, and forest fires (e.g., US Southwest with bark beetle infestations). (Paul Epstein, Harvard Medical School)	Not sure what the reviewer wants here
E-SPM-45	A	3	35	3	38	There should be a note that the length of the record is not sufficiently long to judge whether these changes are outside of the bounds of natural variability. (Indur Goklany, US Department of the Interior)	Issue of natural variability discussed page 3 line 30-33. Many series are longer, but WG1 were consulted and are happy with this record length for assessment of changes.
E-SPM-	A	3	35	3	36	The first sentence says that "Observed responses..." have been attributed. This would mean that ALL observed responses have been attributed - which is clearly	Done – section has been rewritten

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
46						incorrect. Please choose an appropriate qualifying word or phrase, such as "Several large scale observed responses and statistical changes ..." (Andy Reisinger, IPCC SYR TSU)	
E-SPM-47	A	3	35	3	35	It would really help in understanding what is being said if the phrase "multiple systems and sectors" were followed by a parenthetical indication of a few examples, for example "(e.g., in the cryosphere, in coastal regions, etc.)" (Michael MacCracken, Climate Institute)	Phrase removed
E-SPM-48	A	3	36	3	37	The sentence states that Figure SPM-1 shows the "pattern of attributed regional temperature change", whereas the caption for Figure SPM-1 only states that it shows "significant temperature trends". This is an important difference - please change text here to make it consistent with what the figure actually shows. (Andy Reisinger, IPCC SYR TSU)	Done – figure 1 caption has been modified
E-SPM-49	A	3	37	3	37	The phrase "attributed regional temperature change" is really not very clear. As a start, "regional" in this case (Figure SPM-1) seems to have a high degree of spatial resolution, with temperatures not being averaged over a continental sized area (the scale the WG generally uses to define a region). Second, it is not at all clear how that portion of the observed changes that are "attributed" compares to the pattern of "observed" changes--the caption seems to indicate that the figure shows the regional pattern of observed change. I would urge replacing "attributed regional" by "observed". (Michael MacCracken, Climate Institute)	Phrase removed Figure 1 modified and clarified
E-SPM-50	A	3	37	3	37	"spatial pattern of attributed regional temperature change" is an ambiguous phrase. Implication that the spatial distribution has been attributed is surely incorrect. I cannot guess what was meant here. (Christopher Milly, U.S. Geological Survey)	Phrase removed
E-SPM-51	A	3	40	3	42	This sentence leaves it open whether the changes are due to GHG emissions, or simply due to regional/local warming trends. In most instances, global warming caused by GHG emissions may have contributed to changes, but is certainly not the only driver for the observed changes. It would be helpful if the wording made it clear (a) whether the attribution is intended to go only as far as local temperature change or all the way to GHG forcing, and (b) differentiate the attribution for individual effects. Eg the collapse of ice shelves, as a general statement, cannot be attributed to GHG forcing because at least for the Antarctic Peninsula we know that ozone depletion and related circulation changes significantly contributed to the warming, it cannot be attributed to GHGs. Neither is it clear that the retreat of parts of the Antarctic ice sheet can be attributed, given that Antarctica is projected to grow over the 21st century; we don't sufficiently understand the source of the	The example of the ice shelves has been removed. The first section in B discusses system impacts due to regional climate changes and the second section looks at the influence of anthropogenic warming on physical and biological systems at the global scale.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						current dynamic imbalance of the WAIS. (Andy Reisinger, IPCC SYR TSU)	
E-SPM-52	A	3	40	3	40	It should be noted that the while these events have occurred the extent of the Antarctic sea-ice is the same since 1978. (James Bero, BASF)	Snow and ice melt, and text relating to Antarctic sea-ice have been removed
E-SPM-53	A	3	40	3	42	I think it would be easier to understand if the parenthetical phrase read "including loss of Arctic sea ice, retreat of snow cover and mountain glaciers, thawing of permafrost, collapse of ice shelves, and thinning of parts of the Greenland and Antarctic ice sheets" (Michael MacCracken, Climate Institute)	Text removed
E-SPM-54	A	3	40	4	7	It seems to me, that in communicating with decision makers it might be much more effective to be communicating what real people are experiencing as the most important effect. And the main changes are thus temperature increase, sea level rise, and increases in the intensities of precipitation and drought--so focus on what actually affects the most people and then explain why changes are occurring. If one keeps the present order, at least start out by saying that "The main change in the Earth's physical systems that are being experienced today are a result of changes in snow and ice, including loss of Arctic sea ice, retreat of snow cover and mountain glaciers, thawing of permafrost, collapse of ice shelves, and thinning of parts of the Greenland and Antarctic ice sheets." (Michael MacCracken, Climate Institute)	Accepted, impacts related to temperature, SLR, precip changes have been emphasised in the SPM
E-SPM-55	A	3	42	3	42	Change "this" to "these changes"--having line 40 be singular (i.e., main change) is a bit confusing. (Michael MacCracken, Climate Institute)	Text removed
E-SPM-56	A	4	1	4	14	For most the of the impacts listed here, one may be able to make a statement on attribution to GHG emissions for the total set of changes on a statistical basis. However, the wording should take care to not leave room for the potential misinterpretation that each individual impact out of each of those areas listed is necessarily also attributable to GHG emissions. For example, the global average retreat of glaciers can be attributed to GHG emissions, but the retreat of any given glacier cannot. The SPM could usefully include a statement along those lines, perhaps as a footnote as early as page 3. (Andy Reisinger, IPCC SYR TSU)	OK
E-SPM-57	A	4	2	4	3	Replace "disruption of local water resources in some areas" with "changes in local water resources". Alternatively, replace it with "negative impacts in local water resources in some areas and positive impacts in others". (Indur Goklany, US Department of the Interior)	Text removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-58	A	4	6	4	6	Add "adverse" before "changes" in the sentence. Most of the changes being observed are adverse (William Hare, Potsdam Institute for Climate Impact Research (PIK))	But not all are adverse
E-SPM-59	A	4	9	4	14	The first bullet relies (apparently) mainly on two studies, both with serious shortcomings. A more appropriate (and actually stronger) statement for this summary would be based on work by Milly et al. (2005, Nature, Global pattern of trends...). It is suggested that the authors of WGII read this paper and consider its relevance for the entire WGII report. An appropriate statement here would be something like "The global pattern of 20th-century trends in runoff, streamflow, and water availability has been attributed to external forcing of the climate system." Indeed, this might appear in place of lines 9-10 rather than as a bullet, because the general statement of lines 9-10 is a weaker statement than this. (Christopher Milly, U.S. Geological Survey)	Text has been modified and Milly paper assessed in the Report
E-SPM-60	A	4	9	4	14	The apparent references to Peterson et al. and Gedney et al. in this summary statement seems disproportionate. The first study simply did not show that the trend was anything different than natural variability, and a quick look at model outputs shows that natural variability alone could have produced their results. Rigorous detection and attribution of runoff change simply requires a larger data set. The Gedney et al. result is based on a questionable runoff reconstruction and has conclusions that fly in the face of much of the literature on the subject, which is not surprising, as it ignores the physical feedback of boundary-layer drying and heating and the biological feedback of increased plant growth. Are these the only available, relevant, significant references on the subject since TAR? (Christopher Milly, U.S. Geological Survey)	Text modified
E-SPM-61	A	4	9	4	9	'intensified hydrological cycle' WGI attracted some criticism of its use of this term. It can mean many different things to different people. WGI is considering how to deal with these comments, but one simple option is to be specific about what is meant. In this sentence, you could simply say "There is more evidence that runoff and streamflow are changing in some regions" (Richard Wood, Hadley Centre)	This phrase has been removed
E-SPM-62	A	4	9	4	9	"intensified hydrological cycle" - What does this mean? The language seems to be too technical for SPM (similar terminology also used in Box SPM-1) (Sharon Smith, Natural Resources Canada)	Text clarified
E-SPM-63	A	4	10	4	10	Add "increase in" before "streamflow" as this describes the direction of most of the observed changes (William Hare, Potsdam Institute for Climate Impact Research (PIK))	'enhanced' added
E-	A	4	11	4	11	I would suggest that it is worth mentioning that the amount of water vapor in the	Water vapour not referred to specifically

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-64						atmosphere is rising, indicating that this has the effect of keeping the relative humidity about constant and so substantially increases the heat (or discomfort) index experienced by those enduring heat waves. (Michael MacCracken, Climate Institute)	
E-SPM-65	A	4	12			Footnote no. 6: this is not very relevant to the ordinary user. (Ulf Molau, Göteborg University)	Removed
E-SPM-66	A	4	13	4	14	The phrasing here needs a bit of work--it makes one ask how drought can increase in drier regions--sort of like saying the Sahara desert is experiencing increased drought. Perhaps say that it is regions that already become seasonally dry that are being most affected, lengthening their period of dryness, etc. (Michael MacCracken, Climate Institute)	Text removed
E-SPM-67	A	4	13	4	13	The bulleted sentence in this line begins "Drought is increasing [...]". This wording is a bit vague. Is drought increasing in magnitude? Frequency? Magnitude and frequency? I would suggest modifying the sentence to make it clear to the reader how drought is increasing (as described in Chapter 3.3 of the WG1 text). (Sarah Shafer, U.S. Geological Survey)	Text removed
E-SPM-68	A	4	13	4	13	Add the following after "increasing": "in some areas but not in others" (Indur Goklany, US Department of the Interior)	Text removed
E-SPM-69	A	4	16	4	47	Fig. SPM-1: Temperature trends from 1973 to 2002 (and 20 years) are not of sufficient length to tell us whether changes are within the range of natural variability. We would recommend using a much longer period of record, and noting where there is insufficient data to estimate a trend. (Indur Goklany, US Department of the Interior)	Discussion on natural variability on p3
E-SPM-70	A	4	17	4	47	It is unclear what is meant by "statistically significant". Suggest that the meaning be added in a footnote, and that the section with the statistical test be referenced. (Haroon Khesghi, ExxonMobil Research and Engineering Company)	'statistically' removed
E-SPM-71	A	4	22	4	22	Fig SPM-1: While the global mean surface temperature has increased $0.6 \pm 0.2^{\circ}\text{C}$ since 1990, parts the Southern Hemisphere and Antarctica have not warmed in recent decades (James Bero, BASF)	This is shown by the colour coding of temperature
E-SPM-72	A	4	36		36	Temperature trend should be temperature change. (James Curran, Scottish Environment Protection Agency)	Agreed and implemented
E-	A	4	42	4	47	It would be useful if the figure caption stated what is meant by "significant" - ie 1	Significant warming and cooling is defined in

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-73						or 2 sigma standard error of statistical linear trend being less than the trend value? It is important that this figures does not leave room for the inference by readers that "significant" somehow automatically equals "attributable to GHG emissions" (which it does not intend to). (Andy Reisinger, IPCC SYR TSU)	Box SPM-1
E-SPM-74	A	4	42	4	44	I don't think this is very clearly stated. First, these are temperature changes over a period of time and not temperature trends, unless you want to say degrees per three decades--and that is really not a trend for a trend really requires multiple data points, etc.. To express the chart as a trend, perhaps adjust the scale and show change per decade since 1973 or something. Second, rather than say "observed changes in cryosphere, ..." it would greatly help to say "a combination of indicators of changes in major systems and sectors (including cryosphere, ...)" etc.--the chart does not show changes in the cryosphere, for example--looking at the map, there are few places where there are boxes over the cryosphere. (Michael MacCracken, Climate Institute)	Trends → changes Done Caption modified
E-SPM-75	A	4	42			Fig SPM 1 has nice colors but it is much too difficult to read for Policy makers. (Annick Douguédroit, University de Provence)	Figure has been modified and simplified
E-SPM-76	A	5	1	5	4	The rate 1.7 mm/yr is an average for the 20th century, so one should not be saying "are"--and since there is one global sea level, one should not be saying "is" either. The current (and best measured) rate is more like 3 mm/yr. Thus, I would suggest changing this sentence to read "Averaged globally, sea level rose by 15-20 cm over the 20th century. Over the last decade, the increase was almost double the rate for the preceding hundred years. The rising level of the sea is now affecting coastal zones by increasing erosion, flooding, and loss of coastal wetlands and mangrove forests. To date, however, these impacts have been overshadowed by even greater impacts caused by increasing human occupation and building in coastal areas." (Michael MacCracken, Climate Institute)	Text removed
E-SPM-77	A	5	1	5	1	Change the SLR rate to 3.1mm/yr over the last decade and refer to the increase from 1.7mm/yr which is the average of the last 50 years. (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Text removed
E-SPM-78	A	5	1			A context needs to be provided for the rate of change in sea level. Accordingly, an estimate should be provided for the average rate of SLR during the last century. (Indur Goklany, US Department of the Interior)	Text removed
E-SPM-79	A	5	6	5	10	This section is the most important of the working draft since the policy-makers are the ones responsible for climate change mitigation and adaptation responses. Therefore, the most important and crucial aspects of impacts science should only be	Text removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						presented. This paragraph is completely meaningless to a high level policy maker. Why would a policy-maker care about changes to ion concentrations in lakes or indeed the vertical stability of lakes?? These dot points should be deleted as they are irrelevant to policy-makers (Ben McNeil, University of New South Wales)	
E-SPM-80	A	5	6	5	10	There is lack of effect on rivers (Chunzhen Liu, Water Resources Information Center of MWR)	Rivers included
E-SPM-81	A	5	6	5	10	On line 6, change "observed effects" to "effects being observed". On line 8 change "of sea ice and coastal permafrost, and" to "in sea ice and increases in erosion of coastal permafrost, causing". In addition, for lines 7 and 10, it would really help to say why these changes are important and matter. (Michael MacCracken, Climate Institute)	Text removed
E-SPM-82	A	5	6	22		The deep oceans are warming.... (Paul Epstein, Harvard Medical School)	Not sure what's wanted here
E-SPM-83	A	5	12	5	13	Change to read "Marine and freshwater biological systems are responding to rising water temperatures, causing: (Michael MacCracken, Climate Institute)	Done
E-SPM-84	A	5	14	5	14	Change to "increased bleaching" (Michael MacCracken, Climate Institute)	Text removed
E-SPM-85	A	5	14			Should note that in most, if not all cases, so far reefs have recovered because they seem to have some ability to adapt. (Indur Goklany, US Department of the Interior)	Text removed
E-SPM-86	A	5	15		15	It is not an extension of a distribution, which gives an over-reassuring impression. It is a translocation. (James Curran, Scottish Environment Protection Agency)	Text clarified
E-SPM-87	A	5	17	5	17	Use of the word "altered" is not very helpful--it does not indicate sign or magnitude. It would help to give sign of change and significance (Michael MacCracken, Climate Institute)	'altered' removed
E-SPM-88	A	5	18	5	18	To add "of species" after "migration" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Clarified
E-SPM-89	A	5	20	5	23	Is it really true that this effect has really only recently been identified--or that only recently have significant studies been initiated. We had a diagram about this in our US National Assessment published in 2000, so recently is at least that long ago--	Text clarified

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						and I suspect much further as we were quoting other papers. (Michael MacCracken, Climate Institute)	
E-SPM-90	A	5	21	5	22	Suggest that the first phrase be removed. The assertion here is that the answer would be clear if the issues had been "identified" (ocean pH change has been known for a long time; what is lacking is an understanding of the effect on ecosystems) earlier. It may well be that what is the response of marine ecosystems may simply be a hard question. (Haroon Kheshgi, ExxonMobil Research and Engineering Company)	Text removed
E-SPM-91	A	5	22	5	23	The effects are generally thought to be adverse and the sentence needs to be change accordingly. The reference eto 6.4.2.2 appears to in error (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Text removed
E-SPM-92	A	5	25	5	25	Reference to amphibian decline and climate change would be valuable here (Pounds 2006) (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Amphibian decline included in Table SPM-1
E-SPM-93	A	5	25	5	25	Change "occurred" to "been observed" (Michael MacCracken, Climate Institute)	Done
E-SPM-94	A	5	26	5	27	It would really help to give a better indication here--what is generally happening is a poleward or upward expansion of the range and a shrinking of the equatorward and low altitude of ranges--right now the phrasing sounds like a lot of variability--not trends. (Michael MacCracken, Climate Institute)	Done
E-SPM-95	A	5	26	5	27	"Fig. SPM-2b, indicated here, does not illustrate changes in abundance of plants and/or animals, but only changes in plant phenology!" (Harald Pauli, University of Vienna)	Figure removed
E-SPM-96	A	5	28	5	28	I would suggest changing "behaviours" to ""timing of life events and behaviour"--as a lot is happening. (Michael MacCracken, Climate Institute)	Text modified
E-SPM-97	A	5	29	5	29	The bulleted sentence in this line begins "earlier onset of spring events [...]." It may not be clear to a policymaker what "spring events" refers to. Can an example be added to this sentence, such as "earlier onset of spring events (e.g., flowering) [...]"? (Sarah Shafer, U.S. Geological Survey)	Done
E-SPM-98	A	5	29	5	29	Delete "events" as it is spring that is coming earlier--or maybe say phenological spring. (Michael MacCracken, Climate Institute)	It's not the season but the events associated with the season – e.g., leaf unfolding, bird migration, egg-laying.
E-	A	5	31	5	31	Suggest the parenthetical phrase be removed. The 6% result is essentially an	Done

