WMO

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

UNEP

IPCC WGII
Fourth Assessment Report
Climate Change Impacts, Adaptation and Vulnerability

Expert Review of First Order Draft

Specific Comments

Chapter 2

December 5, 2005

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 DECEMBER

Substantive comments

- The chapter writing team should discuss all substantive expert review comments, by email and/or at Merida.
- 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 can be kept electronically, or with pen-and-paper.
- 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 **28th February 2006**.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-0	A	0				**Co-chair and TSU comments** General comments. Obviously, some work has gone into this draft but I think this chapter is not seeing the wood from the trees. The key issue is not what new methods and what new scenarios but what difference they have made to the assessment of impacts/adaptation/vulnerability; how far they have narrowed the range of uncertainty (or v.v.); how far they have altered our confidence, etc. The two main points that are asked of the chapter: a) (not only) what new methods since TAR BUT how have these altered our ability to assess future impacts i.e "resulting uncertainties and confidence future levels" which is the title of the sub-section in the Plenary-approved outline. And b) (not only) what new methods in scenario development but WHAT ARE THE scenarios that characterise the impacts assessments that follow in this volume. On the latter (above, i.e. scenarios): It is essential that the reader can refer here to a summary of the future climates that underpin the material covered in later chapters eg 1) regional temp and precip change under SRES (in the ZoD on p 60 you presented graphs of these, but these are not in the FoD; yet (not all but at least an intelligible summary of) the scenarios used by authors (that is, presented to them in the scenario material you developed for LA1 and 2) must be reported here. and 2) temp and CO2 levels in various stablisation scenarios; and 3) how these differ from IS92a or 1% forcing (because many of the assessed impacts in the volume are under this scenario. And there should be at least some global maps of projected T and P.	We have some sympathy with this view, and have tried to approach the revision by first identifying key messages that emerge from our assessment, from this review and from any other points that we think need to be conveyed. We have a third aim – to demonstrate how methods have proliferated to account for the widely expanding needs of assessment. On methods, context, especially policy context, is critical. The major aim of improvements in methods is as much to increase policy-relevance as it is to reduce uncertainty. This is more do to with confidence that the results matter, rather than reductions in uncertainty, although the needs of both are two significant drivers of risk assessment. Re. getting lost in the detail of methods, this was the case in the FOD but the territory is complex. There are many useful suggestions for how improve this in the review which have informed our own plans for doing so. The chapter has been massively re-organised to account for this and to better integrate methods and scenarios. The context of the scenarios is critical in addition to content; this has been sharpened and integrated with the methods parts to provide a general rationale. For the SRES projections from the TAR and

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						Of course, there is pressure for space, but remember that the readers need not have detail of the new methods that you give them (they can be referred to this); what they want to know is what current scenarios are being used, how they differ from previous (in the TAR) and what this means for the impacts/vulnerability/adaptation assessment that follow in subsequent chapters. And on the former (above) i.e. methods: Again, one gets lost in the detail. The main questions are: a) What new methods have been developed since TAR that have narrowed the range of uncertainty and give us greater confidence in the current assessment; where were the main uncertainties due to method in TAR; where has uncertainty reduced/confidence increased since TAR; and, the corollary, b) Where have advances in methods revealed greater uncertainty, that we did not realise before. For example, the introduction of socio-economic assumptions in the SRES has revealed almost order of magnitude differences in impacts between (for example) A2 and B2, which did not exist in TAR, where a single value often characterised impacts under IS92a with single best-estimate technology/population etc. Length: This is the same as in ZoD, although a cut of one third was requested at LA2. A cut of AT LEAST ONE THIRD is still needed. Since the page length limits have to be met, under any circumstances, it is necessary to cut much of the detail, and use sources to guide the reader elsewhere to the detail. I would also argue strongly that you must make more room to guide the reader on a) The IMPLICATIONS FOR THE ASSESSMENT of the new methods and b) DESCRIBING AND REPORTING the new scenarios that underpin the assessments in the chapters that follow.	FAR, we are comparing these. We have also identified a process to obtain information about scenarios and methods used in the report. It requires some feedback from other chapter authors and we have prepared a short questionnaire. We have added a couple of CAs, where we have identified real gaps, but otherwise haven't been too proactive on this front. We spent a lot of time on identifying key messages in Merida. These are now reflected in the Executive Summary.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						Contributing Authors: There are few of these at present. Author list: should have nationality in brackets alongside names Executive Summary: This currently fails to signal the major advances that have or have not been made. Can you find lead sentences (those in italics) that deliver the main messages: eg a) there have been major improvements in…b) little advance has been made regarding....c) new socio-economic scenarios have enabled... (NB there were some just emerging in TAR, now we have masses of them) d) for the first time scenarios of mitigation (particularly of stabilisation) are available, thus enabling assessment of damage avoidance under varying policies of emissions reduction (NB there was not a single such assessment available in TAR) **(Martin Parry)**	
2-1	A	0				This chapter gives a good overview a range of different perspectives and I think it should be very useful to readers who wish to learn about different methodologies. (Richard Betts, Met Office)	No action needed
2-2	A	0				The reference call-outs in the text are inconsistently formatted, making the consulting references difficult. Also, the method (tense, inclusion in parentheses or not, etc.) of referring to the authors in the text is a sometimes awkward. Although thorough and up-to-date, the chapter is long, detailed and hard to follow for the non-specialist. It seems to be about half again as long as the target length and would benefit from condensation through eliminatation of some detail and redundances and more generalised writing for a broader target audience. Greater reference to how the methods and scenarios are used the other WGII assessment would also be helpful. As a non-specialist in this field I did not perform a line-by-line review, but did note above just a few specific problems which should be addressed. (Donald Boesch, University of Maryland Center for Environmental Science)	References fixed. Chapter heavily reformatted and edited to account for points raised here
2-3	A	0				This is a good FOD and covers the subject well. Section 2.2 on new developments is excellent. Section 2.3 is more problematic. It reads like an objective report and	Mental models and underlying assumptions in scenario use need to be better addressed. The

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						assessment but I have my doubts about it. Probably I am not sufficiently well versed in the nuances of the scenarios debate to be able to read properly between the lines. There are big debates about scenarios and accusations of bias and manipulation and poor methodology. These do not seem to be addressed, and I am left with the feeling that the chapter does not overtly raise a number of issues that are on people's minds, and therefore cannot address them directly. Without being politically prescriptive it should be possible in this chapter to clearly identify the issues and to report on the state of the debate. (Ian Burton, University of Toronto)	debates cannot be adequately covered because of space reasons but we will raise the major ones.
2-4	A	0				A very thorough chapter that provides exscellent coverage of developments since the TAR. One method that gets only a very brief mention, at the end of the chapter, is the use of visualisation techniques/decision-testing tools for investigating climate impacts and adaptation options. Two examples that could be covered are the 'Floodranger' tool (developed at UCL?) and the new visualisation tool for examining climate impacts developed in the ReGIS 2 project (managed by Ian Holman at Carnfield University). The chapter also does a very good job of explaining the roles of stakeholders in the assessment process. I note that the section headings used are quite different from those provided by the IPCC. (Richenda Connell, Acclimatise)	Addressed − we have added material on visualisation techniques: Floodranger (UCL) and ReGIS2
2-5	A	0				Entire chapter needs a good edit for punctuation. The chapter is very long and arduous to read. I suggest the chapter be outlined again and redundances avoided. Section headings need to be parallel. (Virginia Dale, Oak Ridge National Laboratory)	Chapter heavily edited for meaning and readability
2-6	A	0				Overall comment: Chapter 2 gives the appearance of being two chapters (2.1+2.2 and 2.3+2.4) squeezed into one, hence the high page number (recommended length is approx. 60 pages but the draft is currently just over 90 pages). The style of the two parts is very different; this needs to be addressed so that the reader finds the chapter structured in a logical way, which will make the read much more fluent. My overall impression is that the chapter as a whole holds much of the relevant information that I'd expect to find, but there is a need for some rewording and restructuring of sections 2.1 and 2.2. A comment on the overall structure of Chapter 2:I guess this may be a bit late in the process but would in not make sense to shift the sub-sections of the chapter around? I.e. (i) talk about uncertainties in future climate, (ii) how can we address these uncertainties in a wider framework (bring in concept of risk assessment and other methods), (iii) how can we communicate these uncertainties to the public and governing authorities and (iv) where lies the future in terms of describing climate	Scenarios and methods integrated. Chapter restructured to meet closer to the suggested format.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						uncertainties and CCIAV methods. (Marie Ekström, University of East Anglia)	
2-7	A	0				I considered editing the document in detail to try to sort out the major advances (or prioritize them) but this would be an overwhelming task and probably of little value. It appears that each section has problems identifying the new significant improvements and presenting them without appearing like a laundry list of papers. Particularly at issue is the expected 30 page limit which implies that a reduction of one third is probably required. To do this, a significant restructuring may be required (or an alternative presentation style.) Missing issue - The outline for the chapter includes two bullet items that do not seem to be addressed clearly. These are: "Resulting uncertainties and confidence levels" and "Data requirements for assessment". In reading the chapter once through and then again going over details, there was not a clear presentation of these issues, and particularly the latter one. Missing issue - A major advance in modeling climate change has been the introduction of large ensembles of scenarios that are available through online data archives. Both multiple realizations of the response to forcing scenarios and the increased number of climate models (both global and regional) has provided a much richer dataset for the impacts community. At some point, these needs to be highlighted. Missing issue - Regional studies are specific to given locations and timeframes and provide in extremely useful results. At some point, it must be stated that it is difficult to generalize and apply results elsewhere when data may be lacking or circumstances differ. This would be appropriate in a data requirements section. Missing issue - There seems to be a missing general discussion of the common threads among CCIAV methods. Given the desired movement towards a risk management framework, it appears that the required data and analyses need to be viewed from this perspective in order to address the problem from a probabilistic approach. I would suggest something such as: o Major driving factors risk analysis of a given "sector" o Data requirements for risk analysis o Model requirements for risk analysis There do not appear to be clear ties from the preceding sections leading to the discussion in Section 2.4. As written, the final section appears without justification. (Chris E. Forest, Massachusetts Institute of Technology)	Missing Issues (MI): MI 1: we have tried to address these two bullet points (Uncertainties and confidence levels and data requirements). MI 2: This is a WGI CH 11 issue, though we do highlight the importance of regional analysis of CCIAV throughout the text. MI 3: This is now more prominent in 2.2.2.1 (Regional detail). MI 4: common threads amongst CCIAV analysis are addressed through a chapter reformat We have now linked section 2.4 more closely with the preceding sections
2-8	A	0				After reading the chapter, I found it to be a significant amount of information and not a clear presentation of new ideas. It appears to be a collection of all the papers	Addressed. We have spent a considerable time as a group identifying key messages. The

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						or new results and does not make a distinction between ideas that fundamentally change the perspective on the CCIAV problem from those that provide incremental steps without advancing the science significantly. Given the chapter's purpose, it is particularly troubling that most all citations are probably presented in the remaining chapters of WG2. There appears to be a logical disconnect between Sections 2.2 and 2.3. I am particularly frustrated by the discussion of the risk management framework (RMF), which is stated to be the most significant advance, and then the reliance on scenarios to drive impact assessments. At the core of the RMF, the goal is to reduce the likelihood that high consequence events will occur. This can be achieved by either lowering the likelihood of the event's occurrence (mitigation) or reducing the impact or consequence (adaptation). All of this appears to be well presented (although perhaps slightly academic). The logical disconnect, unfortunately, occurs when the chapter transitions to characterizing the future through the scenario or storyline approach with the SRES scenarios prominently discussed. As is well known, these approaches do not offer any likelihoods that a given scenario will occur and therefore, at a fundamental level, these are useless for the risk management framework that requires said likelihoods. As a result, the chapter contradicts itself by laying out a compelling argument for applying the RMF to CCIAV yet then strongly advocates the scenario approach for characterizing the future. Ultimately, decisions are required. Yet, the continued push towards scenario development leads the research away from the decision making process as described under the RMF. At some point, the following must be explicitly stated: "The risk management framework requires a probabilistic approach and a scenarios-based approach does not offer this." (perhaps in Sec. 2.3.1.3) Given the presentation of Section 2.3, the section concerning the probabilistic representations of climate change should be separated from the scenarios approach section. This probably requires moving the material on pg 43 into Section 2.3.1.2. (Chris E. Forest, Massachusetts Institute of Technology)	revised structure of the text reflects, in part, our strategy for addressing these messages. There are few methods fundamental to climate change that have not been used elsewhere, but the context and how they are integrated may be novel. The disconnect between risk assessment and scenarios has now been addressed Probabilistic representations have been separated from scenario-based approaches.
2-9	A	0				New assessment methodologies and the characteraization of future conditions are necessary and well outlined. The selected framework based on risk management is appropriate. The proposed methods for managing and communicating uncertainties are relevant whatever the concerned region. The future directions are however to be consider carefully since information is still scarce in some region. (Savitri Garivait, The Joint Graduate School of Energy and Environment (JGSEE))	Addressed − Section 2.4 has now been expanded to cover other issues, including data scarcity.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-10	A	0				Following are the references alluded to in my comments. Most of these are also available from my home page. Alternatively, I can mail them, if asked. 1. 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. 2. Goklany, IM. 2005. "A Climate Policy for the Short and Medium Term: Stabilization or Adaptation?" Energy & Environment 16: 667-680. 3. Goklany, IM. 2005a. "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. 4. Goklany, IM. 2005b. "Integrated Strategies to Reduce Vulnerability and Advance Adaptation, Mitigation, and Sustainable Development," accepted by Mitigation and Adaptation Strategies for Global Change. . (Indur Goklany, Office of Policy Analysis, Department of the Interior)	Addressed − References have been investigated and added where relevant
2-11	A	0				Overall this is an excellent draft that covers a breadth of approaches and methodologies. It illustrates quite well how much progress has been made since the previous IPCC report on developing approaches to conducting effects and mitigation assessments, or CCIAV in your terminology. It provides a useful primer on these issues, and does a commendable job of clarifying terminology issues, always a significant problem in risk assessments and environmental effects assessments. It does a reasonable job of covering the relevant literature, and provides an understanding for the reader to help distinguish among the various assessment methodologies, understand something about sources of uncertainties, and appreciate the utility of the risk assessment/management approach in decision-making. As such, I believe this will be a valuable contribution to the dialog on climate change. Having said that, I think the chapter could be improved in some general and, as discussed below, some specific ways. First, it is not quite clear what the purpose and objective of the chapter are, so I suggest a clear statement of those at the beginning of the chapter. Since I have not had the benefit of reading the other draft chapters, it may be that Chapter 2 introduces specific methodologies that are used in the subsequent chapters, particularly Chapters 3-8. In that case, it would help if in Chapter 2 there are cross-references to the specific analytical approaches used in those later effects assessment chapters. If that is not the case, then I would certainly suggest that such cross-linkages be incorporated into the overall report; that is, in the subsequent	Addressed − we have clarified chapter aims and there are now better cross refs between this chapter and others.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						chapters, refer back to the specific methodology introduced in Chapter 2 and vice versa. Second, this draft is much longer than needs be to communicate the breadth and nature of various CCIAV assessment methodologies, and there should be a significant attempt to condense the material presented here. The side boxes of information that presently exist in this draft are excellent, and provide useful elaborations and clarifications; I encourage greater use of that structure and less of straight narrative about each approach. Moreover, I suggest that the amount of attention given to each methodology or approach be commensurate with its utility in the rest of the report; that is, while it may be informative to describe some methodology, if that methodology is not subsequently used in the assessments, it should be relegated to a more summary description, perhaps in tabular form. Third, I think it would be useful to organize the presentations at least in part around the risk framework itself. The authors are, correctly in my view, organizing the effects assessments in a risk assessment/ management framework, so I suggest carrying that theme through to the structure of this chapter itself. By that I mean this: the risk framework is fundamentally a cause-effect approach, in which human activities and natural processes are basic drivers, causing a set of physical changes in the global atmospheric/oceanic system, which in turn cause a set of specific stressors (in particular changes in the temperature regime, precipitation regime, rates of sea-level rise, and perhaps intensity of tropical storms and hurricanes) that humans, ecosystems, and agricultural systems experience as effects at local to regional scales. I have found that it is easier to communicate the complexities of climate change and variability and their effects by using this structure as the context. Thus, the issues of climate change scenarios are largely global scale (e.g., it doesn't matter if the GHG comes from China or the U.K.), and the emissions scenarios, mitigation policies, etc. are relevant at that scale. By contrast, how climate change affects people and ecosystems is primarily determined by what those systems experience at the local and regional scale. Granted, we can say something about how biomes might migrate over centuries, but what will really matter to people is what happens to their coastline or their crops or their water supply. And those effects are in fact highly region- and ecosystem-specific; for example, a particular amount of sea-level rise in coastal Louisiana, which as we have emphatically seen recently is subject to extreme rates of subsidence, would have quite different effects from the same amount of sea-level rise on, say, the coast of SE Australia. If the authors followed this structural suggestion, as one example, the discussion of	We have also surveyed how methods are applied in the report and will report this when the information has been collated (possibly after the SOD). We have not used a risk template for the chapter because the structure has already been somewhat dictated by IPCC Plenary. Folded in the multiple stressor approach to ecosystems (and other systems) somewhat better (including US National Assessment)

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						uncertainties could distinguish between the types of uncertainties in predicting global climate change (e.g., alternate emissions scenarios, alternate climate sensitivities, uncertainties in understanding the coupling of atmospheric and oceanic systems, etc.) from the uncertainties in assessing effects relevant to stakeholders and decision-makers (e.g., whether the precipitation in a particular region actually will increase or decrease, how well a particular city and its population are already adapted to high temperatures, how much habitat alteration in a region have made it more vulnerable to flooding, etc.). Another advantage of the driver-stressor-effects structure is to discuss in more depth the interactions of climate change-induced stressors with other natural and anthropogenic stressors, a central component of how effects will be manifested on humans and ecological systems. For example, sea-level rise is an especially important issue in part because of the massive development that has occurred in coastal systems around the world, making the societal infrastructure highly at-risk as well as making natural ecosystems more vulnerable and less resilient. Habitat alteration is critical to preventing natural ecosystem migrations in response to climate change; hydrological alteration has made many regional systems more vulnerable to drought; of course, there are hundreds of examples that could be identified. That brings me to the related suggestion, to use such specific cases as illustrative of the points being made in Chapter 2. A side box about how hurricanes in Central America now lead to disastrous flooding and mudslides because of extensive deforestation over the last few decades is an example that could be used. The fourth overall point to make again relates back to the risk framework. The definitions of risk presented here are useful, but don't quite go far enough to explain risks to ecological and societal systems. The original concept of risk dealt with the probability of specific events multiplied by their consequences, derived from the engineering perspective, such as likelihood of individual failure events that could lead to system failure for nuclear power plants, first developed in the 1950s. By the 1980s, risk assessments were applied extensively to assessing human health risks, but since there was little uniformity in risk assessment approaches, the US National Academy of Sciences formed a panel in 1984 that produced the "Red Book", the definitive work on assessing human health risks, focused on the risks of chemically-induced cancers. That approach was based on a combined assessment of chemical hazards (the inherent ability to cause harm) and exposure (the frequency distribution of doses experienced by an exposed human population). By the early 1990s, however, it was clear that this approach was inadequate for assessing risks to ecological systems, which had multiple stressors	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(not just chemicals), multiple receptors (not just humans), and multiple endpoints (not just cancers). The resulting ecological risk framework was developed by the US Environmental Protection Agency and elsewhere, and specifically addressed the issue of distinguishing those effects that matter from all possible effects in an ecosystem. Essentially any stressor will cause some effect in an ecosystem, but the key is understanding which effects rise to the level of ecological significance. In the present context here, this is critical to understanding ecological effects, in that the effects from climate change-caused stressors that are ecologically or societally important are the ones that must be analyzed and, as noted above, that has to be done at the local or regional scale on specific ecosystems. Much of the climate change effects literature to date has focused on generic or large-scale characteristics, such as global productivity, or distributions of biomes. But to get down to understanding the things that need to be done to ameliorate or adapt to effects, we must assess risks to specific ecological attributes (in the present terminology known as "valued ecosystem components") of specific ecosystems. Finally, as a relatively minor point, the present draft does not seem to draw upon the US National Assessment; I assume that is not the case in the subsequent ecosystem chapters, and of course Chapter 14; nevertheless, I think there is useful information in the National Assessment report that addresses the effects assessment methodology/framework issues discussed in Chapter 2. (Mark Harwell, Harwell Gentile & Associates, LC)	
2-12	A	0				A general note on the issue of scenario selection and use: it seems to me that the scientific community should consider the need to communicate more clearly to decision makers regarding what guidance can be drawn from these excercises. For example, might the scientific community consider how to simplify their results so that decisionmakers are presented with clearer options: e.g., if we proceed on the current path, if we take modest action to mitigate, if we take aggressive action? I think decisionmakers are often confused when presented with analyses using many models and many scenarios; non-scientists often confound various aspects of the uncertainty and fail to recognise the difference, e.g., between different climate sensitivities in the various models versus varying emissions scenarios, etc. And lay people often misinterpret results because they use their normal frames of refererence (e.g., if presented with two options they may assume they are best case and worst case, or "do nothing" versus "do something" approaches, when this may not be the case at all). I would encourage the authors to consider such communication issues early, such as in the design of studies and selection of	Addressed − we have made efforts to address different sources of uncertainty and to attempt to communicate these (in a table).

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						scenarios, in order to enhance the usefulness of research for decision makers. (Note: I am not suggesting limiting research to such simplified approaches, only that communication to those outside the scientific community be considered and appropriately designed to optimize understanding and usefulness. (Susan Joy Hassol, Independent Scholar)	
2-13	A	0				The First Order Draft of Chapter 2 (of the IPCC WGII Fourth Assessment) provides a comprehensive, albeit somewhat fragmented, review of methodologies and examples of characterisations of the future for the debate on climate change impacts, vulnerability and adaptation. The challenge in the next round will be to shorten and harmonize this chapter considerably. An avenue to this could be an edit of the existing material within a more stringent reference to the chapter's framework as introduced in the introduction. In the current version each section appears to follow its own logic rather than an overarching chapter logic. This makes it difficult for the reader to grasp the structure of the material in a consistent and intuitive manner and also gives room for some unneeded repetition. Chapter 2: Furthermore, the material presented in this chapter would benefit from a clearer distinction between Methodological Issues (2.2) and Future Conditions (2.3). Often methodological issues and examples are reported side by side. For example, much of the current section on future conditions in fact addresses methodoloical issues regarding scenario development, which could and should be integrated in section 2.2. Chapter 2: I would like to suggest a a slightly revised structure for the authors' consideration, based on the existing material and agreements by the Plenary in Vienna 2004: (2.1) Introduction; (2.2) Assessment Methodologies; (2.2.1) Data requirements and new methods for measuring CCIAV; (2.2.2) Risk management frameworks; (2.2.3) Scenario development and analysis; (2.2.4) Assessing and communicating uncertainty; (2.3) Characterising the future; (2.3.1) The SRES scenarios; (2.3.2) Thematic scenarios - including derivatives of the SRES scenarios; (2.3.3) Stabilisation and mitigation scenarios; (2.4) Future directions. -- Addtionally I see potential for two additional sections, one (2.2.2a) on advances in modelling approaches in general and decision support systems in particular, and another on (2.2.2b) on sensitivity analyses and model uncertainties. (Thomas Henrich, N/A)	The chapter has restructured in a way generally consistent with that suggested here. We have distinguished between assessing methods of scenario development and characterising future changes assumed in the report. Model developments are not accorded a separate section but are handled in a number of different sections. Model uncertainties are treated alongside other uncertainties in a table (and explanatory text).
2-14	A	0				I read all of chapter 2, and found it to be extremely well written and well documented. There were minor typos etc but I have no problem with the overall messages. (Katharine Jacobs, University of Arizona)	No action needed

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2-15	A	0				When the word "scenario" is used, please clearly distinguish between type, ie "Climate change scenario", "Emissions scenario", "socioeconomic scenario" etc. There are are lots of places where currently it isn't clear. (Geoff Jenkins, Met Office)	Addressed − we have now revised all definitions relating to future characterisations
2-16	A	0				I did not notice any discussion in Chapter 2 about the effects of natural variability, for example, that in many locations (eg NW Europe) this will tend to dominate man-made change for the first couple of decades in quantities such as precipitation, particularly extremes. Hence climate predictions must quantify the uncertainty due to this factor, by running initial condition ensembles. It would be good to have somewhere a box giving a clear discussion of the uncertainties in climate change predictions (emissions, climate models, natural variability) and their relative importance at different times and places. (Geoff Jenkins, Met Office)	Addressed − we have added some text on natural variability to emphasise its importance Addressed − we are working to develop a figure or table on uncertainties
2-17	A	0				I think this chapter is quite useful. It is very important to map out a summary of the various methodologies that are used. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Addressed − we have revised the chapter structure to improve the key messages
2-18	A	0				Although this chapter has grown longer, it still suffers from a lack of distinctions to be made among scenarios. The third section reads like a long laundry list of studies that have been done, without much in the way of ASSESSMENT of the function or value of those studies. Why should SRES-based scenarios be used for CCIAV research? What are the differences among impacts scenarios, adaptation scenarios, and vulnerability scenarios (information needed, topics covered by storylines, etc.)? What are the advantages and disadvantages of using SRES to develop scenarios for purposes other than emissions work? How does each study scenario contribute to the knowledge base about climate change? These are questions that the chapter should answer; instead, short description after short description constitutes the bulk of the section. (Elizabeth Malone, Joint Global Change Research Institute)	Addressed − we have now split the scenarios section into methods and descriptions, and have sharpened the section explaining the role of scenarios as well as highlighting new advances in scenario development.
2-19	A	0				The notion of climate change risk is very complicated and diverse, as rightfully acknowledged in the text. But it could increase in clarity if a more explicit distinction is made between two types of CC risk: one type is the risk that occurs because of changes in 'normal' climatic and weather conditions, the other type is the (increased) risk due to hazards or extreme events. (Marcel Marchand, Delft Hydraulics)	Addressed − We do not distinguish between these as types but as a continuum integrated by methods such as the coping range
2-20	A	0				General: This chapter is an impressive compilation of material but should now be reduced in length and streamlined. In my view the chapter does not adequately recognise the constraints in using tools/	Addressed − we have provided more emphasis on the practical implementation of CCIAV methods for decision making.

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						scenarios systematically in policy-contexts due to lack of resources/ and time. This has been found in the UKCIP (see McKenzie Hedger, M., R.Connell, D. Warrilow, and P. Bramwell. , Bridging the gap: empowering adaptation decision-making though the UK Climate Impacts Programme (submitted).- will send to TSU. There is also evidence of a lack of awareness that climate change adaptation policy often proceeds as an incremental modification to other long established sectoral approaches, for example on flood risk management. Also it fails to recognise that policy-makers often have very different priorities from researchers on tools and research needs, see Wilby, R. M. McKenzie Hedger and C. Parker 2004 , "What we need to know and when: Decision-makers' perspectives on climate change science" Report of Workshop, February 2004, Environment Agency pp 41, will send to TSU. The section on stakeholders included covers only their involvement as a methodology. (Merylyn McKenzie Hedger, Environment Agency)	
2-21	A	0				THERE ARE MANY MANY NOT PUBLISHED PAPERS AND NOT REFEREEDED PAPERS. ACCORDING TO THE INSTRUCTIONS, I READ THAT ONLY PUBLISHED PAPERS ARE TO BE INCLUDED. THERE ARE ALSO NUMEROUS MISSING REFERENCES IN REFERENCE LIST. ISUGGEST THE DEFINTIONS NEED TO BE MORE EXTENSIVE. I WILL POINT OUT SOME AREA. IN GENERAL, IT IS A WELL DONE REPORT. HOWEVER I AM CONCERNED THAT THE AUTHORS ARE BLAMEING EVERYTHING ON GLOBAL WARMING. CLEARLY ALL CLIMATE CHANGE IS NOT DUE TO GLOBAL WARMING. (James O'Brien, Florida State University)	ADDRESSED!!! HOWEVER, WE CAN USE THE GREY LITERATURE WHERE NECESSARY. WE WERE NOT AWARE THAT WE HAD APPORTIONED "BLAME" FOR ANYTHING ON ANYTHING! THE ATTRIBUTION OF CLIMATE CHANGE IS A WORKING GROUP I ISSUE
2-22	A	0				In general, my concern for this chapter is that it does not differentiate between methods for impacts, vulnerability and adaptation studies. Assessment methodologies are lumped together under risk management, and the methods that have developed within, for example, vulnerability and adaptation research are not included. Methodologies that incorporate social science perspectives such as institutions and social networks, or that include human behavior, such as agent-based modelling and actor network theory, are excluded from this assessment of assessment methodologies. As one example, Luers et al's (2003) method for quantifying vulnerability does not fit within this risk management framework that the chapter is organized around. The chapter does a good job at reviewing impacts research and adaptations to those impacts, but it does not address methodological	Addressed − we can understand the reviewer's perspective, and have tried to address those concerns, though they seem to reflect a very structured view of what different methods are and are not, which is not very amenable to the treatment that we have developed here. The new structure of the chapter should at least go part way towards addressing these concerns.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						advances in assessmentsof vulnerability and adaptive capacity. The focus is on vulnerability as an outcome, and not as a context for experiencing climate change. Another concern is that the chapter seems to focus on assessments of the negative impacts of climate change. Some regions, sectors, or groups may benefit from certain aspects of climate change (lower heating costs, longer growing seasons, opportunities for increased transport and oil exploration in ice-free areas, etc.). Methods that assess the differential outcomes and response capacities should be included in order to provide a more complete picture about developments in climate change research. Reference: Luers, A.L., Lobell, D.B., Sklar, L.S., Addams, C.L. and Matson, P.A. (2003) A method for quantifying vulnerability, applied to the agricultural system of the Yaqui Valley, Mexico. Global Environmental Change 13, 255-267. (Karen O'Brien, University of Oslo)	If this is a perception, then it is wholly unintentional! We are well aware of the potential benefits of climate change and will ensure that these are properly reflected in the next version. Reference has been added.
2-23	A	0				This chapter does not include the detailed description of assessment methods such as biological responses to climatic warming trends, which contained in the TAR. The assessment methods in ecosystem modelings have been improved to consider the effects of anthropogenic factors (land use changes) on forest carbon uptake and storage (Levy et al. 2004), and to predict transient responses of terrestrial ecosystems (e.g. Cramer et al, 2001) after the TAR. Would you mention improvements of assessment methods such as ecosystem modelings in this chapter similarly to the TAR. Levy P.E., Cannell M.G.R., and Friend A.D., 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, 21-30. Cramer W, Bondeau A, Woodward FI, Prentice IC, Betts RA, Brovkin V, Cox PM, Fisher V, Foley JA, Friend AD, Kucharik C, Lomas MR, Ramankutty N, Sitch S, Smith B, White A, Young-Molling C, 2001, Global response of terrestrial ecosystem structure and function to CO2 and climate change: results from six dynamic global vegetation models, Global Change Biology 7(4), 357-373. (Kenji Omasa, The University of Tokyo)	Addressed − these issues are treated at length in other chapters (especially chapter 4) and there is insufficient space here. However, we have mentioned new developments in methods if they represent a significant advance on the TAR.
2-24	A	0				This chapter seems to be already in quite good shape. (Klaus Radunsky, Umweltbundesamt GmbH)	No action needed
2-25	A	0				•This chapter is generally comprehensive and clearly written. However, at 90 pages it is about 50% longer than target size. It will require strong editing, particularly if some more figures are to be added; some examples may have to be forgone. • Three paragraphs in three different locations { (1). page 5, 4-11; (2). Page 6, 15-	Addressed − significant cuts have been made

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						18 and (3). Page 9, 32-36} have been devoted to describe 'what is in this chapter'. I prefer to see these three paragraphs combined and placed at the end of introduction. • This chapter does not appear to connect well the risk management assessment(s) with vulnerability and adaptation assessments, which might be considered are part of the bigger picture risk management framework. • References in the text and the reference list require a careful attention as there are many inconsistencies and missing years. (Kim Ritman, Bureau of Rural Sciences)	Addressed − we have attempted to connect these more effectively in the new draft. References have been completely revised and reformatted.
2-26	A	0				I found the entire chapter disappointing and not relevant. I was immediately lost in jargon and claims that there are fantastic new methods for assessment, but there was not a clear statement of which of the new methods are relevant and how they will be used. I am familiar with the top-down methods, and was disappointed to not find an update on improvements in these methods since the TAR, nor of how they will be used for AR4. It is not clear how the bottom-up method could even work. I admit I did not read the entire chapter word-for-word, as I got confused and could not memorize all the new jargon. I doubt anyone else will wade through it either. It needs a clear statement up front of what we know, not of potential new theoretical advances. It is fine if people have written papers on theoretical approaches to assessment, but what method will be used now?? How are you actually going to do this assessment? The chapter summary does not say. It seems like this chapter is very preliminary and really needs more work before having been sent to reviewers. (Alan Robock, Rutgers University)	Addressed − we will have to hope that our re-organisation and shortening of material goes some way towards satisfying these comments, but there is no simple fix to this issue. We have attempted to provide descriptions of terminology, but the jargon is present throughout the literature, so we must try to make sense of it ourselves before conveying its meaning to readers. We have also made some effort to identify key messages about new advances.
2-27	A	0				Chapter is much too long, 92 pp vs. suggested 30 pp. Tedious reading. Even the Executive Summary is 2.5 pp. vs a typical 1 p. Use of acronyms is overwhelming. Document appears to be written for an insider group of experts talking to each other. Frustrating chapter, because it presents a comprehensive, indeed encyclopedic, collection of references to work that has been done, but does not present the results of the work, nor any prioritizing of which methods were most useful. A better approach might be to abolish the chapter and instead spread its descriptions of methods to the chapters in which the results from applications of the various methods are presented. (George Seielstad, University of North Dakota)	Addressed − restructured and trimmed (including the ES). Acronyms and other jargon has been minimised as much as possible. Results are not appropriate for here except in the characterisations sections as they are to be found in other chapters of the report. This chapter is intended to be introductory. We would be happy to abolish the chapter, but others might beg to differ!
2-28	A	0				General Comments: This chapter is uneven in the quality and effectiveness of the writing, and in the quality of the content. I find the material from page 23 on generally to be well-written, well-organized, fairly comprehensive in its coverage	Addressed − we have not taken the structured approach to risk suggested here, which is much more process oriented. Uncertainty in

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						of the literature, and to effectively convey the main elements of recent developments. In contrast, I find the material appearing before page 23 to be severely lacking both in effectiveness of communication and content. It is not apparent that the author(s) of this section have a clear view of what it is that they want to convey to the reader. Nor is it apparent that they have a command of the material, especially on risk management. There are places in which I find the early section incoherent. Nowhere do I find the early section enlightening. The major limitation I find in the chapter is a failure to develop the richness of the decision contexts that are relevant to the assessment of climate change, and discussion of how they are relevant. We have current private and public decision makers who we seek to inform today about the possible impacts of climate change; essentially about the private and public risks associated with climate change. There is essentially nothing here about types of decision makers and the types of risks that are relvant to them. Further, future outcomes of climate change will be mediated by both private and collective decisions, which are made in reponse to private and social risks. Accordingly, an essential attribute of intelligent climate change impact assessments is consideration of how future private and public decision makers respond to the risks that are relevant to them. But here again, there is little discussion of who decision makers are or public or private risks that drive their behavior. But, there is literature on these topics. One survey is, for example, Heal and Kristrom, "Uncertainty and Climate Change" Environmental and Resource Economics 22: 3-39, 2002. (James Shortle, The Pennsylvania State University)	methods and characterisations is much more important at present and hopefully the process and decision analytic structure will come in later assessments. Who manages risk is better outlined. We have included the reference.
2-29	A	0				The SRES scenario storylines are based on the two dimensions global vs. more regional orientation, and economic vs. social/environmental preferences. However, these are not the parameters used in the scenarios, but an implicit mental model is used to translate these storyline parameters in scenario assumptions regarding population growth, GDP and rates of technological progress (and assuming a shock-free development). I suggest to make the mental model behind this “translation” explicit and to discuss the scenarios regarding their assumptions, and not based on the storyline. Then the policy questions have to be about how to influence the growth of population and GDP, and how to accelerate (and direct) technological change, but not regarding more or less globalisation and changes of mind sets in setting policy priorities. For the policy debate and for risk communication (less relevant for scientific scenario development than for the interpretation), this would be more helpful than the current headlines based on A vs. B and 1 vs. 2.	Addressed − we have tried to outline the underlying rationale for the SRES scenarios, but this chapter is not the place for a full critique. We are simply reporting what is in the literature, in order to introduce chapters that report studies that have adopted these scenarios.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						The three questionable assumptions derived from the metal models are (as pointed out in my previous comment on the ZOD): - globalisation leads to a higher growth, and to a more equitable distribution of income. Whereas it is disputed whether globalisation does empirically lead to higher wealth generation or not, it is obvious that the wealth created – be it more or less than without globalisation – is very unevenly distributed. There is no correlation between growth levels and income equity, and the latter – crucial for the assumed benefits of the A1/B1-scenarios will either need a changed international market order to reverse current polarisation trends, or active redistribution mechanisms. In both cases, there would be trade offs for the OECD countries which play no role in the models and their downscaling so far, obscuring the difference between an A1 and a B1 scenario. - a regional focus (in A2/B2) is correlated with higher population growth and thus higher environmental impacts If this correlation is based upon the assumption of faster poverty alleviation under a globalisation scenario, this is empirically not justified (see above). Another explanation is not given, but the assumed correlation makes any scenario other than economic globalisation ex ante, i.e. without proving the case, to an inferior solution in terms of climate change. - if the world is not converging, technological change will be more diverse, and less rapid. From an economist's point of view, this is a surprising assumption, as none of the scenarios calls for an end of global trade, and as under conditions of competition a diversity of options should accelerate progress, not slow it down. The assumption is either inconsistent with market economics, or reflects the assumption that markets are no longer functioning. However, this is not spelled out in the scenarios as such. (Joachim Spangenberg, Sustainable Europe Research Institute SERI)	A more appropriate forum for discussion of the SRES scenarios is chapter 3 of Working Group III.
2-30	A	0				In my brief comments to the ZOD I had focussed on four issues, based my field of expertise as an economist involved in sustainability scenario development: - the understanding of thresholds and coping range as socially constituted, time variant settings; - the role of societal actors, the relation between scientific insight, institutional pressure and political action; and the role of the public at large, as citizens/voters and as consumers; -Cost-benefit analysis which is – at least in some places – described as a scientific	Addressed − we have attempted to cover these points, with the economic assessment methods receiving more specialist attention than in the previous draft.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						method providing verifiable results. This only holds true under a number of assumptions which are relevant when applying CBA in CCIAV: - some of the assumptions implicitly inherent to the SRES scenarios which influence the policy conclusions based on them without undergoing the same rigorous testing as many other assumptions and conclusions. (Joachim Spangenberg, Sustainable Europe Research Institute SERI)	
2-31	A	0				The chapter is way too long. Yet, it has missed the new developments in the measurements of economic impacts, including the new Ricardian stuff by Mendelsohn, the amenity work by Maddison, the happiness research by Rehdanz, and the general equilibrium studies by Jorgenson and Roson. (Richard S.J. Tol, Uni. Hamburg)	Addressed − we have shortened the chapter and included more on economic analysis impacts.
2-32	A	0				This draft chapter provides a thorough and comprehensive overview of the issues surrounding methods for CCIAV studies. In general, the text follows the agreed Plenary outline, and draws overall conclusions from diverse literature as required. Reduction of text: the total length is now 92 pages, and the target length is 60. I have tried below to indicate where sections could be deleted, but generally these are few - nearly all the sections contain pertinent information. If the length is to be reduced, it will have to be mainly through editing some of the details from each section. How far do results need to be included as well as methods? If many of the example results (eg. Table 2.7, page 63; p. 66) could be referenced to, say, another IPCC chapter then the length would reduce considerably. An area of literature not examined much (apart from a brief mention on p.25) is the Sustainability Impact Assessment literature (eg. Dalal-Clayton & Sadler, 2004: www.iied.org/spa/sa.html), including Environmental Impact Assessment, Strategic Environmental Assessment etc. These are embedded within the policy process, for example in the EU's Impact Assessment regime, and could do with a sub-section of their own. Currently, the methods examined in the Chapter are rather 'technical' in nature rather than the more simple ones (such as causal chains and problem trees) often used by policymakers. I would suggest adding a subsection about the actual use of tools and methods by policymakers - how much of the wide range of scenario and risk management methodology is used in practice, why do they choose the methods they do, what are the barriers etc. This Chapter seems like the most appropriate place for this sort of discussion within WGII. In a point related to Comment 4, I would welcome a wider discussion of issues surrounding the use of knowledge within the policy process, such as the importance of power and manipulation of research for political ends. For example as in "Land	Addressed − the chapter has been cut considerably. We will consider these new references for inclusion. EIA and SEA are described. We have included a separate section on policy measures, but will also ensure that there is discussion of methods and tools adopted by policy makers. This issue is more general than climate change, and will only be addressed if we can identify appropriate focused literature.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						and Limits" by Owens and Cowell.....It doesn't have to be long, but just a paragraph or so to raise the issues. (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	
2-33	A	0				The major gap I have seen in this draft, described in detail below, is in both citations of and balanced arguments for, probabilistic analysis that includes socio-economic drivers. In parts (not everywhere), this draft gives the impression that only storylines can be used for uncertainty in socio-economic drivers. This is one prevalent view, but there are others that need to be represented in order to fully reflect the literature since AR4. All suggested additional citations (not already in draft) are given in full at the end. (Mort Webster, MIT)	Addressed − we have tried to highlight examples of where probabiistic representations of non-climate futures have been adopted in CCIAV studies. New references have been added to the chapter.
2-34	A	0				Good chapter overall, please review the following comments with the knowledge that I intentionally am deliberately staying out of the details of some of the sections (e.g., on assessment methodology) and trying more aggressively to comment on other sections (e.g., climate scenario development). I did this both because I am better trained in the climate science-related areas and because my read of the chapter is that these sections will naturally see less attention. Feel free to accept or reject my comments at your discretion as many of them are necessarily general given this background. One thing I noted in reading this chapter from front to back is that there are significant areas of descriptive redundancy. This chapter in particular seems like it could benefit from making it more concise and shorter overall. One possible solution would be to task one person to highlight the main topics of each section, subsection and paragraph and look for places where the discussion is duplicated. I focus on this in a general comment because the chapter seems long given the content and because length is one focus area in the guidance documents for reviewers. One focus area in the guidance document for reviewers is to help ensure that the chapter is focused on "added value" in the assessment. This is admittedly a difficult task, but I felt that some of the sections read like a survey while others read more like what I would expect an assessment to read like. The better sections include descriptions of, for example, why particular approaches represent a more rigorous and / or representative approach, why a particular kind of analysis is difficult or limited, or what high-priority research prospects are in each area. One possible solution is to ensure that each section has some statement on how the	Addressed − we have streamlined the chapter. We have tried to focus more on assessing new methods/scenarios incorporating how each has been used strengths, weaknesses and future needs. We have also paid special attention to the key messages of the chapter.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						survey of past work fits (i.e. a current assessment) in the breadth of all available options. Then, include a forward-looking statement that advocates key additional research or refinement to existing methods. The sections of the chapter I had the most difficulty with were those that felt redundant or esoteric (though maybe this is strictly my own perception). One indicator of a section that might have these problems is the lack of references. If existing literature does not or is not capable of covering key distinctions between types of analysis, then some organizing statements are appropriate. If there are long passages without references, I feel less like the statements represent a consensus of the field. Many references in the text do not appear in the references section. A general challenge given the outline for the chapter is not to completely repeat information in parallel sections of the report. Whenever possible, discuss the type of opportunities and challenges a particular type of analysis represents and refer to the most complete description in the sections where there is a less comprehensive treatment. The discussion of relative merit of projections vs. scenarios vs. thought experiments is admittedly tricky, but somewhat clouded in this draft. Some value judgements seem to filter through and are not always consistent across different examples / sections of the chapter. Similar to other general comments, some assessment or ranking of what preferred future work alternatives might be the most productive to clear up particularly challenging areas in this work would be helpful (e.g., more believable climate runs vs. better downscaling techniques vs. more comprehensive socioeconomic data). The third to last and last "future directions" were completely unexpected given the text in the chapter. The executive summary is good in this respect, but could be improved. Personally, I would like to see these sections strongly reflect a summary of the analysis within the chapter. (Justin Wettstein, University of Washington)	Poorly referenced areas have been added to or omitted altogether. We are conscious of the need to highlight issues that are subsequently taken up in other chapters. We have surveyed other chapters for such issues, and cross-referencing should be stronger in this draft. We have now clarified definitions of future characterisations (e.g. between projections & scenarios). The chapter now reflects the main findings at the start and the end.
2-35	A	0				The authors don't really provide much analysis of the appropriateness of different climate scenarios for different problems to which CCAIV may be applied, particulary for analyses of near-term (< 50 years say) v longer-term policy choices. Is it preferable to use emissions-scenario conditional AOGCM or regional model projections, or ensemble outputs based on a single business-as-usual emissions scenario from a single AOGCM, or multiple AOGCMs, that may better describe near-term uncertainty in climate forecasts ? The chapter identifies that there are risks associated with implementing (or not)	Addressed − we have now paid attention to the time horizons of analysis (near/long term). We have tried to incorporate more information

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						adaptation measures which include those due to climate, as well as those due to the adaptation measure. However, there is no recognition of the decision-makers attitude to risk and the importance of this in determining the level of acceptable/tolerable risk, the urgency to implement adaptation measures, or the choice of adaptation strategy and measures. A less risk-averse (less precautionary) attitude to climate risk implies a greater acceptance of the risk of under-adapting (and vice versa) perhaps based on a unwillingness to risk capital investment in sunk assets. The chapter is greatly in excess of the 30 pages indicated. Considerable space is taken up cataloguing and briefly describing examples of different uses of scenarios in the published literature. In my judgement this has not in itself add much value (although it represents a considerable effort !). I guess that many of these studies will be described in other Chapters. Perhaps there are opportunities for summarising and catagorising the principle attributes of the studies in a table or series of tables, and cross referring to the other chapters ? (Robert Willows, UK Environment Agency)	on the practical use of methods and tools by decision makers, and the importance of attitudes to risk. Chapter has been edited down accordingly
2-36	A	0				Readers would benefit from a clearer or more consistent use of the term 'impact' - perhaps the authors should be more explicit when they talk of impacts - impact on what? Climate variables or material impacts? In the wider (non-climate) risk literature the term mitigation is often used to refer to the reduction in risk following risk management. In the context of CCIAV, this might include adaptations to reduce climate change impacts. The editors may wish to consider whether to identify the possible confusion that can result from the use of the term mitigation to refer solely to GHG reductions within climate change literature, and the less specific usage common in the wider risk management literature. Opportunities: p13, line2-3. I feel some consideration of the relevance of the recent work on uncertainty elicitation, the identification and description of uncertainties in environmental assessment would be appropriate (http://www.nusap.net/download.php?op=MostPopular&ratenum=50&ratetype=num). (Robert Willows, UK Environment Agency)	Addressed − we have revised many definitions to reflect recent developments in CCIAV assessment. This includes the term "impact" and "mitigation" (Better scenario context. More on policy attitudes, risk tolerance. More efficient summaries of scenarios) We have added a table describing different uncertainties to consider in CCIAV and text to address the issue of uncertainty elicitation.
2-37	A	0				Overall, the chapter is clear and well thought out. My comments have mostly to do with the dangers of false concreteness that arise with the use of quantitative methods in situations of deep uncertainty where not everything can be simulated. The chapter makes this point in places, but I think it could be even more emphasized, particularly in the Executive Summary.	Addressed − we have reinforced the issue of uncertainty and t appears in the ES