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-99						example result of one study. (Haroon Kheshgi, ExxonMobil Research and Engineering Company)	
E-SPM-100	A	5	31	5	32	Reference needs also to be made to observed warming induced browning of vegetation in the northern high latitudes see eg D'Arrigo, R. D., R. K. Kaufmann, N. Davi, G. C. Jacoby, C. Laskowski, R. B. Myneni, and P. Cherubini (2004). "Thresholds for warming-induced growth decline at elevational tree line in the Yukon Territory, Canada." Global Biogeochemical Cycles 18(3). Lotsch, A., M. A. Friedl, B. T. Anderson, and C. J. Tucker (2005). "Response of terrestrial ecosystems to recent Northern Hemispheric drought." Geophysical Research Letters 32(6). Wilmking, M., and G. P. Juday "Longitudinal variation of radial growth at Alaska's northern treeline--recent changes and possible scenarios for the 21st century." Global and Planetary Change In Press, Corrected Proof. Wilmking, M., G. P. Juday, V. A. Barber, and H. S. J. Zald (2004). "Recent climate warming forces contrasting growth responses of white spruce at treeline in Alaska through temperature thresholds." Global Change Biology 10(10): 1724-1736. (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Text removed
E-SPM-101	A	5	31	5	31	Do policy-makers understand what 'net primary production' is and why it is important? (Ben McNeil, University of New South Wales)	It is a standard term and used here along with greening clarifies it as an indication of vegetation growth
E-SPM-102	A	5	31	5	32	Change to read "...productivity of about 6% over the past 25 years due to the rising atmospheric CO2 concentration" (Michael MacCracken, Climate Institute)	Text removed
E-SPM-103	A	5	34	5	39	Impacts on Arctic settlements, subsidence of buildings and highways due to thawing permafrost is not strongly apparent. The conclusion in SPM is largely based on statements in Ch 1 which is based on a limited number of publications, (some of which are weak references) and also misinterpretation of information presented in some publications. Subsidence due to thawing permafrost is apparent but it is difficult to attribute to climate change as thawing occurs in response to surface disturbance etc. related to construction and operation of infrastructure (further details will be provided in ch. 1 comments). Section 15.5 makes no statements regarding impacts of thawing permafrost and Arctic settlements. Section 15.7 does discuss permafrost thaw and impacts on infrastructure and clearly states that one of the challenges is discerning between the effects of climate change and the localised human induced changes (related to construction and operation of infrastructure etc.) We can't say with certainty that there is abundant evidence that the effects off climate change on infrastructure (related to permafrost thaw) are	Text removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						apparent and already occurring. (Sharon Smith, Natural Resources Canada)	
E-SPM-104	A	5	34	5	34	Again, change "human systems" to "societal systems" or something a bit clearer. (Michael MacCracken, Climate Institute)	Managed and human
E-SPM-105	A	5	34		42	Flooding and drought must be notable examples in this section - but are not mentioned. (James Curran, Scottish Environment Protection Agency)	Evidence of increasing incidence of extremes affecting human welfare/activities is unclear and controversial, and so omitted given space constraints.
E-SPM-106	A	5	36	5	36	Change to read "Changes in higher latitude agriculture, such as the need to plant earlier in response ..." With "such as" do not need "some" (Michael MacCracken, Climate Institute)	Text has been rewritten
E-SPM-107	A	5	38	5	39	Change to read "In Arctic settlements, disruption of indigenous livelihoods and subsidence of buildings and highways due to thawing of permafrost." Again, give indication of type of change--don't just use "changes" (Michael MacCracken, Climate Institute)	Text removed
E-SPM-108	A	5	39	5	40	It's not clear that changes in indigenous livelihood would not have taken place because of increased technological change, trade, and population growth (because people are living longer). This needs to be modified accordingly. (Indur Goklany, US Department of the Interior)	Not done. It's clear here that these are examples where there is some evidence of increased regional temperatures
E-SPM-109	A	5	40	5	41	Change to read "including as a result of changes in the amounts and seasonal pattern of production of pollens that cause" and then say "and in the increased duration" (Michael MacCracken, Climate Institute)	The region is specified where there is evidence of the effect of allergenic pollen on human health. Further detail can be found in the underlying chapters.
E-SPM-110	A	5	42	22		Add - The impacts of climate change, pests and diseases on natural and managed systems (forest, marine, aquaculture) hold the greatest implications for human health, nutrition and well-being, and human social and economic systems. (Paul Epstein, Harvard Medical School)	This was considered but has not been implemented due to length constraints
E-SPM-111	A	5	42			Add the following: "and reduced duration and frequency of deadly cold waves." (Indur Goklany, US Department of the Interior)	Not included here but is present in Table 3
E-SPM-112	A	5	44	5	44	I would like to see an explicit statement of costs relating to worldwide insurance claims or the magnitude of increase since the 1970s. Ie "Worldwide insurance claims from weather-related disasters have risen three-fold since..." (Ben McNeil, University of New South Wales)	Statement on global economic losses has been removed because it is not clear what the contribution of weather and climate extremes is compared to increased exposure due to location of population and wealth etc.
E-	A	5	44	5	44	Change "Global" to "Around the world" to indicate happening in many places--not	Text removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-113						just some sum of ups and downs that leans negatively. (Michael MacCracken, Climate Institute)	
E-SPM-114	A	5	44	5	48	As a result of severe weather the BASF sites in the Gulf Coast region of the United States sustained minor damage and two plants were closed for about three and four weeks, respectively. The impacts included displaced employees and direct property damage, as well as business interruption caused by the loss of loss of power, raw material supply, customers, transportation and other infrastructure damage. As published in our Interim Report Third Quarter 2005 the hurricanes materially affected our fourth quarter results by €120 million. (James Bero, BASF)	Not sure what is wanted here
E-SPM-115	A	5	45	5	46	Just a note to say please ensure consistency with the final approved wording from WG1 SPM regarding cyclone intensity changes, including any relevant qualifiers. (Andy Reisinger, IPCC SYR TSU)	OK
E-SPM-116	A	5	46	5	48	This sentence could be improved as the literature cited in the section (Millar et al 2006) argues that there is a trend that is weakly correlated with global climate after factoring out increases in exposed value. (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Text removed
E-SPM-117	A	5	46			Whether the intensities of cyclones have increased worldwide is still a debated issue. In any case, a 30-35 year long record is hardly long enough to provide a definitive statement. (Indur Goklany, US Department of the Interior)	Text removed
E-SPM-118	A	5	48	5	48	Change "is at present not known" to "cannot now, with confidence, be separated out from total losses." (Michael MacCracken, Climate Institute)	Text removed
E-SPM-119	A	5	48	22		Add - However, the escalating destructiveness of storms in association with deep ocean warming suggests that climate change is contributing to and will play an increasing role in economic loss in a warmer world with more volatile weather. In addition, vulnerability to the impacts of climate change will increase in all nations, as returns and recovery times between extreme weather events shorten. (Paul Epstein, Harvard Medical School)	Text removed
E-SPM-120	A	5	50			Since human life is more important than property loss we believe that there should be a para devoted to human mortality from extreme weather events that would read as follows: "Despite the recent spate of deadly extreme weather events such as the 2003 European heat wave and the hurricanes of 2004 and 2005, data from EM-DAT, the International Disaster Database maintained by the Office of Foreign Disaster Aid and Center for Research on the Epidemiology of Disasters at the Université Catholique de Louvain, Brussels, Belgium, indicates that aggregate	Human mortality and extreme events is covered in Table 3

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						<p>mortality and mortality rates due to extreme weather events are generally lower today than they used to be. Globally, mortality and mortality rates have declined by 95 percent or more since the 1920s. The largest improvements came from declines in mortality due to droughts and floods, which apparently were responsible for 95 percent of all deaths caused by extreme events during the 20th century. For windstorms, which contributed most of the remaining 5 percent of fatalities, mortality rates are also lower today but there are no clear trends for mortality.” Similar information on this had been conveyed by at least one individual reviewer to the writing team in comments on the “first order draft.” It was inappropriate to have not accepted it. [References: Goklany, IM, 2006b, Death and Death Rates Due to Extreme Weather Events: Global and U.S. Trends, 1900-2004, Climate Change and Disaster Losses Workshop, 25-26 May 2006, Hohenkammer, Germany; Goklany, IM, 2005b, Is Climate Change the 21st Century’s Most Urgent Environmental Problem? Lindenwood Economic Policy Lecture, Series 7, Lindenwood University, St. Charles, MO, also forthcoming in Society (Transaction Publications)]</p> <p>(Indur Goklany, US Department of the Interior)</p>	
E-SPM-121	A	6	0			<p>What is the basis for selecting these anecdotes, and not others? In fact, we recommend that figures should be presented for:</p> <p>B. Changes in global net primary productivity.</p> <p>C. Trends in global mortality and mortality rates from extreme weather events. (See Goklany 2005b or 2006b).</p> <p>(Indur Goklany, US Department of the Interior)</p>	Figure removed
E-SPM-122	A	6	0			<p>Figure SPM-2: A health warning is needed for some of these plots, although this level of detail may not be appropriate for the SPM,. As they only relate to 50-80 years we may postulate a trend but some data sets it could equally be a long-term cycle given the general pattern and noise present. For example, there is evidence for this being the case in terms of storm index data for the North Sea. The data show that the level of storm intensity is only now getting back to levels experienced around 1900, where a slow decline in the index between 1900 and 1960 has been followed by a more rapid increase in recent years (Holt, 1991). Studies of estuary morphology have also suggested that there may be longer term cycles (due to variations in tidal range) superimposed on the underlying trend of the response to sea level rise.</p> <p>(Ian Townsend, HR Wallingford)</p>	Figure removed
E-SPM-	A	6	1	6	1	<p>I really find these figures puzzling - you have to ask yourself are the policy-makers going to understand them and what is the message in them. If keeping them, take</p>	Figure removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
123						out all of the scientific nomenclature and explain what they mean to the layman. (Ben McNeil, University of New South Wales)	
E-SPM-124	A	6	1	6	15	"Fig. SPM-2b: this figure does not show changes in abundance as indicated on the previous page: - an additional figure might be added " (Harald Pauli, University of Vienna)	Figure removed
E-SPM-125	A	6	1			Fig SPM 2 does not show any clear increase (Annick Douguédroit, University de Provence)	Figure removed
E-SPM-126	A	6	32	6	32	It would be helpful if the figure caption stated clearly that these observed changes are correlated with local or regional temperature changes, but that the temperature changes at these specific locations have not been formally attributed to GHG emissions. Temperature changes may be consistent with the global warming signal expected under GHG emissions - but this different from a formal attribution. The latter would require proof that regional and local climate patterns over decades cannot explain the observed change at the relevant location and time scale. For small scale features such as a specific glacier or town (like Perth) this is not currently possible. Also, for Perth there are indications that dynamic changes related to ozone depletion may have contributed to the observed changes in weather patterns. This is also anthropogenic, but not a GHG issue. (Andy Reisinger, IPCC SYR TSU)	Figure removed
E-SPM-127	A	6				Fig SPM-2, Panel A; Have changes due to management philosophy and regimes been factored out of this diagram. If this figure is retained, the legend should note that one way or the other. (Indur Goklany, US Department of the Interior)	Figure removed
E-SPM-128	A	7	4	7	5	The statement on these lines lacks context. Currently available impacts assessments are plagued with uncertainties, therefore the ability to make estimates does not mean that much confidence can be placed in them. Among the reasons why these estimates are suspect are, first, most impacts estimates have necessarily got to be made at local or – for water related impacts, watershed – scales. But at these scales results of CC models are suspect. Second, impacts models are themselves riddled with problems. Third, most impacts assessments do a relatively poor job of factoring in adaptive capacity – and changes in this capacity as a function of economic development and secular technological change (see Goklany 2005c, 2006a). Accordingly, change the heading to read as follows: “ Although magnitudes of impacts can now be estimated for a range of potential increases in global mean temperature, such estimates are plagued with uncertainties. ” (Indur Goklany, US Department of the Interior)	Text removed and impacts summarised in Tables 1 and 2 and on p10. Bold statement modified

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-129	A	7	4	7	4	I think it would be clearer if "Magnitudes" were changed to "The Magnitude"--at present, it seems that any given temperature change could have multiple magnitudes of impact. (Michael MacCracken, Climate Institute)	Magnitudes remains as the magnitude of the impact can vary with increasing temperature
E-SPM-130	A	7	7	7	29	The impacts listed in this text, particularly the impacts on agriculture, do not take adaptation into account. Adaptation is discussed on SPM, Pg. 16-18, and information provided on its ability to reduce impacts. This text needs to acknowledge the importance of adaptation and either summarize the information on Pg. 16-18 or cross-reference it. (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	Text removed. Impacts summarised in Tables 1 and 2
E-SPM-131	A	7	7			Insert prior to "For ecosystems..." the following new sentence, which is for the most part lifted from page 6, lines 28 to 30, of the Technical Summary: "The role of non-climate drivers such as technological change, economic development, and regional land use policy is shown in some studies to be more important in determining outcomes than climate change." (Indur Goklany, US Department of the Interior)	Text removed
E-SPM-132	A	7	7			Insert on line 7 after the period (full stop), the following: "However, currently available impacts assessments are plagued with uncertainties, therefore little confidence can be placed in these estimates. Among the reasons why these estimates are suspect are, first, most impacts estimates have necessarily got to be made at local or – for water related impacts, watershed – scales. But at these scales results of CC models are suspect. Second, impacts models are themselves riddled with problems. Third, most impacts assessments do a relatively poor job of factoring in adaptive capacity – and temporal changes in this capacity as a function of economic development and secular technological change." (Indur Goklany, US Department of the Interior)	Text removed
E-SPM-133	A	7	7		26	Confusion is caused by combining ecosystems and food security. For example, there is no entry for ecosystems in the temperature range 3 to 4 degC when the impacts must be substantial. (James Curran, Scottish Environment Protection Agency)	Text removed. Summary of impacts more clearly delineated in Tables 1 and 2
E-SPM-134	A	7	8	7	8	Define the acronym "UNFCCC" as 'United Nations Framework Convention on Climate Change' in parentheses. You don't want to confuse policy makers and general readers with undefined terms. (Knut Nadelhoffer, University of Michigan)	Source is given to underlying chapter where this is explained properly, for those who are unfamiliar with UNFCCC Article 2 (it is the whole phrase which has the potential to confuse). It would take too much space to explain all this in SPM.
E-	A	7	11	7	26	These temperature bands are very useful and important, but at present they lack	Text has been removed and recreated in

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-135						systematic support from either the TS or the underlying chapters. Relevant findings exist of course in the underlying material, but to make the SPM defensible as being a summary (rather than interpretation), it would be extremely useful if the TS paid systematic attention to those same global temperature bands, and if it summarised and reported the impacts reported in chapters relative to those bands. If the underlying chapters don't refer to those bands in their executive summaries, this could be read to imply that the chapter authors aren't confident about associating specific temperature numbers with impacts. This makes it difficult for the SPM to defend these summary findings. The ecosystem chapter is only qualitative in its executive summary, with specific numbers only found in the chapter itself. The FFF chapter is much more supportive in this respect. Uniformity across chapters with regard to impacts relative to global mean temperature change would greatly strengthen the SPM. (Andy Reisinger, IPCC SYR TSU)	Tables 1 and 2 which are fully supported in the TS and underlying chapters.
E-SPM-136	A	7	11	7	12	There is virtually no empirical evidence to support this portion of the statement related to reduced yields at lower latitudes. Today we are about 75% of the way toward a temperature increase of 1o C above pre-industrial levels, yet global agricultural productivity has never been higher, even in developing countries (Goklany 1998, 2000). As a result global hunger is lower today than it was in the 1960s, for example. Much of this improvement is due to human adaptation. We would note these facts in the text, and note that comparing empirical information against model results suggests shortcomings in the latter. (Indur Goklany, US Department of the Interior)	This section of text has been removed and rewritten in the new Section C and Table 1. Temperature changes are now relative to the 1990 baseline
E-SPM-137	A	7	11	7	26	Suggest that confidence in list of conclusions be specified. This is particularly important when conclusions with low confidence are highlighted in a summary. (Haroon Kheshgi, ExxonMobil Research and Engineering Company)	Text removed and recreated in Tables 1 and 2 where each statement has a confidence level
E-SPM-138	A	7	11	7	26	Suggest that confidence in list of conclusions be specified. This is particularly important when conclusions with low confidence are highlighted in a summary. (Haroon Kheshgi, ExxonMobil Research and Engineering Company)	Text removed and recreated in Tables 1 and 2 where each statement has a confidence level
E-SPM-139	A	7	11	7	13	Some coral reefs are projected to experience highly adverse effects in this range. (William Hare, Potsdam Institute for Climate Impact Research (PIK))	This is acknowledged in Table 1
E-SPM-140	A	7	11	7	26	From the policymaker's perspective, it is not very useful to use pre-industrial temperatures as the point of departure. I don't know of any one who is seriously advocating a return to temperature levels that existed during the Little Ice Age. Do we really want to go back to a time when harvests failed regularly in Europe? Re-do this piece, by using current temperatures as the point of departure.	Temperatures relative to 1990 now used

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Indur Goklany, US Department of the Interior)	
E-SPM-141	A	7	14	7	19	<p>With regard to the impacts of CC on ecosystems, we note that:</p> <p>A. "lost from current range" is not the same as "lost forever." This should be noted. Also, it would be useful to provide an estimate of the period of time over which such losses may occur, and to note what might take the place of these species. After all, nature does abhor a vacuum.</p> <p>B. Instead of relying on anecdotes about the tundra and boreal systems, it would be more fruitful to look at how climate change might modulate other threats to biodiversity. Specifically, CC is one of many threats to biodiversity. In fact, habitat conversion, chiefly due to conversion to agricultural uses, is probably a greater threat. How would this threat be affected by climate change? In fact, analyses suggest that these pressures might actually be reduced, at least for several decades. For instance, Levy et al. (2004) estimate that global sink capacity and net biome productivity would increase through 2100 even under a 4.0o C increase <u>over 1990 levels</u> (under A1FI; Levy et al. 2004). They also estimate that under the same scenario, the amount of global cropland would decrease. Each of these diminish pressures on biodiversity.</p> <p>Accordingly the items pertaining to ecosystems should be re-done.</p> <p>(Indur Goklany, US Department of the Interior)</p>	Text removed and recreated in Tables 1 and 2
E-SPM-142	A	7	14	7	14	<p>Regarding the phrase "lost from current range": The key question is, can they migrate to another geographical range. If and where species can migrate, the overall impact is less significant than where loss from a given range equals regional extinction. It would be very useful if this additional information could be extracted from the underlying chapter and added here to make the statement more relevant to decision-makers.</p> <p>(Andy Reisinger, IPCC SYR TSU)</p>	Text removed
E-SPM-143	A	7	14	7	16	<p>Extinctions are projected in this temperature range (see Chapter 4, Hare 2006)</p> <p>(William Hare, Potsdam Institute for Climate Impact Research (PIK))</p>	Text removed and recreated in Table 1
E-SPM-144	A	7	14	7	14	<p>Change "lost from current range; further" to "displaced from their current ranges, with"--"lost" is just not the right word here.</p> <p>(Michael MacCracken, Climate Institute)</p>	Text removed
E-SPM-145	A	7	16			<p>Append to the end of line 16, the following: "unless effective adaptations are undertaken."</p> <p>(Indur Goklany, US Department of the Interior)</p>	The implementation of adaptation strategies is specified in Table 1
E-SPM-	A	7	17	7	17	<p>"is tundra meant here solely as high latitude tundra or does it include alpine ecosystems: after 'Most of tundra' you might add 'including alpine ecosystems' "</p>	Text removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
146						(Harald Pauli, University of Vienna)	
E-SPM-147	A	7	18	7	18	Change "lost" to "displaced"--then add a phrase if the species are really being lost/made extinct. (Michael MacCracken, Climate Institute)	Text removed. Extinction made clear in Table 1
E-SPM-148	A	7	18	7	21	A. We note that global impact assessments undertaken by Parry et al. (1999, 2004) indeed indicate that large numbers will be thrown at risk for hunger because of CC; however, they also indicate that many more millions would be at risk whether or not climate changes. (see Goklany (2003, 2005a). Policy makers are owed this context. Withholding this nugget of information is a sin of omission. Without such information, policy makers would lack necessary information for evaluating response strategies and the trade-offs involved in selecting one approach and not another. One consequence of using Parry et al.'s results to compare population at risk for hunger with and without climate change is that it indicates that measures to reduce vulnerability to current climate sensitive problems that would be exacerbated by CC could have very high benefit-cost ratios. In fact, analyses by Goklany (2005a) using results from Parry et al. (1999) and Arnell et al. (2002) suggests that over the next few decades, vulnerability reduction measures would provide greater benefits, more rapidly, and more surely than would reactive adaptation measures or, for that matter, any mitigation scheme. See also Goklany (2005c). B. These results are based on analyses that do not fully account for increases in adaptive capacity that should occur if economic and technological development unfolds per the assumptions of the SRES (Goklany 2005c, 2006a). This should be noted in the text. (Indur Goklany, US Department of the Interior)	This whole text, from lines 11 to 26, has been deleted. Tables SPM-1 and SPM-2 give greater insights into risks of hunger etc, with full confidence range from negative to positive changes. Adaptation context is given in captions of these tables.
E-SPM-149	A	7	22	7	26	For these ranges, something really does need to be said about impacts on ecosystems. (Michael MacCracken, Climate Institute)	This has been addressed in Table 1
E-SPM-150	A	7	22	7	34	A. We note, once again, that global impact assessments undertaken by Parry et al. (1999, 2004) indeed indicate that many additional millions will be thrown at risk for hunger because of CC; however, they also indicate that many more millions would be at risk whether or not climate changes. (see Goklany (2003, 2005a). Policy makers are owed this context. Withholding this nugget of information is a sin of omission. One consequence of this is that measures that would reduce vulnerability to current climate sensitive problems that would be exacerbated by CC could have very high benefit-cost ratios. In fact, Goklany (2005a) suggests that over the next few decades, such measures would provide greater benefits, more	Duplicate of comment 148

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						rapidly, and more surely than would reactive adaptation measures or any mitigation scheme B. These results are based on analyses that do not fully account for increases in adaptive capacity that should occur if economic and technological development unfolds per the assumptions of the SRES (Goklany 2005c, 2006a). This should be noted in the text. (Indur Goklany, US Department of the Interior)	
E-SPM-151	A	7	22	7	23	"Global decrease in agricultural production potential." Does this mean a decrease from the maximum production potential which will be achieved under slight climate change (2 - 3 degC) or that from the present level of production potential? (Kiyoshi Takahashi, National Institute for Environmental Studies)	Text removed and recreated in Table 1 where the yield potential is related to low and mid/high latitudes
E-SPM-152	A	7	24	7	25	Add at the end of this sentence, the following: "although impacts can be attenuated if effective adaptive measures are undertaken." (Indur Goklany, US Department of the Interior)	Text removed and recreated in Table 1 where adaptation is implied
E-SPM-153	A	7	28	7	28	Change "which might" to "that are likely to"--"might" is not in the lexicon and gives no hint of how important or likely the change is--use the lexicon. (Michael MacCracken, Climate Institute)	Done
E-SPM-154	A	7	29	7	29	Change "livelihood of people or" to "livelihoods of groups of people and"--both happen, "or" is not appropriate here (Michael MacCracken, Climate Institute)	Text removed
E-SPM-155	A	7	31	7	34	Should not this list also indicate a dependence on " the ability to respond or build resilience" ? (Michael MacCracken, Climate Institute)	Text removed and section now on p17 where resilience and adaptation is implied in the term 'more vulnerable'
E-SPM-156	A	7	32	7	36	This statement is not really correct and also does not convey another main message one can draw from the literature. Firstly it is not just the "levels" of development but population and the development pathway which affect the numbers at risk. More importantly, one of the main messages from the literature is that for a given development pathway, in general the risk increases the higher the global mean temperature, This is clear for example from Arnell 2006 in the DEFRA book where he examines the effect of different climate scenarios for given SRES story lines. (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Figure 2 clearly supports the statements being made on p17 of the FGD SPM
E-SPM-157	A	7	32		36	Muddled wording and thinking. The use of "levels of development" does not indicate whether the result is positive or negative, in damage, environmental or cost terms. (James Curran, Scottish Environment Protection Agency)	This has been clarified on p17 of the FGD SPM
E-	A	7	33	7	33	Citation is necessary after "IPCC SRES"	Citations have not been provided in the SPM

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-158						(Antoaneta Yotova, National Institute of Meteorology and Hydrology)	
E-SPM-159	A	7	35	7	35	Insert to read "People and near-coastal infrastructure at risk"--as we have seen in New Orleans, even if one gets people out, what happens to the infrastructure really matters too. So, it must be included in the evaluation of risk. (Michael MacCracken, Climate Institute)	Text removed
E-SPM-160	A	7	36	22		In addition, vulnerability to the impacts of climate change will increase in all nations, as returns and recovery times between extreme weather events shorten. (Paul Epstein, Harvard Medical School)	Not sure what is wanted here
E-SPM-161	A	7	38	8	6	Figure SPM 4 should not be included in the SPM for the following reasons and I suggest shortening and generalizing these points as the specific example given is not ideal for the reasons explained here- First, it is the result of one model only (from Tol 2004 (Tol, R. S. J. 2004 The double trade-off between adaptation and mitigation for sea level rise: an application of FUND, research unit sustainability and global change FNU-48, Hamburg University and Centre for Marine and Atmospheric Science, Hamburg.). Right or wrong it is inappropriate to include the results of one model and in the SPM. Second there is an error in the figure and captions which are taken from Nicholls and Lowe Figure SPM4 labels "upgraded evolving protection" in the original paper as "evolving protection" and is an order of magnitude more than indicated. This is result very heavily qualified in the underlying paper where it says: "Nicholls and Tol (2005) based on a cost-benefit analysis approach suggest that a widespread protection response would be an economically-rational response under the SRES scenarios (a rise of up to 38 cm by the 2080s taken from the HadCM3 model (see discussion in Nicholls (2004)), which broadly agrees with several previous analyses. However, other evidence suggests that there are potential limitations to a protection response, particularly as the magnitude of sea-level rise increases (e.g. Nicholls et al., 2005). Protection only manages flood risk and does not remove it – the final response to occasional inevitable disasters remains uncertain and could trigger coastal abandonment. Mitigation provides a mechanism to minimise the occurrence of this situation in the long-term. Therefore, relying solely on adaptation would appear as problematic as depending on mitigation alone." (William Hare, Potsdam Institute for Climate Impact Research (PIK))	This Figure has been removed
E-SPM-	A	7	39	7	44	There is a bit of confusion here, it seems to me, because the real damage comes not from the slow rise of sea level, but from major storms--on top of sea level rise. It	The point being made here is the importance of the development pathway in determining

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
162						would be useful to make this point. Also, it is not at all clear that the estimates really take into account how much sea level rise could occur with a 4 C warming--it could be at least several meters--and at that point, there is no way one gets such good protection for so little as a number of major coastal cities may need to be abandoned, etc. There is huge investment in coastal infrastructure--and a lot cannot be protected against storms on top of significant sea level rise--and as key infrastructure is abandoned, so will whole cities need to be abandoned. (Michael MacCracken, Climate Institute)	the possible impacts.
E-SPM-163	A	7	39	7	41	First, the difference really only becomes significant, I believe, after mid-century--some time indication should be given here. Second, there are huge risks also in developed areas because there is so much key infrastructure in the vulnerable areas--serving many tens of millions, and not all are poor. Major cities are at risk, etc. (Michael MacCracken, Climate Institute)	Text removed
E-SPM-164	A	7	40			As this text is intended for policy makers it would help to remove the jargon (ie explain what the scenarios are in words) (Ian Townend, HR Wallingford)	Reference is made to Endbox 3 for clarification of the SRES scenarios
E-SPM-165	A	7	43		43	Spending on coastal protection, pro rata with GDP, may not be a sensible course of action - if there is no longer-term prospect of maintaining communities in an area as sea-level continues to rise. Early abandonment would be the wise decision. (James Curran, Scottish Environment Protection Agency)	Text removed
E-SPM-166	A	8	0			Figure SPM-3: As this text is intended for policy makers it would help to remove the jargon (ie explain what the scenarios are in words) As this text is intended for policy makers it would help to remove the jargon (ie explain what the scenarios are in words) (Ian Townend, HR Wallingford)	Reference is made to Endbox 3 for clarification of the SRES scenarios
E-SPM-167	A	8	0			Figure SPM-3. There are some significant inconsistencies with WG1 SOD findings regarding changes in the physical climate system: eg confidence in increases in storms is only moderate; there is currently no projection of a local disintegration of WAIS under warming up to 1 or 2 degrees, and no projection of an unqualified "disintegration" (prettty strong term!) of the WAIS at the century scale even up to 3 degrees warming (A1B scenario); also there is no clear "trigger" for widespread deglaciation of Greenland and hence use of this word is misleading. I'm also not convinced that these statements are consistent with the findings of chapters 15 and 19. Also please note that most readers will assume, based on this figure, that the time scale of impacts is the next 300 years, not millennia, which is where disintegration of WAIS would become much more likely. (Andy Reisinger, IPCC SYR TSU)	Figure 3 has been removed and recreated as Tables 1 and 2. Consistency with WG1 has been checked

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-168	A	8	0			<p>A. This page should be modified in light of our previous comments.</p> <p>B. For reasons articulated previously, the level of confidence attached to impacts on social and human systems are most likely overstated (see Goklany 2005c, 2006a).</p> <p>C. With respect to the entries related to water stress, we note that Arnell’s (1999) analyses of the global impact of CC on water stress indicates that fewer people might be under stress (if one measures stress by counting the number of people living in areas where annual water availability drops below 1,000 m3), although the number of countries with water-stressed populations might increase. This result is confirmed by Arnell (2004). Moreover, neither study accounts for any adaptations.</p> <p>D. It is disingenuous to report the population “new water stressed” without also noting that as many, if not more, may no longer be water stressed (if Arnell’s analyses are to be trusted).</p> <p>E. In addition to heat waves we would give equal time to cold waves.</p> <p>F. With respect to species, “lost from current range” does not mean that will necessarily be lost. They could migrate (with or without human help). Moreover, in general it seems to us that neither the inertia of species nor their adaptability has been taken into account.</p> <p>G. We note that according to DEFRA studies on the global impacts of CC on hunger and human health which have been done for global mean temperature increases of 3.2o to 4o C above 1990 levels (not pre-industrial levels), the contribution of CC to the global population at risk of these climate sensitive hazards is small compared to the contribution of non-CC related factors (see Goklany 2003, 2005a, 2005c). As noted previously, policy makers are owed this context. Without such information, policy makers would lack necessary information for evaluating response strategies and the trade-offs involved in selecting one approach and not another. One consequence of using Parry et al.’s results to compare population at risk for hunger with and without climate change is that it indicates that measures to reduce vulnerability to current climate sensitive problems that would be exacerbated by CC could have very high benefit-cost ratios. In fact, analyses by Goklany (2005a) using results from Parry et al. (1999) suggests that over the next few decades, vulnerability reduction measures would provide greater benefits, more rapidly, and more surely than would reactive adaptation measures or any mitigation scheme. See also Goklany (2005c).</p> <p>H. The time dimension is notably – and inexplicably – absent from this figure. Since adaptive capacity is a critical factor in determining impacts (more so for human and social systems), and time is an important factor in determining adaptive capacity (because of secular changes in technological prowess and the assumption</p>	<p>A, B. Figure 3 has been removed and recreated as Table 1 and 2, which treats impacts in a more systematic manner with confidence and sourcing provided for all entries. Confidence levels have been checked and are consistent with the underlying chapters.</p> <p>C and D. These water stress numbers represent those becoming newly water stressed and reflect the infrastructure costs associated with meeting the demand where less water is available.</p> <p>E. Cold waves/exposure mentioned in Table 3 and section C under Health</p> <p>F. Text removed</p> <p>G. This context is given explicitly on page 17 lines 8-26 (and now has its own headline statement)</p> <p>H. The time dimension is now included in Tables SPM-1 and SPM-2 which replace Fig SPM-3.</p> <p>I Figure is replaced by Tables SPM-2 and SPM-3 which make clear the assumptions about population (together with endbox 3)</p>

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						that economic development will advance over time), the level of impact depends not only on the global mean temperature but also when that temperature will be reached. I. It's not clear what assumptions are made regarding population growth in this figure. (Indur Goklany, US Department of the Interior)	
E-SPM-169	A	8	1	8	1	Top line of chart: With regard to "Food", somehow the column entries need to be accounting for technological development. I rather suspect that what is given here is the influence of climate change on potential production, not of all influences (including technological development) on production potential. Also, there are more aspects that just production potential to be considering, and listing entries for-in particular what happens to farmers as the crops that can be grown profitably (or at all) change. There will be significant displacement or disruption of farmers, even if the world produces enough food. (Michael MacCracken, Climate Institute)	Figure has been removed and reformed to Table 1
E-SPM-170	A	8	1	8	1	Third column: Top entry--change "may" to "is likely to". In second entry, change flooding to "sea level rise and inundation from storm induced flooding". Add an entrée somewhere indicating that levee construction will be required. Indicate the risk to human health--disease, heat waves, what? In bottom entry, say "Many more at risk from storm-induced coastal flooding" and I do not understand the location of the entry "Flooding by SLR" for less than 1 C--there is not so much SLR at that point. (Michael MacCracken, Climate Institute)	Figure 3 has been removed
E-SPM-171	A	8	1	8	2	The location of the impacts in the box does not seem to correspond to their depiction in the underlying chapters. For example, in Table 19.2 there is consideration of the effects that occur when temperature change is <2C from 1990, while for example the figure implies that most of the world's reefs would be bleached at about 0.8 C above "pre-industrial". Since 1998 was about 0.9C above the late 1800s instrumental average temperature, then this would imply that in 1998 that more than half of the worlds coral reefs were already bleached (chapter 1 does not reach this conclusion)? Given the potential importance of this chart, it should be more transparent what it means and the objective basis for its contents (transparency and traceability). (Haroon Kheshgi, ExxonMobil Research and Engineering Company)	Figure 3 has been removed and replaced with Tables 1 and 2 which are consistent with the Table in Chapter 19 and with the other relevant chapters
E-SPM-172	A	8	1	8	2	The confidence of statements on hunger exceeds the confidence of statements on food production. This does not make sense and does not seem to be the intent of the confidence statements asserted in table 19.2.	Figure 3 has been removed and replaced with Tables 1 and 2 which are consistent with the Table in Chapter 19 and with the other

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Haroon Khesghi, ExxonMobil Research and Engineering Company)	relevant chapters
E-SPM-173	A	8	1	8	2	The categorization of MOC change as a “singular event” has very low confidence. This is a hypothesis based on paleo-analogues that have not been born out in GCM studies (which do not show abrupt anthropogenic change from MOC). Suggest changing the title of the column to geophysical systems as in table 19.2. (Haroon Khesghi, ExxonMobil Research and Engineering Company)	Figure 3 has been removed and replaced with Table 1 which shows a weakening of the MOC
E-SPM-174	A	8	1	8	2	It is interesting that many of the lower confidence conclusions in this figure have to do with agriculture, which is perhaps the most heavily studied topic. Suggest that standards be more carefully applied in both the selection of statements and the judgement of their of confidence. (Haroon Khesghi, ExxonMobil Research and Engineering Company)	Figure 3 has been replaced by Tables 1 and 2 which are consistent with the underlying chapters in terms of content and confidence level.
E-SPM-175	A	8	1	8	2	I have difficulty tracing all of the conclusions in this chart to peer reviewed references. For example, the figure states that at about 1.4C, one quarter of species would be lost from current range. I do not know if this refers to species on land, or if it includes benthic ecosystems with also contain many species, and where temperature change is moderated by cold bottom water? Suggest that each of these conclusions be clearly tied to a discussion paragraph and references in the underlying chapters, including a discussion of confidence. (Haroon Khesghi, ExxonMobil Research and Engineering Company)	Figure 3 has been removed and replaced by Tables 1 and 2, references are supplied for each statement
E-SPM-176	A	8	1	8	1	Fourth column: In top entry, change to say "Frequency of heat waves and extended periods of hot and humid days is much greater; outdoor activities in many locations untenable for weeks to months"--there is not really any viable way to adapt to this--unless wear space suits or stay inside. (Michael MacCracken, Climate Institute)	Figure 3 has been removed and replaced by Tables 1 and 2
E-SPM-177	A	8	1	8	1	First column of table: Why not move the glacier entry to column 4. There needs to be some entries regarding extinction of species other than just the "widespread loss". Is it really true that "all coral reefs will be bleached--what about saying "virtually all"? In the entry about one quarter of species lost, change "lost" to "displaced" unless it is really meant that they go extinct--and I don't think this is the case. (Michael MacCracken, Climate Institute)	Figure 3 has been removed and replaced by Tables 1 and 2. Clarification provided re: corals
E-SPM-178	A	8	1	8	1	Fifth column: I would urge an initial entry for widespread melting of mountain glaciers. (Michael MacCracken, Climate Institute)	Figure 3 has been removed and replaced by Tables 1 and 2. Glaciers are no longer included in Table 1
E-SPM-179	A	8	1		17	This section should address release of CO2 from soils and forests under rising temperatures (ie positive global carbon feedback) (James Curran, Scottish Environment Protection Agency)	The terrestrial biosphere tending towards a net carbon sink is included in the new Table 1

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-180	A	8	6	8	6	Mention needs to be made that adaptation costs real money--way it is phrased, sort of seems as if could do this easily. When forced to adaptation, are diverting societal resources from one category that might be really productive to one that is sort of recovering from damage instead of doing something new. So, indicate adaptation is costly--perhaps say "which can be costly" (Michael MacCracken, Climate Institute)	Caption have been revised
E-SPM-181	A	8	9	8	9	Change to say "global average change in so"--so it is clear that this is not an indication of the local change. Also on line 10 say "global temperature changes" (Michael MacCracken, Climate Institute)	Done in caption of Table 1
E-SPM-182	A	8	12	9	13	Is this really correct--is it emissions or concentrations that are kept constant. I would imagine it should be concentrations. (Michael MacCracken, Climate Institute)	Caption and figure removed
E-SPM-183	A	8				Figure SPM-3. Rght-hand box with text: clarify (graphically) whether the text paragraph locations relate to the general temperature change on the y axis, or are meant to match the five WRE scenarios. (Stephen Sheppard, University of British Columbia)	Figure removed
E-SPM-184	A	8				Fig SPM-3, right hand panel. The whole of this figure needs to be checked for consistency with WGI Ch 10 - particularly the confidence statements in the last two columns (confidence appears to be being used here to assign probabilities to events). It is extremely important to maintain consistency across the WG's on matters like this, otherwise the integrity and reputation of the IPCC process will be compromised. (Richard Wood, Hadley Centre)	Consistency with WG1 has been checked
E-SPM-185	A	8				Fig SPM-3, right hand panel, right hand column. I think it is dangerous (wrong, actually!) to assign confidence (which implies probability) to statements about MOC shutdown at various warming levels. From column 5 I would deduce that at a warming level around 5 degrees above 1990, MOC shutdown would have a probability of 20-50% of occurring. I don't think that could be justified as a robust conclusion from the literature, and it is inconsistent with WGI Ch 10. Sadly it is simply not possible to assign robust probabilities to such an event, at the current stage of the science. I think the only solution is not to assign any confidence statements to such events. I think the next statement down on WAIS disintegration may fall into a similar category. [I think high confidence in weakening of the MOC is OK.] (Richard Wood, Hadley Centre)	Acknowledged and MOC shutdown removed from the new Table 1. The WAIS statement is no longer in Table 1
E-SPM-	A	9	1	9	1	In Figure SPM-4, do these figures consider island nations as well? For a 4 C temperature increase, which will be causing catastrophic loss of ice from the major	Figure 4 has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
186						ice sheets, how can one really protect low lying islands and coastal areas--this figure really looks incorrect, at least as far as the equilibrium types of impacts--and is it not these that should be indicated, and not just what is happening in the 2080s, for a few decades later, the situation will be much worse. Most importantly, why is there no range or uncertainty given here--are these just the results of one modeling group making a number of assumptions? If so, the degree of confidence in these results should be indicated as pretty low. (Michael MacCracken, Climate Institute)	
E-SPM-187	A	9	1		6	Zero is not a point on this graph. We know that zero degree temperature rise cannot possibly happen. The plots must not be traced back through the origin on this graph. In addition, it is assumed in the figure legend that spending on protection increases in line with GDP - but many will argue that global or national GDP will suffer serious decline as a result of climate change. (James Curran, Scottish Environment Protection Agency)	Figure 4 has been removed
E-SPM-188	A	9	3	9	3	It would be my guess that the flooding calculation is based on the amount of sea level rise. This happens slowly, so it seems to me flooding is not the right word-- what should be said is "displaced by sea level rise". Now, I would also venture that this is calculated in a way not taking into account storm surges, nor non-linearities-- so my guess is the numbers are very low. For a 4 C rise, one may be able to protect some urban areas, but they may end up being surrounded by ocean areas. (Michael MacCracken, Climate Institute)	Figure 4 has been removed
E-SPM-189	A	9	4	9	4	Define "SRES". See prior comment for reasoning. (Knut Nadelhoffer, University of Michigan)	Figure 4 has been removed. SRES is fully explained in Endbox 3
E-SPM-190	A	9	5	9	5	For clarity, I would rephrase to say that "spending is assumed to increase at the same rate as GDP". (Michael MacCracken, Climate Institute)	Figure 4 has been removed
E-SPM-191	A	9	5			Insert "on protection" between "spending" and "increases". (Indur Goklany, US Department of the Interior)	Figure 4 has been removed
E-SPM-192	A	9	14	9	15	This should say "reductions in permafrost and seasonal snow cover" as permafrost is really also very important. (Michael MacCracken, Climate Institute)	Text has been rewritten
E-SPM-193	A	9	14	9	15	It's not clear to me why the cryosphere per se is listed as a vulnerable sector here: I would have thought it is the impact on ecosystems and human systems resulting from changes in the cryosphere that matters in this "vulnerability" context? In that case, these resulting impacts should be stated rather than changes in the physical	Text has been rewritten