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Evelyn Wright, N/A)	
2-38	A	0				There is a lot of grammatical errors in this FOD, hope these errors can be modified in the SOD (I tried to list all the errors, but because of the time limitation, I just list some errors below). After the publication of IPCC TAR, there is a UK-China bilateral climate change project on Chinese agriculture, Chinese researchers used UK Hadley Centre RCM system-PRECIS to do some work on downscaling of GCM climate change scenarios, and these dynamical downscaled scenarios were directly used in impacts studies via strict evaluation of RCM capacity. Some results are published or in the way to publish, the methodology how to use RCM scenarios for Chinese researchers is very special, hope it can be included in SOD. There is confusion for Chinese authors' surname and first name in references, hope it can be corrected in SOD. The whole chapter is too long, and I feel there is too much description of conception in this FOD.For example, the Box 2.4 takes about 1.5 pages, is it necessary for this too long description? Since TAR publication, there wrer some quantitative analysed results for the future extreme events by Chinese scientists, hope these results can be concluded in the summary of this chapter 2, and also in WGI relevant chapters. For the whole chapter 2, the authors tried to use concept of 'risk management' to put the adaptation and mitigation together, and establish the linkage of adaptation and stablisation/mitigation scenarios, but I believe that more research should be done on it. I wonder taht the authors emphasized the stablisation/mitigation scenarios so much. (Yinlong Xu, Chinese Academy of Agricultural Sciences)	Addressed − the chapter has been cut down and grammatical and referencing errors eradicated (if possible). We cannot incorporate much of this work which is already covered in WGI or regional chapters. Some of the methodological material the reviewer is referring to was covered in the TAR, and we do not have sufficient space to repeat it here.
2-39	A	2	0	4		What about more focus on regional assessments? (Virginia Dale, Oak Ridge National Laboratory)	Not applicable as a key point in the ES
2-40	A	2	1			Executive summary: a suggestion, shift the order of paragraphs in the “Executive summary” to: “A rich array …”; “Risk management …”; “The coping …”; “Stakeholder …”; “The formal …”; “Probabilistic representations …”; “SRES-based …”; “Other global …”; “Mitigation/stabilisation …”. I.e. bring forward the “Probabilistic representations …” and group the sections on scenarios together. (Marie Ekström, University of East Anglia)	Addressed – the ES has been completely restructured to cover methods then scenarios.
2-41	A	2	1	26	40	Throughout these sections make clear whether discussions are referring to global analyses of mitigation and adaptation, local analyses of adaptation in the context of global climate change, or local analyses of adaptation in the context of global mitigation, or indeed local adaptation and mitigation in the context of global climate change with or without global mitigation. Example page 19 lines 19 to 50 (Rachel Warren, School of Environmental Sciences)	Addressed. We are now more specific about the scale of analysis being referred to.
2-42	A	2	1	26	40	Throughout sections 2.1 and 2.2 there is frequent reference to coping ranges.	This is true and will be added in the 2.2.3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						Throughout, this reference and discussion of coping ranges needs to be linked to the consideration of the dependence of climate change impacts and adaptive capacity on the rate of change. Within the sections some of the studies referenced have emphasised the importance of dynamics, but this is not continued in the discussion of coping ranges. Obviously if climate changes more quickly it will be harder to adapt. Adaptive capacity in many cases evolves with time and therefore the slower is climate change the easier it will be to adapt. This is true for both human and natural systems. If in the literature coping ranges have not been linked to temporal aspects, then this should be poined out. (Rachel Warren, School of Environmental Sciences)	section on coping ranges
2-43	A	2	1	26	40	Throughout sections 2.1 and 2.2 there is frequent reference to adaptive processes but much of this clearly refers only to human systems. On page 18 lines 6 to 14 there is discussion of adaptive processes in natural systems. In these sections 2.1 and 2.2 it should be clarified where the discussion refers to only human systems or only natural systems and whether any statements made about methdologies or vulnerabilities/adaptive capacities and coping ranges apply to human systems only, natural systems only or both. e.g. page 7 lines 10 to 19. (Rachel Warren, School of Environmental Sciences)	Coping ranges apply to all systems. This will be clarified in the 2.2.3 section on coping ranges
2-44	A	2	1	32	50	These two sections are very methodological and assess a very large number of different methods that have been used for CCIAV with examples. I suggest that for each methdology mentioned particularly where examples are given that cross referencing is made to the place in the AR4 where the results of the study in question is given. This could be a two way process since you coudl suggest to authors of other chapters that they include the results of the studies referenced in your chapter. Some of them may be in the section 2.3 of this very chapter. In general - is each chapter in WGII considering adaptation? For global WGIII Ch 3 can be cross referenced. Example the lists on pgs 16-19 but there are many others throughout. Same applies to any IA modelling/safe landing/tolerable windows approaches. (Rachel Warren, School of Environmental Sciences)	Will undertake this – a last minute activity but we have designed a brief questionnaire for chapter authors. This may not appear in the next draft, however.
2-45	A	2	1	72	50	In general suggest make more of extreme events story - there are good placeholders for it, but add somewhere that thus far CCIAV has tended not to consider increases in extreme events and that so far they are the way in which climate change impacts have mostly been felt by human societies (give examples) and so that CCIAV will require a second iteration when we have a better handle on how to predict extreme events (Rachel Warren, School of Environmental Sciences)	Added in impacts section under 2.2.3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-46	A	2	1	72	50	In general I think more needs to be made of fact that CCIAV doesn't take into account, because of uncertainties and difficulties in predicting, the effects of large scale non singular events (forest dieback, clathrate release, ice sheet melt) (Rachel Warren, School of Environmental Sciences)	We will leave this to Ch 19 apart from the occasional referral
2-47	A	2	1	26	40	I suspect that elsewhere in WGIII the term "limits to adaptation" will be used. I suggest that we explain or define a limit to adaptation and say whether this is the same as the threshold referred to at the edge of a coping range. (Rachel Warren, School of Environmental Sciences)	This is true and will be added in the 2.2.3 section on coping ranges
2-48	A	2	1	32	50	All of these sections are very "academic" - and I wonder if they could be condensed - who is the AR4 intended for and does it need to contain so much detail about methods? (Rachel Warren, School of Environmental Sciences)	Addressed − we have reduced the length and re-organised the sections to be much more concise.
2-49	A	2	3	2	19	The chapter has two very large goals: an assessment of new assessment methodologies and an assessment of research on the characterisation of future conditions. The authors have succeeded in pulling together an impressive amount of information related to different methodologies, and they have provided much detail on different methods and approaches. However, I feel that it is difficult to identify the recent developments and distinctions in methods because the chapter addresses approaches to assessments of "climate change impacts, adaptation and vulnerability (CCIAV)." This treats impacts, adaptation, and vulnerability as if they are synonymous, rather than related. Assessing the impacts of climate change based on different scenarios of climate change and future development is quite different than assessing vulnerability to potential changes, or assessing adaptation options and adaptive capacity. I think the new development over the past years is that each of these three aspects of climate change has developed into its own field, with its own methods and approaches. There is still significant confusion about the distinction between impacts and vulnerability, and how adaption and adaptive capacity influence both impacts and vulnerability, but there really are different approaches to each of these facets of climate change. The differences cannot be distinguished simply as "top-down, scenario based approaches" versus "bottom-up, vulnerability driven approaches." What is new is that impact studies are improving in their treatment of climate variability and extreme events, vulnerability science is developing and integrating both biophysical and social approaches, and methods for studying adaptation and adaptive capacity are being developed. (Karen O'Brien, University of Oslo)	Addressed. The introductory sections have been restructured and revised to present more effective distinctions between different approaches to CCIAV.
2-50	A	2	4			TAR full name (Xiongwen Chen, Alabama A & M University)	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-51	A	2	4	2	4	Acronym CCIAV may be better read as CCIVA (Climate Change Impacts, Vulnerability and Adaptation). (Kim Ritman, Bureau of Rural Sciences)	Not applicable – this option was discussed and rejected in Merida Plenary discussion. The title of the AR4 report uses IAV
2-52	A	2	4	2	15	CCIAV is defined twice. Once is enough. (Alan Robock, Rutgers University)	Addressed
2-53	A	2	8	2	19	Why is risk assessment not an approach like the others? Please explain. There seems to be a distinction between approaches and methods. It might help to clarify this. (Ian Burton, University of Toronto)	Addressed
2-54	A	2	8	2	19	Reads as insider mumbo-jumbo. (George Seielstad, University of North Dakota)	Addressed, we have tried to explain all terms likely to be unfamiliar to the reader
2-55	A	2	8	2	19	I Would like to applaud the authors for highlighting the emerging array of "bottom-up", vulnerability-driven assessment methodologies both here in the Executive Summary and throughout the Chapter. I would encourage the authors to ensure that examples of such bottom-up, vulnerability assessment methodologies cited in other AR4 chapters are at least referenced in this Chapter. For example, Chapter 16, Small Islands, includes a Pacific Islands vulnerability assessment methodology recently employed in several Pacific Islands in a CIDA-funded vulnerability assessment program coordinated by the South Pacific Regional Enviornment Programme (SPREP); I would encourage the authors of Chapter 2 to cross-reference -- and perhaps include the assessment framework figure -- in this review of Assessment Methodologies as well. (Eileen Shea, East-West Center)	Addressed, with cross referencing to other chapters and use of figures in the body of this chapter (though not here in the ES).
2-56	A	2	8			the approaches to assessment have many uses. For example, the approach to assessment can contribute to understanding of the real world. Regarding the functions of this approaches, it is possible to extend these response to both policy needs and reseach or knowledge needs. (Bangzhong Wang, China Meteorological Administration)	Not applicable – paragraph removed
2-57	A	2	10	2	10	The classification of assessment approaches according to natural hazard, vulnerability/resilience and policy-driven approaches is confusing. There are many approaches to studying natural hazards, including engineering approaches and vulnerability approaches. Likewise, there are many approaches to assessing vulnerability (social vulnerability approaches, biophysical approaches, indicator approaches, livelihood approaches), and the same holds for resilience and adaptation. Some of these approaches may be more policy-driven than others--I think that defines the objective more than the approach. (Karen O'Brien, University of Oslo)	Addressed. We now use a similar classification to that suggested here.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-58	A	2	10		15	It is too difficult to understand the sentence "while top-down ……(CCIAV)". It is better to re-write this sentence with easy understanding way. (Yinlong Xu, Chinese Academy of Agricultural Sciences)	Not applicable – paragraph removed
2-59	A	2	12	2	12	Methodologies may be a better word than permutations (Karen O'Brien, University of Oslo)	Not applicable – paragraph removed
2-60	A	2	15	2	15	Expansion of CCIAV is not required here (again) (Kim Ritman, Bureau of Rural Sciences)	Not applicable – paragraph removed
2-61	A	2	21	2	31	Why is risk assessment not an approach like the others? Please explain. There seems to be a distinction between approaches and methods. It might help to clarify this. (Ian Burton, University of Toronto)	Addressed, but in any case paragraph removed
2-62	A	2	21	2	31	"Risk management frameworks are useful methods for assessing and analyzing the risks associated with climate change." This sentence is certainly true. But it should not be argued here in the Executive Summary that it is an appropriate generalized method for assessing impacts,adaptation, and vulnerability, even if risk management is standardized internationally. Risk management treats climate change as a hazard (when in some cases it may be beneficial), vulnerability as a consequence (when it can be conceived of as existing before any change occurs), and adaptation options as the treatment of risk (when they may involve behavioral and institutional factors) (Karen O'Brien, University of Oslo)	Addressed. Nevertheless, risk management is still discussed in the ES, but it is not advocated as the only method of assessment.
2-63	A	2	21	2	31	I was very encouraged to see focused discussion of the value of a risk management approach, framework and methodologies to support climate vulnerability and adaptation studies. This is consistent with emerging recognition within the disaster management community of the importance of climate adaptation in disaster preparedness and planning (as evidenced in recent annual World Disaster Reports published by the International Federation of Red Cross and Red Crescent Societies) and AR4 provides an important opportunity to encourage further integration of climate, risk management and disaster management communities in their shared efforts to understand and manage climate-related risks. (Eileen Shea, East-West Center)	No action required
2-64	A	2	21	2	31	From a 'risk' perspective I find this paragraph rather sloppy. Line 23 implies (wrongly) that impacts (I) are a component part of hazard (H). Risk assessment would equate impacts with consequence. The problem surfaces at varies times in the chapter. The authors use 'impacts' to describe two principle forms of CCIAV. (a) GHG (or AOGCM) (H) consequent changes in climate variables (I) (change in temp, sea-level); (b) some measure of material consequence for human well-being	Not applicable – paragraph removed from ES Elsewhere in the chapter, use of "risk" and "impacts" to be checked

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(I) (land-use suitability, flooding) resulting from changes in climate variables (H) (change in temp, sea-level). Both are correct, but the context needs to be made clear to avoid confusion. (Robert Willows, UK Environment Agency)	
2-65	A	2	22	2	26	This sentence is too long. (Kim Ritman, Bureau of Rural Sciences)	Not applicable – paragraph removed
2-66	A	2	23			I propose to withdraw the "its impacts" expression because the impacts is related also to the vulnerability. (Mahi Tabet-Aoul, Association pour la Recherche pour le climat et l'environnement (ARCE))	Not applicable – paragraph removed
2-67	A	2	24			I propose to wthdraw the "vulnerability as a conséquence" and to replace it by "the vulnerability as the capacity to resist and face up the hazard. The impacts are the consequences of the hazard and the vulnerability together". (Mahi Tabet-Aoul, Association pour la Recherche pour le climat et l'environnement (ARCE))	Not applicable – paragraph removed
2-68	A	2	24			I must admit that I've never been comfortable with the concept of 'vulnerability' as articulated within climate impacts community. I'm pleased to see the authors recognise this later (eg p5, line 27). But I don't like 'vulnerability as the consequence' (line 24) which is rather vague. Vulnerability is some estimate of future risk, hopefully over a defined period, and includes exposure to hazard, level of future consequence and significance of that consequence (eg exceedance of a threshold), and (perhaps) some estimate of the probability,. Ie vulnerability could be called a risk ! In some cases vulnerability is used in absence of any estimate of probability, ie in a form of what-if scenario (sensu lato) analysis: If this receptor were exposed to this suite of climate variables, what would be the consequences? Recommend the authors tie down the link between the language of risk assessment and use of term vulnerability. See also comment below (p. 14, line 16). Also define a vulnerability-based approach in terms of risk-assessment? (see comment p13. 39-47) (Robert Willows, UK Environment Agency)	Not applicable – paragraph removed
2-69	A	2	33	2	39	What's the difference between TAR and coping range of climate (Xiongwen Chen, Alabama A & M University)	Not applicable – paragraph removed
2-70	A	2	33	2	33	The coping range "of climate" should read "of "systems or society" (climate doesn't cope) (Karen O'Brien, University of Oslo)	Addressed
2-71	A	2	34			I propose "given climatic conditions" instead of "climatic conditions".	Not applicable – paragraph removed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Mahi Tabet-Aoul, Association pour la Recherche pour le climat et l'environnement (ARCE))	
2-72	A	2	37			"utilised" should be "used" (Xiongwen Chen, Alabama A & M University)	Not applicable – paragraph removed
2-73	A	2	37			I propose "hazards, vulnerability and society" instead of "hazards and society". (Mahi Tabet-Aoul, Association pour la Recherche pour le climat et l'environnement (ARCE))	Not applicable – paragraph removed
2-74	A	2	40	3	2	"Stakeholder participation is crucial for successful climate risk treatment." From the perspective of methods of assessment, it would be useful to point out that stakeholder participation is becoming an increasingly useful component of climate change risk assessments. (Karen O'Brien, University of Oslo)	Addressed [included in: "Stakeholders are seen as crucial in assessing the needs for developing policies and measures to adapt to climate change, because they are those who will be most affected and need to carry out adaptation (Burton, et al 2002; Lim, 2004).]
2-75	A	2	40	3	2	Highlighting the importance of effective stakeholder engagement is also encouraging and well-warranted. I would, however, like to suggest that the Executive Summary discussion of this item might want to include explicit reference to two points raised later in the chapter (page 28) regarding the VALUE of sustained, participatory stakeholder engagement: establishing and sustaining credibility and setting climate vulnerability assessments in a problem-driven context in order to facilitiate the development of an effective risk management strategy. These two points are emerging strongly from ongoing climate variablity forecasting and applications work in the Pacific (and in other regions) and I fear that they may be lost if not more consciously highlighted than in the current text. The six-level stakeholder participation framework currently highlighted is informative but highlighting WHY stakeholder engagement is so valuable might be even more useful in the Executive Summary and in the Chapter text as well. (Eileen Shea, East-West Center)	Addressed − this is now included in the of Ex. Summary
2-76	A	2	40	2	42	The definition of stakeholders as "…individuals or groups who have anything of value…" is overly restrictive. This definition would seem to exclude individuals or groups that have an interest in climate change for reasons other than risk to their individual or collective assets. Thus, it would exclude, for example, those who are concerned about the impacts of climate change on "others" in society living now or in the future. It would exclude innovators working in the private or public sectors who are not now held accountable for risks or opportunities that climate change may create for their organizations, but who have the foresight and initiative to take	Not applicable – paragraph shortened

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						actions today on behalf of their organizations. (James Shortle, The Pennsylvania State University)	
2-77	A	2	40		42	I propose to withdraw these lines because the stakeholders may have value to be affected by climatic change. (Mahi Tabet-Aoul, Association pour la Recherche pour le climat et l'environnement (ARCE))	Not applicable – paragraph shortened
2-78	A	2	42		45	I would like to write these lines as follow" People's knowledge and expertise comprise the principle resource for adapting to the impacts of climate change, because they are those who will be most affected and need to carry out adaptation. The stakeholders are seen as crucial in assessing the needs for developing policies and measures to adapt to climate. (Mahi Tabet-Aoul, Association pour la Recherche pour le climat et l'environnement (ARCE))	Not applicable – paragraph shortened
2-79	A	2	43			Sorry to be pendantic, but these two words are often confused, although they mean very different things. 'Principle' should be 'principal' (same comment applies to page 23, line 24). (Irene Lorenzoni, University of East Anglia)	Not applicable – paragraph shortened
2-80	A	2	43			Should be "principal" and not "principle." (Alan Robock, Rutgers University)	Addressed
2-81	A	2	43	2	43	Should be principal not principle (unless it is different in the USA?!) (Rachel Warren, School of Environmental Sciences)	Addressed
2-82	A	2	47			Regarding stakeholder participation, how does one ensure that the views of the "non-vocal" or even non-participants are represented and given their due weight (as it ought to be given in a democracy at least)? (Indur Goklany, Office of Policy Analysis, Department of the Interior)	Addressed − Suggestions in the APF.
2-83	A	2	47		49	Too many 'participation' used. (Yinlong Xu, Chinese Academy of Agricultural Sciences)	Not applicable – paragraph shortened
2-84	A	2	48			WHAT IS 'FUNTIONAL PARTICIPATION' (James O'Brien, Florida State University)	Addressed − defined in the ladder
2-85	A	2	49			WHAT IS 'SELF-MOBILIZATION' (James O'Brien, Florida State University)	Addressed − defined in the ladder
2-86	A	3	4			Why CCIAV and not CCIVA? In most of the literature the order is impacts, vulnerability and adaptation. Did the authors choose CCIAV? They might consider changing to CCIVA. It is complicated by the fact that one can have vulnerability before adaptation (gross vulnerability?) and after adaptation (net vulnerability?). But most of the literature so far is addressed to vulnerability before adaptation. (Ian Burton, University of Toronto)	Not applicable – this option was discussed and rejected in Merida Plenary discussion

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-87	A	3	4	3	15	Reader left wondering which approach was used. (George Seielstad, University of North Dakota)	Not applicable – paragraph removed
2-88	A	3	6			delete "decision" (Xiongwen Chen, Alabama A & M University)	Not applicable – paragraph removed
2-89	A	3	6	3	14	Temporal aspects could be mentioned here (see comment 1) (Rachel Warren, School of Environmental Sciences)	Not applicable – paragraph removed
2-90	A	3	6			One '-' between 'decision' and 'making' should be omitted. (Yinlong Xu, Chinese Academy of Agricultural Sciences)	Not applicable – paragraph removed
2-91	A	3	7			It would be useful to first define "uncertainties.' It is not clear what is meant by "deep uncertainties?" (Virginia Dale, Oak Ridge National Laboratory)	Not applicable – paragraph removed, but explanation appears in the main chapter
2-92	A	3	8			"strategies" for what? (Virginia Dale, Oak Ridge National Laboratory)	Not applicable – paragraph removed
2-93	A	3	9		15	Most of the Executive Summary is a strong and effective distillation of the chapter. However, this section on uncertainty doesn't convey the well-thought-out material in the text. It's worth moving some of the material from the text here, in particular: 1) from page 31, lines 41-43, the simple statement "decision-making under uncertainty is inevitable, since some of the uncertainties will likely remain poorly characterized and irreducible," and 2) some of the material on communicating uncertainty and the difficulties therein from pages 28-30. As it currently reads, this summary gives the false impression that all uncertainty can be easily dealt with using simple management techniques. (Evelyn Wright, N/A)	Not applicable – paragraph removed Need to consider if a paragraph on uncertainty is needed in the ES
2-94	A	3	12			rewrite (Xiongwen Chen, Alabama A & M University)	Not applicable – paragraph removed
2-95	A	3	17	3	21	Are you talking about regional emissions scenarios or regional climate change scenarios? It is not clear here and in further discussion. Regional climate change does not depend on regional emission or long-lived species, such as GHG, but could depend on regional aerosol emissions and certainly depends on reginal land use. (Alan Robock, Rutgers University)	Addressed, and these points added.
2-96	A	3	17	3	29	Encourage the authors to consider whether they would like to expand the Executive Summary discussion of SRES Scenarios to include the discussion in Section 2.2.3.4 (page 60) highlighting the need to address not just temperature changes but also changes in other "key climate variables to which natural and human systems are exposed." As is the case with Comment #3, the point is made later in the Chapter but might benefit from reiteration here in the Executive Summary.	Addressed, but may need to be deleted for brevity.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Eileen Shea, East-West Center)	
2-97	A	3	17	3	20	The SRES scenarios are quite hopeless for impacts research, because of the course resolution and the lack of detail on anything but population numbers and per capita income. Besides, the economic projections have been heavily and correctly critized. (Richard S.J. Tol, Uni. Hamburg)	Addressed with a critique of the scenarios and downscaling techniques.
2-98	A	3	19	3	21	Might note the absence of adaptation scenarios or adaptation in existing scenarios. Scenarios for adoption of innovations (adaptation) have existed for some time (Lionberger, Griliches) but the climate literature has not developed them and has been content to make heroic assumptions about adaptation rates. (Ian Burton, University of Toronto)	Addressed – there are some limited examples in the literature, which we cite. Section 2.2.4.2. Check these references and possibly insert into new section on adaptation scenarios (diffusion).
2-99	A	3	23		24	Based on my understanding of SRES 'storylines,' especially before reading the rest of the chapter, it seems odd to be downscaling them. My understanding is that the storylines underlie quantitative emissions and concentrations of long-lived greenhouse gases, which for practical purposes are treated as being mixed homogeneously throughout the global atmosphere. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Not applicable – the reviewer has misunderstood the application of mitigation scenarios in this context. Text modified to clarify relevance.
2-100	A	3	31		50	Why are mitigation/stabilization scenarios included in the WG II Report (also Section 2.3.4)? The fact that impacts affect the mitigation undertaken seems to this reviewer to be insufficient to include them here; also, this reasoning argues that impacts scenarios should be included in the WGIII report: are they? (Elizabeth Malone, Joint Global Change Research Institute)	Not applicable – the reviewer has misunderstood the application of mitigation scenarios in this context. Text modified to clarify relevance.
2-101	A	3	34			"do" should be "does". "..change of global average temperature…" (Xiongwen Chen, Alabama A & M University)	Not applicable – paragraph revised
2-102	A	3	37			Is there sufficient scientific proof of what the level should be? (Hans H.J. Labohm, Netherlands Institute of International Relations 'Clingendael')	Not applicable – the whole assessment has assist in examining this question.
2-103	A	4 5	6	4 5	7	The meaning of risk management is ambiguous, and is at odds with the common notion of risk management as a goal of decision making (as opposed to the description here of risk management as a means for decision making under uncertainty). Essentially, risk management is described here as both a process and an outcome. I would suggest making this clear. The issue I would raise with this notion is that risk management processes may fail to achieve desired risk management outcomes. Further, risk management goals can often be achieved (or not) through a variety of means. Accordingly, I would suggest the use of definitions that distinguish between ends and means. (James Shortle, The Pennsylvania State University)	Page numbering may be mis-referenced. Addressed – we have carefully redefined different terms and classifications and revised the structure of the text to reflect this.
2-104	A	4	8		9	This research runs the risk of ignoring important uncertainties for which pdfs have not been, or cannot be, specified.	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Evelyn Wright, N/A)	
2-105	A	4	15	4	16	"…Group (GSG) convened by the Stockholm Environment Institute,… (Paul Raskin, Tellus Institute)	Not applicable – text removed
2-106	A	4	25			Introduction: Currently there are several "introduction" sections in the manuscript; these could all be merged into one. By merging these sections the length of the chapter will be reduced and the reader will be given a representative introduction to the entire chapter and not merely for the first subsections of the chapter. I suggest that much of the information in the following subsections are merged: • 2.1.1.3 – already part of the introduction • 2.2.3.3. – this section deals with management of uncertainty, which would seem to be an overall topic of this chapter. Perhaps some (if not all) of this text is more relevant in an introductory section rather than in a sub-section • 2.3.1 – this is the introductory section for section 2.3., there should be no need for two introductions in one chapter. Perhaps it could be renamed to something else but "introduction"? However, something representative of section 2.3 needs to be included in the overall Chapter 2 … perhaps break out some of the general description in section 2.3.1.1? (Marie Ekström, University of East Anglia)	Addressed – there is now only one general introduction to the chapter.
2-107	A	4	25			Introduction (related to the above comment): It is not clear how Section 2.1.1 gives "a frame" representative for all methods of this chapter, perhaps the sub-heading should be changed to make it clear this section deals with CCIAV methods, otherwise why isn't the section "2.2.3.2 Probabilities and Baysian Analysis" included under 2.1.1? (Marie Ekström, University of East Anglia)	Addressed – introduction has been shortened and divided into three sub-sections.
2-108	A	4	25	9	36	Section 2.1: With more than five pages, this section seems a bit long in a 30 page chapter. An introduction of 1-2 pages would be sufficient, with particular focus on (i) a short historical wrap-up, and (ii) a framing of methods addressed in this report. Thus sections 2.1.1.2 and 2.1.1.3 could be shortened or deleted (see below comments). Please also note that the section numbering at fourth level with only on third level section (2.1.1) is not needed. (Thomas Henrich, N/A)	Addressed – introduction has been shortened and divided into three sub-sections.
2-109	A	4 5	25	4 5	25	I believe it would be more appropriate to say that CCIAV methods have expanded to a richer set of information for characterizing and managing uncertainty, than to say they have expanded to manage uncertainty. (James Shortle, The Pennsylvania State University)	Page numbering may be mis-referenced. Addressed – we have revised the text-
2-110	A	4	27	4	29	A subtle but important point: You say that accurate and reliable assessments are of	Addressed – text has been revised

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						increasing importance, but this is to say that something that we cannot have now or in the near future is of increasing importance. Scientists and policy makers certainly would like to have "accurate and reliable assessments," but we are, in general, far from being able to provide such. Accordingly, "accurate and reliable" is too high a standard for assessments for contemporary decision making. It is for this reason that well-crafted scenario analyses are what are really important for researchers and policy makers. (James Shortle, The Pennsylvania State University)	
2-111	A	4	27	4	37	Very good introduction! (Justin Wettstein, University of Washington)	No action required
2-112	A	4	42			"are increasing…" should be "enhance" (Xiongwen Chen, Alabama A & M University)	Not applicable – paragraph deleted
2-113	A	4 5	45	4 5	45	The meaning of "starting at the socio-economic end" is unclear. (James Shortle, The Pennsylvania State University)	
2-114	A	5	4			"developments" should be "development" (Xiongwen Chen, Alabama A & M University)	Not applicable – paragraph revised
2-115	A	5	4		5	SENTENCE 'THIS CHAPTER--' IS BAD. (James O'Brien, Florida State University)	Addressed– section revised
2-116	A	5	13			"characterisation" should be "characteristics" (Xiongwen Chen, Alabama A & M University)	Not applicable – comment is invalid. The term is correctly used in this context.
2-117	A	5	20			It is not clear what you mean by scenario, here and above. Is it a scenario of emissions or scenario of climate change? (Alan Robock, Rutgers University)	Addressed – we have revised this introductory section to make this clearer.
2-118	A	5	20	5	22	It should be noted that CO2 effects will be intensified especially under low availability. (Masayuki Yokozawa, National Institute for Agro-Environmental Sciences)	Comment seems to be misplaced
2-119	A	5	22			"framing" should be "frame" (Xiongwen Chen, Alabama A & M University)	Not applicable – language is correct
2-120	A	5	22			Introduction (Section 2.1.1): The author talks about three main orientations (listed on page 5) and directs the reader to a summary of these given in table 2.1., however this table comprise four orientations. Furthermore, how do the three different structures of CCIAV assessments on page 5 related to the three "strands" of development for scenarios for the future and the CCIAV procedures listed on page 4? Please help the reader by clearly stating how these different categories relate to each other. (Marie Ekström, University of East Anglia)	The Table only has three. We don't think it is legitimate to link the drivers with the orientations and in any case the introduction is rewritten
2-121	A	5	22	7	3	Section 2.1.1.1: A framing for methodological approaches is useful, and would give	Considering - complex enough –