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						climate system itself. (Andy Reisinger, IPCC SYR TSU)	
E-SPM-194	A	9	14	9	14	I would suggest changing "ice melt" to "retreat of sea ice, glaciers, and ice sheets" as it is not really just the melting of ice that matters--but much more. And this should be more specific. (Michael MacCracken, Climate Institute)	Text has been rewritten
E-SPM-195	A	9	16	9	16	Mention should also be made of the loss of unique ecosystems at high latitudes and altitudes, and also that much of the dieback process will lead to enhanced occurrence of fires. (Michael MacCracken, Climate Institute)	Tundra, boreal forests and mountain ecosystems are now included in rewritten text.
E-SPM-196	A	9	16		16	There may well be population collapses as well as ecosystem shifts. (James Curran, Scottish Environment Protection Agency)	Text has been rewritten
E-SPM-197	A	9	17	9	17	Change to read "by sea level rise and higher storm surges" (Michael MacCracken, Climate Institute)	Text has been rewritten
E-SPM-198	A	9	18	9	18	The statement that water resources will become more scarce for most people does not seem justified by the underlying text. A similar conclusion does not appear in Chapter 3, which stress that beyond 2020 projections of river runoff are highly uncertain. Also, if the statement is true, it ignores the role that other factors play in water availability. These are discussed in the TS, (Pg. TS-13, lines 30-37 and 45-49) and also in chapter 3. A more correct statement would be "Climate change is one of the factors that will lead to increased water scarcity for many people." (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	Text has been rewritten
E-SPM-199	A	9	18	9	18	Mention also needs to be made of the impacts on agriculture, energy generation and industry. (Michael MacCracken, Climate Institute)	Not sure what this comment refers to
E-SPM-200	A	9	18			This statement is suspect for the following reasons: A. We note that Arnell's (1999) analyses of the global impact of CC on water stress indicates that fewer people might be under stress (if one measures stress by counting the number of people living in areas where annual water availability drops below 1,000 m3), although the number of countries with water-sterssed populations might increase. This result is confirmed by Arnell (2004). B. Neither Arnell (1999) or Arnell (2004) account for any adaptations. For extended discussion see Goklany (2003, 2005a, 2005c). (Indur Goklany, US Department of the Interior)	Statement has been clarified
E-	A	9	19	9	21	It needs to be added here that the changes will also be requiring significant and	Adaptive efforts by individuals are mentioned

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-201						disruptive adaptive efforts by farmers. IPCC's focus has traditionally been almost exclusively on the issue of overall food production, but it takes farmers to do this and the changes in climate, as relocations and changes in crops grown occur, will cause significant disruption of the farm community--making education of farmers and having investment capital for them to change crops key means for building resilience and adapting. (Michael MacCracken, Climate Institute)	in Section D.
E-SPM-202	A	9	20			Based on our previous comments on p. 7, we would change "small" to "small-to-moderate". (Indur Goklany, US Department of the Interior)	Text has been rewritten
E-SPM-203	A	9	28	9	29	The other key reason that the polar regions will experience large impacts is because the freezing threshold will be crossed in many cases--and it is actually this that helps to amplify the changes, so it should be mentioned. Also, the polar systems are highly attuned to their present climatic conditions--so changes can be quite disruptive. (Michael MacCracken, Climate Institute)	Text has been rewritten
E-SPM-204	A	9	28	9	35	It would be useful to have these statements and this selection of the most vulnerable regions supported with a more detailed analysis in the TS, including a metric that allows comparison of the vulnerability of Africa against, say, the Indian sub-continent. These are very high-profile statements that need full and explicit support from underlying material in the TS, since this is the first point where different regional assessments can be compared. If it's not explicitly supported in the TS, it is difficult to justify it being in the SPM. (Andy Reisinger, IPCC SYR TSU)	All statements can be directly sourced to the TS and underlying chapters
E-SPM-205	A	9	31	9	31	I think it would help to make the case if "rain-fed" were changed to "monsoon-fed" so that the seasonality of the rainfall was also indicated. (Michael MacCracken, Climate Institute)	Text has been rewritten
E-SPM-206	A	9	33	9	34	Usage of terms ("impact", "exposure" and "vulnerability") does not seem consistent with IPCC's definitions. A suggestion for the revised text: "Small islands are likely to be highly vulnerable due to the combination of high exposure (e.g., sea level rise and storm surge) and low ability to adapt (e.g. lack of infrastructure). (Kiyoshi Takahashi, National Institute for Environmental Studies)	Text has been rewritten to reflect comment
E-SPM-207	A	9	33	9	35	Interestingly, the converse is also true--developed nations have extensive coastal infrastructure and major cities at risk, so they too are really highly vulnerable--so both ends of the scale result in problems. I think it really unfortunate that IPCC keeps so much focus on the developing nations being so much (more) at risk--the developed nations have tremendous built infrastructure along coasts--and relocating	OK

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						cities is going to be very hard and expensive. (Michael MacCracken, Climate Institute)	
E-SPM-208	A	9	34	9	34	the lack of adaptation options could be mentioned, i.e. for some people the only solution will be migration/relocation (Silvia Llosa, ISDR System)	This hasn't been added to the section on Small Islands under Section C as this section focuses on impacts. Adaptation is covered in Section D
E-SPM-209	A	10	1	10	7	Specific mention should be made of key vulnerabilities in developed nations, including, at least, coastal communities and extensive infrastructure, water resources, and ecosystems susceptible to drought and fire. (Michael MacCracken, Climate Institute)	Developed nation vulnerabilities are highlighted in Table 2 and under regions in section C
E-SPM-210	A	10	6	10	6	Rephrase "hot summer of 2003" by "hot summers of 2003 and 2006" (Sabine Wurzler, North Rhine Westphalia State Environment Agency)	Text removed
E-SPM-211	A	10	9	10	14	This list is so incomplete that it seems to me problematic--it is just at too high a level. For example, it does not really mention indigenous peoples/subsistence hunters and gatherers, whose system is changing out from under them; it does not mention those living along coastlines; it does not really specifically raise health related issues; etc.--I think it risks making the impacts seem too limited. (Michael MacCracken, Climate Institute)	This list has been rewritten and simplified
E-SPM-212	A	10	11	10	11	add after 'over-exploitation' 'and impacts of natural hazards' (cross-reference 17.3.1 and 20.3) conflicts are another stress (Silvia Llosa, ISDR System)	Text removed
E-SPM-213	A	10	11			Political side-swipes such as this weaken the case (Ian Townend, HR Wallingford)	Text removed
E-SPM-214	A	11	0			Figure SPM-5: Useful figure. I was surprised at some of the outcomes. In particular the blanket high negative response of marine ecosystems, given that the marine ecosystems has exhibited the greatest resilience to previous cataclysmic episodes. Discussions with the oil and shipping industry suggest that reduced ice cover is likely to be a very positive change for industrial exploitation of Arctic resources and by inference positive for the construction industry. (Ian Townend, HR Wallingford)	Figure 5 has been removed
E-SPM-215	A	11	0			Figure SPM-5: On a more technical note, the authors may wish to consider alternative ways of shading cells that makes them accessible to colour-blind people and resilient under black-and-white printing. (Andy Reisinger, IPCC SYR TSU)	Figure 5 has been removed
E-	A	11	0			Figure SPM-5: It would be useful if this figure were more comprehensively and	Figure 5 has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-216						explicitly supported in the TS and executive summaries of the underlying chapters (and possibly contained itself in the TS). The executive summaries of all relevant underlying regional chapters should aim to make a single explicit statement that justifies the shading for each cell in the SPM (and TS), for the time scale and emissions assumptions chosen. (Andy Reisinger, IPCC SYR TSU)	
E-SPM-217	A	11	0			Figure SPM-5: For balance, it would appear necessary to include systematic positive impacts, such as human health: reduced winter illness, especially if there is a separate entry for heat stress. (Andy Reisinger, IPCC SYR TSU)	Figure 5 has been removed
E-SPM-218	A	11	1	11	1	While I think the diagram gets things roughly right, what bothers me is that each of the regions is so large and diverse that there will be a whole range of impacts within any given region. For North America, water resources will become much more problematic where the snowline rises, etc.--it just seems to me that it needs to be noted that there will be very large ranges within every region. I also wonder how the averaging was done to get this chart--likely very subjectively, and somehow this should be noted by having some indication of confidence level, or maybe saying that these refer to some of the most impacted subregions within each of the regions. (Michael MacCracken, Climate Institute)	Figure 5 has been removed
E-SPM-219	A	11	1	11	1	The set of impacts seem to not have air and water pollution. (Michael MacCracken, Climate Institute)	Figure 5 has been removed
E-SPM-220	A	11	1	11	1	For North America, under transport--there is extensive transportation infrastructure at risk--highways, airports, etc.--protecting and/or relocating is going to become very, very expensive. (Michael MacCracken, Climate Institute)	Figure 5 has been removed
E-SPM-221	A	11	1	11	9	"in the table on this page (Fig. SPM-5): 'Tundra and alpine ecosystems' may be added in a separate line - alpine ecosystems are present on all continents and are highly vulnerable; it seems to be possible to add estimates on climate change impacts (as assigned for the other ecosystem categories) on the basis of the various regional and thematic chapters!" (Harald Pauli, University of Vienna)	Figure 5 has been removed
E-SPM-222	A	11	1			Figure SPM-5: Forest ecosystems in the polar regions are strongly positively impacted? - in my opinion some other factors need to be taken into account - rapid increase of air temperature by 4 °C or more will induce serious instability in ecosystems, there are possible negative impacts of invasive insects and other biological species, including pests and diseases, negative impacts of wildfires	Figure 5 has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter- Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						during summer are very possible. (Milan Lapin, Faculty of Mathematics, Physics and Informatics, Comenius University)	
E-SPM-223	A	11	1			FIGURE SPM5. The impact ratings should be double checked, Some obvious errors include the green box for birds etc and Australia and NZ where the chapter itself and Chapter 4 imply a reddish risk... (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Figure 5 has been removed
E-SPM-224	A	11	5	11	5	To change "assume" to "assuming" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Figure 5 has been removed
E-SPM-225	A	11	5	11	5	To add "Report" after "Assessment" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Figure 5 has been removed
E-SPM-226	A	11	5	11	8	It is worth noting that the global mean temperature change up to 2050 is not very strongly dependent on the choice of (SRES) emissions scenario - see WGI SPM SOD. So, provided the development pathway assumed in making up the figure is broadly consistent with one SRES scenario, and the climate change assumptions used to make up the figure are broadly consistent with that SRES scenario, the figure may be rather robust to choice of SRES scenario is followed - a fact it may be worth noting in the caption. However I think the different scenarios do have differences, e.g. in aerosol loadings, to the extent that the individual sectors are sensitive (e.g. to local aerosol), the robustness may be lost. In any case it would be useful to have some brief assessment of whether the figure is purely illustrative or is likely to be broadly applicable to a range of futures. (Richard Wood, Hadley Centre)	Figure 5 has been removed
E-SPM-227	A	11	5	11	8	Are these assumptions consistent with any of the SRES emissions scenarios? And is the assumed climate change consistent with that scenario? If not, I can see this figure coming in for a lot of criticism. (Richard Wood, Hadley Centre)	Figure 5 has been removed
E-SPM-228	A	11				Fig SPM-5. We are unaware of many studies that have fully accounted for the increases in adaptive capacity that should accompany economic development and secular changes in technological change (see Goklany 2005c, 2006a). What has been assumed as the secular rate of technological change in constructing this figure? How advances in economic development, and social and human capital accounted for? What is meant by "strongly negative" or "weakly negative." These seem to be subjective judgments. Accordingly, we would recommend excising this figure from the SPM.	Figure 5 has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Indur Goklany, US Department of the Interior)	
E-SPM-229	A	12	0			Box SPM-1. It would be helpful to have material in each section ordered according to projections, impacts, adaptation, residual impacts. At the moment, some sections are a bit confusing because they refer to adaptation and then in the next bullet point go back to impacts without adaptation. (Andy Reisinger, IPCC SYR TSU)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C
E-SPM-230	A	12	1	12	1	It is potentially confusing to have solid dots in Figure SPM-3 and then here to use solid dots--do they or do they not mean high confidence? It might actually be appropriate to have the bullet markers indicate the level of confidence. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C and bullet points have been removed
E-SPM-231	A	12	1			A. Substitute “tentative” for “expected” in the heading for the box, and add a head note that notes that these impact estimates are tentative because currently available impacts assessments are plagued with uncertainties, therefore not much confidence can be placed in them. Among the reasons why these estimates are suspect are, first, most impacts estimates have necessarily got to be made at local or – for water related impacts, watershed – scales. But at these scales results of CC models are suspect. Second, impacts models are themselves riddled with problems. Third, most impacts assessments do a relatively poor job of factoring in adaptive capacity – and changes in this capacity as a function of economic development and secular technological change (see Goklany 2005c, 2006a). B. This table fails to provide the wider context in which impacts of CC for specific hazards should be viewed. What is the contribution of CC to populations at risk for hunger, water stress, coastal flooding, and hunger? As noted previously, policy makers are owed this context because without such context, policy makers would be deprived of necessary information for evaluating response strategies and the trade-offs involved in selecting one approach and not another. In fact, analyses by Goklany (2005a) using results of DEFRA sponsored studies for hunger, water stress, coastal flooding, and malaria indicates that over the next few decades, vulnerability reduction measures would provide greater benefits, more rapidly, and more surely than would reactive adaptation measures or any mitigation scheme. See also Goklany (2005c). C. Unless the potential of adaptation is already alluded to within the bullets in this table, these bullets should generally be prefaced with “Unless effective adaptation measures are taken...”, particularly if they apply to human or social systems. This would be apropos for the 2nd,3rd, and 4th bullets listed under Food, Fibre and Forest Products; for most of the bullets in the water, coastal systems, and industry	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						categories; and all the bullets in the health category. (Indur Goklany, US Department of the Interior)	
E-SPM-232	A	12	3	12	20	Should reflect the findings of Milly et al. (2005, Nature, Global pattern of trends...): "The skill of climate models to relate past trends in runoff, streamflow, and water availability to external climate forcing has been demonstrated." (Christopher Milly, U.S. Geological Survey)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-233	A	12	4	12	8	The first and second bullet points are somewhat in contradiction - if you say there are "already" increasing very wet and very dry areas, this to me suggests an implicit projection of similar future precipitation changes. (Otherwise, what meaning has the word "already" in this context, if not to signal the beginning of a trend?) Perhaps the authors could contrast regionally consistent changes and uncertainty at the catchment scale, consistent with the underlying chapter. (Andy Reisinger, IPCC SYR TSU)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-234	A	12	4	12	5	I guess you're talking about an increase in the contrast between dry and wet regions, rather than an intensification of the hydrological cycle, which I'm not clear how it is defined and really matters only over land. (Olivier Boucher, Met Office)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-235	A	12	4	12	5	For general understandability, I would suggest replacing "hydrological cycle" with "cycle of evaporation and precipitation". I would also add a note that heavy precipitation events are likely to become greater and more frequent, as are periods of high evaporation and drought. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten to include last sentence of comment 235
E-SPM-236	A	12	6	12	6	The sentence "Simulation of precipitation change by climate models remains uncertain." needs better expression, i.e. "Precipitation change as simulated by climate models remains uncertain." (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	This is WG1 material and has been removed from the SPM. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-237	A	12	6	12	8	I think saying "uncertain" is a bit too strong--this implies we know nothing at all, which is not the case. There is agreement about snow tending to rain, about intense rain events becoming heavier, and about some of the larger shifts, etc. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-238	A	12	10	12	10	To change "management" to "managed" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten. This statement on adaptation has been removed as Section C focusses on impacts only

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-239	A	12	11	12	11	Change "may" to "is like to"--comply with the lexicon (Michael MacCracken, Climate Institute)	Done
E-SPM-240	A	12	11			(The same also in CH. 1, p. 22, line 40) Reduction of transpiration from plants at increasing CO2 concentration and consequently increase of runoff - this statement need to be explained more in detail. Most of plants will produce more biomass at increasing CO2 concentration and available soil moisture. This is not possible at decreasing transpiration. There are information on the plant stress due to high CO2 concentration, these results must be considered more complex and need further research. On the other hand increased air temperature at no change of relative humidity will cause increase of potential evaporation. I would like to mention only that such simplified statement might be confusing a little. (Milan Lapin, Faculty of Mathematics, Physics and Informatics, Comenius University)	Statement has been removed
E-SPM-241	A	12	13	12	13	Change to read "and in drought risk are very likely to lead.."--again, use the lexicon. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-242	A	12	15	12	16	Suggest change to "Climate change and associated sea level rise are very likely to increase the adverse impacts of saltwater intrusion in coastal areas and on coastal aquifers and groundwater." (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-243	A	12	16	12	16	Something is missing after "relative" ("high"?) (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Relative is correct, however, Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-244	A	12	17	12	18	Suggest change "retreat towards winter" to "occur earlier in the year" (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-245	A	12	19	12	20	It is not clear why this conclusion applies only to islands in the Indian Ocean--that is just one example. I would suggest a change to say: "Sea level rise is expected to significantly reduce the thickness of the freshwater lens on small islands;" Then give an example if appropriate--but the one here is for a quite small SL rise--that may occur by 2030. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. This text has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-246	A	12	23	12	26	I do not think it necessary to mention the scenarios--of true for these two, likely true for all, or write it that way. I would suggest changing this to read: "Terrestrial ecosystems are projected to continue to be a net sink for carbon for the next several decades, but thereafter to become a net source of carbon as warming causes greater release of carbon than the CO2 increase stimulates. The climate moderating influence of the sequestration of C by expansion of taiga is likely to be offset by the effect of warming on tundra, which will likely lead to release of CH4; and ongoing C uptake by tropical forests is likely to decline due to both climate change and socio-economic pressures. (Michael MacCracken, Climate Institute)	Text for this statement has been rewritten. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C.
E-SPM-247	A	12	23	12	41	" 'the vulnerability of and the high risk of species losses in alpine ecosystems' is suggested to be indicated under the paragraph 'Ecosystems' (Harald Pauli, University of Vienna)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten. Alpine ecosystems are not included in the SPM
E-SPM-248	A	12	29	12	29	I would suggest changing "severe impacts" to "sever losses" to be sure the sign of the effect is clear. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-249	A	12	32	12	33	I would suggest changing this to "The numbers and intensity of wildfires are likely to increase globally, causing up to half of the forests and woodlands to be replaced by savanna and grasslands"--if this is indeed what is meant. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-250	A	12	34	12	35	The statement that pH increases are "likely" to impact calcifying and aragonite forming organisms "severely" appears to contradict the statement on page 5 line 21-22, which says that little is known about the implications for ocean or coastal biology. If little is known, a "likely" statement of a severe impact would appear impossible, or at last would have to be qualified with "low confidence". (Andy Reisinger, IPCC SYR TSU)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-251	A	12	34	12	34	I would delete 'previously unrecognized" as this is just not the case--maybe true for IPCC assessments, but was recognized by others for quite some time. I would also change "to impact" to "to severely impact" to give a sense of importance. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten and corals are now included under 'Coastal' and in Table 1
E-SPM-252	A	12	36	12	36	I would change "Massive" to "Extensive" as it is areal extent that is key. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
							C. Text has been removed but is included in Table 1
E-SPM-253	A	12	38	12	38	I would change "move" to "relocate" or "shift" and then say "while the poleward reestablishment of many plant species ..." (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-254	A	12	40	12	40	The numbers 42% and 17% seem much too precise to me--perhaps coming from one study. Also, does one really need to give the scenario for 2050--are not most results the same. So maybe say "The productive Arctic sea ice biome could contract by roughly 40% by mid-century and the Antarctic biome by near 20%." (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-255	A	12	43			For the section 3, the heading of "Food, Fibre and Forest Products (FFF)" should be modified as "Food, Fibre, Forest and Fish Products (FFFF)", because of the item 5 ".", involved the content of fish species... (Futang Wang, Chinese Academy of Meteorological Sciences)	FFF is the Plenary agreed title and has been retained in the FGD. Fish are also food.
E-SPM-256	A	12	45	12	46	I would suggest changing this to read "have a small beneficial influence on crop productivity. In tropical ... are likely to cause decreases in yield for major cereal grains. Avoiding 10-15% of the yield reduction is expected to be possible with short-term adaptation." (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-257	A	12	48	12	50	On line 49, change "were" to "was" (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-258	A	12	50	22		Add - CO2, heat and humidity stimulate growth of weeds, including agricultural weeds. The interactions of extreme weather, pests, diseases and weeds could lead to surprising non-linear changes in agricultural yields. (Rosenzweig C, Iglesias A, Yang XB, Epstein PR, Chivian E. Climate change and extreme weather events: Implications for food production, plant diseases, and pests. Global Change & Human Health 2001; 2: 90-104). (Paul Epstein, Harvard Medical School)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-259	A	12	51	12	53	It is not clear why this point is limited to "Mediterranean" pastures--should that word not be deleted, unless this is referring generally to Mediterranean-type climates? The point as phrased seems to indicate that mortality will be reduced--and this seems incorrect--will not mortality go up? And on line 53, what is meant by "housing"--is this barns? (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-260	A	12	54	12	55	Given that there will be an increase in fires and conversion of lands, will the output of global forest products really go up? At least, will it go up sustainably, or is the stock being reduced to get the amount of products up? Also, change "may" to "is likely to". It should also be noted that such an increase will likely only occur with small rises in temperature--or at least add some indicator of for what situations this applies. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-261	A	12	56	12	58	Should it not be saying that "local extinctions are very likely at the equatorward edges of ranges ..." and then later say "In some cases, overall productivity will increase." (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-262	A	12		12		The last sentence on this page ("Trade flows ... ") needs better expression to be clear (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-263	A	12				Box SPM-1. The introduction or title to this Box should make it clearer that the "main expected impacts" are based on a range of climate change assumptions (ie. more than one SRES scenario) and that these do not include scenarios with explicit climate change policy on mitigation (ie. post-SRES or WRE scenarios); otherwise, the implicaiton to policy-makers could be taken that these changes are inevitable and not contingent on policy. (Stephen Sheppard, University of British Columbia)	Done. Box SPM-1 has been removed but the new replacement text is preceded by an explanation of the assumptions
E-SPM-264	A	13	2	13	7	On line 2, change "human" to "cities and". On line 5, change "temperature" to "temperature and sea level rise" as both are already having influences. On line 6, it might help to say "Significant storm-induced extreme water levels" to indicate what is meant. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-265	A	13	8	22		Add - Droughts have precipitated large diebacks of wetlands via growth of spartina-eating snails (Silliman, Brian R., van de Koppel, Johan, Bertness, Mark D., Stanton, Lee E., Mendelssohn, Irving A. Drought, Snails, and Large-Scale Die-Off of Southern U.S. Salt Marshes Science 2005 310: 1803-1806). (Paul Epstein, Harvard Medical School)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-266	A	13	9	13	9	I suggest changing "human" to "societal"----or no adjective at all as it is not clear there is any other kind. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-	A	13	10	13	12	I think it a serious mistake to not be pointing out how much key infrastructure	Developed nations and the concentration of