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						the remainder of the chapter a needed common frame of reference. The proposed focus on scale, subject matter, time (explorative vs normative) gives an entry point, but should be expanded at least by the issue of approach (qualitative vs quantitative). Furthermore, it is important to note that different assessment contexts exist and often call for different methods, thus introducing notion of the intital goal (research vs business vs policy) would be needed and could help structure the methods discussed later. For example, risk management approaches usually have a different rationale than scientific assessment oriented modelling approaches, which again differ in their aim strongly from decision-making geared participatory approaches. (Thomas Henrich, N/A)	concentrating more on aim. We have a broader view of risk than this
2-122	A	5	22	5	22	Should the heading refer to this as a "report"? (Rachel Warren, School of Environmental Sciences)	Yes (WGII FAR), but heading will be changed
2-123	A	5	24	5	26	"Starting as the straightforward application of climate scenarios to assess impacts and potential adaptations, CCIAV methods have expanded to manage uncertainty by addressing a variety of spatial scales, assessment directions and temporal aspects." The way that this is written, it comes across that new methods are still uniquely and straightforwardly based on the application of climate scenarios, but that they incorporate uncertainty better. It doesn't reflect the development of approaches, for example as described by Burton et al. (Burton, I., Huq, S. Lim, B., Pilifosova, O., and Schipper, E.L. (2002) From impacts assessment to adaptation priorities: the shaping of adaptation policy. Climate Policy 2, 145-159.) (Karen O'Brien, University of Oslo)	We can't see how the reviewer can draw this conclusion when we are saying the opposite. A simpler treatment should help Burton et al already mentioned in this context
2-124	A	5	24	5	28	Was application of CCIAV to assess impacts of emissions scenarios ever straightforward ! I think the authors are arguing that use of CCIAV has expanded from the assessment of emissions scenarios through to 'impacts' assessed in terms of changes to climate variables (via GCM's and downscaling?) to a much broader range of applications, including those that take climate model scenario-conditional outputs and run them through an impact model based on a CCIAV framework. If so they should simply say so ! (Robert Willows, UK Environment Agency)	To be clarified in introduction
2-125	A	5	25			"uncertainty" be "uncertainties" (Xiongwen Chen, Alabama A & M University)	Not applicable
2-126	A	5	30	7	3	Section 2.1.1.1 presents wildly proliferating options. Within option ii alone are 4 options. It would be more useful to apply some judgement about which option is best, then use it. (George Seielstad, University of North Dakota)	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-127	A	5	30			Section 2.1.1.1 (and 2.1.1 generally): This section seems to be missing a key opportunity to discuss a distinct assessment orientation--that related to the audience / scope of the assessment. For example, the U.S. National Assessment mentioned in this chapter contained national, regional and sectoral elements in its compendium of reports / impacts assessments. Each of the assessments had a different approach (top-down vs. bottom-up) that was, mostly, a logical expression of the target audience (national and sector reports focused on top-down approaches whereas the regional assessments were more oriented toward bottom-up approaches). Some of this is addressed by "scale", but some seems to me to be distinct. (Justin Wettstein, University of Washington)	The influence of assessment aim is being clarified
2-128	A	5	32		39	The initial implication of these items seems to be that there are basically three binary choices, and that one can choose them independently, so you have a 3-dimensional matrix of length two in each direction--2^3 = 8 possible choices. However, these axes of options are really not orthogonal (independent). For example, setting a target, then assessing how to reach/avoid that target, as stated in (iii), seems to map quite strongly to 'concentrates on solutions' as stated in (ii). The range of choices also depends on the sector of interest. For example, if you wanted to fine-tune the design and operation of a dam for drinking water storage and hydroelectric generation, you're going to prefer small-scale data, diagnose the conditions that cause negative and positive outcomes, and assess how to reach positive outcomes and avoid negative ones. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Agreed. See above
2-129	A	5	32	6	44	I'm not sure how helpful this section is. It could be better written ! The emphasis and key message could be the usefullness of the distinction between exploratory and normative approaches (Ie give into temptation on line 2 !!). Actually, the key message should be that the purpose of undertaking a CCIAV assessment should be clear and determines the approach to CCIAV. There could be more discussion of the motivation and difficulty of framing the problem, which will often determine the nature and starting point of any CCIAV assessment (top down, bottom up, exploratory, normative) and will then need to broaden out to include relavent aspects to effectively characterise the risk problem (choice of receptors, spatial scale, period of assessment, impact measures, climate variables, choice of models and methods, mitigation and adaptation measures/treatments, etc, etc). There is an implicit assumption that CCIAV assessments are policy focussed (eg in Figure). This is OK, but in future CCIAV may become increasingly focussed at the appraisal of projects and programmes, to deliver adaptation. Lines 15-18 don't follow from the preceding 3 paragraphs, which haven't mentioned	Agreed. See above.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						natural-hazards approach, vulnerability/resilience based and policy-based approaches. The would equally stand alone if p. 5, line 30 to p6. line 13 were deleted !! (Robert Willows, UK Environment Agency)	
2-130	A	5	34			rewrite (Xiongwen Chen, Alabama A & M University)	Text removed
2-131	A	5	41			DESSAI A OR B (James O'Brien, Florida State University)	Figure removed
2-132	A	6	0			Figure 2.1. might require some modificaiton. While it demonstrates the overlap between the 2 processes at the policy level, the time axis (Past, Present and Future) given in this figure would appear to mean they do not connect, which need not be true, and surely the different components do not have the temporal scale implied by the trianges. Also there is no sense of spatial scale for the bottom-up approach. Could the spatial and temporal scales be combined to one side? Indicators in the bottom-up triangle require to be properly ordered. (Kim Ritman, Bureau of Rural Sciences)	Figure removed
2-133	A	6	1	6	7	This sentence is too long. (Kim Ritman, Bureau of Rural Sciences)	Totally rewritten
2-134	A	6	2			rewrite (Xiongwen Chen, Alabama A & M University)	Totally rewritten
2-135	A	6	2	6	13	Is this paragraph necessary? If so, it strikes me that its points could be said more efficiently. (Justin Wettstein, University of Washington)	Totally rewritten
2-136	A	6	5	6	5	These "bottom-up" approaches start from socio-economic conditions at the local scale, rather than outcomes. I disagree that they are largely normative. Starting with economic resources, institutions, infrastructure, equity, technology, information and skills is no more normative than startign with world development and global greenhouse gases. (Karen O'Brien, University of Oslo)	Should be helped by claified text and removal of Figure 2.1
2-137	A	6	7			rewrite (Xiongwen Chen, Alabama A & M University)	Totally rewritten
2-138	A	6	9			should read "to assess how" (Donald Boesch, University of Maryland Center for Environmental Science)	Totally rewritten
2-139	A	6	9			Delete "assess" (Virginia Dale, Oak Ridge National Laboratory)	Totally rewritten
2-140	A	6	9			assess' rather than 'asses' :-) (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Totally rewritten

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-141	A	6	9			WHAT DOES 'TO ASSES SHOW' MEAN (James O'Brien, Florida State University)	Totally rewritten
2-142	A	6	9	6	9	Typo : move the s (Rachel Warren, School of Environmental Sciences)	Totally rewritten
2-143	A	6	16			"assessing" be "assess" (Xiongwen Chen, Alabama A & M University)	Totally rewritten
2-144	A	6	19			Figure 2.1: Based on this figure, I have trouble with the dichotomy of top-down vs. bottom-up. In the top-down triangle, each successive arrow requires an additional level of context that can only stem from a bottom-up building of a question. E.g., if I want to regionalize, I need to ask "What region am I interested in?" and in order to assess impacts, I need to ask "In what sector am I interested in analyzing impacts?" Conversely, if I want to assess adaptive capacity, I need to ask "Adaptation to what environmental variable?" which can link back to world-wide drivers. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Figure removed
2-145	A	6	20	6	44	Section 2.1.1.1 - Figure 2.1: This figure shows the different angles in bottom-up and top-down approaches, but the time axis is misleading in this context and should be excluded. (Thomas Henrich, N/A)	Figure removed
2-146	A	6	22	6	44	Figure does not clarify the description of it on p. 5. (George Seielstad, University of North Dakota)	Figure removed
2-147	A	6	34	6	36	Point (ii) is unclear, wording needs attention (Rachel Warren, School of Environmental Sciences)	Figure removed
2-148	A	6	43			Figure 2.1 It is not clear why the categories in the bottom left triangle go from bottom to up. Vulnerability can exist at the level of institutions. What is the scale? For the top right triangle an arrow from global to local is drawn. Why is there not a similar arrow for the bottom left triangle? It is perverse to suggest that climate adaptation policy relates only to vulnerability (social and physical).I question the concept of physical vulnerability. Is the WAIS vulnerable? Not in my meaning of the word vulnerable. This is a poor diagram and should be modified, thrown out, or something else substituted. (Ian Burton, University of Toronto)	Figure removed
2-149	A	6	44			REF NOT COMPLETE (James O'Brien, Florida State University)	Figure removed
2-150	A	7	3			table 2.1 "PSIR" (Xiongwen Chen, Alabama A & M University)	Agreed. Table not yet resolved.
2-151	A	7	3			Table 2.1--same note as p. 5, lines 32-39. Some different terminology is used in this table, but the same basic problems remain.	Agreed. Table not yet resolved.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	
2-152	A	7	3			Table 2.1 - use of 'upside' and 'downside' terminology could be ambiguous or difficult to understand, especially to non-English readers. Consider omitting? Personally I do not feel these terms have great descriptive value. Would be perhaps worthwhile for consistency retaining the explanations given on page 2, and thus substituting 'upside' with 'opportunity enhancing' and 'downside' with 'harm-avoiding' (or something similar). (Irene Lorenzoni, University of East Anglia)	Agreed but terms suggested are less clear. Table not yet resolved.
2-153	A	7	3			Table 2.1: Orientation of approaches to undertaking CCIAV assessments. Regarding scale, some studies are neither top-down or bottom-up, but instead focused on a single scale (e.g. impacts of climate change on global agricultural productivity; household adaptations to future climate change). Time can include projections of future conditions or analyses of the impacts, vulnerabilities and adaptations to current climate variability. I am not sure what a normative, goal-oriented approach to CCIAV is (perhaps studies that focus on reducing impacts, decreasing vulnerability, or increasing adaptation?) but perhaps it fits better under a category called "assessment objective." (Karen O'Brien, University of Oslo)	Your first example is top-down the second bottom up. Assessment objective is being promoted in the introduction (see above responses to 128 & 129)
2-154	A	7	3	7	4	Table 2.1 -- I'm not certain that I agree with the distinction made between "vulnerability-driven" and "resilience-driven" assessment approaches; Figure 2.3 actually appears to combine them which is more consistent with my own experience. Most of the experience I've had with bottom-up vulnerability assessment approaches in the Pacific have been set in an overall context of building resilience through adaptation as an objective although never with a pre-determined outcome (other than enhanced resilience). I'm not convinced that resilience-driven approaches are different from vulnerability-driven assessments; just a different facet of the lens through which one views the assessment. If the authors want to maintain this distinction, I would encourage some additional clarification in the final text. (Eileen Shea, East-West Center)	Agreed. Will reconcile Tables 2.1 and 2.3 but not yet resolved
2-155	A	7	3	7	4	Table 2.1. Scale seems to me to more appropriately refer to the units of analysis - e.g., local, regional, global. Bottom up or top down seems to me to better refer to the approach that is used to determine impacts at the chosen scale. Conceptually, a top down analysis could focus on units ranging from global to local. Similarly, a global scale analysis could aggregate up from local or regional analyses. The subject matter and policy-driven dichotomy seems to me to obscure more than enlighten. Essentially, I find the "orientation of approach" column to mix methods	Agree about the mixing. Considering these points

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						of analysis (e.g., top down or bottom up) with goals of analysis (assess policy impacts). I would suggest a taxonomy which differentiates goals and methods. Speaking of definitions, there are many terms in this table (e.g., resilience-driven, critical thresholds, pressure, state, response) that may not mean anything to some readers, or that may mean different things to different people. I would suggest avoiding jargon to the extent possible, and making sure that it is defined when necessary. (James Shortle, The Pennsylvania State University)	
2-156	A	7	3			Table 2.1: Useful, well-organized table that summarizes many key concepts. This table could gain just a little more specificity and relax that currently exisiting in the text. (Justin Wettstein, University of Washington)	No action needed
2-157	A	7	3			Table 2.1 This is a very clear and helpful summary of the framing (Evelyn Wright, N/A)	No action needed
2-158	A	7	3		4	:' after Table 2.1 should be omitted. Within Table 2, 'Define' should be 'Defines'. (Yinlong Xu, Chinese Academy of Agricultural Sciences)	Not applicable
2-159	A	7	5	7	5	There is something wrong with the grammar of the sentence "They have been increase in the number..". I guess it should read: " There have been increases in the number ..." (Sabine Wurzler, North-Rhine Westphalia State Environment Agency)	Text not here
2-160	A	7	6	8	6	Section 2.1.1.2: Key concepts and definitions of terms used in the climate change impacts, adaptation and vulnerability context need to be consistent across the whole report and should be defined outside this chapter, and only refered to here. Indeed it is crucial for the report as a whole to be consistent in terminology. (Thomas Henrich, N/A)	Some discussion of terms needed here where they go beyond IPCC glossary because it does not happen elsewhere
2-161	A	7	6	8	6	Could this section be cut and the reader referred to another Chapter? (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Will be trimmed but retain discussion on vulnerability
2-162	A	7	8	7	8	I interpret this sentence as meaning "has helped to differentiate" instead of "has challenged" (Karen O'Brien, University of Oslo)	No, but section heavily edited
2-163	A	7	16			UNDP in full (Geoffrey Levermore, Manchester University)	Yes, where relevant
2-164	A	7	17	7	19	Do you mean to leave the reader with this particular definition of adaptation as the appropriate one having noted that there are competing notions? (James Shortle, The Pennsylvania State University)	This is adaptive capacity – will be left to Ch. 17.
2-165	A	7	21			Table 2.1 I am struck by the absence of the concept of risk in this table.	It is all about risk. See above notes on altering

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Ian Burton, University of Toronto)	Table
2-166	A	7	21			rewrite (Xiongwen Chen, Alabama A & M University)	Heavily edited and moved to Section 2.2.3
2-167	A	7	21	7	29	It would be useful to include other definitions and conceptualizations of vulnerability here. E.g., Is vulnerability the adverse effect or impact itself, or is it the likelihood of experiencing an adverse effect? (Karen O'Brien, University of Oslo)	Good issue, cannot resolve in space we have
2-168	A	7	21	7	29	Does vulnerability to climate change reveal several layers or is it revealed to have several layers? What do you mean by a "risk assessment framework depending on whether risk treatment measures have or have not been excercised"? (James Shortle, The Pennsylvania State University)	Yes
2-169	A	7	21	7	29	This pgph is very good (Rachel Warren, School of Environmental Sciences)	No action needed
2-170	A	7	22	7	22	after "risk treatment" add "see Box 1 for definition" (Rachel Warren, School of Environmental Sciences)	Addressed
2-171	A	7	22			have been exercised …. and successful. (Robert Willows, UK Environment Agency)	Addressed
2-172	A	7	26	7	29	does the UNFCCC itself refer to vulnerability in physical systems? Article 2 contains no reference to physical systems, only social and biological. (Ian Burton, University of Toronto)	True, but some physical systems are said to be vulnerable to climatic phenomena
2-173	A	7	26	7	29	Reference to vulnerability as defined in chapter 19: the current wording is not clear enough. Does vulnerability contribute to dangerous anthropogenic interference? Cross-reference should be more precise. (Irene Lorenzoni, University of East Anglia)	Addressed – will cross-reference
2-174	A	7	28			Assessment' should be 'Convention'. (Yinlong Xu, Chinese Academy of Agricultural Sciences)	Addressed
2-175	A	7				In Table 2.1 eliminate the line before Policy-driven (Donald Boesch, University of Maryland Center for Environmental Science)	Addressed
2-176	A	8	1	8	2	Who surveyed? Patwardhan (2004)? (Donald Boesch, University of Maryland Center for Environmental Science)	Not applicable – text revised
2-177	A	8	1			"()" (Xiongwen Chen, Alabama A & M University)	No Action Needed
2-178	A	8	1	8	6	I would agree that vulnerability is a complex multi-faceted concept and that it is important for readers to know this. I do not find this paragraph to have done that effectively, or to indicate why scale and context, for example, are important. I know it is difficult to do with limited space. (James Shortle, The Pennsylvania State University)	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-179	A	8	1	8	6	In a risk-based framework, vulnerability would not be used, but replaced in context by more precise terms terms such as present-day risk or future risk or residual risk, or unacceptable risk. (Robert Willows, UK Environment Agency)	Vulnerability and risk will be sorted out in Box 2.1 and in the Section 2.2.3. on vulnerability assessment
2-180	A	8	2	8	4	rewrite (Xiongwen Chen, Alabama A & M University)	Addressed
2-181	A	8	2			"showing" should be "show" (Xiongwen Chen, Alabama A & M University)	Addressed
2-182	A	8	4			rewrite (Xiongwen Chen, Alabama A & M University)	Addressed
2-183	A	8	8	9	36	Section 2.1.1.3: Risk Management is already discussed at length in section 2.2.1. Therefore there seems no need for this seperate section 2.1.1.3. This section can be shortened, deleted here and key points merged into the later sections. (Thomas Henrich, N/A)	Addressed
2-184	A	8	8			Section 2.1.1.3--This section seems to be one that most uniformly depicts climate change as being all bad. This may leave the entire AR4 open to legitimate criticism by greenhouse skeptics. While other parts of the chapter explicitly mention that some effects of climate change may be positive, especially for a certain sector of people, or they may leave opportunities that can be better exploited if anticipated, this section is entirely 'risk' and 'hazard.' Please use value-neutral terminology to the greatest extent possible. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Not deliberate. Addressed
2-185	A	8	10	8	22	Consider for deletion (Ha-Duong Minh, CNRS)	Addressed
2-186	A	8	10			WHAT IS 'ENHANCED GREENHOUSE EFFECT'? (James O'Brien, Florida State University)	No Action Needed
2-187	A	8	12	8	14	Please reword these 2 lines for clarity (Rachel Warren, School of Environmental Sciences)	Addressed
2-188	A	8	13	8	13	Need parentheses around references and to deal with the stranded "adaptation policy framework.' (Donald Boesch, University of Maryland Center for Environmental Science)	Addressed
2-189	A	8	19	8	21	The exact phrase is “dangerous anthropogenic interference with the climate system”. What exactly does the term “criteria” refer to? In Article 2 the climate problem is socially constructed as a pollution problem. The pollution paradigm seeks to limit damage (acceptable risk?) to a level determined by standards and criteria. In this case what are the standards and what are the criteria and what methods have been developed or are needed to measure them?	Will discuss with Ch 19. Standard is DAI and criteria link to food security, the natural environment and sustainable development. Will define if room allows

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Ian Burton, University of Toronto)	
2-190	A	8	24			The element of value judgements influencing risk management is only briefly introduced at the beginning of this chapter, but scarcely considered in the development of risk management strategies. Other chapters of WGII do pick up on this element so perhaps a cross-reference or acknowledgement should be made to this element? (Irene Lorenzoni, University of East Anglia)	Addressed – included in discussions on what is normative
2-191	A	8	24			A small comment could be made here about the changing nature and extent of assessments - mainly following scientific protocols and procedures at the inception of the IPCC, then progressively becoming more inclusive. (Irene Lorenzoni, University of East Anglia)	Addressed in another section (2.1.1)
2-192	A	8	27			You could refer to a paper which encapsulates these points: Lorenzoni I, Pidgeon NF and O'Connor RE (2005) Dangerous climate change: the role for risk research. Risk Analysis, 25 (6) - published in December this year. I attach a pdf copy fyi. See "Ch02 Lorenzoni.pdf" (Irene Lorenzoni, University of East Anglia)	Will do – the whole risk volume will be looked at for possible citation and discussion
2-193	A	8	33	9	6	The text states that political action is in response to/results from the IPCC reports. In reality, science and policy co-evolve, there is no unidirectional causal link. The text may be simplified by relying more on the table. (Ha-Duong Minh, CNRS)	Both exist. Governments do act on reports.
2-194	A	8	33	9	6	Severely reduce and fold this text into Table 2.2 - doesn't need both Table and text (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed
2-195	A	8	34	8	34	Good example of the unnecessary verbosity: couldn't the first word in the answer be "yes"? (George Seielstad, University of North Dakota)	Yes
2-196	A	8	35	8	36	Delete on IPCC 1990 and include in parentheses. (Donald Boesch, University of Maryland Center for Environmental Science)	Addressed
2-197	A	8	39	8	42	As for the climate models, shouldn't you mention Dr. Hansen's suggestion that the IPCC scenarios are rather pessimistic (http://www.sciam.com/media/pdf/hansen.pdf)? I understand that conventional scenarios remain useful, but the question raised by Dr. Hansen is already well known through internet. Thus, the readers of the IPCC report will feel curious if such questions are neglected, and hence, the value of the report might be adversely affecte (Kiminori Itoh, Yokohama National University)	Not applicable here – mentioned in later section on scenarios but treated in WG I.
2-198	A	8	47	8	47	What is meant by "current baseline" I don't think we have one unless we mean the	Addressed. Baseline (current) or future

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						short term. Explain length of time for which these baselines last - to 2100, or only 2030 or 2010 (Rachel Warren, School of Environmental Sciences)	reference projections (or similar words)
2-199	A	8	50			Add a new senntence at the end: " That different societies perceive risks differently is evident in that not all nations have ratified the Kyoto Protocol." (Indur Goklany, Office of Policy Analysis, Department of the Interior)	Not a appropriate response. We have a short section on risk perception
2-200	A	8		8		See previous comments on risk management as a process versus a goal. (p7 lines21-29) (James Shortle, The Pennsylvania State University)	Addressed
2-201	A	9	0			The major problem is language. It is really time consuming to read the whole chapter. With this problem, some concepts can not be fully understood. (Xiongwen Chen, Alabama A & M University)	Agreed and addressed
2-202	A	9	3			"sees" change into "explores" (Xiongwen Chen, Alabama A & M University)	Text removed
2-203	A	9	3	9	3	I would suggest that "this generation exhibits" rather than "this generation sees." (James Shortle, The Pennsylvania State University)	Addressed
2-204	A	9	4			Use of the term 'risk treatment' (although I understand it is taken from the UNDP framework on page 11 and adopted for consistency) is not entirely appropriate, I feel. There will always be a certain degree of risk related to any phenomena or issue under consideration. Risk in itself cannot be 'treated'. The literature talks about risk management and this, I would suggest, is the terminology we should be using. For example, rather than 'treat' we could use 'manage', 'deal with' etc. (Irene Lorenzoni, University of East Anglia)	Risk language is a minefield which is the reason for Box 2.1. Will reduce the use of "treat" but risk management as a term has different uses
2-205	A	9	23	9	25	Risk management is not only about mitigating or adapting to hazards, it is also about capitalizing on opportunities, and for some sectors in some places, climate change presents opportunities. (James Shortle, The Pennsylvania State University)	Agreed, this is mentioned in text
2-206	A	9	23	9	33	why does this chapter treat risk management for adaptation or adaptation + mitigation only? Why is there no treatment of risk mgmt approaches to mitigation? Is this because there is another chapter somewhere (WGIII)? If so, it would help to say so, if not, this third perspective needs to be treated in this chapter as well. (Mort Webster, MIT)	WGIII issue. Can cross-reference
2-207	A	9	25			rewrite (Xiongwen Chen, Alabama A & M University)	Not applicable
2-208	A	9	30	9	31	"+" (Xiongwen Chen, Alabama A & M University)	Not applicable
2-209	A	9	31			"+"	Not applicable

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Xiongwen Chen, Alabama A & M University)	
2-210	A	9	32	9	32	"This report describes risk management where adaptation is being used to treat climate risks or where adaptation and mitigation are both being considered." Does this refer to the entire WGII report in general, or to this chapter or section? (Karen O'Brien, University of Oslo)	This report is this Report
2-211	A	9	32	9	32	To this point, the text hasn't described risk management. It has given a long buildup to risk mgt. if it ever gets there. (George Seielstad, University of North Dakota)	Addressed by restructure and rewrite
2-212	A	9	39			Section 2.2: My first impression is that this section needs re-organising as it is in some need of a logical and clear structure. I'm sure all the necessary information is there, but I found it very hard to read and take in just because the different sections are not very well linked with each other.I suggest that there may be a need for looking over the choice of headings and their organisation to make sure the information is structured in a clear fashion. (Marie Ekström, University of East Anglia)	Addressed by restructure and rewrite
2-213	A	9	39	32	50	Section 2.2: This section would benefit from a clearer framework. This could be provided by the framework proposed in section 2.1.1.1 (see comments above) and/or by the evolotion of methods perspective in section 2.1.1.3 (in particular Table 2.2 is useful here). Also,important developments have also been achieved in the methods used for scenario development, in particular with stakeholders. While this is touched upon in the various sub-sections and in in more detail in section 2.3, a seperate section to bring together the methodological issues around scenario development and analysis is needed here. Especially the distinction between scenarios, sensitivity, uncertainty analysis, et cetera would be useful. Additionally, some progress in the role of model-based, often interactive 'decision support systems' applied within scenario exercise and risk assessments has been made over the last years and could be addressed. (Thomas Henrich, N/A)	Addressed by restructure and rewrite.
2-214	A	9	39	32	50	The treatment of integrated assessment modelling in the section 2.2 needs improving. Do the authors consider IA modelling to be one of the methods for CCIAV? This may be the case for some IA models but not others? Needs to be clarified. Where does the tolerable windows approach mentioned sit? In page 20 line 5 it is mentioned that integrated models are discussed further in the section 2.2.3 uncertainty, but they are not unless page 31 line 9 is about IA but it is not very clear. I am pretty sure that IA methods have been written out in (chapter 18?) suggest that authors clarify relationship between IA and CCIAV on different scales, explain role of integrated assessment models in global policy assessment for risk	Addressed in short section on IA; cross ref with CH 18

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						treatment of clmate change, which is very considerable, particularly for mitigation and sadly lacking for adaptation. And refer to the chapter 18(?) list of IA modelling methods. The section 2226 "assessing policy benefits" might be an appropriate place to discuss IA but again this section needs to clarify whether global or local policies are being referred to. In lines 14 to 18 on p26 some IA modelling papers are referenced but this could be more extensive. (Rachel Warren, School of Environmental Sciences)	
2-215	A	9	41	9	44	The first paragraph under 2.2 is incorrect; the third part of the section deals with "Managing and communicating uncertainty" not "selected applications of CCIAV methods". The "selected applications…" is dealt with in the third part of the "Risk management frameworks" section (i.e. section 2.2.1.3). (Marie Ekström, University of East Anglia)	Text removed
2-216	A	9	41	9	44	The organization of this section around risk management frameworks, management of uncertainty, and selected applications of the two seems to dismiss some of the other frameworks that are being used, including vulnerability frameworks (e.g., Turner et al. 2004) and adaptive management frameworks. The decision to treat CCIAV as a single unit, rather than as different areas within climate change research, obscures many of the methodological differences and developments. Reference: Turner, B.L., Kasperson, R.E., Matson, P.A., McCarthy, J.J., Corell, R.W., Christensen, L., Eckley, N., Kasperson, J.X., Luers, A., Martello, M.L., Polsky, C., Pulsipher, A. and Schiller, A. (2003) A framework for vulnerability analysis in sustainability science. Proceedings of the National Academy of Sciences of the United States of America 100, 8074-8079. (Karen O'Brien, University of Oslo)	The chapter is endeavouring to do the very things the reviewer states it is not (e.g. tresting CCIAV as a single unit). The chapter has been reformatted to avoid any ambiguities
2-217	A	9	41	9	49	At the beginning of this section (2.2) suggests that the first part describes the 'development and application of risk management frameworks'. But in the next section (2.2.1) states that the 'adaptation and application of risk management framework' is the most significant since the TAR. 'Application' here doesn't give us a clear meaning. Either it should come before adaptation (application and adaptation of…) or can be deleted. (Kim Ritman, Bureau of Rural Sciences)	Chapter reformatted
2-218	A	9	47			Section 2.2.1 on risk management: The field of risk management is a fairly new-ish concept within mainstream climatology, could the authors say something about when it started to take off and who were in the forefront (some of this is discussed in section 2.1.1.3)? Is there a specific field that has inspired in terms of methodology (e.g. finance/engineering/medicine) and if so, for what reason. (Marie Ekström, University of East Anglia)	Insufficent room to give historical review. Will nominate a couple of references.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-219	A	9	47	9		Starting p 9 we have long "boiler plate-ish" primer on risk management based on the Australian/New Zealand Standard for Risk Management, and the ISO/IEC guidelines. I find this section very disappointing. It is not wrong, although there are disputable points, but it is generic to the point of being meaningless within the climate change context, and misses fundamental issues and related literatures. We have a taxonomy that really does not advance meaning or capture essential literature. Missing for example, is the crucial distinction between individual and collective risk, and individual versus collective risk management; and missing is literature related to these distinctions. Also missing is the classic Knight distinction between risk and uncertainty; discussion of appropriate treatment of regular versus catastrophic risk. Frankly, this section does not show a deep command of the literature on public and private decision making for collective and individual risk management. (James Shortle, The Pennsylvania State University)	Considerably condensed. Not excited by the distinctions offered by the reviewer – we don't have room to do all these things in a manner that is directly relevant to CCIAV. However, we will certainly endeavour to tighten up definitions.
2-220	A	9	47			Section 2.2.1: There is a big focus on risk assessment in this chapter. I think that is fine and generally a positive organizing concept. However, it seems to me that much of the fundamental work cited in this AR4 chapter covers only a portion of the breadth of topics falling under risk asssessment as it has been defined here. Is there a diagram (either to replace or in addition to Figure 2.2) which demonstrates the continuum of activities required? It seems like a good way for a reader to catalog different studies and I feel an opportunity is possibly being missed given the current presentation of the idea. (Justin Wettstein, University of Washington)	Condensed. If Fig 2.2 survives (doubtful because of space) it will have the APF and UKCIP frameworks
2-221	A	9	47			Section 2.2.1: Much of this discussion seems very (too?) academic and somewhat redundant with other sections (e.g., 2.1.1.3). Also, related to another general comment on this section, I do not see climate change assessments and risk management as fundamentally distinct things, but maybe climate change assessments are subsumed by larger risk management frameworks. If this is so, one short and simple description of the relationship between the "old" and "new" assessment approaches could save much in terms of length and improve the readability of this chapter. (Justin Wettstein, University of Washington)	Restructured and condensed
2-222	A	9	49	10	4	IPCC was perhaps rather slow to appreciate the value of risk management frameworks. (Robert Willows, UK Environment Agency)	True. No action needed
2-223	A	10	6	10	7	I consider this definition as far too broad and unclear. Phrased in this way it could easily be equal to 'sustainable development'. I would favour a more strict definition,	No. Broad definition is better than this circular one.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						such as ' risk management is the complete process of risk analysis, risk assessment, options appraisal and implementation of risk management measures'. (Marcel Marchand, Delft Hydraulics)	
2-224	A	10	6	13	12	There has been a recent atempt to come up with a common risk management framework and taxonomy. The International Risk Governance Council in Geneva has prepared a document called "Risk Governance: Towards an Integrative Framework" White Paper No. 1 (IRGC: Genenva 2005). The document includes a discussion of all the major taxonomies. The main pont is that the whole process of identifying, assessing, evaluating, managing and monitoring risks has been called risk governance. Each step int he governance process is well described there and is in acordance with the intention of the description in this document. It does offer more precision and clarity, however.With respect to climate change, the assessment of physical impacts may be just as important as the assessment of economic impacts and social concerns. The decision analytic approach for delecting the most appropriate risk management strategy is propogated in the IRGC document. This would provide an excellent link to the discussion of MCA in the previous section of the document. I would suggest a reworking of this subsection with a strong emphasis on the IRGC document. (Ortwin Renn, University of Stuttgart)	Adding ref and key points (esp. Re MCA). Unlikely to add new term risk governance – it is difficult to see how the International Risk Governance Council can somehow supplant all the other international efforts and just adds to the complexity in terms of language and process.
2-225	A	10	14	10	15	It is not clear to me how adaptation assessment can contain all the elements of risk managent. Would the former be included in the latter as management implies in its use of words that it's more extensive? Perhaps clarify somewhat. (Irene Lorenzoni, University of East Anglia)	Yes. Addressed
2-226	A	10	16	10	20	Remove last two sentences of this paragraph (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed
2-227	A	10	17			Fig 2 does not compare the two approaches - it only shows them. A comparsion would be useful. (Virginia Dale, Oak Ridge National Laboratory)	Condensed. If Fig 2.2 survives (doubtful because of space) it will have the APF and UKCIP frameworks
2-228	A	10	22	10	36	I might encourage the authors to reflect the later discussion of the value of participatory approaches that effectively engage scientists and stakeholders in a shared assessment process rather than pointing only to "communication and consultation" which tends to imply a one-way, scientist-driven approach. (Eileen Shea, East-West Center)	Have section on stakeholders and cross-ref others
2-229	A	10	22	10	32	Symbol + and - is presumably meant to be and/or, better to write and/or for clarity (Rachel Warren, School of Environmental Sciences)	Addressed
2-230	A	10	22	10	32	Are we talking about local or global assessments? In particular local or global	Yes. Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						mitigation and/or adaptation? (Rachel Warren, School of Environmental Sciences)	
2-231	A	10	28	10	29	The second sentence of this bullet point doesn't belong in the list; you've not made a judgment for any of the other listed CCIAV methods. This comment should be included in text outside the list - and perhaps give some references? (Marie Ekström, University of East Anglia)	Should be hazard not risk.
2-232	A	10	30			"mitigation measures" should be "mitigation methods" (Karen O'Brien, University of Oslo)	No.
2-233	A	10	30			methods are … appraised … and prioritised. (Robert Willows, UK Environment Agency)	Addressed
2-234	A	10	34		36	I would add that stakeholder involvement also builds support for actions involved in adaptation and adaptive capacity. Also add this point on page 22, lines 29-35. (Elizabeth Malone, Joint Global Change Research Institute)	Addressed in stakeholders section
2-235	A	10	38	10	43	An example of how ISO will standardize risk management would be useful. Unless the standards are actually used across different discourses on climate change, the confusion may persist... (Karen O'Brien, University of Oslo)	It will persist unless guidance re climate change is provided at some later date
2-236	A	11	0			One main difference between the two concepts visualised in fig 2.2. is the fact that AS/NZ describes a reflective stage after the "treat risk" stage, i.e. there is an arrow from the "treat risk" box to the "monitor and review" box, such a reflective stage is not part of the UNDP stage. Can the authors comment? (Marie Ekström, University of East Anglia)	If Fig 2.2 survives (doubtful because of space) it will have the APF and UKCIP frameworks
2-237	A	11	0			Remove both these figures (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	If Fig 2.2 survives (doubtful because of space) it will have the APF and UKCIP frameworks
2-238	A	11	0			Figure 2.2: Is this figure necessary? How does its utility compare with other figures / tables in the chapter? Are both panels necessary? (Justin Wettstein, University of Washington)	If Fig 2.2 survives (doubtful because of space) it will have the APF and UKCIP frameworks
2-239	A	11	1			Figure 2.2a is obviously pixellated and of lesser quality than Fig. 2.2b. The text seems to imply that the UNDP Adaptation Policy Framework is new and improved over AS/NZS 4360, but we should not reach that conclusion based on the quality of the schematic figures illustrating the two. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	If Fig 2.2 survives (doubtful because of space) it will have the APF and UKCIP frameworks
2-240	A	11	6			Fig 2 does not compare the two approaches - it only shows them. A comparsion would be useful. (Virginia Dale, Oak Ridge National Laboratory)	If Fig 2.2 survives (doubtful because of space) it will have the APF and UKCIP frameworks
2-241	A	11	14	10	20	Section 2.2.1: Here it would be sufficient to list a range of different standards, and	Yes. Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						then to focus only on one (i.e. the UNDP APF would be best suited). Highlighting the AS/NZS 4360 standards seems to detailed (e.g. in Figure 2.2), as other framworks exist (such as UKCIP, see Willows 2003), but not are explored in similar detail. (Thomas Henrich, N/A)	
2-242	A	12	0			WGIII has also tried to define probability adjectives and confidences (R Swart led it). This comment may be useful for following pages. P63 uses some of the defined terms but they are not referenced. (Geoffrey Levermore, Manchester University)	this is in the introduction to the whole report (general guidance)
2-243	A	12	0			Box 2.1: This box is useful, but much of this has already been discussed. Can one or the other of the discussions be eliminated or substantially reduced (especially since this is a "box" and not a figure / table)? (Justin Wettstein, University of Washington)	Box retained, tightened, text much reduced.
2-244	A	12	1			On the definition of the terms (Box 2.1). There are descriptions on resilience in this chapter. But you have two different definition of resilience nowadays; one is "engineering resilience" which shows speed (or time) of going back to the original state of the system, and the other is "ecological resilience" which corresponds to the width of stable regions of the system. I hope, if possible, that Box 2.1 contains these definitions, and hope that you kindly make it clear which definition of resilience is used in this chapter. (Kiminori Itoh, Yokohama National University)	This point will either be in Box 2.1 or the vulnerability section
2-245	A	12	1			Box 2.1 Risk is often defined in the natural hazards literature as equal to hazard times vulnerabiilty. It would be useful to include a definition of vulnerability in the table. (Karen O'Brien, University of Oslo)	This point will either be in Box 2.1 or the vulnerability section
2-246	A	12	2	13	10	Section 2.2.1 - Box 2.1: Similar to the definitions of key concepts, relevant terms should be defined across the report as necessary (thus arriving at an IPCC definition), and should not be highlighted seperately in this section. (Thomas Henrich, N/A)	Granted, except where they are important to methods. Risk is being covered because it introduces a new lexicon
2-247	A	12	17	12	19	Definition of Coping range is not clear yet. Please think of putting an example. Or use a part of sentences of p.22 (Hisayoshi MORISUGI, Tohoku University)	Edit section by about half
2-248	A	12	17	12	19	Include reference to acceptable risk (see also comment p14, line 16) (Robert Willows, UK Environment Agency)	Addressed
2-249	A	12	21	12	21	In relation to health exposures, the key elements are dose multiplied by time. I wonder if the idea of exposure in climate change impacts is better identified with this integrated (magnitude x time) view, rather than solely duration of time.	It is. Will ensure it reflects that

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Justin Wettstein, University of Washington)	
2-250	A	12	21	12	23	The assertion that exposure is not well-suited to climate risk (assessment) is surprising given that it is such an important general risk principle. For something to be at risk, it has to be exposed to the hazard. Risk reduction/management is often achieved by reducing exposure. The definition should be reconsidered and the assertion substantiated. I note that the authors find the term useful on p.60, line 46 ! (Robert Willows, UK Environment Agency)	Remove assertion
2-251	A	12	33			Box 2.1 line 33. is risk treatment the same as adaptation? If not what is the difference? (Ian Burton, University of Toronto)	Not always. Mitigation too.
2-252	A	12	35	12	36	Here the definition of Risk is completely wrong and contradicts the definition given in the main text on page 10 lines 8 to 12. I would like to refer to the Language of Risk Document prepared by the EU Floodsite Project (see www.floodsite.net), which gives a very good and workable definition of risk: Risk is the probability that an event will occur and the impact (or consequence) associated with that event. In short: Risk = Probability multiplied by consequence. (Marcel Marchand, Delft Hydraulics)	No, it is not wrong, it is broader than earlier technical definitions. Will ensure that they are consistent throughout the text.
2-253	A	12	38	12	38	"systematic process to understand the nature and level of risk" (Justin Wettstein, University of Washington)	Addressed
2-254	A	12	40	12	40	In Box 1 what is reference to Australia? (Rachel Warren, School of Environmental Sciences)	Text removed
2-255	A	12	48	12	50	Again the same comment on risk management definition as in comment no. 2 (Marcel Marchand, Delft Hydraulics)	See above
2-256	A	13	2	13	6	Box 2.1 lines 2-6 what is the relationship of risk reduction and risk sharing to adaptation? In most typologies of adaptation risk spreading and sharing are considered to be an adaptation. (Ian Burton, University of Toronto)	Addressed
2-257	A	13	13			Trivial … the numbering of the heading should be 2.2.1.1 not 2.2.1.2 (Marie Ekström, University of East Anglia)	Headings changed
2-258	A	13	13	13	35	It will be difficult for readers to connect the actual results--if any are given--with the description here of the methods for getting results. Hence my suggestion to move part of chapter to where the results are presented. (George Seielstad, University of North Dakota)	Results in rest of report will cross-ref where possible
2-259	A	13	13	13	37	Section 2.2.1.2a/b: There are two sections 2.2.1.2. (Justin Wettstein, University of Washington)	Headings changed
2-260	A	13	15	13	20	The authors should distingiush (a) secondary (and tertiary) effects of climate	Text removed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						change from (b) climate change as one of a number of contributory hazards. Secondary (and teritary) effects recognise the multiple links in the direct pathway leading from a change in climate variables to the consequent harm. See figure 1.2, p. 48 in Willows & Connell, 2003. (Robert Willows, UK Environment Agency)	
2-261	A	13	16	13	17	Here the distinction between direct effect of climate and climate-related hazards is introducted. Very good! I would propose to put this distinction much more prominent throughout the text of section 2.2.1. See also comment no.1 (Marcel Marchand, Delft Hydraulics)	Raised in new structure
2-262	A	13	16	13	16	Is it completely demonstrated that small local changes can't mean DAI? Need to discuss DAI for whom - the planetary average or the individual (Rachel Warren, School of Environmental Sciences)	Ch 19 will deal with this one
2-263	A	13	19	13	20	Tertiary risks are twice removed such as those …'. This sentence is completely unclear for me. Please explain. (Marcel Marchand, Delft Hydraulics)	Text removed
2-264	A	13	19	13	19	Replace "but not" by "or" since climate change has probably already been the sole cause of extinction of the Golden Toad and by itself can cause the extinction of many more species eg polar bear. Whilst in many cases the ecosystems suffer the double whammy of climate change and other pressures. (Rachel Warren, School of Environmental Sciences)	Text removed
2-265	A	13	22	13	26	The sentences in this paragraph doesn't appear to be linked together, it reads like a list of statements. Please reword. (Marie Ekström, University of East Anglia)	Addressed. Text restructured and condensed
2-266	A	13	29	13	32	The concept / missing component in policy-related risks is abstract, can you raise a general example after the sentence ending on line 31, "for example, some studies have looked at the response of ____ to changed mitigation policies in isolation (to the influences of ____)." The sentence ending on line 32 is empty. Following it up with how (or an example of how) the growing literature is impacting the "problem" might help. (Justin Wettstein, University of Washington)	Addressed. Text restructured and condensed
2-267	A	13	31	13	32	"A growing literature on integrated assessments and climate policy is addressing these issues." Include references here… (Karen O'Brien, University of Oslo)	Addressed. Text restructured and condensed
2-268	A	13	33			without the need (Xiongwen Chen, Alabama A & M University)	Not Applicable
2-269	A	13	37			As with the preceding sections, this section had portions that seemed redundant and light on citations.	Addressed. Text restructured and condensed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Justin Wettstein, University of Washington)	
2-270	A	13	39			After "As outlined in the introduction…", add "to chapter 2" or "to this chapter." (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Text removed
2-271	A	13	41			".." (Xiongwen Chen, Alabama A & M University)	Addressed
2-272	A	13	41	13	41	Use of "central" unclear (Rachel Warren, School of Environmental Sciences)	Addressed
2-273	A	13	41	13	42	Are the "three different templates" the same as the "three different analytical approaches"? (Rachel Warren, School of Environmental Sciences)	Clarified
2-274	A	13	43			(and many other places). The term "natural hazards approach" appears to be being used to describe a way of estimating impacts due to man-made climate change. This seems a very confusing descriptor and I suggest should be changed. (Geoff Jenkins, Met Office)	Has misread the text
2-275	A	13	43		47	This seems to deal with the same material as p. 5, lines 32-39 and Table 2.1, which I have commented on above, but offers a rather different range of options, certainly framed in a very different way (a simple list rather than a matrix). (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Addressed. Text restructured and condensed
2-276	A	13	43	2	47	These lines are very good. (Rachel Warren, School of Environmental Sciences)	No action needed
2-277	A	13	43	13	47	The three approaches described here are related to the two approaches (exploratory and normative) described earlier (Section 2.1.1.1). The authors should clarify the relationship. (This section is much clearer than the preceding rather abstract discussion in SEction 2.1.1.1). All three approaches described could and in principal probably should (if truly risk based) establish or lead to the consideration of thresholds of acceptable/unacceptable risk, not just the vulnerability-based approach. (Robert Willows, UK Environment Agency)	Yes. The restructure is sorting this out (hopefully)
2-278	A	13	49	14	12	Please reword these two paragraphs so that the information is clearly conveyed. As it stands, it is not clear how the left hand side of fig 2.3 shows the rise in importance of the assessment of a range of historical and current factors. The second paragraph that deals with the importance of baseline data should be reworded so it merges better with the overall section -as it stands it reads as a statement and is not as a part of a fluent text. (Marie Ekström, University of East Anglia)	Addressed
2-279	A	13	49			This does not make sense to me; it does not explain the figure nor drawn any logical conclusion that I can see. Does it not also apply to the RHS?	Text clarified

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Kim Ritman, Bureau of Rural Sciences)	
2-280	A	13	49	13	49	"rise in importance" : there is no time factor in the diagram, it does not show the rise in importance. However it shows that these things are now in use, and explain that they were not previously in TAR studies. (Rachel Warren, School of Environmental Sciences)	Addressed − we have revised the text
2-281	A	14	0			Figure 2.3. is somewhat confusing depending on the points that the authors seek to make: • The connection coming from the 'Historical' or LHS probably needs to end up in the vertical line at the extreme RHS rather than at the box labelled 'future climate'. Individual connections (perhaps dotted lines) between similar components of 'historical & current climate risk' and 'future climate risk' may be appropriate. (Kim Ritman, Bureau of Rural Sciences)	Do not agree, but will attempt to clarify the meaning
2-282	A	14	1	14	8	Figure 2.3 -- I like the effort to capture the similarities and distinctions of the various assessment approaches in a single illustration like this but I have to admit that I was a bit uncomfortable with the way the image implies that assessing historic and current climate risk is always distinct and seperate from assessing future climate risk. I recognize that the feedback/input arrows are included but the figure seems to imply that one can (should?) choose either/or when deciding how to approach an assessment. In my own experience, understanding and addressing historical and current climate vulnerability has been coupled with assessing future climate vulnerability in an overall context of understanding and managing climate risk in general -- both today and in the future. I believe I read this intention in some of the Chapter text but am not sure I see it reflected in the Figure caption or descriptive text. (Eileen Shea, East-West Center)	The connections are multiple and complex and there is no simple way to do this. Clear explanation in caption/text
2-283	A	14	1	14	1	Figure 2.3 remove the two arrows linking "current impacts" to "coping capacity" and "future impacts" to "Vulnerability to untreated risk" since impacts do not cause vulnerability or coping capacity. Both impacts and coping capacity together determine the remaining impacts (with or without adaptation) and thus the necessary risk treatment (Rachel Warren, School of Environmental Sciences)	It is a process relationship, not a causal one
2-284	A	14	8			rewrite (Xiongwen Chen, Alabama A & M University)	Will clarify
2-285	A	14	9			rewrite (Xiongwen Chen, Alabama A & M University)	Will clarify
2-286	A	14	10	14	12	This sentence seems very important to me and I found it surprising that this was the	This is now addressed earlier in the chapter –

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						first (?) mention in the chapter and that this subject does not come up with more prominence throughout the chapter. For example, the weakness here is often in our ability to provide reasonable scenarios about variability and extremes in climate via a climate model. Are there methods by which variability and extremes can nonetheless be addressed? Do particular assessment methodologies better enable these types of analyses? In what kind of assessments does this information play a more critical role? (Justin Wettstein, University of Washington)	it is a key method for understanding social and natural responses to climatic variability and extremes
2-287	A	14	12			"…which are more difficit to simulate in climate models." True, but seems like a non-sequitur. In order to use any of these approaches, changes in climate from models still have to be used. (Geoff Jenkins, Met Office)	No action needed
2-288	A	14	12			"… which are more difficult to simulate in climate models." This point -- that methods which overcome the tendency to focus on impacts and outcomes that can be model-simulated are particularly necessary and important -- could even be further emphasized. (Evelyn Wright, N/A)	It is a key method for understanding social and natural responses to cv and extremes that can be translated to climate change and partially overcomes the need to predict such changes from climate models
2-289	A	14	16	14	17	you say that that treatment can reduce the consequence of an event or modify the event. But the point of risk management is often to lower the PROBABAILITY of an event. (Mort Webster, MIT)	This is referring to adaptation only
2-290	A	14	16			You've defined what is at risk (hazard, probability (of exposure) and impact) and it is then implied that vulnerability is the level of unacceptable risk (either before or after adaptation). This may not be clear to many readers !! I think it very important that the authors nail down at an early point in the Chapter the relationship between 'vulnerability' and the language of risk (and then be consistent). I would suggest adding a definition to Box 2.1 covering the terms acceptable/unacceptable risk and vulnerability, and a paragraph to the text that nails the issue. (Robert Willows, UK Environment Agency)	Addressed. Text restructured and condensed
2-291	A	14	23	14	26	Per comment #5, I'm not convinced that there is a real distinction between vulnerability-driven and resilience-driven especially if "focusing on adapation and adaptive capacity" is the razor used to make the distinction. Most recent vulnerability assessment approaches with which I am familiar are vulnerability and adaptation assessment methodologies that may start with understanding vulnerability but drive toward the development of adaptation options. (Eileen Shea, East-West Center)	Addressed.
2-292	A	14	24			Again this could be clearer. By 'value' I think the authors mean a judgement	Addressed. Text restructured and condensed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						regarding acceptability of the risk. But value might be easily mis-interpreted as economic value, cost (ie an impact). (Robert Willows, UK Environment Agency)	
2-293	A	14	25	14	28	"Vulnerability concentrates on the downside of risk and resilience approaches focus on adaptation and adaptive capacity. Much of the assessment at the local scale is not specifically concerned with whether a particular level of change is dangerous, but instead deals with development pathways, researching the implementation of adaptation measures with different institutions and stakeholder groups." Does the downside of risk refer to negative or adverse outcome, and if so, does the upside of risk refer to positive outcomes or benefits? Adaptive capacity is conceptually a part of vulnerability (those who are most vulnerable are considered to have the lowest adaptive capacity). Assessments at the local scale are not "not specifically conerned with whether a particular level of change is dangerous" but instead they contextualize the dangers and identify the groups or sectors that particular levels of change are dangerous to. (Karen O'Brien, University of Oslo)	There are a range of opinions on this and we think the text catches many nuances of these but hope rewriting is improving that
2-294	A	14	27			delete "instead" (Xiongwen Chen, Alabama A & M University)	Addressed
2-295	A	14	28			It is not clear why local scale assessments would / should not deal with what may be perceived as dangerous (Irene Lorenzoni, University of East Anglia)	Both situations occur – adaptation does not need a sense of DAI
2-296	A	14	45	15	45	I do not understand the "Hazard not constrained" in element 6x3 of the Table 2.3 (Rachel Warren, School of Environmental Sciences)	Probabilities not constrained – word choice
2-297	A	15	4	15	7	Other relevant cites here include Yohe et al (2004), Yohe et al (2005), Webster et al (2003), Keller et al (2004). (Mort Webster, MIT)	Addressed
2-298	A	15	15	16	10	Risk management can be substructured into four major strategies: risk-informed strategy focusing on modelling complex causal relationships and identifying robust means to reduce or mitigate risks, the precaution-based methods focussing on high uncertainties in causal modeling and identifying resilient means to cope with uncertain but possible outcomes and discourse based strategies on modelling highly controversial and ambiguous outcomes and identyfing consensual means to treat these challenges. More explanations can be found in the IRGC document No. 1 (Ortwin Renn, University of Stuttgart)	Can only count three here, but referencing the original document
2-299	A	15	19	16	1	In Table 2.3 I assume that the last rows of examples are yet to be completed. (Donald Boesch, University of Maryland Center for Environmental Science)	Yes – to be addressed
2-300	A	15	19	16	1	The table offers 20 options. Within each are several sub-options. If you are trying	Table describes 4 approaches – to be cut to

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						to explain to an acadmic group of climate change experts how complex the task is, this approach may be okay. But if you want non-experts to grasp the need for mitigation and adpatation, this table is a bewildering disaster. (George Seielstad, University of North Dakota)	three. Final decision on combination of Table 2.1 and 2.3 not yet made
2-301	A	15	19			Table 2.3 is very useful (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Accepted
2-302	A	15	19			Table 2.3: Some of the cells could be revised. Some words / phrases seem subjective (e.g.., efficacy could be only one analytical criteria of policy-driven assessments) or general ("fitter"). (Justin Wettstein, University of Washington)	Addressed
2-303	A	15	20			there is inconsistency in the citing of the Adaptation Policy Framework. This will arise in other chapters. My preference is that it be cited with UNDP as the author, by analogy with the UNFCCC Compendium of Decision Tools which also has individual authors. (Ian Burton, University of Toronto)	We are considering this
2-304	A	15	20			Table 2.3--lots of grammatical, symbol, and formatting problems. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Addressed
2-305	A	15	20	15	20	In the table 2.3 a distinction is made between Vulnerability driven and Resilience driven. I do not agree with the terminology, as vulnerability and resilience are two terms expressing the same (in fact they are their antonyms in a way: the more resilience a system, the less vulnerable). I would prefer to use the term Susceptibility driven instead of Vulnerability driven. (Marcel Marchand, Delft Hydraulics)	Addressed
2-306	A	15	40	15	40	In Table 2.3 the 5x5th element could have added "compared to managed ones" (Rachel Warren, School of Environmental Sciences)	Addressed
2-307	A	16	3	16	18	Per comment #1, this may be a place in the Chapter where one could include an example of a bottoms-up, vulnerability and adaptation framework being utilized at a regional level such as the Pacific framework described in Chapter 16. (Eileen Shea, East-West Center)	If retained, yes
2-308	A	16	7	16	7	How does Jones method fit into the three methods just described? Is it a policy based method? (Rachel Warren, School of Environmental Sciences)	Natural hazards based
2-309	A	16	8			PARRY 1998 MISSING IN REF LIST (James O'Brien, Florida State University)	Addressed
2-310	A	16	20	16	28	Suggest that it needs to mention here that this aggregation is made virtually impossible due to the enormous model-model differences in climate predictions,	Not so – this is the reason for many of the methods described in this chapter – has missed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						particularly at a local level and of extremes, which is how most impacts are caused. (Geoff Jenkins, Met Office)	the point
2-311	A	16	30			The method of listing different references (as is done in section 2.2.1.3) is not very reader friendly. Could not these references be presented in a flowing text that puts the work into a guiding framework? The detail of each study may be partly lost but I'd suggest that it is more important that the overall structure is conveyed to the reader (he/she can always go and read the references for further detail at a later stage). (Marie Ekström, University of East Anglia)	Addressed − text has been revised throughout
2-312	A	16	30	19	15	Section 2.2.1.3: This section gives a range of interesting examples of past assessment and indicates their features. However, a systemisation along different approaches (for which then examples are given) would be more useful in this methodological chapter. (Thomas Henrich, N/A)	Addressed − the new structure allows for this
2-313	A	16	30	18	3	I wonder whether the assessment categories described in Table 2.3 -- Natural Hazards, Vulnerability/Resilience and Policy-Baed -- might not make better section sub-headings in which to categorize and describe some of the recent assessment experience. It would reinforce the concepts embedded in Table 2.3 (and in the preceding text) and might be easier for readers to follow the thread through the list of examples identified on pages 16 through 18. (Eileen Shea, East-West Center)	Addressed − we have re-structured the headings in a similar way to that suggested.
2-314	A	16	30	18	3	Would like to encourage authors to search other chapters -- particularly the regional chapters -- to include the examples used the assessment examples used there as well. (Eileen Shea, East-West Center)	Addressed
2-315	A	16	30	19	15	Can reduce a lot of detail in here - maybe present the bare facts as another table with list of examples in it (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed − text has been shortened significantly
2-316	A	16	30	16	30	This does not describe impacts assessment since this is the kind of work done by WGII. But it does describe adaptation and vulnerability assessment, suggest change title. Or change to CCIAV? (Rachel Warren, School of Environmental Sciences)	Addressed − we have included new headings
2-317	A	16	30			Section 2.2.1.3: This section is more effective than previous ones in my opinion. Do the conceptual points in previous sections overlap with (potential) points to be made attached with this survey of existing work? If so, the overall discussion may be shortened. The topics in this section do not seem to match Table 2.3; if they	Addressed − new headings are being used and text has been shortened