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-267						developed nations have along the coast--proportionately speaking, I would think they developed nations might have much more at risk. (Michael MacCracken, Climate Institute)	infrastructue at the coast isn't specifically mentioned here in Section C because this is a general statement which affects both deveoped and developing nations
E-SPM-268	A	13	12	13	12	To cut "combine to" and change "enhance" to "enhances" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-269	A	13	13	13	13	The increases in flooding also depend on changes in storm intensity and frequency (including for hurricanes, etc)--not just (or even mainly) on sea level rise and climate change. (Michael MacCracken, Climate Institute)	Changes in storm intensity and frequency are part of climate change
E-SPM-270	A	13	17	13	19	This point seems really implausible--how can it cost more to protect coastal areas in developing nations than major cities plus coastal areas in developed nations--that seems absurd on its face. In both types of countries, one would protect only the valuable lands, and there are many more in developed nations (unless one is counting cities like Hong Kong as in a developing nation, which would be a bit absurd too). The key issue here is that there are tremendous amounts of coastal infrastructure at risk in cities around the world--and protecting them against high levels of sea level rise will be very expensive if not impossible. It may well be that developed nation infrastructure presently has a bit more protection, but one sea level starts going up significantly, the developed nations have much more at risk. In any case, we should stop playing one off against the other--significant sea level rise will be catastrophic for everyone. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-271	A	13	22	13	22	To add "as a whole" after "society" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been reworted slightly. 'As a whole' has not been inserted after 'society' as this has been replaced by 'societies'
E-SPM-272	A	13	22	13	24	How can sea level rise not be mentioned here--there are major ports and cities that are at very great risk--especially as some of the lowlands erode away, as happened for New Orleans. (Michael MacCracken, Climate Institute)	High-risk areas is a general term which covers lowlands.
E-SPM-	A	13	25	13	28	While the case in terms of GDP, in terms of absolute dollars, the reverse is really the case. Again, playing off the two sides seems to me a real mistake.	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
273						(Michael MacCracken, Climate Institute)	regions are now located at the start of Section C. Text has been removed.
E-SPM-274	A	13	26	13	26	To cut "-" before "can range ..." (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-275	A	13	30	13	30	Change "negative" to "strongly negative" or something similar to indicate that the impacts will be substantial. (Michael MacCracken, Climate Institute)	Done. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C.
E-SPM-276	A	13	33	13	33	after 'areas', add and are already under stress with respect to current climate variability, extreme events and natural hazards.' Then start a new sentence 'In addition, they have limited access ...' (Silvia Llosa, ISDR System)	This bullet has been rewritten
E-SPM-277	A	13	34	13	34	I would suggest changing "levels" to "intensities". Also, it is turning out that insurance is starting to disappear for the wealthy, putting them at great financial risk. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-278	A	13	35	13	36	On line 36, substitute a period (or "full stop) for the comma, and replace the remainder with the following new sentence: "While this would potentially leave a larger role for governments and individuals as risk bearers, it might also reduce overall losses in high risk areas." (Indur Goklany, US Department of the Interior)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Reference to insurance has been removed
E-SPM-279	A	13	35	13	35	Change "catastrophe loss costs" to "catastrophic losses" (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Reference to insurance has been removed
E-SPM-280	A	13	35	22		With increased catastrophe loss costs, the private insurance sector is already increasing prices and is withdrawing coverage.... (Paul Epstein, Harvard Medical School)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Reference to insurance has been removed
E-SPM-281	A	13	35			There should be new bullet inserted at line 35 that would read as follows: "Despite the recent spate of deadly extreme weather events such as the 2003 European heat wave and the hurricanes of 2004 and 2005, data from EM-DAT, the International Disaster Database maintained by the Office of Foreign Disaster Aid and Center for Research on the Epidemiology of Disasters at the Université Catholique de Louvain, Brussels, Belgium, indicates that aggregate mortality and mortality rates	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten. Due to space limitations the suggested text (left) has not been included.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						due to extreme weather events are generally lower today than they used to be. Globally, mortality and mortality rates have declined by 95 percent or more since the 1920s. The largest improvements came from declines in mortality due to droughts and floods, which apparently were responsible for 95 percent of all deaths caused by extreme events during the 20th century. For windstorms, which contributed most of the remaining 5 percent of fatalities, mortality rates are also lower today but there are no clear trends for mortality.” (Indur Goklany, US Department of the Interior)	
E-SPM-282	A	13	37	13	37	To change "Climate change is likely in many areas ..." to "In many areas, climate change is likely ..." (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-283	A	13	42			no mention of increase in respiratory diseases due to aeroallergens and dust (Silvia Llosa, ISDR System)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Allergenic pollen included in Table 1
E-SPM-284	A	13	42			Health section: this section seems unbalanced because it excludes the positive impacts of warmer winters, which can be significant in temperate and high-latitude regions. This should be included. (Andy Reisinger, IPCC SYR TSU)	Text on positive impacts of warmer winters has been included in FGD SPM. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C.
E-SPM-285	A	13	43	13	58	This bullet highlights one of the problems with estimates of health impacts of CC. This bullet deals with “current” ability to adapt. But impact estimates should be forward looking exercises. We should be looking at future adaptive capacities. See Goklany (2005c, 2006a). We accordingly, recommend rewriting all the bullets in this category be rewritten so that they are forward looking. In fact, we would argue that if the Millennium Development Goals are met, then the impacts of CC would be considerably dampened. (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-286	A	13	43	13	61	There should be a bullet devoted to cold-related deaths. (Indur Goklany, US Department of the Interior)	Now included in FGD SPM. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C.
E-SPM-287	A	13	43	13	44	Add "in tropical developing countries" - the statement would not be correct in its current form for e.g. Europe. (Andy Reisinger, IPCC SYR TSU)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM - 288	A	13	44	13	44	To change "from" (climate change) to " related to" (climate change) (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-289	A	13	46	13	46	It would be useful to mention that there will be both higher temperatures and higher humidities, and the heat index goes up very rapidly. (Michael MacCracken, Climate Institute)	Increased humidity has not be addressed specifically in the Health section of Section C. However, 'climate change' is the general phrase which will cover changes in water vapour along with temperature, precip etc. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-290	A	13	47	13	47	Change "events test" to "events are likely to test" or something similar. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-291	A	13	49	13	49	in addition to public infrastructure, lack of disaster reduction policies and measures such as health early warning systems, also affects impacts (Silvia Llosa, ISDR System)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-292	A	13	50	13	50	I would suggest changing this to read "Increases in temperature and duration of heat waves are likely to increase ground-level ozone concentrations, which will in turn likely increase respiratory ..." (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-293	A	13	52	13	53	On line 52, change "could" to "are likely to" and may be clearer to move "in some regions" to start of sentence. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-294	A	13	54	22		Add - Extreme precipitation events can lead to outbreaks of water-, rodent- and mosquito-borne disease. (Paul Epstein, Harvard Medical School)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-295	A	13	55	13	55	Change "may" to "are likely to" (Michael MacCracken, Climate Institute)	Done. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-296	A	13	57	13	58	This bullet highlights one of the problems with estimates of health impacts of CC. This bullet deals with “current” ability to adapt. But impact estimates should be forward looking exercises. We should be looking at future adaptive capacities. See Goklany (2005c, 2006a). We accordingly, recommend rewriting all the bullets in this category be rewritten so that they are forward looking. In fact, we would argue that if the Millennium Development Goals are met, then the impacts of CC would be considerably dampened. (Indur Goklany, US Department of the Interior)	Done. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-297	A	14	0			Box SPM-2. It would be helpful to have material in each section ordered according to projections, impacts, adaptation, residual impacts. At the moment, some sections are a bit confusing because they refer to adaptation and then in the next bullet point go back to impacts without adaptation. (Andy Reisinger, IPCC SYR TSU)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-298	A	14	1	15	55	Box SPM-2: This summary comes across as a one way street with negative impacts everywhere. This would appear to be inconsistent with, for instance the first bullet on p19, which suggests a positive response at higher latitudes. (Ian Townend, HR Wallingford)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten. POistive impacts are specified under the sectors in Section C. Australia and New Zealand describe positive impacts, and Polar regions states that there will be both positive and negative impacts in the Arctic.
E-SPM-299	A	14	5	14	5	add in the parenthesis 'conflicts and complex disasters [9.2.2] (Silvia Llosa, ISDR System)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-300	A	14	5	14	5	"food insecurity" seems an awkward phrase--what about "civil turmoil" and then adding "discontinuous growing seasons" (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed. Food insecurity is now included in the 2 nd Africa statement on p8 of the FGD SPM
E-SPM-301	A	14	9	14	9	Change "losses" to "desertification"--we do not lose land, it goes to other uses. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-	A	14	11	14	11	Change "Changes in" to "Decreases in" in order to give the sign.	Done. Box SPM-1 and 2 have been removed.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-302						(Michael MacCracken, Climate Institute)	The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-303	A	14	15	14	15	Change "could degrade due" to "are likely to be degraded by" and change "may be" to "are likely to be"--and phrasing needs to be cleared up so there is one verb. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-304	A	14	17	14	18	I would suggest changing this to "Initial assessments show that efficient water utilisation and adaptation through use of drip irrigation has the potential to save water and therefore offset some of the water losses expected due to climate change."--need to replace "may" and "could" (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-305	A	14	21	14	22	It is quite confusing to have two different units for area--hectares and kilometers squared--use on or the other. Also change "flooded" to "inundated" as flooding is often considered transient and not permanent. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-306	A	14	23	14	24	The scenario here does not really make a difference, so drop that. Also, does this estimate include CO2 effects--this should be mentioned. And what about reefs elsewhere? (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-307	A	14	25	14	26	Need to indicate the significance of this--does the change matter? Also, say 2020s and not 2025. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-308	A	14	27	14	28	Change "could" to "are likely to". And would be useful to indicate the impact on rivers and water resources--say why this is important. (Michael MacCracken, Climate Institute)	Likelihood statement has been added. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-309	A	14	29	14	30	Delete "for the SRES A1F1 scenario"--this is just not needed when say "as high as" (Michael MacCracken, Climate Institute)	Done. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-310	A	14	31	14	31	Replace "an increase" with "each increase" if this is the case--need to give indication for more than 1 C change (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-311	A	14	35	14	36	It would help to indicate what fraction of the area these locations add to--looks to be quite substantial (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-312	A	14	36	14	36	To change "There is likely to be substantial loss of biodiversity." to, for example "The loss of biodiversity is likely to be substantial." (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-313	A	14	38	14	39	Delete "under SRES A1 and B1 scenarios"--in 2050, the difference between scenarios is too small to really have an effect--so 10-25% likely covers all scenarios. (Michael MacCracken, Climate Institute)	Done. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-314	A	14	40	14	41	The sentence "There is very likely to be loss of high-value land, faster road ..." needs better expression, i.e. "It is very likely to happen loss of high-value land, faster road ..." (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-315	A	14	43	14	43	Is this really only "likely" or should it be "very likely"? (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-316	A	14	45	14	45	Change "growing conditions" to "productivity" and then say "is likely" (Michael MacCracken, Climate Institute)	'longer growing seasons' replaces 'enhanced growing conditions'. Likely has been added. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-317	A	14	47	14	47	To change "where there are reductions in rainfall" to, for example, "when reductions in rainfall are expected" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-318	A	14	51	14	51	For clarity, change to "with minimum summertime river flows" and delete "under the IS92a emissions scenario as the phrasing likely makes it applicable in all cases. Also, this point should be linked to that given on lines 54-55." (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-319	A	14	52	14	52	Delete "Under the A1F1 scenario" as this is likely the case for all scenarios. (Michael MacCracken, Climate Institute)	Done. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
							C.
E-SPM-320	A	14	54	14	54	To add "can be expected" after "up to 50%" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-321	A	14	54	14	55	Combine with point on lines 50-51--and can delete mention of scenario. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-322	A	14	55	14		"in addition under point 'Up to 50% of European flora...' (which actually is in line 56-57 - only numbers 1-55 can be entered here): 'alpine communities face up to 60% loss of species under extreme scenarios' (refers to chapter 12, page 4, line 11-12)" (Harald Pauli, University of Vienna)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-323	A	14	57	14	57	Can delete "under four SRES emissions scenarios" as understood--useless detail. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-324	A	14	58	14	59	It seems implausible it will take till 2050 for this to be the case--is this not likely evident now or in next two decades? And is this really phrased properly--should it not be something like "By mid-century, the centers of production of key crops are very likely to have shifted northward by several hundred kilometers."? In reality--crops don't shift--choices that farmers make shift. On line 59, change "in the Mediterranean" to "in Mediterranean countries" (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-325	A	14	62	14	62	Delete "under a range of emissions scenarios" as useless and unneeded information. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-326	A	14		14		line 58: the text in paragraph 12.4.7.1 refers to energy crops and not crops in general. Issues related to insurance costs and tourism need to be also addressed in the SPM (as in the TS) (Yannis Sarafidis, National Observatory of Athens)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-327	A	14		14		l.61-62: address impacts on snowpacks and snowmelt, therefore on winter tourism? (Silvia Llosa, ISDR System)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter- Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
							C. Text has been removed
E-SPM-328	A	14		15		All the comments we made with respect to Table SPM-1, apply to Table SPM-2. (Indur Goklany, US Department of the Interior)	OK
E-SPM-329	A	15	2	15	3	The year "2010" is far too precise--or was this supposed to say 2100? If the former, maybe say "Climate change is already starting to exert a negative influence on rice yields, while the CO2 increase is exerting a positive influence on soybean yields." And mention need not be made if conclusion applies to all scenarios. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-330	A	15	5	15	6	Change "in 2025" to "By t6he 2020s" and change "for 2055" to "for the second half of the century"--or something to spread out the time period. Also, can drop "depending on the SRES scenario considered" as this is assumed. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been included in Table 2
E-SPM-331	A	15	7	15	7	Change "Any future" to just "Future"--or really boxing oneself in. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-332	A	15	17			Insert "economic" prior to "losses". Long term data show that, despite the 2004 and 2005 hurricane seasons, deaths and death rates in the US from extreme weather events have declined substantially Goklany (2000, 2006b). This fact should be noted because in, our opinion, loss of life generally trumps economic losses in terms of significance. (Indur Goklany, US Department of the Interior)	Done. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-333	A	15	24			Replace "complicate" with "necessitate changes in". (Indur Goklany, US Department of the Interior)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-334	A	15	26	15	26	The numbers "74-118%" are far too precise--likely better to say roughly double or something like that. (Michael MacCracken, Climate Institute)	Accepted. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten
E-SPM-335	A	15	28	15	29	While technically true, the text should note also that if evidence of increasing trends continues to mount it is quite likely that the philosophy of managing future risk will be changed so that risk management will take future projections into consideration and not just historical experience. (Indur Goklany, US Department of the Interior)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-	A	15	28	15	28	To change "in response to" to "based on" (historical experience)	Box SPM-1 and 2 have been removed. The