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						cannot fit that structure, why not? One or both may need to be revised? (Justin Wettstein, University of Washington)	
2-318	A	16	30			Are all these studies risk management assessments? Many seem less comprehensive than the structure presented in previous sections. If that is the case, it would be good to mention that in a summary of the approaches (and maybe to make the distinction between impacts assessments and risk management assessments less distinct). (Justin Wettstein, University of Washington)	Addressed with new headings
2-319	A	16	32	16	34	"As implied earlier, adaptation can be assessed from several different directions, through a natural hazards approach, undertaking impact assessments driven by current and/or future climate, or by assessing vulnerability and resilience of different groups over time." It is unclear what a natural hazards approach to adaptation assessments involves. Is it based on physical exposure only? Most natural hazards research over the past two decades has emphasized the social construction of disaster, thus a natural hazards approach would be more closely linked to social vulnerability framework and approaches. (Karen O'Brien, University of Oslo)	Addressed − we have tried to reconcile these approaches in the revised introduction and in these sub-sections
2-320	A	16	32	16	34	Should this match Table 2.3 if so policy driven methods are left out of these sentences. Time is mentioned here so another opportunity to address the dynamics. (Rachel Warren, School of Environmental Sciences)	Addressed
2-321	A	16	32	19	15	Relate lines 32-34 to the sub-headings in section 2213. It is not clear how they relate at the moment, (Rachel Warren, School of Environmental Sciences)	Addressed
2-322	A	16	32	16	34	Rather than being implied, I would rather it was stated clearly and explicitly ! These are very much different starting points, each of which should be focussed on identifying the need for adaptation and/or evaluating adaptation options. Wherever one starts, a risk framework-based approach implies that all of the components (eg described in 2.3) are considered. (Robert Willows, UK Environment Agency)	Addressed
2-323	A	16	36	16	36	Please include the indicator based framework (DPSIR) for water resources managament in river basins, reported in Aerts, J.C.J.H. (2005). Adaptation for river basins: connecting policy goals to the water resources system. Water Science and Technology 51(5), 121-131. http://www.iwaponline.com/wst/05105/wst051050121.htm; and in Aerts, J.C.J.H., Droogers, P. (2004). Climate Change in Contrasting River Basins: Adaptation Strategies for Water, Food and Environment. Cabi Press, Wallingford. (Laurens Bouwer, Institute for Environmental Studies, Vrije Universiteit)	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-324	A	16	36	18	3	The examples here are good; adding examples from Europe, North America, and Asia would provide a more global perspective (perhaps drawing from the other chapters of the report, especially Chapter 17). (Karen O'Brien, University of Oslo)	Addressed
2-325	A	16	36	17	25	Attractive examples of engagement with stakeholders. The overall issue of CC is narrowed to particular locales. People within those locales are appropriately questioned about strategies. (George Seielstad, University of North Dakota)	Not applicable
2-326	A	16	36	17	25	In this list some are assessments of adaptations to current climate that have been carried out, adaptations to current climate that have not been carried out, and some are assessments of adaptation that could be carried out to cope with future climate change. These should be separated out. Also the subheading refers to "current adaptations". I read this as meaning adaptations that have been carried out and refer to the current climate. So the heading needs to be changed, or the material re-ordered. (Rachel Warren, School of Environmental Sciences)	Addressed
2-327	A	16	37			adaptation (Xiongwen Chen, Alabama A & M University)	Addressed
2-328	A	16	40	17	25	Instead of just listing examples, it would be more useful to list approaches and then provide examples of implementing these approaches for identifying adaptations. (Virginia Dale, Oak Ridge National Laboratory)	Addressed
2-329	A	16	40	17	25	Exept for one example all examples mentioned come from Africa. I would recommend to use a more balanced list of examples from the global perspective. (Marcel Marchand, Delft Hydraulics)	Addressed
2-330	A	16	40	16	40	The term "water harvest" seems rather unusual (Rachel Warren, School of Environmental Sciences)	Not applicable
2-331	A	16	41			MOHAMED 2004 MISSING (James O'Brien, Florida State University)	Addressed
2-332	A	17	1		50	MANY MISSING REF (James O'Brien, Florida State University)	Addressed
2-333	A	17	16			"??2004" (Xiongwen Chen, Alabama A & M University)	Addressed
2-334	A	17	23			BATIMA'=FORTHCOMING==HOW CAN YOU USE SOMETHNG YOU HAVE NOT SEEN!! (James O'Brien, Florida State University)	Addressed
2-335	A	17	27	18	3	Per comments #5 and 8, would like to ask authors to re-visit the decision to call out resilience-driven assessments as a separate category or provide additional	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						clarification of how they differ from vulnerability/adaptaton assessments. I had a difficult time, for example, figuring out whether I would place recent Pacific Island experience (e.g., as described in Chapter 16) in the category of adaptation or resilience used in this section of the Chapter or, for that matter in either vulnerability or resilience as distinctions drawn elsewhere in this Chapter. After re-reading the examples of 'adaptation' assessments, I get the impression that the distinction is being drawn to delineate assessment projects that have been developed to evaluate specific adaptation measures from broader vulnerability assessment activities where no specific adaptation measure has (yet) been developed. If this is the case, I would encourage the authors to add some additional explanatory text to clarify this for the readers. (Eileen Shea, East-West Center)	
2-336	A	17	28	17	29	I would be clear that these are a limited number of examples, rather than a definitive list of work that has been done. If not, I would include reference to the recent findings of -- Patt, Anthony, Pablo Suarez, and Chiedza Gwata (2005). Effects of seasonal climate forecasts and participatory workshops among subsistence farmers in Zimbabwe. Proceedings of the National Academy of Sciences of the United States of America 102: 12673-12678 -- which utilized a community workshop approach to test the ability of subsistence farmers in Zimbabwe to benefit from adaptations to their annual farming techniques based on seasonal climate forecasts. (Anthony Patt, Boston University)	Addressed
2-337	A	17	30	18	3	Instead of just listing examples, it would be more useful to list approaches and then provide examples of implementing these approaches. (Virginia Dale, Oak Ridge National Laboratory)	Addressed
2-338	A	17	32			"against" change into "by" (Xiongwen Chen, Alabama A & M University)	Addressed
2-339	A	18	5	18	14	I would like to draw your attention to another study on vulnerability that integrates the social and biophysical dimensions: Promoting sustainable resilience in coastal Andhra Pradesh (P. Winchester, M. Marchand & E. Penning-Rowsell, forthcoming chapter in a book on Managing Coastal Vulnerability, to be published by Elsevier). I send you the manuscript separately. (Marcel Marchand, Delft Hydraulics)	Addressed
2-340	A	18	5	19	15	I'm not sure why the items included in this discussion aren't part of the preceding discussion of adaptation assessments on pages16 and 17 unless the distinction is that the items discussed in this subsection; see also preceeding comment #12 about clarifying the distinction for readers.	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Eileen Shea, East-West Center)	
2-341	A	18	5	18	32	In the context of this section, I cannot see the distinction between vulnurability and natural hazards driven assessment efforts, except maybe in terms of the subject of the study (e.g., water resources versus ecosystem services). In the extreme, they are of course distinct, but (for example) the ATEAM project described here seems as if it could also be described as a natural hazards issue, given the drivers of change proposed. In contrast, the VISTA project is concerned with a much broader range of influences, but may be diffuse enough that different "vulnurability areas" have either strong natural or socioeconomic components / hazards? Could the case also be made that vulnerability and resilience measures are also overlapping in alternate examples? If so, I wonder if the distinction of assessment approaches could be described differently and, if so, if the amount of space making the distinction here is worthwhile. (Justin Wettstein, University of Washington)	Addressed
2-342	A	18	14	18	14	I would also include that there have been calls for better recognizing the uncertainties inherent in vulnerability assessment, and hence their potential limited usefulness. Patt, Anthony, Richard J.T. Klein, and Anne de la Vega-Leinert (2005). Taking the uncertainties in climate change vulnerability assessment seriously. Comptes Rendus Geosciences 337: 411 – 424. (Anthony Patt, Boston University)	Addressed
2-343	A	18	16	18	42	I would like to suggest to include the DINAS COAST project with the DIVA (Dynamic Interactive Vulnerability Assessment) tool (www.dinas-coast.net). This is a European funded project on global change and sea level rise. It is important to mention this project because the text is relatively short of coastal examples. (Marcel Marchand, Delft Hydraulics)	Addressed
2-344	A	18	24	18	32	Did the ATEAM study consider rates of change? (Rachel Warren, School of Environmental Sciences)	Addressed
2-345	A	18	27	18	27	The reference should not be to Schroeder 2005, but rather to Schröter et al. 2005 (the Science article). (Anthony Patt, Boston University)	Addressed
2-346	A	18	28			I prefer "ecological services" to "ecosystem services," for the former term captures all levels of the biological hierarchy. (Virginia Dale, Oak Ridge National Laboratory)	Addressed
2-347	A	18	47			Strike "of" (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Addressed
2-348	A	19	10	19	12	The Mongolian example is already mentioned earlier (page 17) and can thus be deleted here.	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Marcel Marchand, Delft Hydraulics)	
2-349	A	19	17			This section could be expanded with a discussion of more dimensions of integration. Dalal-Clayton & Sadler (ref above) Chapter 6 introduces these. (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Room does not permit expansion but will check reference
2-350	A	19	17	20	34	The paras lines 19 to 40 do not have a heading proably because they are meant to be introductory to the three subheadings. However there needs to be more connection with these subheadings in these paras if that is so. Which of the integrated approaches mentioned are horizontal or vertical? (Rachel Warren, School of Environmental Sciences)	Text being condensed – not enough room for structural description of IA
2-351	A	19	19	19	29	Simple models are preferable to complex models. Complex models give the illusion of greater precision and total comprehensiveness. However, to the extent they rely on human behavior anticipated decades from now, they can't be precise. (George Seielstad, University of North Dakota)	Simple models can also be integrated. Model integration is not synonymous with model complexity
2-352	A	19	19	19	29	The authors may consider it worth emphasizing that the majority of IA's involve the integration of models differring in complexity (eg dynamic models versus static models, biophysical process models and econometric models or conceptual models). (Robert Willows, UK Environment Agency)	Addressed
2-353	A	19	25		26	Good to see discussion that Earth System models are beginning to be used for CCIAV studies. There are arguments for and against this (some authors are concerned that biases in, for example, the atmosphere components of ESMs mean that impacts models should remain outside of the models so that climate biases can be compensated for by using only climate anomalies from the models and applying them to obervational climatologies. But clearly there are stong arguments for more integrated approaches to allow for feedbacks. The authors may be interested in Betts (2005), Phil Trans R Soc which discusses this in more details - I can provide to the TSU if required. (Richard Betts, Met Office)	Addressed
2-354	A	19	27			Simple models surely cannot be better at representing uncertainty if they are heavily parametrised and therefore much more uncertain, at the spatial and temporal scales where impacts occurr. It is now feasible (albeit expensive) to represent uncertainty using full climate models, so the statement is out of date. (Geoff Jenkins, Met Office)	Disagree, because simple models can represent uncertainties that complex ones can't
2-355	A	19	28			"complex" change into "sophisciated" (Xiongwen Chen, Alabama A & M University)	No
2-356	A	19	43	19	43	Global and national impact or policy assessments?	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Rachel Warren, School of Environmental Sciences)	
2-357	A	19	45	19	45	National impact assessments? (Rachel Warren, School of Environmental Sciences)	Addressed
2-358	A	19	48	19	48	After "effects" insert "on the efficacy of global risk treatment" (Rachel Warren, School of Environmental Sciences)	Not applicable
2-359	A	20	6	20	6	"are a property of systems" (Justin Wettstein, University of Washington)	Not applicable
2-360	A	20	7			This section could refer to the RegIS project which integrated climate change and socio-economic scenarios to examine impacts on agriculture, water resources, biodiversity and the coastal zone (See contact details above). It could also refer to the limitations of complex integrated assessments like RegIS at present - eg that it did not examine feedbacks between all sectors; analysis of uncertainty was constrained by the number of model runs; socio-economic factors were developed by use of expert judgement and it was difficult to assess the relative significance of climate change and socio-economic factors. (Richenda Connell, Acclimatise)	Addressed – there are several references to this project
2-361	A	20	8	20	34	The SRES scenarios themselves put climate change in the context of development and therefore the wider global change context. Mention this here. Also suggest extent to which climate change's interaction with desertification and hydrological crises (caused by over grazing and increasing demand for water) has been assessed. (Rachel Warren, School of Environmental Sciences)	Addressed
2-362	A	20	12			rewrite (Xiongwen Chen, Alabama A & M University)	Not applicable
2-363	A	20	13			rewrite (Xiongwen Chen, Alabama A & M University)	Not applicable
2-364	A	20	15			impact (Xiongwen Chen, Alabama A & M University)	Not applicable
2-365	A	20	15			benefit (Xiongwen Chen, Alabama A & M University)	Not applicable
2-366	A	20	15	20	22	Willows& Connell (2003) emphasized the need to consider multiple stressors in evaluating the need for and effectiveness of climate adaptation options (Robert Willows, UK Environment Agency)	Addressed
2-367	A	20	23			Insert the following on line 23. The multiple stressor approach is also useful in illuminating the relationship between climate change and sustainable development, and in identifying policy approaches that could simultaneously address both problems. Goklany (2003, 2005), based on results from Arnell et al (2002) for the total global populations at risk (PARs) for hunger, malaria, coastal flooding and	Ch 20, but consider citation here

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						water shortage due to both climate change and non-climate change related factors, estimated that over the next few decades reductions in the total PARs could be obtained more effectively through advancing adaptive capacity by either (a) reducing the vulnerability to these hazards under current climate conditions or (b) more broadly pursuing sustainable economic development. The first of these approaches can be generalized by targeting any climate-sensitive hazard to man or the environment that would be exacerbated by climate change. To the extent that these hazards are key vulnerabilities that might determine the target and timetable for avoiding dangerous climate change, this approach would reduce the overall cost of mitigation, provided opportunities for "no regret" mitigation actions are taken, and there are active steps taken to improve existing and develop new technologies that would increase the cost-effectiveness of mitigation options. These approaches would help ensure that climate change policies are pursued within the wider context of sustainable development. (References are given at the end, unless they are already in Chapter 2.) (Indur Goklany, Office of Policy Analysis, Department of the Interior)	
2-368	A	20	27			different (Xiongwen Chen, Alabama A & M University)	Addressed
2-369	A	20	27	20	27	replace "globalization" with " trade liberalization" and replace "the need" with "areas or groups that could benefit from" policy interventions. (Karen O'Brien, University of Oslo)	Addressed
2-370	A	20	30		34	Also Earth System models based on GCMs (eg: Cox et al 2000, Nature) are being used for impacts studies eg: Betts et al (2004) Theoretical and Applied Climatology look at impacts on Amazon forests. There are pros and cons to both EMICs and GCM-based ESMs - EMICS allow large ensembles to explore uncertainties, but are low resolution so less useful for regionally-specific studies. (Richard Betts, Met Office)	Addressed
2-371	A	20	34			considered as dangerous (Xiongwen Chen, Alabama A & M University)	Not applicable
2-372	A	20	34			Is this addition necessary in SOD? (Irene Lorenzoni, University of East Anglia)	Not applicable
2-373	A	20	41	20	47	If one backs up to 1900 and imagines foreseeing the 20th century's development, the near-impossibility of predicting socio-economic charaterizations is apparent. (George Seielstad, University of North Dakota)	Not applicable
2-374	A	20	42			Insert "acquiring" before "data." What are complex data? (Virginia Dale, Oak Ridge National Laboratory)	Rewritten
2-375	A	20	46			which is discussed	Text removed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Xiongwen Chen, Alabama A & M University)	
2-376	A	20	50	21	3	the sentence beginning with "For example, in many traditional…" on page 50 appears to be missing something. (Eileen Shea, East-West Center)	Rewritten
2-377	A	21	22	21	36	I would encourage the authors to strengthen/highlight this call for local data to support bottom-up analyses (e.g., historic and current patterns of climate variability and impacts, risk perceptions and risk management approaches, local knowledge and practices, demographics and other socio-economic trends, etc.). Support for regional and locally-based research, modeling, assessment and stakeholder engagement is, in this reviewer's opinion, currently severely underfunded and, in some quarters, underappreciated. A strong signal from IPCC regarding the importance/value of this work will go far toward enhancing these critical activities. (Eileen Shea, East-West Center)	To be included in 2.2.5. Mention the disappearance of meteorological stations in developing world: economic crisis lead to a lack of support to climate data measurements. Desinventar http://www.desinventar.org/desinventar.html
2-378	A	21	36			There could be a short comment here on how the scenarios may then be used (and perhaps reference made to another chapter or section where this is discussed in more detail) (Irene Lorenzoni, University of East Anglia)	Communicate uncertainty: single scenarios should not be presented.
2-379	A	21	38	22	35	Another kind of threshold is an unexpected major change of state. Systems determining global climate are complex. No one knows precisely when a combination of circumstances may force a change of state. Therefore, asking stakeholders what level of change they can tolerate is an incomplete process, because in some cases no one know what to ask--in the case of changes no one has imagined. (George Seielstad, University of North Dakota)	Acknowledge and addressed
2-380	A	21	40	21	41	"The clearest distinction between risk management and the straightforward prediction of outcomes is in the development of criteria which set the terms of reference by which the significance of risk is assessed." This sentence is not clear -- is it saying that criteria are developed to contextualize the risk? (Karen O'Brien, University of Oslo)	Substitute with "is in establishing first the thresholds by which the significance of .. "
2-381	A	21	40	22	35	Suggest that points 1 and 2 have small headings to give names to the two kinds of thresholds. Ch 19 of WGIII also describes two kinds of thresholds, the same terminology could be used since the same is meant (I believe the terms used are type I and type II but please check). (Rachel Warren, School of Environmental Sciences)	Addressed
2-382	A	22	2			This section on thresholds should say that thresholds need to take account of the decision-maker's attitude to the climate risk, and to the risks of over- or under-adapting. (See Willows and Connell, 2003, p. 56-58). For instance, in the UK, the	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						privatised water companies are regulated by OFWAT. OFWAT is very risk-averse to over-adapting - ie to allowing the water companies to develop new water resources (reservoirs) that are proved in the future to be unnecessary. BY contrast, the UK Environment Agency is risk-averse to London being flooded, and the standard of protection offered by the Thames Barrier is much higher than for flood defence schemes that protect less-valuable assets. (Richenda Connell, Acclimatise)	
2-383	A	22	6		13	I particularly like this paragraph and its use of examples of various classes of thresholds. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	No action required
2-384	A	22	6	22	6	"in the first sense" replace by "type 1 threholds" (if that is the name used in Ch 19). Similarly in "the second sense" replace by "type 2 thresholds" (if matches Ch 19). (Rachel Warren, School of Environmental Sciences)	Addressed
2-385	A	22	6	22	13	It may be worth observing that biophysical thresholds that can be resolved as a 'step' at a local spatial or temporal scale may be effectively continuous over a larger scale. A 'step' is observed if a (relatively) large change in a response (impact variable R) follows from a (relatively) small change in the causal variable X, relative to some other part of the functional relationship R(X) (Robert Willows, UK Environment Agency)	No action required
2-386	A	22	6		13	It's important to add that although often we know, or strongly suspect, that such thresholds exist in a system, we often don't know precisely or even approximately where they are. This complicates their use in analysis considerably, and making assumptions or guesses about their locations (or neglecting them when we can't specify them) seriously compromises the "value neutrality" mentioned here. (Evelyn Wright, N/A)	Addressed [Added: ", even if they are not currently well known for some biophysical systems.]
2-387	A	22	13			neutral in value (Xiongwen Chen, Alabama A & M University)	Addressed
2-388	A	22	15	22	27	This is an important weakness of the risk management approach, and should be given more prominence (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Stakeholder involvement is crucial for defining then this local or regional thresholds.
2-389	A	22	18			Delete linear? (Robert Willows, UK Environment Agency)	Not relevant
2-390	A	22	20			extreme heat may be registered as unacceptable at 30C' (I assume the authors aren't suggesting that thermometers are conditioned by past experience !) (Robert Willows, UK Environment Agency)	Substitute registered for define or established by a community, or ..
2-391	A	22	24	22	24	What is a "management threshold"?	It has an example in the text. Perhaps include

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Rachel Warren, School of Environmental Sciences)	"conditional" threshold, or sort of.
2-392	A	22	25			"especially so" change into "true" (Xiongwen Chen, Alabama A & M University)	Addressed
2-393	A	22	25			or life expectancy ! (Robert Willows, UK Environment Agency)	No action needed
2-394	A	22	29	22	35	Should give a biological example as well. (Virginia Dale, Oak Ridge National Laboratory)	Will consider
2-395	A	22	29	22	35	Most risk literature (eg Willows & Connell, 2003) emphasizes that appropriate risk thresholds should be agreed between policy manager and risk assessors. (Robert Willows, UK Environment Agency)	Addressed − included
2-396	A	22	39			This is an important section and does no do justice to NEW METHODS or developments in old methods. The work of Jones is cited but not quoted or explained. Perhaps false modesty is at work here, but at a very minimum one or more of the coping range diagrams from Jones should be included. I think these have strong explanatory and communication power. (Ian Burton, University of Toronto)	Addressed – has been revised and new diagrams added.
2-397	A	22	39	22	39	Same comment as above re: coping range "of climate" does not make sense (Karen O'Brien, University of Oslo)	Addressed − TRUE. (it also is stated in the executive summary) "the coping range of a system to climate variations
2-398	A	23	1	23	8	What is the relationship between coping ranges and limits to adaptation? (Rachel Warren, School of Environmental Sciences)	Addressed − it would be more interesting to say that coping ranges can "define"or trigger vulnerability state
2-399	A	23	1	23	8	Presumably these critical thresholds could be either type 1 or type 2 (Rachel Warren, School of Environmental Sciences)	We are not using this structure
2-400	A	23	1	23	8	Linking to comment 93 above, if extremes are not considered then one is only considering whether the mean climate change lies within the coping range - and extremes of drought, precip, storm etc could lie outside the coping range, unless the mean climate is also characterised by changes in the frequency and intensity of the extreme weather events. (Rachel Warren, School of Environmental Sciences)	No action required. Stakeholders might also describe trends in climate, so changes in frequency, intensity and length of extreme events can be assessed.
2-401	A	23	4	23	5	I understand the meaning of this sentence but it seems to me that coping ranges -- unlike thresholds -- allows us to consider the extent to which any given state of vulnerability is manageable -- rather than the implication of this sentence as now written which is that one is moving in or out of a state of vulnerability. (Eileen Shea, East-West Center)	Added: The coping range is used to link the understanding of current adaptation to climate (or when vulnerability is manageable)
2-402	A	23	20	24	20	Stakeholder participation in knowledge creation: this is covered well, but i) include some of the actual methods (focus groups, citizens' juries etc.) ii) include some of	Addressed − People's knowledge and expertise comprise the principle resource for

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						the critiques of participation as a method (eg. capture by vested interests, representativeness of stakeholder groups, groupthink, the issue of power relationships outside the stakeholder group) should also be mentioned (eg. Cooke & Kothari - "Participation - The New Tyranny?") (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	adapting to the impacts of climate change, creating the knowledge and acting to adapt to (the impacts of) climate variability and change. However, stakeholder involvement might be developed in a context where political differences, inequalities, or conflicts might come up. So.. cross validation (Triangulation/Iteration**)** ?, historic + social research? Several methods (focus groups, ctitizens' juries, etc.) are described in (Conde and Lonsdale, 2005)…
2-403	A	23	22			What about stakeholder involvement at the global level? Climate change is a global issue (Ian Burton, University of Toronto)	UNFCCC?
2-404	A	23	22	23	31	Seems a bit of a simplistic description of the role of stakeholders. There's a difference between what they may enact for themselves and what role they may perform in engagement exercises. Also there is no reference to (the value of) indigenous knowledge? (Irene Lorenzoni, University of East Anglia)	Addressed − Something like: Indigenous knowledge studies have shown that this is a valuable source of information (Nyong, 2002..) so it must be incorporated in the assessment of the viability of adaptive measures to climate change (related this sustainable development?). In any case, mutual respect between communities and a research team much be achieved to guarantee the adaptation knowledge can be acquire by both set of actors.
2-405	A	23	22	23	31	Again, I don't agree with this definition of stakeholders, nor does it capture the diverse roles of stakeholders in risk assessment and response. This paragraph reads like normative "boiler plate" on stakeholders rather than the results of experience and research. Moreover, it focuses on stakeholders as "partners" in adaptation. They can be, but they can also play other roles, like enriching assessments by helping guide choices of assessment questions, and providing information and insights that can help answer assessment questions. Further, the section completely begs the question of the context of decision making: individual business? Small local water utility? Local land use authority? (James Shortle, The Pennsylvania State University)	As stated in the APF (Lim, 2005) stakeholders should be involved since the definition of the scope and objectives of the research, and also enriching assessments by helping guide choices of assessment questions, and providing information and insights that can help answer assessment questions. .Reference to table 17.x, examples of "adapt now". Table 17.2 Current Adaptation Practices to Climate Risks