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-336						(Antoaneta Yotova, National Institute of Meteorology and Hydrology)	main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-337	A	15	32	15	32	Change "reduce" to "decrease" and this range is awfully small given the range of scenarios--this really seems implausible. And likely better to change "2080-2100" to "end of the century". It would also be useful to say why this is an important change. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten.
E-SPM-338	A	15	33	15	33	What is meant by "Northern Hemisphere permafrost is projected to reduce by 20-35% by 2050" - the areal extent? its thickness? Clarification is required. Section 15.3.4 presents no values regarding reduction of permafrost and only mentions that the areal extent of permafrost will decrease in the 21st century. The statement should be revised to better reflect statements in Ch 15. (Sharon Smith, Natural Resources Canada)	In depth. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten.
E-SPM-339	A	15	36	15	37	Numbers here are too precise. Change "11%" to "roughly 10%", change "given" to "if" and change "14-23% of polar desert by 2080" to something like "roughly 15-25% of polar desert areas by the end of the century." And leave off "under SRES A2" if this generalization also then makes statement apply more generally. (Michael MacCracken, Climate Institute)	Numbers have been rounded as suggested. Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been rewritten and quantitative statements are included in Table 2
E-SPM-340	A	15	46			Small islands section: The bullet point lines 57-58 appears to have no obvious relationship to climate change impacts or adaptation but is about mitigation; it should be deleted. If it has an explicit link with adapting to the impacts of climate change itself, then this link needs to be brought out. (Andy Reisinger, IPCC SYR TSU)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-341	A	15	46			Small Islands section: I'm surprised that this section makes no reference (nor the TS nor underlying chapter) - about the long-term impacts of sea-level rise over several centuries. I would have thought that the complete disappearance of some countries under some long-term scenarios would be worth highlighting? This is of course an issue that needs to be addressed by the underlying chapter, it can't be done in the SPM only. This comment is just to flag that if Chapter 16 were to provide relevant statements (that need to be fully backed up by long-term sea-level projections from WG1), it would be extremely relevant for the SPM to take them up. (Andy Reisinger, IPCC SYR TSU)	OK.
E-SPM-342	A	15	49	15	51	I found the phrasing here a bit confusing. I also think the numbers given indicate too much precision and imagine uncertainty range is broader. (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
							C. Text has been removed from section but is now included in Table 1 with rounded values
E-SPM-343	A	15	57	15	57	Change to "For small islands" or something other than "in" (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-344	A	15	59	15	59	Change "size" to "limited size" and "pool, lack" to "pool and lack" (Michael MacCracken, Climate Institute)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-345	A	15		15		To add "production" after "In small islands, energy" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Box SPM-1 and 2 have been removed. The main impacts for systems and sectors and regions are now located at the start of Section C. Text has been removed
E-SPM-346	A	16	6			Append to the end of the first sentence, the following: "in the context of adaptation to current climate related problems." (Indur Goklany, US Department of the Interior)	Suggestion taken onboard although exact phrasing not used.
E-SPM-347	A	16	7	16	7	add 'variability and' after 'climate' (Silvia Llosa, ISDR System)	'variability' has not been incorporated into the text as these are specific examples which incorporate climate change into design specifications.
E-SPM-348	A	16	19	16	22	I would think that mountain or high altitude environments should also be mentioned as having among the lowest adaptive capacity. (Michael MacCracken, Climate Institute)	Text has been removed
E-SPM-349	A	16	19			Replace "industrial sectors" with "human and social systems." (Indur Goklany, US Department of the Interior)	Text has been removed
E-SPM-350	A	16	22			Append to the end of the sentence, the following: " although adaptive capacity can be enhanced by reducing existing non-CC related threats to such systems." For detailed rationale, see Goklany (2000, 2003, 2005a). (Indur Goklany, US Department of the Interior)	Text has been removed
E-SPM-351	A	16	24	16	26	Many potential current adaptations are effective and consistent with sustainable development, and vice versa. In particular, measures to reduce current vulnerabilities to climate-sensitive problems would protect against both climate variability now and future climate change (and hence are sometimes termed 'no regret' strategies" [New language is shown in bold . Deletions are not shown.] (Indur Goklany, US Department of the Interior)	Text has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-352	A	16	25	16	25	add after 'variability', 'and weather extremes' (Silvia Llosa, ISDR System)	Text has been removed
E-SPM-353	A	16	26	16	26	'no regrets' could be replaced by 'win-win' to take a positive stance (Silvia Llosa, ISDR System)	Text has been removed
E-SPM-354	A	16	31			Modify the beginning of the para, to read as follows: “In general, measures to advance sustainable development either through reducing climate-sensitive problems (e.g., hunger and malaria) or more generally through measures that would enhance economic development, human and social capital (e.g., enhancing literacy or improving health) would advance the capacity to adapt not only to climate change but to a broader set of problems. Implementing such measures are likely to have very high benefit-cost ratios. Thus, adaptive capacity can be...” [New language is shown in bold.] For a detailed rationale see Goklany (2005a, 2006a). (Indur Goklany, US Department of the Interior)	Text has been rewritten
E-SPM-355	A	16	33			Include the local level of co-ordinating adaptation into development planning, since this is the level where much community development planning occurs and the local level is referenced elsewhere (eg. Chapter 17 p.28). (Stephen Sheppard, University of British Columbia)	All levels from the individual citizen to national governments and international organisations are included p18 ln 44-45
E-SPM-356	A	16	34	16	34	replace 'disaster preparedness' by 'disaster risk reduction'. (Silvia Llosa, ISDR System)	Disaster preparedness has been retained
E-SPM-357	A	16	35	16	35	we propose to replace the sentence on NAPAs with: "There is growing consensus that responding to existing variability and extremes by implementing disaster risk reduction strategies will initiate the necessary actions to respond to climate change [17.2.2]' The Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, adopted at the World Conference on Disaster Reduction, 18-22 January 2005, Kobe, Hyogo, Japan. (www.unisdr.org/wcdr) is evidence of this consensus. (Silvia Llosa, ISDR System)	Text has been removed
E-SPM-358	A	16	38	16	42	It would be extremely helpful to have more specific figures, or even just sample thresholds, for limits to adaptation. This is of course an issue that needs to be addressed by the underlying chapter, it can't be done in the SPM alone. This comment is just to flag that if Chapter 17 were to provide more specific examples and figures of limits to adaptation, it would be extremely relevant for the SPM to take them up.	OK

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Andy Reisinger, IPCC SYR TSU)	
E-SPM-359	A	16	38	16	39	It is possible – in fact desirable, given the amount of confidence that can be placed on impacts estimates – to implement measures that are not sensitive to the details of such analyses. Examples include: development of methods to treat and prevent malaria and other climate-sensitive diseases, developing crops that would resist droughts or grow in soils that are saline, water logged or contain too much aluminum crops, pricing water or developing property rights for water. Accordingly, replace “projections of future climate change are sufficiently accurate” on line 39 with the following: “ the adaptation measures are not specific to the location specific details of climate change impacts analyses, and are robust despite the many uncertainties associated with them.” See Goklany (2000, 2005a, 2006a). (Indur Goklany, US Department of the Interior)	Text has been rewritten
E-SPM-360	A	16	40	16	41	On line 40, change "may" to "is likely to" and on line 41 change "may not" to "is unlikely to" to conform to the lexicon--and provide useful information. (Michael MacCracken, Climate Institute)	Text has been removed
E-SPM-361	A	16	41	16	42	is it not also a question of unavailability of options? (e.g. for SIDS whose very existence is at stake) (Silvia Llosa, ISDR System)	Text has been removed
E-SPM-362	A	16	45	22		Add- Distributed generation with clean energy technologies can optimize adaptation and mitigation. It can improve adaptation, enhancing energy security in the face of storms, heat waves and supply interruptions; improve public health, agriculture and poverty alleviations; and spur markets for technologies to mitigate climate change. (Paul Epstein, Harvard Medical School)	Text has been removed
E-SPM-363	A	17	0			Emphasize Energy Sector: diversification of supply source; technological changes. Add - These can improve health, nutrition and power development, thus decreasing overall vulnerability to climate change. (Paul Epstein, Harvard Medical School)	Table SPM-1 has been removed
E-SPM-364	A	17	1	17	1	Third column: Given that the situations will become unprecedented, it seems a bit unlikely that "indigenous knowledge" will really prove useful--at least as highest priority. (Michael MacCracken, Climate Institute)	Table SPM-1 has been removed
E-SPM-365	A	17	1	17	1	Fourth Column: The texts should say that at least some of these options could be very costly. (Michael MacCracken, Climate Institute)	Table SPM-1 has been removed
E-	A	17	1	17	1	First column: The text should indicate that at least some of these options do require	Table SPM-1 has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-366						new research. (Michael MacCracken, Climate Institute)	
E-SPM-367	A	17				table SPM-1: under 'Drying/drought-social' in addition to diversification of income, livelihoods strategies could be added [17.2]; in settlement/other, add 'famine early warning systems [17.2] under 'Increased rainfall/flooding-human health': replace 'disaster preparedness' by 'disaster risk reduction'; after 'relief', add 'and recovery'; -Settlement/other: after 'risk assessment', add 'and awareness' under 'Wind speed/storminess-human health': replace 'disaster preparednes' by 'disaster risk reduction'; after 'relief', add 'and recovery'; -Settlement/other: add (as under Increased rainfall/flooding) risk assessment and awareness, land use change and protection of critical facilities (Silvia Llosa, ISDR System)	Table SPM-1 has been removed
E-SPM-368	A	17				A. This table needs to renumbered. B. Somewhere in the human health column, add the following: "Improve the capacity to implement existing and new methods to treat and prevent climate-sensitive diseases." (Indur Goklany, US Department of the Interior)	Table SPM-1 has been removed
E-SPM-369	A	18	1	18	4	This paragraph is unclear. Is the message that adaptation hasn't been implemented because (mostly) because people don't know how and don't believe they need to? Is that what is meant by "cognitive"? After the sentence on line 4, we suggest "Countries are, nevertheless, increasingly committed to reducing risk to existing climate variability and extreme weather events, as evidenced in the signing and implementation of the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, which commits governments to integrate climate change adaptation and disaster risk reduction. (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	The first statement in Section D highlights the fact that some adaptation is occurring now in response to climate change and variability. However, this is only on a limited basis and amongst the reasons for this are the limits/barriers to adaptation which do indeed include information, attitude, social and behavioural aspects. There has been some modification of the text but it has remained essentially the same as in the SOD SPM
E-SPM-370	A	18	2			Substitute "constraints" for "limits" (Indur Goklany, US Department of the Interior)	Limits remains
E-SPM-371	A	18	6	18	16	This presentation of likely costs for adaptation is really very limited, and seems quite optimistic, especially for sea level rise as the amount of rise starts increasing (and recognizing that the increase will be going on for centuries; protecting major cities is going to cost, I would think, far more than just a few tenths of a percent of GDP--and virtually all coastal nations have low lying cities. For agriculture, farmers and their facilities will need to be significantly reworked as crops change.	Text has been substantially rewritten and now states 'At present we do not have a clear picture of the limits to adaptation, or the cost, partly because effective adaptation measures are highly dependent on specific, geographical, climate risk factors as well as

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						Protection against flooding from heavier extreme events and hurricanes is going to be quite costly. For human health, tremendous effort will be needed to strengthen and improve infrastructure and responsiveness to disease vectors, etc. Overall, these couple of points are simply inadequate. (Michael MacCracken, Climate Institute)	the policy environment.' P16 ln 25-27
E-SPM-372	A	18	9	28	12	It might be worth adding that protection of natural ecosystems and the natural character of the coast can place significant limits on the techniques and levels of protection against SLR. (Andy Reisinger, IPCC SYR TSU)	This section has been rewritten
E-SPM-373	A	18	13	18	16	Two issues: Firstly, the first percentage figure is not a percentage, but percentage points (being derived from Table 17.2). Secondly, having read the relevant section of chapter 17, it is not clear to me where the second percentage figure comes from. Is it relative to the first percentage figure - ie 10-16% of 4 percentage points? Does this mean that slowness or failure to adapt could change the reduction of impact from 4 percentage points to 3.93 percentage points - and if so, isn't this completely buried in uncertainty of the first assessment? (Andy Reisinger, IPCC SYR TSU)	Text has been removed
E-SPM-374	A	18	15	18	16	While this statement may be true in a narrow sense, it omits important context. It should also note that this isn't the full universe of adaptations that will be available in the future , particularly if economic development and technological change advance as assumed per the SRES scenarios. (Indur Goklany, US Department of the Interior)	Text has been removed
E-SPM-375	A	18	18	18	29	The text is definitive about the relationship between atmospheric CO2 concentration and impacts, ignoring the large uncertainty in the relationship between CO2 concentration and temperature rise. One characterization of this uncertainty is the range given for climate sensitivity, which WG I now estimates lies between 2 and 4.5 C, with a best estimate of 3 C. Policymakers need to know what relationships between CO2 concentration and temperature rise are assumed in the studies being assessed and how those assumptions compare with WG I's assessment of the relationship. (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	Text has been substantially rewritten. Full range of stabilisation and SRES profiles for 3 time slices are shown in Table 1
E-SPM-376	A	18	18	18	29	By employing the back-forecasting method, it would be helpful for policy makers to show absolute volume & weight of Co2 to keep stalilization leveasl of 450 ppm,550 ppm and 750 ppm, i.e. how much aggrigate weight and volume and how long such weight and volume of Co2 emittance be acceptaqble or permitted in each year till 2080, with taking into consideration of volune & weght of carbon sequestration. (Susumu Nakamaru, Sun Management Institute)	This is WG3 territory

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-377	A	18	20	18	29	<p>These lines need to be replaced with the results from Chapter 19 on Key Vulnerabilities. The references here to specific stabilization levels etc are really quite contentious and in some cases in error. For example it cannot be said that stabilization at 450 ppmv CO₂ (ca 520-550 CO₂) would lead to only "some major impacts on ecosystems" as this level of GHGs could (likely even) bring a warming of order 3-4°C and would generate impacts identified earlier in the SPM as major and many in number. For human impacts I would argue that it cannot be said with confidence that "most major impacts" would be avoided. At 550 ppmv CO₂ there is a good chance that most of the major impacts identified in this report would NOT be avoided.</p> <p>(William Hare, Potsdam Institute for Climate Impact Research (PIK))</p>	Text has been substantially rewritten. Full range of stabilisation and SRES profiles for 3 time slices are shown in Table 1 along with examples of impacts related to various temperature changes
E-SPM-378	A	18	20	18	30	<p>First, most of the information on these lines is based on Table 20.4. However, there are several problems with that table that need to be fixed; after that is done, these lines in the SPM should be fixed. The problems we have with Table 20.4 are the following:</p> <p>A. Table 20.4 omits critical information that would provide a context in which CC impacts should be viewed. This information, which is also available in Arnell et al. (2002) -- the same source used to construct this table -- is the millions of people that are exposed to the stresses highlighted in this table (i.e., the population at risk) in the absence of climate change. This information should be included in an additional column. This compilation has already been done by Goklany (2005a) for the 2080s. It shows that for hunger, water stress and malaria -- which inexplicably is not included in this table, although the data are available in Arnell et al (2002) -- the population at risk in the absence of climate change exceeds the population at risk under the "unmitigated" or the S750 and S550 cases. This suggests that for these stresses through the 2080s (at least), non-climate change related factors are more important than climate change, and that existing hurdles to sustainable development would outweigh additional hurdles due to climate change (through 2085, at least). Reference: Goklany, I.M.: 2005a. "A Climate Policy for the Short and Medium Term: Stabilization or Adaptation?" Energy & Environment 16: 667-680.</p> <p>B. The implications of the relative magnitude of the populations at risk for the hazards noted above with and without climate change should be noted in the SPM (see Goklany 2005a).</p> <p>C. This table only provides information on the millions of people for whom water stress is increased without providing a parallel estimate of the millions for whom water stress would be reduced. [Actually we recommend providing estimates</p>	<p>Text has been deleted and replaced by headline on page 18 line 16 and the following text. In particular, lines 25-29 in the old SPM, which were based on Table 20.4, have been deleted.</p> <p>Table SPM-1 now presents broadly the same information in a more rigorous format. Full range of stabilisation and SRES profiles for 3 time slices are shown, together with examples of impacts related to various temperature changes</p>

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						<p>of changes in the total population under water stress, which is often defined a populations that have less than 1,000 m3 per year per capita available to them.] The current formulation is misleading, to say the least. In fact, comparing the population living in water stressed areas with and without CC, suggests that CC might, in fact, reduce the net population at risk of water stress. Moreover, the water stress analysis ignores adaptation actions that are available, and have historically been used to worldwide to relieve water stress (see Goklany 203, 2005a, 2005c).</p> <p>Second, the first bullet (lines 25 through 26) is based on Sec. 18.4.3 and Table 20.4. However, there is nothing at these locations about impacts at 450 ppm. That bullet should, therefore, be eliminated.</p> <p>Accordingly, we would replace lines 23 through 29 with the following: “These studies indicate that for emission pathways leading to stabilization at 550 and 750 ppm about 2200, the impacts of climate change on the population at risk of hunger, malaria and water stress through the 2080s is generally small compared the impacts of other non-climate change factors. However, coastal flooding is an exception. This suggests that response strategies focused on reducing vulnerability to current climate-sensitive problems that might be exacerbated by climate change could provide greater benefits than stabilization at 550 or 750, at least through the 2080s.” For a detailed rationale and analysis see Goklany (2005a). (Indur Goklany, US Department of the Interior)</p>	
E-SPM-379	A	18	23	18	29	<p>These are very crucial statements that seem to be insufficiently supported by the TS or the underlying sectoral or regional chapters. Supporting such a critical statement only with reference to the discussion in section 18.4.3 and Table 20.4 appears weak. Section 18.4.3 does not actually come to the strong conclusion that the SPM states, but remains much more ambiguous, and Table 20.4 is based only on the single paper by Arnell et al. (Andy Reisinger, IPCC SYR TSU)</p>	Text has been substantially rewritten. Full range of stabilisation and SRES profiles for 3 time slices are shown in Table 1 along with examples of impacts related to various temperature changes
E-SPM-380	A	18	23	18	29	<p>One important element that seems to be missing in this discussion is the long-term impact of climate change on ice sheets and consequent sea-level rise over centuries to come, with significant impacts that are virtually certain to go beyond the adaptive capacity of many low-lying countries, even if they happen only slowly. I am aware that the statements refer only to impacts by 2080, but it would appear a crucial omission not to refer to longer term impacts which may be set in motion at the stabilisation levels that this section refers to (given that no other section provides a systematic treatment of the long-term implications of stabilisation). This should not be done as another bullet point so that relevant time scales aren't blurred, but perhaps as additional paragraph afterwards. It also provides an important basis</p>	Discussion of impacts over the long term from ice sheet melt is discussed in a new section on p15

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						for potential synthesis with findings from WG1 about the "commitment" to long-term climate change. The authors might wish to think of other long-term issues (in addition to sea-level) that might warrant being included for similar reasons. (Andy Reisinger, IPCC SYR TSU)	
E-SPM-381	A	18	25	18	29	This needs to be rephrased--Arctic communities are already experiencing major impacts, and the will surely get worse. The phrase "most major impacts" is just inadequate--through to line 29 unless one really gives an indication of how "major" they will be--like 550 to 750 ppm is arguably likely to cause an ultimate sea level rise of several meters or more--so one of the "major" impacts is apparently global flooding of many major cities, etc.--give a sense of what is being talked about. (Michael MacCracken, Climate Institute)	Text has been rewritten
E-SPM-382	A	18	25	18	25	note that, if you are talking about equivalent CO2 as implied by footnote 8, we have already exceeded or are close to exceed the 450 ppm eq. CO2. (Olivier Boucher, Met Office)	Noted
E-SPM-383	A	18	25	18	26	According to the lead-in to this bullet, this is based on Sec. 18.4.3 and Table 20.4. However, there is nothing at these locations about impacts at 450 ppm. This bullet should, therefore, be eliminated. (Indur Goklany, US Department of the Interior)	Text has been rewritten
E-SPM-384	A	18	25	18	26	According to the lead-in to this bullet, this is based on Sec. 18.4.3 and Table 20.4. However, there is nothing at these locations about impacts at 450 ppm. This bullet should, therefore, be eliminated. (Indur Goklany, US Department of the Interior)	Text has been rewritten
E-SPM-385	A	18	31	18	32	Modify the heading to read as follows: "Over the long term, both adaptation and mitigation are needed to fashion a comprehensive approach to dealing with climate change." As lines 41 through 42 note, in the near term the effects of mitigation will be minimal (see also comments on these lines, below). (Indur Goklany, US Department of the Interior)	Text has been rewritten
E-SPM-386	A	18	36	18	44	These sentences need to be rewritten to include the insights from Chapter 19. At present they do not do that (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Text has been rewritten
E-SPM-387	A	18	36	18	44	The text might mention what can be done with buildings to make them much less energy and resource demanding. The American Institute of Architects has set a goal by about 2020 of a 90% reduction in energy use for construction and operation, while also making the building healthier for occupants, etc. (Michael MacCracken, Climate Institute)	Text has been rewritten
E-SPM-	A	18	38	18	40	This sentence should explicitly refer to slowing the rate of change for impacts, and the importance of this for facilitating adaptation. Reference to a "date of impact"	Text has been rewritten. It is clear that by slowing the rate of temperature increase,

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
388						can be misleading and the important message that the rate of change can matter hugely for gradual impacts could easily be lost on readers (eg natural migration rates of species, and technical or social inertia in adaptation by human systems). Also, without a specific time scale you may want to replace "and its magnitude" with "and/or its magnitude". Otherwise, this sentence could be misread as supporting the erroneous concept of "before" and "after" climate change. (Andy Reisinger, IPCC SYR TSU)	adaptation will be important for coping with early impacts
E-SPM-389	A	18	38	18	42	There are two sources of inertia that have to be accounted for in providing estimates of how rapidly mitigation programs may bear fruit. First, as the SPM notes, is the inertia of the climate system. Second is the inertia of the economic system. It will take about 50 years to renew the existing energy system. The SPM ignores this source of inertia. Accordingly, we believe the "2040" on line 41 is overly optimistic. Given that we are already in 2006, the earliest date by when significant benefits from mitigation could be evident is probably 2056 (i.e., 50 years hence). Accordingly, the following changes should be made: A. On line 39, add "and the slow turnover rate of the economic system" after "system" B. Replace lines 41 through 42 with the following: "Significant benefits from mitigation are unlikely to be realized until 50 years hence." (Indur Goklany, US Department of the Interior)	The inertia of the climate system is of main relevance here. It has been specified that the benefits of mitigation will not be realised for several decades
E-SPM-390	A	18	40			Add to end of sentence "...and reducing the long-term need for/intensity of adaptation." (Stephen Sheppard, University of British Columbia)	This was considered but has not been incorporated
E-SPM-391	A	18	41	18	42	The statement that the climatic benefits mitigation would not be realized until 2040 is not correct. Such a statement depends on the emission scenario assumed , aerosol emissions assumed in the reference case etc. As a consequence it is not possible to make such a broad statement or indeed be more precise than to say something like until from "may not be significant until the 2020s". (William Hare, Potsdam Institute for Climate Impact Research (PIK))	'will not be realised for several decades' replaces the original text
E-SPM-392	A	18	43	18	44	This statement is quite important and significant, but the underlying chapter doesn't actually support it very strongly. Chapter 18ES and 18.1 do little more than state this sentence, but the studies assessed in the body of the chapter (particularly in 18.4) do in my opinion not fully support this to be a major general conclusion worthy of elevation to the SPM (other than specifically for long-term sea-level rise for low-lying countries). This is largely because no attention appears to have been paid to quantitative limits in the sectoral and regional chapters. It would be extremely helpful if all the sectoral and regional chapters paid specific attention to	Text reworded and referenced to chapter 20

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						examples of limits to adaptation, for temperature bands or changes in specific climate variables or regionally relevant impacts, that can then be summarised in the TS and more powerfully and defensibly stated in the SPM. Qualitatively the statement is true of course, but it is hardly a new finding and is very open to interpretation in all sorts of directions. (Andy Reisinger, IPCC SYR TSU)	
E-SPM-393	A	18	45			This section should disclose explicitly that some adaptations may conflict with mitigation, including some adaptations mentioned in Table SPM-1, eg. increased energy use to make snow. Suggested wording (additional bullet): "At the same time, some adaptations (including some options described in Table SPM-1) may conflict with attainment of mitigation goals." (Stephen Sheppard, University of British Columbia)	This is beyond the scope of the SPM, given that at least one example would have to be given, and that space is at a premium. This is dealt with in the TS (page 65 lines 2 to 12).
E-SPM-394	A	18	46	18	46	Change "'is likely to" to "will"--there is no doubt about this at all. (Michael MacCracken, Climate Institute)	Text has been removed
E-SPM-395	A	18	47	18	47	The sentence "But together they can' is far too optimistic--the Arctic is already experiencing impacts, and sea level rise has a good ways to go even with no emissions. And the adaptation costs in some cases could be quite high. (Michael MacCracken, Climate Institute)	Text has been removed
E-SPM-396	A	18	47	18	48	Delete "This suggest the value of" and change "which would include" to "that includes"--again, this is not some vague requirement--it is the only path available, so say it will be required. (Michael MacCracken, Climate Institute)	Text has been removed
E-SPM-397	A	18	50			There is an important statement in Chapter 18 that may be worth bringing into the SPM, which is that comparing adaptation and mitigation as if it were a null-sum game is fraught with difficulties (see Chapter 18 executive summary, page 3 line 13-20). This is a very important perspective that could be very relevant when WG2 material is brought forward into the Synthesis Report and combined with WG3 cost assessments. (Andy Reisinger, IPCC SYR TSU)	New Chapter 18 ES is worded slightly differently, and the message is less strong. We believe that this concept would require too much space to justify rigorously in the SPM whereas at another level it is self-evident. No action.
E-SPM-398	A	19	0			A definition of what is and what is not encompassed by sustainability and sustainable development here would be most useful. (Olivier Boucher, Met Office)	Definition of sustainable development is now provided
E-SPM-399	A	19	1	19	28	Section E: This discussion is very important. From my perspective it seems to miss two relevant statements and findings contained in the TS and/or underlying chapters, that haven't been brought forward to the SPM. The first one is a reference to possible regional or global limits to adaptation, ie instances where the residual	The limits of adaptive capacity are implied where indication is given of regions with low adaptive capacity and the fact that these are particularly vulnerable.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						damages start to escalate due to limits of adaptive capacity being reached. Chapters 17, 18, 19 and 20 all have some relevant material on this. The second is that key vulnerabilities (especially large-scale discontinuities, or loss of regionally significant systems) would seem to have an important place in this discussion. Not everything from chapter 19 is relevant here, but the very reason why the impacts discussed in chapter 19 are called "key" vulnerabilities is because they do impact on sustainability. (Andy Reisinger, IPCC SYR TSU)	Key vulnerabilities are discussed in the SPM
E-SPM-400	A	19	2	19	28	My reaction is that this is MUCH too blasé about what the implications are. There is no way that the impacts are likely to be "positive at higher latitudes" (line 8)--the Arctic report said just the opposite, the impacts are negative now. And the impacts of sea level rise will affect many countries and there is no way they are positive. The statement made on lines 9-10 is far too optimistic--many suggest that a 2-3 C rise will cause dangerous consequences for the Earth--not just be expected to be negative. With Greenland at risk (and starting to deteriorate), the impacts are likely to be very substantially negative, rising at a rate much higher than 2-3% per year--the rate of sea level rise will be accelerating, and thresholds of coastal protection will be overwhelmed, flooding large areas (like Florida, Bangladesh, etc.). And so on. (Michael MacCracken, Climate Institute)	Section E has been removed and text has been reworded and incorporated into section D.
E-SPM-401	A	19	2			SECTION E COMMENT: This section should also include ecosystems whose sustainable use and conservation are part and parcel of sustainability (William Hare, Potsdam Institute for Climate Impact Research (PIK))	Section E has been removed
E-SPM-402	A	19	4	19	5	This heading is not supported by the material in this document. The following heading would be more faithful to the information here: " If the temperature increase is sufficiently high , aggregate effects of climate change at global and regional will be negative, especially in the context of multiple stresses; however, at low-to-moderate temperatures, CC may result in net global benefits, although there could be winners and losers at regional or local levels. " [New language is shown in bold .] (Indur Goklany, US Department of the Interior)	Section E has been removed
E-SPM-403	A	19	4	19	5	The chapeau heading is in contradiction with the first bullet point: the chapeau states that aggregate effects WILL be negative (no reference to temperature level - hence it implies for all temperatures), whereas the first bullet point says that for changes up to 2 deg C above pre-industrial, impacts are likely to be mixed. Only one of those two statements can be correct. (Andy Reisinger, IPCC SYR TSU)	Section E has been removed and text has been reworded and incorporated into section D.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-404	A	19	6			There should be lead-in to the bullets on lines 7 through 29 that notes: “Based on impacts analyses that are plagued with many uncertainties including the fact that they that do not fully account for increases in adaptive capacity and the broader range of technological options that should become available if economic and technological development grow consistent with the assumptions that drive the SRES scenarios, uncertainties in impact models, and uncertainties in climate models, especially at local and regional scales:” (Indur Goklany, US Department of the Interior)	Section E has been removed and text has been reworded and incorporated into section D.
E-SPM-405	A	19	7	19	10	We believe the numbers on lines 7 and 9 should be revised upward and (for reasons noted previously) they should be referenced to 1990, not pre-industrial, levels. First, the text on page 7 of the SPM tells us that agricultural potential will peak at 2-3o C, despite the fact that most analyses consistently underestimate (if not totally ignore) future adaptive capacity and ignore technological options that should become available over time due to secular technological change (see Goklany 2005c, 2006a). Second, global forest area could increase for a temperature increase approximating 3 (+)o C above 1990 (not pre-industrial) (Arnell et al. 2002). Third, global carbon sink capacity and net biome productivity could also increase through 2100 even under a 4.0o C increase over 1990 levels (under A1FI; Levy et al. 2004). Fourty, the amount of cropland is projected to diminish under the same scenario, which should substantially reduce pressures on biodiversity (see Goklany 2005c). Fifth, Arnell (2004) shows that under the same scenario (4o C under A1FI), total population under water stress might well decline at least through the 2080s (see also Goklany 2005c). (Indur Goklany, US Department of the Interior)	Done. Section E has been removed and text has been reworded and incorporated into section D.
E-SPM-406	A	19	8			The phrase "positive at higher latitudes" describing the impacts of global mean temperature changes up to 2 degrees seems to be far too sweeping for such a large area, conflicts with descriptions elsewhere (eg, Chapter 17), and may confuse readers who note on SPM page 9 that the highest latitudes (the Poles) are among the most adversely affected. Suggest modifying the wording to represent a mixture of negative and positive impacts in the higher latittudes. (Stephen Sheppard, University of British Columbia)	Section E has been removed
E-SPM-407	A	19	8			Global mean temperature increase up to 2 °C will cause positive impacts at higher latitudes? - it is possible that the sum of all impacts will be positive, but some negative impacts are very important (rapid shift of biological species to the higher latitude may cause long lasting instability in ecosystems, significant runoff increase in some regions may cause problems in infrastucture and soil erosion, invasive species may cause increase of diseases, increase of wildfires are possible also in	Section E has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						regions where they did not occurred up to present ...) (Milan Lapin, Faculty of Mathematics, Physics and Informatics, Comenius University)	
E-SPM-408	A	19	9			Change “expected” to “tentatively estimated”. For reasons previously articulated, the quality of impacts assessments does not warrant the use of the term “expected” in conjunction with the results of impacts assessments. (Indur Goklany, US Department of the Interior)	Section E has been removed
E-SPM-409	A	19	12	19	14	The figures given here appear inconsistent with the figures in the TS or the underlying chapter. (Andy Reisinger, IPCC SYR TSU)	This bullet in section E has been rewritten and is now in the last part of Section D
E-SPM-410	A	19	12	19	14	Given the importance of these figures to compare impacts costs against mitigation costs (even if crudely and with all sorts of caveats), it might be helpful to have a slightly longer discussion of the assumptions and limitations underlying those figures. For example, it might be useful to state whether most of those studies include very long-term impacts (such as melting of Greenland), whether there are non-linearities accounted for (eg ecosystems flip, or when certain regions reach their adaptive capacity limits), and finally a reference to the fact that damage costs not only increase at the margin, but also accumulate (but there are no studies considering this). (Andy Reisinger, IPCC SYR TSU)	This bullet in section E has been rewritten and is now in the last part of Section D
E-SPM-411	A	19	13	18	13	I am confused by the numbers here. Having the standard deviation be twice as large as the mean implies that the social cost of climate change could well be positive-- and this seems really absurd. The range of variation must be quite skewed. (Michael MacCracken, Climate Institute)	This is the correct interpretation. At least one study has put the cost at a (small) negative value.
E-SPM-412	A	19	13	19	13	If the mean estimate for carbon social costs is \$43 per tonne and the stdev is \$83/tC, then there is a possible benefit to emitting CO2. This is because the confidence interval includes NEGATIVE values. Was there a mistake in the stdev value? Could it be 8.3 (rather than 83)? (Knut Nadelhoffer, University of Michigan)	This is the correct interpretation. At least one study has put the cost at a (small) negative value.
E-SPM-413	A	19	16	19	18	This bullet is not necessarily accurate. Because of multiple stresses, it is possible – even likely – that CC might relieve some stresses. Some examples: A. Global sink capacity and net biome productivity could increase through 2100 even under a 4.0o C increase over 1990 levels (under A1FI; Levy et al. 2004). B. The amount of cropland is projected to diminish under the same scenario, which should substantially reduce pressures on biodiversity, because agricultural land use is the largest stress on global biodiversity (see Goklany 2005c). C. Arnell (2004) shows that under the same scenario (4o C under A1FI), total	Section E has been removed. Section D contains a new heading ‘Vulnerability to climate change can be exacerbated by the presence of other stresses’.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						population under water stress might well decline at least through the 2080s. Accordingly replace this bullet with one that reads as follows: “Because humanity and the rest of nature are under a multiplicity of pressures and the wide ranging consequences of climate change, unless global temperature changes are very high, CC might reduce some of these pressures in certain sectors in certain locations, while adding to pressures in others.” (Indur Goklany, US Department of the Interior)	
E-SPM-414	A	19	17	19	18	include complex disasters and conflicts [17ES; 17.1; 17.3] (Silvia Llosa, ISDR System)	Climate hazards and conflict have been included in ‘Vulnerability to climate change can be exacerbated by the presence of other stresses’ in Section D.
E-SPM-415	A	19	20	19	22	This statement seems to contradict the statement in chapter 20 executive summary. Chapter 20 says that climate change per se will not be a serious impediment to reaching Millennium Development targets for 2015 - which is exactly the opposite of what the reader takes from the SPM. Please revise the SPM wording to ensure consistency with the findings reported in the TS and underlying chapter. (Andy Reisinger, IPCC SYR TSU)	SPM now specifies achievement of MDG over the next half century not by 2015.
E-SPM-416	A	19	20	19	28	These bullets need to be refined. First, in the short-to-medium term, it is the lack of sustainable development that hinders adaptation and mitigation to climate change [Note the Millennium Development Goals (MDGs) are to be met by 2015, by which time the impacts of CC on climate-sensitive hazards and threats will still be relatively modest compared to impacts of non-CC related factors according to all the impacts analyses (see Goklany 2005a, 2005c). In the very long term, however, CC may indeed retard sustainable development. However, according to the DEFRA Fast Track Assessments [Arnell et al. 2002, and the series of papers reported in Global Environmental Change, v. 14 (2004)], on an aggregate level this is unlikely to be the case for most climate sensitive hazards until after the 2080-2100 period (see Goklany 2005a, 2005c). Accordingly, the two bullets on lines 20 through 28 should be revised thus: A. Replace the bullet on lines 20 through 21 with the following: “For the next few decades, lack of sustainable development will hinder the ability of nations – particularly developing nations -- to adapt or mitigate climate change.” B. Modify and split the following bullet (starting on line 24) into two. The first of these bullets should read: “ In the long term , climate change will affect sustainable development, making it more difficult to achieve.” [New language is shown in bold ; deletions not shown]. The second of the new bullets should read as follows: “ The corollary is that Sustainable development may be an effective is a	SPM now specifies achievement of MDG over the next half century not by 2015. These two bullets have been removed from Section E and new text added which states that SD can reduce vulnerability by enhancing adaptive capacity and increasing resilience.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						very cost-effective way of reducing/avoiding the negative aspects of climate change impacts , and while simultaneously building both adaptive and mitigative capacity.” [New language is shown in bold]. For detailed rationale, see Goklany (2006a). (Indur Goklany, US Department of the Interior)	
E-SPM-417	A	19	24	18	24	Change "affect future" to "make" and delete "making it"--there is no question, what with rising sea level, tighter water resources, greater prevalence of disease vectors, disrupted agricultural production in developing nations, etc. that a much stronger statement is not required. (Michael MacCracken, Climate Institute)	Section E has been removed and section on SD is now in Section D and it has been stated that ‘...it is very likely that climate change can slow the pace of progress toward sustainable development...’
E-SPM-418	A	19	24	19	25	Use of the word "corollary" is incorrect here. Corollary means that something follows logically. The first sentence says that climate change makes SD more difficult, but I don't see a LOGICAL implication that therefore, fostering SD will reduce climate change impacts. It's no doubt true, but it doesn't follow on the basis of logic. As a counter example, drinking lots of alcohol makes it harder to walk in a straight line, but it doesn't follow logically (and demonstrably is NOT true) that walking in a straight line somehow increases resilience against alcohol. (Andy Reisinger, IPCC SYR TSU)	Section E has been removed and section on SD is now in Section D
E-SPM-419	A	19	24	19	28	add either in this bullet or as a separate bullet 'Reducing losses to weather-related disasters, meeting the MDGs and wider human development objectives, and implementing a successful response to climate change are aims that can only be accomplished if they are undertaken in an integrated manner. [17.4.2; 20.3]' source 'Disaster risk, climate change and international development: scope for, and challenges to, integration', Lisa Schipper and Mark Pelling in Disasters (2006), 30(I): 19-38' (Silvia Llosa, ISDR System)	Section E has been removed
E-SPM-420	A	19	26	18	26	It is not at all clear how various of the impacts can be avoided--sustainable development might help to reduce them, but at a cost, and it is just implausible that there will be little cost to avoiding the challenges ahead. (Michael MacCracken, Climate Institute)	Not sure what is wanted here
E-SPM-421	A	19	26			Suggest more moderated wording given the shortage of good data on relationships between adaptation and sustainable development (see Ch. 20): "...reducing/avoiding some negative aspects of climate change impacts..." (Stephen Sheppard, University of British Columbia)	Section E has been removed
E-SPM-422	A	19	28	19	28	To change "adaptive capacity" to "adaptation measures" (Antoaneta Yotova, National Institute of Meteorology and Hydrology)	Section E has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
E-SPM-423	A	19	28	22		Distributed systems to generate energy cleanly and stabilize the climate can be the first and necessary step toward more wide-ranging sustainable changes in human impacts on forests, farms and fisheries. (Paul Epstein, Harvard Medical School)	OK
E-SPM-424	A	20	1			Figure SPM-6: This figures seems to hang somewhat loosely at the end of the SPM, with insufficient justification as to why India is picked out (especially if we say that Africa is the most vulnerable region, and not India?). It illustrates too little of the conceptual issue and focuses too much on a specific region without justification as to why this particular region is picked out. This is a problem at the SPM level. I'd also be cautious about the wording "globalization vulnerability" - does this mean that the IPCC says that globalisation makes people more vulnerable? A number of people would argue that globalisation makes them more resilient due to greater resource flow etc. The IPCC should be careful not to pass an implicit judgement and choose wording on this more carefully. (Andy Reisinger, IPCC SYR TSU)	Figure 6 has been removed
E-SPM-425	A	21	6	21	6	I would think it might also be useful to add here a definition of "resilience" (Michael MacCracken, Climate Institute)	Definition of resilience hasn't been added to the SPM. Additional definitions can be found in the glossary and the TS
E-SPM-426	A	21	8	21	9	Why is it that climate change is either one or the other--is it not both. One might say that a change in a variable could be either in its mean or its variability, but climate change covers all moments of all variables. (Michael MacCracken, Climate Institute)	Not sure what the reviewer is getting at here. The IPCC definition of climate change includes natural and anthropogenic components.
E-SPM-427	A	21	8	21	13	There should be an explicit statement noting that as used in this document, the term "climate change" includes CC due to all causes and not just greenhouse gas induced changes. Moreover, in order for the SPM to be useful to policy makers, in light of this broad definition, the SPM should take pains to distinguish between the impacts of greenhouse gas induced CC and CC due to all other causes. This is because response strategies — particularly those directed at mitigation – for greenhouse gas induced CC and non-greenhouse gas induced CC may be quite different. In fact, this is one of the advantages of adaptation approaches, and should be noted in the SPM. (Indur Goklany, US Department of the Interior)	Done
E-SPM-428	A	21	8	21	27	There should be a definition for "climate variability". It's not clear whether "climate variability" includes variability under current climate or only under conditions of CC. Accordingly, we would like an explicit statement on this matter. (Indur Goklany, US Department of the Interior)	This has not been added to the SPM. Additional definitions can be found in the AR4 glossary
E-	A	21	8	21	13	(The same also in INTRO, p. 6., line 6-11) The definition of Climate Change as a	This is the IPCC approved definition of