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-406	A	23	23			People's and institutional knowledge … (Virginia Dale, Oak Ridge National Laboratory)	Addressed − accepted
2-407	A	23	28			cultural and environmental context (Virginia Dale, Oak Ridge National Laboratory)	Addressed
2-408	A	23	36	23	36	Important point. Stakeholders ARE crucial. (George Seielstad, University of North Dakota)	No action needed
2-409	A	23	38			should be Burton et. al. (Ian Burton, University of Toronto)	Addressed
2-410	A	23	40			Replace outdated reference to UKCIP's work (McKenzie-Hedger, 2000) with more current ref (West and Gawith, 2005). West and Gawith is already included in the refs for chapter 2, as it is mentioned elsewhere in the chapter. (Richenda Connell, Acclimatise)	Addressed
2-411	A	23	46			literatures are… (Xiongwen Chen, Alabama A & M University)	Not applicable
2-412	A	23	46	24	21	The discussion of stakeholder participation is quite limited to climate change applications. The US-Academy of Sciences in Washington is preparing a panel document on stakeholder participation in environmental decision making. The report is due in spring of 2006. Reviews of stakeholder participation can be found in: Rowe, G. and Frewer, L.: "Public Participation Methods: An Evaluative Review of the Literature," Science, Technology and Human Values, 25 (2000), 3-29. and Renn, O.: "The Challenge of Integrating Deliberation and Expertise: Participation and Discourse in Risk Management," in: T. L. MacDaniels and M.J. Small (eds.): Risk Analysis and Society: An Interdisciplinary Characterization of the Field (Cambridge University Press: Cambridge 2004), 289-366.It maybe useful to distinguish between diferent purposes of participation:collecting and classsifying knowledge, reflecting difernt types of evidence and evaluating the risks; making balanced judgments about pros and cons of a management option; making decisions (Ortwin Renn, University of Stuttgart)	Addressed − references added
2-413	A	23	46	24	2	Much of this paragraph seems to describe adaptation issues related to adaptation in water management specifically although the opening sentence suggests a more general discussion of adaptive capacity. A bit of clarification would help. (Eileen Shea, East-West Center)	Addressed
2-414	A	23	47	23	49	"It is generally being recognised that general determinants of community capacity to manage current climate risks relate to upper tier political and institutional arrangements;" -- it is unclear what "upper tier political and institutional arrangements" refers to - references would be useful here. (Karen O'Brien, University of Oslo)	Roger to address

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-415	A	23	50			Replace "water" with "resource" (Virginia Dale, Oak Ridge National Laboratory)	Addressed
2-416	A	23	50			why water management? Are we not talking generally here? (Irene Lorenzoni, University of East Anglia)	Addressed
2-417	A	24	1			…generic and their (Xiongwen Chen, Alabama A & M University)	Addressed
2-418	A	24	1		23	NUMEROUS MISSING REF (James O'Brien, Florida State University)	Addressed
2-419	A	24	1	24	2	This is the key point, the reason stakeholder involvement is crucial. There are no one-size-fits-all solutions. (George Seielstad, University of North Dakota)	No action required
2-420	A	24	1	24	1	Figure 2.4 second box who is interacting with whom? (Rachel Warren, School of Environmental Sciences)	Addressed. Stakeholders with stakeholders ("stakeholders themselves")
2-421	A	24	4	24	6	Figure 2.4 -- this is an intriguing way of viewing stakeholder participation although I suspect that in many assessment activities and adaptation planning the reality is a mix of more than one of these approaches. I'm also not sure that I'd distinguish self-mobilization as a completely separate category but rather consider self-mobilization as one approache to interactive participation (i.e., interactive, participatory processes can be initiated by affected communities (stakeholders) or a scientific/analytical community). I'm also not sure that 'catalyzing change' would be a separate/additional level of participation but, rather, an outcome of self-mobilizing, participatory processes. I can be convinced to the contrary but I think the text would need to be clarified a bit. (Eileen Shea, East-West Center)	Figure 2.4, where stakeholder involvement is seen as a process, even though stakeholders themselves can skip or merge steps of the ladder, or even the "catalysing change" could occur since the lower levels of the ladder.
2-422	A	24	6			Is it necessary to have 'catalysing' change an additional category? I would see it as inherent part of the topmost tier of this figure ie self mobilisation (Irene Lorenzoni, University of East Anglia)	Addressed − Figure will be revisited
2-423	A	24	9	24	10	This section should reflect the experiences from the US National Assessment. Much has been written about the stakeholder involvement in that process (e.g., several articles by Ann Fisher). (James Shortle, The Pennsylvania State University)	Addressed − we will follow up this possibility
2-424	A	24	11			The special issue of the journal of Risk Analysis due out this December (2005, issue 6, vol 25) will contain a series of papers on perceptions and management of climate change uncertainty and danger. Some, e.g. Poumadere's - referenced also below with regards to ch20, may be an interesting addition here. (Irene Lorenzoni, University of East Anglia)	Addressed.
2-425	A	24	20			Add a new senntence at the end: " That different societies perceive risks differently	Not applicable − we are not sure that is the

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						is evident in that not all nations have ratified the Kyoto Protocol." (Indur Goklany, Office of Policy Analysis, Department of the Interior)	best example.
2-426	A	24	20	24	20	Do you mean extreme weather events, increasing frequency of extreme weather, increasing strength of extreme weather, or slow change, or all of these? (Rachel Warren, School of Environmental Sciences)	All of these
2-427	A	24	22			Section 2.2.2.5--This problem is mainly in this section, but seems quite widespread: frequent spelling of 'judgement' rather than 'judgment.' My dictionary only lists the latter spelling. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Not applicable – UK spelling
2-428	A	24	22	26	39	This section is a specific example of my general comment No. 3. It presents ways people have assessed policy benefits, but it doesn't give the assessment. (George Seielstad, University of North Dakota)	Not applicable – insufficient space
2-429	A	24	22	25	50	In section 2.2.2.5, p. 25-26, decision support tools are classified based on Niang-Diop, Bosch (2004). This seems to be not too helpful in some respects, as CBA and MCA/MCDA are methods which help defining policy targets. Opposed to this, CEA, listed as an alternative methodology, is a tool to identify the most cost-efficient implementation mechanisms for a given target and can, at least in principle, be used with both CBA and MCA. Expert judgement, finally, is a crucial element of three aforementioned methods. CBA seems to be considered as an objective method to determine an absolute measure of desirability as a basis for optimisation and prioritisation (although based only on one criterion, economic efficiency). However, this carries a number of implicit and often counterfactual assumptions: first, all factors taken into account must be fully commensurable, i.e. meaningfully addressed in the same unit of measurement, usually in money terms (including defining an economic value of things without a market price). Secondly, the assessment must be based on full information about all future impacts (all of tem measurable in monetary terms, too). Thirdly the value of future events must be weighted by a discount rate, based on the time preferences assumed (usually unchanged for future generations). For these assumptions, however, there cannot be an objective criterion, which is the reason why they are so bitterly disputed amongst economists. The latter factor makes each CBA a subjective undertaking, based on the valuation of the future by the individual economist and his/her peer group or school of thought. MCA is based on a broader judgement by involving stakeholders. However, there are two main schools, the US one and the European one. The US school tries to use MCA to rank alternatives similar to a CBA, based on a broader set of criteria with weights attached based on expert judgement or stakeholder participation. However,	National Adaptation Action Programme (NAPA). http://www.seib.org/napassess/ Useful comments to be incorporated into text We have strengthened the treatment of economic impacts.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						aggregating the criteria and deriving a ranking to identify the best option again assumes strong commensurability, although no longer necessarily on a monetary basis (although a conversion factor might be determined). As opposed to this, the European school (Munda, Giampetro, van der Sluis and others) suggests what I call a "horizontal" as opposed to the US "vertical" MCA, resulting in a range of options without necessarily being able to identify an overall ranking. This range of options is considered as input for the policy process, helping to achieve better informed decisions due to the rankings provided for each criterion, based not on expert judgements, but on participatory policy processes. In particular the latter version of MCA is no way more arbitrary than CBA, but based on intersubjective stakeholders instead on peer community This means that CBA without too many problems is applicable to good simultaneously meeting three criteria - goods which are traded on markets, so a price is established and substitutability is given at the margin, or a price for non-traded goods is universally accepted (not an average as enforcing this would undermine consumer sovereignty); - goods for which the costs are known as completely as the benefits, as otherwise any CBA will have an in-built bias again mitigation (as is observed later in the same section); - goods for which the costs are due and the benefits materialise during about the same time, as otherwise the discount rate (which ever if not zero) will devalue future events as compared to current ones. A "safe bet" in CBA terms would be a policy which would mitigate climate change now, but make later generations bear the costs (the Copenhagen Consensus of leading economists illustrates this kind of thinking). Only if these conditions are met (as is often the case in everyday life), CBA can identify "optimal solutions" – in all other cases it is equivalent to "the pitfall of researchers ascribing their own values to the assessment" (ZOD p- 20, l. 5). If these three conditions are not met, CBA is not superior, but can be misguiding, and should be handled with caution. As opposed to that, MCA valuations are more broadly based than CBA and might be preferable in all cases where the long term (and thus depreciation) plays a role, as is the case in climate change assessments. (Joachim Spangenberg, Sustainable Europe Research Institute SERI)	
2-430	A	25	0	25		The section of prioritizing adaptation measures begs a very important question: prioritization by whom? Appropriate methods and information structures use for prioritization will often depend on the decision maker. The discussion of	Addressed – we have revised the text and will consider the citation

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						prioritization techniques is also incomplete. See e.g., the recent work of GP Patil on prioritization methods. (James Shortle, The Pennsylvania State University)	
2-431	A	25	1	25	6	This is a good set of sentences--and may deserve mention in the section on choice of assessment method, as described in a previous comment. (Justin Wettstein, University of Washington)	Addressed
2-432	A	25	8	37		These paras overlap with material provided in chapter 17. They are consistent. (Richenda Connell, Acclimatise)	No action required
2-433	A	25	8			These are only some methods - probably useful at larger scales- perhaps brief mention could be made again to issues of stakeholder contribution, engagement and empowerment in evaluating options. (Irene Lorenzoni, University of East Anglia)	Addressed – cross reference
2-434	A	25	11	25	13	Also needed are estimates of costs if no mitigation is attempted. (George Seielstad, University of North Dakota)	Addressed
2-435	A	25	14	25	15	There is no reason why MCA should not assess more then eight criteria. Many applications of MCA do. (Ortwin Renn, University of Stuttgart)	See below
2-436	A	25	14			It is not so much that MCDA requires 3-8 criteria, it is that 3-8 is an appropiate number of criteria for MCDA. (< 3 you don't have multiple criteria, and more than 8 is usually unnecessary and unwieldy). (Robert Willows, UK Environment Agency)	Addressed
2-437	A	25	14			...orders and other methods of uncertainty analysis …' - meaning not clear. Although the need for uncertainty analysis appears to be appreciated by users of MCDA analysis, it is equally applicable to Cost-benefit analyses. ! (Robert Willows, UK Environment Agency)	Addressed
2-438	A	25	16			Somewhere between …. ' - -- a bit vague --- delete ! (Robert Willows, UK Environment Agency)	Addressed
2-439	A	25	19		20	Use of 'expert judgment' in the definition of 'expert judgment' is self-referential. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Addressed
2-440	A	25	19	25	20	Expert judgement ist not simply another alternative. CBA, MCA, and CEA usually need expert judgements as input, too. So it is confusing to see it in a line with the other methods and I am not sure, what kind of selection/prioritization is meant with this item. Immediate ranking by experts? Or ranking by expert-votes? (Ortwin Renn, University of Stuttgart)	Addressed
2-441	A	25	19	25	20	James Surowiecki has written The Wisdom of Crowds, in which he presents the case that large groups of people may be wiser than small groups of so-called experts. His thoughts are at least worth serious consideration by the IPCC.	Stakeholder section?

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(George Seielstad, University of North Dakota)	
2-442	A	25	19	25	20	Many would argue that each of the previous methods are (i) structured and (ii) do or at least can involve expert assumptions or judgement. Eg MCDA requires explicit or implicit judgements regarding swing weights and MCDA usually recommended as part of a process by which these judgements are elicited. (Robert Willows, UK Environment Agency)	Addressed
2-443	A	25	22	25	24	I have doubts that CBA is a good (or the "best") method to handle optimization. It tells us something about a single measure, but optimization needs to deal with the interaction of different measures. (Ortwin Renn, University of Stuttgart)	Addressed
2-444	A	25	22	25	31	I am not sure if the paragraph really meets the differences between the methods. One difference not mentioned is, if the method deals with the selection of single measures (like CBA) or with the selection of bundles of measures (like CEA eg. by linear-programming-least-cost-models). I think also that optimization is more a feature of CEA than of CBA (CBA tells us something about a single measure, but optimization needs to deal with the interaction of different measures, like CEA). In which meaning is CEA "between" CBA and MCA? (Ortwin Renn, University of Stuttgart)	Addressed
2-445	A	25	22	25	24	I'm not sure what the authors mean by an "absolute measure of desirability". As the authors themselves point out, cost-benefit analysis is only judged by one criterion of economic efficiency and no social/cultural/environmental considerations so I am confused as to how the result of a CBA would give an absolute measure of DESIRABILITY since desirability would, presumably, involve considerations other than just fiscal. (Eileen Shea, East-West Center)	Addressed
2-446	A	25	22	25	31	CBA compared to MCA: CBA does not eliminate subjective judgement because the B part necessitates the economic valuation of benefits which are calculated/estimated from physical metrics. Such valuation is inherent;y affected by value judgements and is therefore subjective. Hence one could argue that CBA is entirely subjectives whilst MCA presents all the information to the decision maker. (Rachel Warren, School of Environmental Sciences)	Addressed
2-447	A	25	24			"heavy" change into "strongly relied on" (Xiongwen Chen, Alabama A & M University)	Addressed
2-448	A	25	27	25	31	See above. An alternative to MCDA is the use of contingent valuation to support cost-benefit analyses, but contingent valuation invloves judgement ! I would advise the authors to avoid using the word 'subjective'. All methods require	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						judgements to be made. These may be modellers 'assumptions' or expert or other valid judgements about social or monetary values. (Robert Willows, UK Environment Agency)	
2-449	A	25	28	25	29	I do not agree that MCA is more arbitrary than CBA. Many assumptions needed for CBA (e.g. discounting rate) can also be challenged as arbitrary. The outcome of CBA look more firm and less arbitrary, because of the expression of results in single unit (monitary), but that only hides the uncertainties in the assumptions. (Marcel Marchand, Delft Hydraulics)	Addressed
2-450	A	25	30	25	31	Does CBA produce more than a ranking? And why do you emphasize, that MCA and CEA produces "only" a ranking? Do you regard a ranking not as a base for selection and prioritization? (Ortwin Renn, University of Stuttgart)	Addressed
2-451	A	25	44			suggest to apply (Xiongwen Chen, Alabama A & M University)	Not applicable
2-452	A	25	46	25	50	Related to a previous comment, this strikes me as of fundamental importance in doing responsible impacts work, despite the fact that it is often difficult to perform this type of analysis given climate model output. I ask the authors of this chapter to question whether the prominence of variability / extremes / rate of change influence discussions in this chapter is due to a lack of technical capacity to answer these questions. Alternatively, does the discussion accurately reflect the relative importance of these kind of "climate changes" relative to mean climate changes or socioeconomic influences? If the answer to this question is "no", then this is a fundamental difficulty / challenge / area for future work in developing capacity to do risk management assessments. (Justin Wettstein, University of Washington)	Need to bring thus up early and is to be addressed in Section 2.4 as a gap
2-453	A	25	50			underestimate (Xiongwen Chen, Alabama A & M University)	Addressed
2-454	A	26	4	26	6	Emphasize the risk of the do-nothing policy option as well. (George Seielstad, University of North Dakota)	Addressed
2-455	A	26	4	26	12	I am not really sure what is being said here, and to the extent that I do, I do not believe that it is consistent with the literature. (James Shortle, The Pennsylvania State University)	Not applicable
2-456	A	26	20	26	29	Another paper that may be relevant here is just about to be published by Klaus Keller et al. in Climatic Change, Dec. 2005 - it will be out around Nov 15 and addresses these issues, in particular, the emission reductions required to reduce the risks of widespread demise of coral reefs and disintegration of the WAIS. (Susan Joy Hassol, Independent Scholar)	Check reference and cross ref with Ch 19

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-457	A	26	20	26	29	This is a good paragraph. (Rachel Warren, School of Environmental Sciences)	No action needed
2-458	A	26	20	26	29	This discussion seems to miss the less dramatic structural changes in variability we might expect to be more plausible. For example, changes to the fundamental modes of atmospheric and oceanic variability, to the jet structure or position, to mid-latitude storm tracks or to the location and / or prominence of the ITCZ might have just as prominent a signature in terms of societal impact as the THC / WAIS collapse examples. (Justin Wettstein, University of Washington)	Addressed – we now cover this, briefly under singular events.
2-459	A	26	22			delete "indicators" (Xiongwen Chen, Alabama A & M University)	Key vulnerabilities
2-460	A	26	22			The chapter should distinguish here (and elsewhere) between non-linear events (such as corals, THC, WAIS, etc, which are very uncertain but not surprises, because we know about their existence and potential to be rapidly non-linear) and true surprise events or processes which might come out of the blue (analagous to the ozone hole) which by definition we know nothing of at present. (Geoff Jenkins, Met Office)	Addressed briefly in thresholds section / uncertainty table
2-461	A	26	22			Suggest to replace “surprise” by “abrupt, unexpected and”. (Ha-Duong Minh, CNRS)	Addressed
2-462	A	26	23	26	23	What is meant by "this"? (Rachel Warren, School of Environmental Sciences)	No applicable
2-463	A	26	24			Should indicate the meaning of THC and WAIS. (Donald Boesch, University of Maryland Center for Environmental Science)	Addressed
2-464	A	26	31		34	Sentence not intelligible to me. Explain with a table or a figure maybe ? (Ha-Duong Minh, CNRS)	Rewritten
2-465	A	26	31	26	33	Isn't it obvious that it's more probable to exceed lower than higher levels? (George Seielstad, University of North Dakota)	Rewritten
2-466	A	26	31	26	33	Meaning unclear !! (Robert Willows, UK Environment Agency)	Rewritten
2-467	A	26	31		33	I can't parse this sentence as it's currently written... higher levels... lower levels… of what… sea level… temperature? (Evelyn Wright, N/A)	Rewritten
2-468	A	26	37	26	37	Actually several IA models have used probabilistic analysis e.g. ICAM (Dowlatabadi) and I think also the AIM model and more are planned. (Rachel Warren, School of Environmental Sciences)	Addressed – we will add references
2-469	A	26	42	32	50	Section 2.2.3: This section provides an informative overview of uncertainty. It would benefit further from introducing and expanding on the concepts of different	Hmmm – space may not permit

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						types of errors (i.e. Type I and Type II). (Thomas Henrich, N/A)	
2-470	A	26	42	32	50	Section 2.2.1 and Section 2.2.3: These section explore the concepts of risk and uncertainty. However, the issue of 'ignorance' (in other words the 'unknown unknowns') is not touched upon, and should be included. (Thomas Henrich, N/A)	Addressed
2-471	A	26	42	32	50	Introduction of 2.2.3 is impressive,specifically the term, communicating uncertainty, is good. (Hisayoshi MORISUGI, Tohoku University)	No action needed
2-472	A	26	44	28	5	It is necessary to differnetiate diferent types of uncertainty. Although there is no consensus in the literature on the best means of disaggregating uncertainties, the following categories appear to be an appropriate means of distinguishing the key components of uncertainty: o target variability (based on different vulnerability of targets); o systematic and random error in modelling (based on extrapolations from animals to humans or from large doses to small doses, statistical inferential applications, etc.); o indeterminacy or genuine stochastic effects (variation of effects due to random events, in special cases congruent with statistical handling of random errors); o system boundaries (uncertainties stemming from restricted models and the need for focusing on a limited amount of variables and parameters); o ignorance or non-knowledge (uncertainties derived from lack or absence of knowledge). The first two components of uncertainty qualify as epistemic uncertainty and therefore can be reduced by improving the existing knowledge and by advancing the present modelling tools. The last three components are genuine uncertainty components of aleatory nature and thus can be characterised to some extent using scientific approaches but cannot be further resolved. If uncertainty, in particular the aleatory components, plays a large role then the estimation of risk becomes fuzzy. The validity of the end results is questionable and, for risk management purposes, additional information is needed such as a subjective confidence level in the risk estimates, potential alternative pathways of cause-effect relationships, ranges of reasonable estimates, loss scenarios and others. (Ortwin Renn, University of Stuttgart)	Addressed _ we now include a table that attempts to capture different types/sources of uncertainty.
2-473	A	26	50	26	50	I presume that what is meant here is 'managing the uncertainty in PROJECTIONS of climate change"? (Eileen Shea, East-West Center)	Addressed – note that definitions of terms such as "projection" have been revised

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-474	A	27	1	28	5	I am very pleased that this has been included in the FAR. However, I do think this section is vastly under-cited and perhaps misses referencing on of the groups doing research in this area. I would suggest being in touch with Granger Morgan at Carnegie Mellon University as he is leading an international, NSF-funded Climate Decision Making Centre that is focused on the development and application of these methodologies http://cdmc.epp.cmu.edu/PROJECT.htm (Aynslie Ogden, Government of Yukon)	Will attempt to address but pressure on space. Morgan's work is already cited.
2-475	A	27	1	32	50	In this section "availability" "anchoring" and "representativeness" are mentioned p27 lines 47-50. The following sub-sections need to refer back clearly to these three terms - suggest further subheadings to do so. (Rachel Warren, School of Environmental Sciences)	Insufficient space to add sections
2-476	A	27	2			Section 2.2.3.1: The text is useful and well written, but I'm not sure the topic warrants its own section; perhaps the text could be compacted and put into a fact box? (Marie Ekström, University of East Anglia)	Addressed
2-477	A	27	2			Section 2.2.3.1: Good section overall, but could the component paragraphs be shortened? All paragraphs seem like they could be shortened, but the third seems especially worthy of consideration. (Justin Wettstein, University of Washington)	Addressed
2-478	A	27	4			Replace "calculus" with "method" (Virginia Dale, Oak Ridge National Laboratory)	Consider
2-479	A	27	10			frequency (Xiongwen Chen, Alabama A & M University)	Not applicable
2-480	A	27	10			BAYESIAN IS NOR SUBJECTIVE. THIS IS AN INCORRECT INSERTION. (James O'Brien, Florida State University)	Reviewer is incorrect
2-481	A	27	17	27	24	This is a very good / thoughtful point--maybe worthy of its own paragraph after the paragraph currently running from lines 26-41? (Justin Wettstein, University of Washington)	Insufficient space
2-482	A	27	26	27	41	I doubt readers not intimately familiar with the Bayesian approach will understand this. It's a question of whom you are writing for. (George Seielstad, University of North Dakota)	Consider
2-483	A	27	29			BAYES 1763 NOT IN REF LIST (James O'Brien, Florida State University)	Addressed
2-484	A	27	35			It is not the use of judgement that distinguishes Bayesian approaches, but the formal approach (Bayes theorem) by which data is used to revise that judgement. In the frequentist approach, for example, the choice of pdf used to describe a fequency distribution is often a subjective one, especially in the absence of sufficient data to	Bayesian methods can be applied to frequentist data

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						properly evaluate different pdf options ! (Robert Willows, UK Environment Agency)	
2-485	A	27	43		50	his discussion should cite Tversky and Kahneman (1974). (Mort Webster, MIT)	Reference will be considered
2-486	A	28	2			delete "very much" (Xiongwen Chen, Alabama A & M University)	Text edited
2-487	A	28	2	28	5	This conclusion seems a very elaborate way of saying the most useful approach lets experts give gut-feel estimates of uncertainties. (George Seielstad, University of North Dakota)	No – formal treatement of uncertainty in decision analysis is reflexive and more than "gut feel"
2-488	A	28	7			Section 2.2.3.2: This section persists in treating uncertainty and risk as known by "experts" and communicated to "stakeholders." Wynne, who is cited, talks about stakeholders' knowledge of both these areas -- a dialogue is important, but the participants all have important information. People can then define actions based on risks that they have identified. (Elizabeth Malone, Joint Global Change Research Institute)	Addressed
2-489	A	28	7	30	29	Section 2.2.3.2 I excellent. However, consider the intended readership. The chapter reads as if it's intended to deliver a message to writers of other chapters, not to people outside the IPCC family. (George Seielstad, University of North Dakota)	Will consider
2-490	A	28	7	30		Ad 2: the role of social actors When talking about adaptive action, it is not sufficient to address the individual reactions of stakeholders, important as they are. In addition, the mechanisms of decision making and the specific "mental maps" of decision makers not as individuals, but for the collective "classe politique" play a significant role not sufficiently discussed in section 2.2.3.2, p. 29-30. While it is true that "this kind of uncertainty is impossible to quantify", it is still possible to describe some of the key mechanisms shaping it. For instance, much of public decision making is based on (rather simplified) cost-benefit assessments, including a systematic discounting of future costs and benefits (see ad 3 below), and the need to find immediate answers to challenges convincing the decision makers' respective constituencies that the problems are dealt with adequately. As a result, plans are being made including significant future efforts and expenditures, which seem promising at the moment of decision, but turn into serious political and economic challenges the closer the date comes when the (no longer discounted) bill has to be paid in reality. This then may lead to reversions of earlier decisions, which significantly influence the levels of mitigation and adaptation implemented in reality, and thus the climate impacts on everyday life.	A series of useful points worth noting in text but space does not permit elaboration

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						The ATLANTIS project, although not a scenario in the scientific sense, provided useful insights into the broad range of policy options including the twists and turns policy could take under certain conditions (referred to as Nicholls, Tol, p. 54, without drawing such conclusions from it). Furthermore, individual insight based on "decision makers' mental models" will not suffice for action, but collective discourses must be reflecting the problems of mitigation and adaptation. They can be triggered by frontrunner groups and blocked by laggards, for reasons of material interest as much as for inertia. Thus the need for scientists to address different audiences (and their "pre-existing mental maps") to trigger the necessary discussions, a conclusion not possible without taking the structure of political discourses into account. This my be one of the reasons why when discussing stakeholders, civil society seems to play no detectable role (which if intentional is as much underestimating their role as official UN documents are overestimating it). (Joachim Spangenberg, Sustainable Europe Research Institute SERI)	
2-491	A	28	7	30	29	See Comment 6 (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed
2-492	A	28	7			Section 2.2.3.2: Note that many of the citations in this section are older. Are there more recent citations that could provide new insight or information? (Justin Wettstein, University of Washington)	Has not been treated in IPCC before but will assess key new references
2-493	A	28	9	28	23	especially 221-23. I am delighted to see this text because there has been some discussion about including this topic in Ch. 19. I would prefer to see it retained here and a brief cross reference made in Ch. 19. I think it is important to recognize that "these patterns of decision making" etc. also occur with professionals and experts INSIDE their immediate fields of excellence, especially where comparisons are made. In Ch 19 we are writing about key vulnerabilities. The cryosphere experts say that the key vulnerabilities are in the cryosphere. Ecologists say that the key vulnerabilities are in species and ecosystems, and social scientists say that the key vulnerabilities are people and only people. Many economists say that there are no key vulnerabilities. Not surprisingly the experts tend not to write about this! (Ian Burton, University of Toronto)	Addressed
2-494	A	28	9	30	29	The review of risk communication with respect to uncertainties is dominated by US studies and results. The problems with the heuristics and bias approach have not been mentioned. A good source for a critical analysis of this literature is Gigerenzer, G. and Selten, R.: „Rethinking Rationality," in: G. Gigerenzer and R.	Addressed –we will consider these references