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-429						sum of natural and anthropogene causes is not consistent with up to present understand of Climate Change nature. The natural climate forming factors (astronomic, terrestrial and circulation) cause Climate Changes and Climate Variability existing there during the all Earth history. Climate Change is only the supplement caused by changing atmospheric greenhouse effect due to human activities. Future climate changes represent a sum of natural Climate Changes and anthropogenically induced Climate Change. The presented definition in SPM and INTRO is not acceptable for me and I think so that also for many climatologists. (Milan Lapin, Faculty of Mathematics, Physics and Informatics, Comenius University)	climate change
E-SPM-430	A	22	4	22	30	The definition of the terms used to characterize uncertainty do not include the qualitative terminology IPCC has also agreed to use, nor do they state that in most cases expert judgment is used in assigning uncertainty levels. The text needs to explain the process used to quantify expert judgment and to reference the guidance document developed on this topic. WG II should also consider use of the qualitative terminology IPCC has adopted. (Lenny Bernstein, L.S. Bernstein & Associate, L.L.C.)	These are the definitions used throughout the AR4 and other IPCC reports
E-SPM-431	A	22	12	22	12	It seems to me that the options given here are too limited. First, one can well use multiple approaches, so it should be "analysis and/or an elicitation" but, more important one should also mention model simulations, experiments, historical or other analogs, etc. as also providing ways to estimate or contribute to estimating likelihood. (Michael MacCracken, Climate Institute)	These are the definitions used throughout the AR4 and other IPCC reports
E-SPM-432	A	22	27	22	28	There should be an explicit statement noting that the confidence levels noted in this document have not necessarily been reviewed or endorsed by the experts and governments that have reviewed this document. Alternatively, the precise (rather than the general) methodology and procedure for each confidence level should be forwarded to all reviewers and sufficient time allotted for a detailed review. We believe, that this would take much more than the 2 months allotted for this review. (Indur Goklany, US Department of the Interior)	These are the definitions used throughout the AR4 and other IPCC reports

IPCC WGII AR4 SOD *EXPERT* Review Comments

LATE COMMENTS:

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-1	LATE	0	0			The document is well structured and seems to touch key issues of relevance to policymakers. It could be strengthened by drawing in more material related to Article 2 of the Convention with respect to keystone impacts, possible thresholds, upper limits or indicators to guide future climate policy. Some of this material is currently summarised in Ch 19 – though presumably if it is there it is also found in the individual (sector, region) chapters. If you were able to do this, it would provide a bridge for discussion of mitigation and adaptation as they relate to vulnerability to climate change and impacts. In its current form, the SPM emphasises issues relevant to adaptation. (Jan Corfee-Morlot, OECD)	Article 2 and DAI is included in the SPM
SPM-2	LATE	0	0			Attitudes and public perceptions of climate change receives almost no attention in the SPM yet it is important. There is a need to move IPCC assessments out of the "linear" mode of trying to "inform decision-makers" into a mode that supports inter-active exchange and reflection among people -- both consumers and producers of information on climate change -- about how to frame the problem and approach responses. There is a small but growing social sciences literature on this issue with respect to climate change, much larger if one looks at environmental problem solving more generally. The IPCC reports largely ignore this literature or more generally issues of how information is used in decision-making. The social sciences literature suggests that there are various ways of thinking about the problem of climate change and that it is not sufficient to understand the "science" and the assessment to stimulate policy but that one also needs to frame research and assessments in such a way that it is meaningful to different stakeholders, whether they be island communities, arctic indigenous people or urban dwellers in coastal cities. One of the underlying recommendations is the need to create deliberative "spaces" where science assessment interacts with people (consumers of information, i.e. stakeholders including policymakers) through a more iterative process. Focusing some attention on policy and other decision-making processes and on how expert information is communicated and further developed through deliberative exchange could help to frame the discussion in the SPM about where "fact vs value" distinctions are fuzzy and impossible to separate. For example, this comes up in the discussion of Article 2 around meanings of dangerous; it also comes up when you discuss controversial, value-laden issues such as social costs of carbon. Without deliberative spaces to help elaborate and develop understanding about the wide range of legitimate views on sensitive issues (e.g. how much and	With the best will in the world, we can't cover this in the SPM because (1) we're constrained by chapter content, and the chapters don't cover it, and (2) we're struggling to keep the length as short as possible. No action.

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						<p>what kind of risks associated with climate change are acceptable?), it is difficult to advance meaningful policy reforms to respond to climate change at any scale. Clearly it is easier to orchestrate deliberative processes on smaller scales of decision-making (ie. regional rather than global) and this has begun to occur in some places with some success in terms of shifting attitudes and understanding about climate change. The media also play a role—and have begun to shape attitudes and understanding of climate change. This could also be mentioned -- there is a significant literature on media and global environmental issues. (Jan Corfee-Morlot, OECD)</p>	
SPM-3	LATE	3	28	6	37	<p>I have several general comments: 1) I was surprised at the lack of a discussion of policy options in the SPM, since this is a "summay for policy makers". I have not read the detailed chapters, but can only assume that there is material on regualtions, taxes/subidies, trading mechanisms, voluntary agreements, R&D and other policy tools that are currently being used in different sectors, although perhpas not fully reflecting climate change. 2) I sense that there are two main new finding, e.g. climate change is happening now and affecting many different physical and ecological systems and we can now estimate future impacts with greater certainty than in the TAR. Yet you have managed to make the first finding very unexciting...in fact boring! boring! While you may not wish to admit it, but you are competing with the popular press which has run stories for the last 3-4 years documenting changes in different systems. As currently written policy makers will wonder whether they should even care (or fund another assessment!), e.g. "rising temperatures include bleaching of coral" WOW!....or "changes in physical systems include the loss of Arctic sea ice ...and retreats of glaciers worldwide" I suggest that you try to put some interesting data in the summary that will attract your readers. For example, " The area of Arctic Ocean sea ice was lowest in more than a century during the summer of 2005 as measured by satellite data. The estimated decline in 'end-of-summer' Arctic sea ice is now approximately 8 percent per decade" (http://nsidc.org/news/press/20050928_trendscontinue.html)...at least that says something! ...as I write this 16000 cows (1percent of the herd) died in CA! ..more importantly 26000 people died in France in 2003 ...yet you say effects are not yet apparent on human systems! Please rewrite the first section, put in some interesting data (10-15 bullets) and drop most of the bland material on pages 4-5. I also note that you have 4 pages of detailed facts about future vulnerabilites about which we have less confidence and only one page of not very interesting information about things we are measuring today. Finally, having read an early version of Chapter 19, I am left wondering why you did not simply use it for the SPM (yes I know it was</p>	Section B has been substantially rewritten

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						not comprehensive)..but it would have been a good starting point. 3) The message about adaptation need to be refined and made clearer, e.g., some human systems may be able to adapt up to certain point, but natural systems will not be able to adapt. As I read the SPM, I got an overly optimistic message about the ability to adapt. (see additional comments below) (Dennis Tirpak, OECD)	
SPM-4	LATE	3	30	3	31	the following statement seems oddly precise: “Over 99% of observed changes in systems and sectors are consistent with regional temperature trends.” Are the changes also consistent with other manifestations of climate change e.g. shifts in precipitation patterns or sea level rise? (Jan Corfee-Morlot, OECD)	Statement has been rewritten
SPM-5	LATE	7	1	9		Section on Art 2 could be strengthened if you pulled in a wider range of results from the Ch 19 summary (see specific suggestions below). In particular, the notion of key vulnerabilities is completely missing from the chapter. (Jan Corfee-Morlot, OECD)	Key vulnerabilities included in the SPM
SPM-6	LATE	7	1	9		Need to have some reference to the difficulty of interpreting Art 2 – one or two sentences bringing inevitable mix of “fact and values” in interpreting Art 2 (see 1st para ES of Ch 19). (Jan Corfee-Morlot, OECD)	Given the need to keep page length to a minimum we have not tried to explain UNFCCC Article 2 in the SPM – presently readers need to go to the TS and/or underlying chapters for explanation
SPM-7	LATE	7	1	9		Mention need for multiple metrics to assess key vulnerabilities across different systems/sectors. (Jan Corfee-Morlot, OECD)	Key vulnerabilities are no longer mentioned in SPM
SPM-8	LATE	7	1	9		Could mention criteria for assessing key vulnerabilities to interpret Art 2 (e.g. also in ES-Ch19 – magnitude, timing, distribution, likelihood and confidence, persistence and reversibility, adaptation, etc (Jan Corfee-Morlot, OECD)	Done in footnote on page 10
SPM-9	LATE	7	4			p. 7, section on Art 2, should be broadened to include some discussion of key vulnerabilities - Ch 19; Suggestions: Might rework the lead sentence (p.7): Key vulnerabilities are associated with the range of potential global mean temperature increase and these merit attention from policymakers. (Jan Corfee-Morlot, OECD)	Done in footnote on page 10
SPM-10	LATE	7	17	9	18	Results on p 7 are quite specific (i.e. 1/3 of species lost from current range in 2-3 C range) and should also be reflected or tied in with sector impacts found later in the SPM, e.g. in Box SPM-1. Would it be possible to link or add some temperature specific outcomes to make the tie more specifically to your earlier discussion?	This section has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Jan Corfee-Morlot, OECD)	
SPM-11	LATE	7	22	9	7	With regard to current knowledge of future vulnerability, Fig. SPM-3 says it all and is more comprehensive than the listing of impacts from 1 to 6 degrees C. on page 7. I suggest dropping this listing and simple using the figure. I also question why Fig SPM-4 is the only example of how development might affect impacts. I don't disagree with the facts, but wonder why this example is singled out in the SPM. I suggest that you drop it unless you can find a more generic way of making the point. Alternatively you might wish to include a figure on natural systems which cannot adapt to provide balance. (Dennis Tirpak, OECD)	1-6 deg listing has been removed from the text and Fig. SPM-3 has been expanded to Tables 1 and 2. Fig. 4 has been removed and replaced by a new Figure 2 which more clearly demonstrates the importance of the development pathway chosen
SPM-12	LATE	8	1			it is useful to have discussion structured around changes of 1C (as opposed to 0-2, 2-4, >4 as currently found in ch 19). Fig p. 8 is a useful addition. Interesting spin on the categories laid out in ch19. Raises a question of the consistency between Ch19 (and its categorisation of key vulnerabilities) and this SPM set of categories. If there was consistency between the two, you would provide a clearer indication of need for metrics to assess/monitor change and progress. (Jan Corfee-Morlot, OECD)	The SPM and CH19 are consistent. Fig 3 has now been expanded and replaced by new Tables 1 and 2
SPM-13	LATE	9	8			Add mention of the concept of thresholds for key vulnerabilities and the difference between "systemic" and "normative" thresholds (this might be done on p. 9 under heading "some sectors and systems are especially vulnerable"). (Jan Corfee-Morlot, OECD)	Thresholds of varying impacts are highlighted in Tables 1 and 2
SPM-14	LATE	10	16	10		This is a significant piece of information. (I assume it relates just to future impacts.) However it is buried and practically invisible. It essentially says we have much more information and greater confidence about what is going to happen in the future for many more regions and sectors than we had in the TAR. If I am correct...Why don't you say it in plain English and put it on line 10 of page 7 once you get rid of the listing. I don't find the cross references in Fig SPM 5 helpful at all (its a big distraction which will not be used by most readers of the SPM) ...why not prepare two different versions...one for the SPM without the references and one for the TS with the references and cross reference the latter. (Dennis Tirpak, OECD)	Text has been removed. New Section E and Section B highlights the increase in studies carried out since the TAR. Section E also highlights future research needs Fig 5 has been removed
SPM-15	LATE	12				Box SPM-1, Water. "Internal conflicts in arid and semi arid areas over water and pasture rights will increase with possible higher loss of human lives and property" (Shem O. Wandiga, University of Nairobi)	Box has been removed
SPM-16	LATE	12		15		Box SPM-1 - I realize that every chapter author probably wants to have some part of his work in the SPM...Don't give into this demand. There are some interesting facts here that could be retained to make the SPM interesting, but the entire table	Box has been removed

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						could be put into the TS to save space ...a compromise might be an appendix. This will also make the approval process much easier. I assume you already realize that the nature of the bullets is very uneven, many are poorly worded, etc... I assume that this is largely results from inconsistent scenarios and different timeframes. (Dennis Tirpak, OECD)	
SPM-17	LATE	13	25	13	28	box spm-1: Second bullet under industry is awkward and needs reformulation. (Jan Corfee-Morlot, OECD)	Box has been removed
SPM-18	LATE	13	43			Under health (I have not read the chapter) I was surprised to see no mention of possible decline in mortality due to cold stress, at least in some regions if not globally. I know that this result can be found a few studies. (Jan Corfee-Morlot, OECD)	Box has been removed
SPM-19	LATE	14	20	14	32	Box SPM-2: • coastal zone impacts – vulnerability of highly populated coast-lines in Asia and elsewhere to sea-level rise – seems to be missing entirely • Asia – glacial retreat – don't you want to mention the impact implication of this e.g. for water supply, hydropower in the region ? (Jan Corfee-Morlot, OECD)	Box has been removed
SPM-20	LATE	14				Page 14; Box SPM-2, Africa: "Mountain glaciers will all be melted and river sources will most likely be affected" "The African media face of hunger, malnourished children, women, and old persons may become more frequent. Cost for relief food to the international community will rise and internal conflicts and migration of abled persons to other countries will increase". (Shem O. Wandiga, University of Nairobi)	Box has been removed
SPM-21	LATE	16	4			The heading should read "Some adaptation is occurring now in human systems, depending on the society, but natural systems cannot be readily managed and will not be able to adapt" (Please read early IPCC reports!) PS: I am sure the Inuit are going to like your example... Was anyone from your team in Montreal? Did they listen to the stories they told? In the near term the Inuit will buy nontraditional food to survive (adapt)..in the long run their culture, traditions and society will be lost. (Dennis Tirpak, OECD)	Heading rewritten to 'Some adaptation is occurring now, to observed and projected future climate change, but on a very limited basis.'
SPM-22	LATE	16	19			I note that you continue to use the term 'adaptive capacity' which is not well defined and cannot be measured. I find this a disservice to the policy community. Why not drop this term in this assessment and reintroduce it in a later IPCC report when you figure out how to measure it. (Dennis Tirpak, OECD)	Adaptive capacity is used in the SPM and is defined at the back of the report

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
SPM-23	LATE	16	30			The heading should read "The ability of human societies to adapt can be enhanced, but there are limits and costs" (Dennis Tirpak, OECD)	The heading has been changed to: More extensive adaptation is required to reduce vulnerability, but there are barriers, limits and costs. Supporting text has been rewritten
SPM-24	LATE	16	35			1) I don't understand the sentence. 2) NAPs are a UNFCCC term that apply to the LDCs...yet development planning should apply to all countries (Dennis Tirpak, OECD)	NAPs have been removed from the SPM
SPM-25	LATE	16	38	16	42	I think you are talking about adaptation to climate variability and climate not climate change in the first sentence. Please clarify. Regarding the second sentence, I think that delays could also lead to reduced costs if maladaptation is prevented. The sentence needs to be balanced. The last sentence should make it clear that you are talking about human systems. (Dennis Tirpak, OECD)	Text has been removed
SPM-26	LATE	16	44	16	46	insert and "and" and make it clear that this is for human system responses (Dennis Tirpak, OECD)	Sentence is OK as it is
SPM-27	LATE	16	44			as note previously..I find the lack of a discussion of real policy options to be disappointing. See comment number 1 (Dennis Tirpak, OECD)	Noted. Space constraints and need to avoid being policy prescriptive absolutely preclude this.
SPM-28	LATE	18	1	18	2	The first sentence should be a heading and in bold to balance the optimistic message of table SPM1 (Dennis Tirpak, OECD)	Table 1 has been removed.. Text has been rewritten
SPM-29	LATE	18	15	18	16	this sentence does not make sense as written. Failure to adapt would presumably wipe out the entire benefit of adaptation, no? (Jan Corfee-Morlot, OECD)	Text has been removed
SPM-30	LATE	18	18	18	29	This material should be moved forward to section C and put in terms of temperatures. It also needs to be made consistent with material in WGIII SPM on the probabilities of exceeding certain thresholds. (Dennis Tirpak, OECD)	This remains in section D. Temperature ranges for the stabilisation scenarios are provided in Table 1
SPM-31	LATE	18	18	18	29	Impacts can be reduced or delayed...section This section could be beefed up with the results of the ch19 integrated assessment lit review – see Ex Sum, Ch 19 , line 15-37, p 3 (Jan Corfee-Morlot, OECD)	This section has been substantially rewritten
SPM-32	LATE	18	31			This heading is overly optimistic, but at least you used 'complementary' and not 'synergistic'..this will only be so in some sectors and certain points in time..the heading needs to reflect the text that follows which is somewhat different (Dennis Tirpak, OECD)	Heading now changed to: A portfolio of adaptation and mitigation measures can further diminish the risks associated with climate change. 'Complementary' is retained in the supporting text. Supporting text has

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
							been rewritten
SPM-33	LATE	18	31	18	50	adaptation section <ul style="list-style-type: none"> Mention - key distinctions that matter to allow adaptation to be effective, and to lower its cost are slowing the pace of climate change as well as the magnitude; higher potential for effective adaptation in human systems than in natural systems where change maybe non-linear and systems may not be managed systems. (from Ch 19) (Jan Corfee-Morlot, OECD)	Slowing the rate of climate change is mentioned
SPM-34	LATE	18	41			The benefits of mitigation measures will be felt in the near term in the form of energy security, reduced air pollution and in some situations new business opportunities. What is the basis for picking 2040? Line 46: There is a stronger argument to be made based on a paper by Hansen who said that we already have 0.6 Celsius in the pipeline. If you accept that estimate then some adaptation is necessary. (Dennis Tirpak, OECD)	2040 replaced by 'after several decades'
SPM-35	LATE	19	7	19	8	What is the basis for saying that the impacts will be positive at high latitudes...you are introducing a value judgment. I personally would like my grandchildren to inherit a planet that has a northern polar cap in both the summer and the winter. I don't consider the disappearance of summer ice in the Arctic or ice from Greenland to be positive. Nor do I believe that the SLR that will accompany a rise of (let's call it 4 degrees C) in northern latitudes will be positive. Have you added the number of species lost in the north vs. the south? Figure SPM3 says that 25 percent of the species will be lost at between 1-2 degrees. This is very problematic comment!! (Dennis Tirpak, OECD)	Text has been removed
SPM-36	LATE	19	12	19	14	This should be caveated to note that it does not include non-market systems, non-linear effects, abrupt changes extreme events and market effects in all regions and that there are significant data and methodological issues relating to equity weights and discounting.. (Dennis Tirpak, OECD)	These uncertainties are described in the text which has been moved to Section D
SPM-37	LATE	19	12	19	14	implications for sustainability – 2nd bullet: <ul style="list-style-type: none"> This discussion of social costs of carbon is misleading as written. It needs to clearly state that all est of scc are incomplete (e.g. as none include impacts of extreme events, and most are missing one or two other big categories of impacts). Also that the wide range of estimates is due at least in part from a wide range of legitimately different perspectives (and assumptions) about how to value impacts over very long time frames and in the distant future, across diverse regions and populations, and in non-market sectors (e.g. ecosystems). (Ch 20 does say this but 	These uncertainties are described in the text which has been moved to Section D

IPCC WGII AR4 SOD *EXPERT* Review Comments

Chapter- Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						if I recall that discussion is found in a different section of the chapter than the discussion of SCC numbers. Too bad!) (Jan Corfee-Morlot, OECD)	