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						Selten (eds.): Bounded Rationality: The Adaptive Toolbox. Dahlem Workshop Report. (MIT Press: Cambridge 2001), 1-12. (Ortwin Renn, University of Stuttgart)	
2-495	A	28	15			What is a successful decision? (Virginia Dale, Oak Ridge National Laboratory)	Resolution in decision-making process – no need to further explain
2-496	A	28	22			JUST IN LAY PEOPLE' ?? (James O'Brien, Florida State University)	No applicable
2-497	A	28	25	28	38	To me, it seems there is some disconnect between this, more practical, description of stakeholder involvement and the more academic treatment in the introductory sections. Is there? If so, is it deliberate? (Justin Wettstein, University of Washington)	Addressed – we will try to reconcile these apparent differences
2-498	A	28	35	28	44	The discussion of the importance/value of a shared process of dialogue and exploration with stakeholders is extremely important and I encourage the authors to consider highlighting this in the Executive Summary as well as here in the body of the Chapter. (Eileen Shea, East-West Center)	Consider
2-499	A	28	38	28	41	Delete 'two' as there can be more. Also what is meant by 'outside' this format? (Irene Lorenzoni, University of East Anglia)	Addressed
2-500	A	28	39	28	39	Are there some examples of integrated stakeholder involvement that would be worthwhile to cite? One example I am aware of is the Climate Impacts Group at the University of Washington, though I'm sure other groups are pursuing integrated risk management frameworks associated with climate variability? This might be one area where "gray literature" might be worth citing? (Justin Wettstein, University of Washington)	Yes
2-501	A	28	48	29	18	Extremely important point: different strategies will be needed for different regions. (George Seielstad, University of North Dakota)	No action needed
2-502	A	29	2			Use "policymakers" rather than "political elites" (Geoff Jenkins, Met Office)	There is a difference
2-503	A	29	2			Point out somewhere (maybe not here) that, due to climate inertia and offsetting future greenhouse gas and aerosol precursor emissions (at least in the SRES emission scenarios), climate change over the next 2 or 3 decades at least is insensitive to which SRES emissions scenario is used. This means that, for many adapters, they do not need to trouble themselves with uncertainty due to future emissions. (Geoff Jenkins, Met Office)	Addressed – we now mention this explicitly. It is an important point for many assessors wishing to select climate scenarios for use in near-term assessments.
2-504	A	29	5	29	7	In this sentence in particular, but in the discussion in this section in general, I would	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						like to see more integration with the concept of risk management-based assessment laid out in the initial sections. (Justin Wettstein, University of Washington)	
2-505	A	29	12			GLOBAL ENVIRONMENTAL CHANGE-HUMAN AND POLICY DIMENSIONS 15 (2): 139-149 JUL 2005 (Irene Lorenzoni, University of East Anglia)	Consider
2-506	A	29	16			skillful (Xiongwen Chen, Alabama A & M University)	UK English is being used
2-507	A	29	16	29	18	Stakeholders and decision-makers deal with uncertainty all the time. If there were absolute certainty, their decisions would be easy--and unnecessary. (George Seielstad, University of North Dakota)	No action needed
2-508	A	29	25	29	25	Yes, the likelihood of extreme events is of greater concern to stakeholders than slow, gradual changes. (George Seielstad, University of North Dakota)	No action needed
2-509	A	29	30	29	32	This statement presents one viewpoint as fact, when it is not. This is not only inconsistent with much of the literature, it is inconsistent with other sections of this same draft, notably 2.2.3.1 probabilities and Bayesian analysis. There is nothing about special (from a Bayesian view) about the uncertainties in socio-economic drivers that make it "impossible to quantify." There are many good reasons to use scenarios and storylines, but NOT because future uncertainties cannot be quantified. (Mort Webster, MIT)	Will briefly reference debate
2-510	A	29	31	29	31	Qualitative story lines of the future are indeed more useful than sophisticated models that assume certain human behavior in the distant future. (George Seielstad, University of North Dakota)	No action needed
2-511	A	29	43	29	43	The reference to Patt 2002 should istead be Patt and Gwata (2002): Patt, Anthony and Chiedza Gwata (2002). Effective seasonal climate forecast applications: examining constraints for subsistence farmers in Zimbabwe. Global Environmental Change 12: 185-195. (Anthony Patt, Boston University)	Addressed
2-512	A	29	43	29	43	Where experts lose credibility is when they pretend their model actually equals the future. (George Seielstad, University of North Dakota)	No action needed
2-513	A	30	2		29	I very much like this list of pitfalls, as an aid for people identifying these in themselves and others, and attempting to resolve them objectively. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	No action needed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-514	A	30	2	30	29	This part is also impressive in a sense tha it proposes a frontier for research on information (Hisayoshi MORISUGI, Tohoku University)	No action needed
2-515	A	30	8			". This…" (Xiongwen Chen, Alabama A & M University)	No action needed
2-516	A	30	12			"compared" change into "in comparison to…" (Xiongwen Chen, Alabama A & M University)	Not applicable
2-517	A	30	20			holding the assessed likelihood constant' requires clarification. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	No action needed
2-518	A	30	21		23	The sentence that begins with 'Fourth,…' needs clarification. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Missing "if"
2-519	A	30	21	30	24	wording of this sentence is not clear: how do non-anthropogenic risks relate to controllability? At the end of this paragraph it would also be useful to refer to the lack of importance of climate change for most laypeople and how it is a lower priority in comparison to other issues in daily life (ie issue of prioritisation). See also paper in Climatic Change by Lorenzoni and Pidgeon (forthcoming). In terms of producing scenarios of future climate possibilities with stakeholder input, it may be worth referring to work by Ann Fisher et al on CARA (Consortium for Atlantic Regional Development). (Irene Lorenzoni, University of East Anglia)	Consider, but section to be cut
2-520	A	30	21		23	Important point, please clarify this sentence's syntax. (Ha-Duong Minh, CNRS)	Missing "if"
2-521	A	30	22			Something missing in this sentence. (Donald Boesch, University of Maryland Center for Environmental Science)	Missing "if"
2-522	A	30	29			Also role of trust and responsibility are very important - a forthcoming paper in Climatic Change by Lorenzoni and Pidgeon covers some of these perspectives from a public perceptions view of climate change in the US and in Europe. This can be made available to the authors. Also, please see paper by Arnell, Adger and Tompkins on expert elicitations of the likelihood of rapid climate change (available upon request). (Irene Lorenzoni, University of East Anglia)	Consider
2-523	A	30	31	32	50	In some sense, the approach of this section is trying to model human behavior. I suggest that attempt is futile. Different people will always make different decisions when presented the same information, especially in the cases of events having extremely low probability but extremely severe consequences. The best strategy is to share what is known as widely as possible. Rely on people to decide what to do. Don't steer them by managing uncertainties for them. One consequence of	No, this is not its aim – it is to understand how people respond to uncertainy

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						uncertainty was not mentionesd. Typically, people postpone action because "it might not be as bas as 'they' say." That's possibly true, but few think uncertainty cuts the other way--"it might be much worse." (George Seielstad, University of North Dakota)	
2-524	A	30	33	32	50	Uncertainty management needs to distingish between uncertainty about the agent, the effect or the vulnerabilioty of the risk absorbing system. One can be uncertain about the future emission of gree house gases, ione ca be uncertain about the effects on climate and other endpoints and onme can be uncertain about the ability of endpoints or tragets to cope with the changes. These different loci of uncertainty necessitate different strategies of uncertainty management. Agent and effect uncertainty may induce better research, more expert consensus or better validation methods while vulnerability uncertainty is highl yinfluenced by orhanisational skills, building codes, behavioral assumptions and others. (Ortwin Renn, University of Stuttgart)	Addressed around a new uncertainty table
2-525	A	30	33	30	34	This is the no. 1 problem. It's not obvious that more research can reduce uncertainty; it may, in fact, increase it. Enough knowledge exists to prompt action. (George Seielstad, University of North Dakota)	Addressed
2-526	A	30	33	30	38	A mention of this would seem to fit in the sections on tools to evaluate adaptation options. (Justin Wettstein, University of Washington)	Not needed
2-527	A	30	42		43	"…….include: uncertainties in future EMISSIONS of greenhouse gases and aerosol PRECURSORS (which will……" (Geoff Jenkins, Met Office)	Section edited
2-528	A	30	48	31	1	Very good to see discussion of effects of land surface changes. As well as "feedbacks" (eg. response of vegetation to climate change exerting a further effect on climate change), land surface change can act as an additional FORCING of climate change (in addition to the radiative forcing of GHGs etc). It is important to be clear about the distinction between feedbacks and forcings (often "feedback" is used when "forcing" is more appropriate, ie: in the case of direct human-induced land cover change. There is some discussion of this in WG2 ch2. (Richard Betts, Met Office)	Addressed in different section and terminology has been scrutinised
2-529	A	31	1	31	2	Change wording to "Some of the current uncertainty ranges for key parameters such as climate sensitivity may shrink in the near future in the light of new knowledge" (Rachel Warren, School of Environmental Sciences)	Addressed
2-530	A	31	7			focusing (Xiongwen Chen, Alabama A & M University)	Spelling change?

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-531	A	31	7		18	SRES points out that the SRES emissions scenarios are not equally likely. (Geoff Jenkins, Met Office)	Already noted in the text
2-532	A	31	7	31	38	In these summaries of probabilistic approaches, studies that treat socio-economic uncertainties, of which there are several, have been categorically omitted. Whether deliberate or accidental, this group of work is in the published literature (and more forthcoming) and should be included here. These include: Nordhaus and Popp (1997), Manne and Richels (1994), Richels et al (2004), Webster et al (2003), Yohe et al. (2004), Yohe et al. (2005), Scott et al. (1999). (Mort Webster, MIT)	Ok. This is a long list – going back to well before the refs. suggested here. Can include these specific references if the 'inverse problem' going from a reference to the citations listed an be easily solved. Perhaps, Mort Webster can send those and more.
2-533	A	31	22			"missing feedbacks" would be better described as "uncertain processes"; feedbacks are not engineered into climate models, they come about automatically when processes are described properly. (Geoff Jenkins, Met Office)	Ok. Point taken – but the outcome is still the same – feedbacks that exist in the real world are absent from models.
2-534	A	31	23	31	38	These sentences seem at least partially redundant as compared with previous sections. Could be better integrated with previous descriptions. For what is unique, this discussion could be simplified in terms of different types of "known" versus "unknown" variability. The last sentence is a good assessment, but what motivations could be put in place to better deal with this problem? (Justin Wettstein, University of Washington)	I am not sure who is going to deal with the issue of redundancy across sections? The lead authors need to think about this. We will for our part focus the discussion on the suggestion of "known unknowns" and "unknown unknowns"
2-535	A	31	24		38	There have been two attempts at probabilistic emissions scenarios, as far as I am aware, which give very different results. That due to MIT estimates a 50% probability of CO2 emissions by 2100 as about 20GtC/yr with 5 and 95 percentiles of 8 and 37 GtC/yr. That due to EPA gives 14, 10 and 19 GtC/yr for the same quantities. This is a good illustration of the lack of certainty in even probabilistic estimates. Maybe all this is covered in WG3? (Geoff Jenkins, Met Office)	Details on socio-economics of emissions scenarios are bets left for WG-III?
2-536	A	31	24			See comment 8 above. (Geoff Jenkins, Met Office)	Comment 8?
2-537	A	31	37	31	38	This situation may never change. (George Seielstad, University of North Dakota)	Addressed
2-538	A	31	38			Delete "anytime"; it's redundant. (Geoff Jenkins, Met Office)	Addressed
2-539	A	31	44	31	45	Will readers know what is meant by deep uncertainty? (Robert Willows, UK Environment Agency)	No
2-540	A	31	45			What is deep uncertainty? (Virginia Dale, Oak Ridge National Laboratory)	There is text currently that clarifies this – "system models, parameter values, and interactions are unknown or contested".

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-541	A	32	1		3	The work by Lempert and colleagues is very good and important to cite. However, it is important to point out that implicit in their approach is that all states of the world examined are equally weighted, since their measure of robustness is explicitly that decision that works well in the largest number of SOWs. (Mort Webster, MIT)	OK
2-542	A	32	1	32	9	This dialog is confusing. A focus on the dangers and benefits of the alternate approaches could clear up the apparent contradictions? (Justin Wettstein, University of Washington)	Fine.
2-543	A	32	6	32	9	The robustness approach (minimax regret) doesn't require use of pdf's to characterise uncertainties (scenarios are often used). PDf's might allow a better description of how measures might vary in their 'robustnesss' across different possible futures. Last sentence needs justifying (I for one don't know why outcomes should be highly inefficient!) The robustness approach should help reduce regret, but not necessarily help identify measurees with high potential pay-off but also high-risk. (Robert Willows, UK Environment Agency)	First point. OK – pdfs are not neccessary but are useful. This is simply a statement about second order uncertainty. If PDFs are off from their 'true value' – we could pay a high price for the robust strategy.
2-544	A	32	17	32	20	Discuss the trade-offs in terms of uncertainty and applicability here? (Justin Wettstein, University of Washington)	Not clear. What is applicability'?
2-545	A	32	29			rewrite (Xiongwen Chen, Alabama A & M University)	Meaning of comment not clear. We will look at section and clarify writing.
2-546	A	32	29		38	This para seems to repeat a lot of what is on page 16, lines 10-15. Worth merging the two? (Geoff Jenkins, Met Office)	Will look at this.
2-547	A	32	40			"an impact" replaces "An impacts threshold" (Xiongwen Chen, Alabama A & M University)	Not clear why this should be the case.
2-548	A	32	40	50		This section could refer to adaptive management as a useful strategy for decision-making under uncertainty. See Willows and Connell, 2003, p 69 (Richenda Connell, Acclimatise)	Possibly. But adaptive management opens up a whole new literature
2-549	A	32	40	32	50	I cannot easily see where in sections 2.1.1. and 2.2.1 the topics are more extensively discussed (Rachel Warren, School of Environmental Sciences)	See 2.2.2.2 and 2.2.2.3
2-550	A	32	42	32	43	If this is how risk is used in this chapter, then it should be defined earlier. (Virginia Dale, Oak Ridge National Laboratory)	Change "Here" to "In this context"
2-551	A	32	45	32	45	remove s from defines (Rachel Warren, School of Environmental Sciences)	Ok. done
2-552	A	32	46	32	46	Does the study consider exceedance of thresholds and how they are reduced by mitigation and adaptation and then consider the residual damage?	No. Thresholds incorporate adaptive strategies.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Rachel Warren, School of Environmental Sciences)	
2-553	A	33	1	71	50	Section 2.3: In view of the discussion of future conditions, it would be helpful to introduce and refer to a 'cascade of uncertainty'. Plausible ranges of future conditions could be described in this context, thus distinguishing more clearly between (i) socio-economic futures, (ii) emission futures, (iii) climate futures, (iv) impact futures, (v) adaptation future. (In particular in section 2.3.3.) Within this setting different existing scenario exercises can then be addressed and used as examples. (Thomas Henrich, N/A)	Not applicable – this section has now been split into methods (new section 2.2.2) and Characterising the future in this assessment (section 2.2.3). We are presenting a table of uncertainties in section 2.2.1. That should cover this, but not in the context only of scenarios, but of scenarios and their outcomes.
2-554	A	33	1	71	50	Section 2.3: As much of the 'Characterising the future' section is based on the SRES scenarios or diverse derivatives of these scenarios, it would be useful to re-introduce the four scenarios with a 1/4 or 1/2 page summary each. Also, the famous SRES 'tree-matrix' which shows the A1-B2 scenarios in their relation to environmental and economic world-views, would be useful to repeat in this report for completeness. (Thomas Henrich, N/A)	Addressed – space constraints compel us to minimise these descriptions (in section 2.3).
2-555	A	33	1	38	15	Section 2.3.1. Much of this section is of generic nature and/or on methodological issues, and would be better placed to sections 2.1 and 2.2. (Thomas Henrich, N/A)	Addressed – methods are now separate from scenario descriptions.
2-556	A	33	3			Overall section 2.3: I haven't got much to comment on this section as I found it easy to follow and well structured. My only general comment is: it may be useful to include something on the temporal component of studying future climate, e.g. explain what future temporal windows are of interest for scientists/stakeholders (is there a conflict?), what are the reasons for focusing on specific windows, and perhaps something on how different uncertainties change with time? (Marie Ekström, University of East Anglia)	Addressed – we make explicit mention of the increasing need for near-term projections for which uncertainties are greater due to the S/N problem.
2-557	A	33	3	71	50	section 2.3 itself is interesting, but I do not see the relationship between section 2.2 and 2.3. It may be worth while to make a separate chapter for each sections. (Hisayoshi MORISUGI, Tohoku University)	Addressed – scenario methods are now separate from scenario descriptions and ahead of other CCIAV methods
2-558	A	33	3	34	12	The more I read, the more the impression sinks in that the authors are engaged in "theoretical social engineering." The discussion moves into how people will behave, or how they will arrive at decisions about how to behave, or how they will react given certain information, etc. I don't think this is a useful exercise. It assumes an omniscience unlikely to exist. (George Seielstad, University of North Dakota)	Addressed – this is not the intention at all. We hope that the revised text will shed light on the purpose of adopting scenarios and highlight that we are attempting to represent uncertainties in future conditions, not make statements about what will happen.
2-559	A	33	3	72	49	this section talked so much things which is beyond the range of climate change impacts even with the economic and social dimension. Therefore the section would	Not applicable – the section explicitly does not treat only climate scenarios, as these are

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						be limited to climate scenarios for climate change impact assessments. (Bangzhong Wang, China Meteorological Administration)	insufficient on their own for assessing impacts, adaptation and vulnerability.
2-560	A	33	5			As stated earlier, I suggest renaming section 2.3.1 to something else but "Introduction". (Marie Ekström, University of East Anglia)	Addressed
2-561	A	33	7			Section 2.3.1.1: It might be worthwhile to close this section with a statement about the trade-offs in uncertainty as it is presented here and the potential for subjectivity. (Justin Wettstein, University of Washington)	Addressed elsewhere in new uncertainty table.
2-562	A	33	9			"imapct" replaces "impacts" (Xiongwen Chen, Alabama A & M University)	Not applicable
2-563	A	33	9		16	This para seems like an intro, and hence comes a bit late in the chapter. (Geoff Jenkins, Met Office)	Addressed in revised introduction
2-564	A	33	9			Be careful of insisting that scenarios be "internally consistent". The potential inconsistency of scenarios is a source of insight, e.g., B-A-U scenarios are inconsistent (but still interesting) insofar as the assumption (usually implicit) of no abrupt climate change is violated. (Paul Raskin, Tellus Institute)	Not applicable – there may be insights to be gained in not having internal consistency,, but is this something to aim for? The example given here is also puzzling. Why should BaU scenarios be inconsistent and how does abrupt climate change figure here?
2-565	A	33	12	33	12	inclusion of the adjective "unsustainable" here seems unnecessary since any exploitation of resources -- sustainable or otherwise -- is a "driving factor contributing to environmental change". It's use here might imply a value judgement that I don't believe is intended or necessary to convey the point being made. (Eileen Shea, East-West Center)	Addressed – deleted
2-566	A	33	12	33	12	Using the phrase "unsustainable exploitation of natural resources" seems like a bad choice, even if that is the fact. I think the phrase draws disproportionate attention given the other mentioned stresses and many alternatives such as "unsustainable use of non-renewable natural resources" exist. (Justin Wettstein, University of Washington)	Addressed – deleted
2-567	A	33	14	33	14	"Formidable uncertainties" might actually be "impossibilities." (George Seielstad, University of North Dakota)	Not applicable – deleted
2-568	A	33	15			"...human behaviour, and societal and natural conditions." Scenarios address uncertainty in the evoltuion and rsponse of social-ecological systems. (Paul Raskin, Tellus Institute)	Not applicable – deleted
2-569	A	33	18			physics, economics andsocial science (Xiongwen Chen, Alabama A & M University)	Not applicable – deleted
2-570	A	33	18		41	Climate change scenarios are fine for testing sensitivities, approaches, etc. But it	Not applicable – deleted, but the comment is

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						should be clearly pointed out that people in the real world who have to plan adaptation to climate change, especially of expensive, long-lifetime, infrastructure such as transport systems or reservoirs, need PREDICTIONS of climate change. Climate change scenarios ("plausible alternative futures", or whatever) are of little use to them. (Geoff Jenkins, Met Office)	debatable, as there will always be uncertainties associated with projections (including those of climate). The whole chapter is about managing impacts and adaptation under uncertainty.
2-571	A	33	20			I would be careful about suggesting that scenarios ever offer solutions to anything. They are certainly helpful however! (Ian Burton, University of Toronto)	Not applicable – deleted
2-572	A	33	20			Replace "solutions to" with "information for" (Virginia Dale, Oak Ridge National Laboratory)	Not applicable – deleted
2-573	A	33	21			Suggest that "credible" be removed. On whose criteria? (Paul Raskin, Tellus Institute)	Not applicable – deleted
2-574	A	33	34			RASKIN--FORTHCOMING. YOU CANT USE SINCE NOT TO BE PUBLISHED NOW!! (James O'Brien, Florida State University)	Not applicable – deleted, though Raskin et al. is already published!
2-575	A	33	43			Section 2.3.1.2 is not parallel with 2.3.1.1 (Virginia Dale, Oak Ridge National Laboratory)	Addressed: new section headings are now being employed
2-576	A	33	45	34	7	I don't see how you can make a CCIAV assessment without a climate change prediction/scenario. When you have understood "the regional vulnerability to El Nino", you cannot adapt to changing conditions (for example, brought about by a changing frequency or intensity of El Nino) until you know how the El Nino will change. "Skilful short term forecasting" maybe part of an adaptation response (although improvements in this will happen anyway), but cannot replace the need to build higher river defences here or cut wider firebreaks in forests there. (Geoff Jenkins, Met Office)	Addressed – this section has been heavily revised, but the point is still made, reflecting the literature, that some studies do not apply scenarios but can still offer useful insights on vulnerability to climate variability and climate change.
2-577	A	33	47			What is vulnerability to El Nino? I can understand that there might be vulnerability to the floods and droughts associated with ENSO. Perhaps like first, second and n order impacts we need to think of first, second and n order vulnerabilities? (Ian Burton, University of Toronto)	Addressed – text revised
2-578	A	33	50	34	3	An alternative view is that the scenarios about ENSO intensity and timing are valuable, but (in some circumstances) NOT AS valuable as better short-term forecasts. How could information about the vulnerability to changed ENSO events not be helpful? It seems this statement is quite subjective. One way to clarify might be to highlight the conceptual boundaries over which short-term forecasts might be more valuable than information from long-term predictions / scenarios. An aside--does it matter if skill in terms of forecast improvement in one spatial /	Addressed – the text already implies what the reviewer is suggesting, but it is unnecessary to make the point more explicit unless supporting literature can be identified to justify this.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						time scale is limited relative to another? I'm not sure this is the case here, but one can imagine a case where information in one area is much easier to achieve than in another, which might be relevant for future work. (Justin Wettstein, University of Washington)	
2-579	A	34	1	34	3	I would simply like to applaud the authors for recognizing the valuable and potentially central role that coping with extremes and patterns of variability is already playing and is likely to continue to play in adaptation to changing climate conditions. (Eileen Shea, East-West Center)	No action needed
2-580	A	34	2			"skillful" (Donald Boesch, University of Maryland Center for Environmental Science)	Not applicable – UK spelling
2-581	A	34	2			delete "combined" (Xiongwen Chen, Alabama A & M University)	Not applicable
2-582	A	34	9	34	12	The term scenario has a wide range of common usages. The authors correctly identify the proper technical sense here and are right to emphasise that (i) sensitivity analysis (line 14), (ii) unstructured 'what-if' analyses (line 22) (such as 'worst-case scenario') are not scenarios in this strict technical sense. The term scenario is also used to describe the appraisal of different risk treatment options in the context of both mitigation and adaptation. The authors later ecognise, for example, that some stabilisation scenarios are scenarios sensu stricto, and some sensu stricto) I note that the authors later use scenario in the broader sense (p. 45, line 15 et seq), and should consider distinguishing their useage more clearly (eg scenario, sensu lato?). (Robert Willows, UK Environment Agency)	Addressed – we have redefined all terminology for this assessment.
2-583	A	34	10	34	10	remove "senso stricto" (Justin Wettstein, University of Washington)	Addressed – removed
2-584	A	34	19		20	Who's defining plausibility here? Either cite something from the literature that analyzes these studies as not plausible, or drop the derogatory comment. (Elizabeth Malone, Joint Global Change Research Institute)	Addressed – text has been revised and we now achnowledge the subjectivity in defining plausibility in the Box.
2-585	A	34	22	35	18	Since on p35 singular events are mentioned as plausible they should not be categorised as implausible on p34 (Rachel Warren, School of Environmental Sciences)	Addressed – we now treat these as plausible, but mention that some construction methods apply implausible assumptions
2-586	A	34	23			You probably mean "improbably", rather than "implausible". There are many low probabiity/high impact scenarios that are plausible (consistent with current conditions, trends, and knowledge about bio-physical and societal dynamics). (Paul Raskin, Tellus Institute)	Addressed – we now treat these as plausible, but mention that some construction methods apply implausible assumptions
2-587	A	34	25			literatures	Not applicable and anyway grammatically

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Xiongwen Chen, Alabama A & M University)	incorrect
2-588	A	34	29	34	50	This section is very good (Rachel Warren, School of Environmental Sciences)	No action needed
2-589	A	34	41	34	43	And, of course, melting of glaciers and polar ice, which can also have lag effects. (Donald Boesch, University of Maryland Center for Environmental Science)	Addressed. – this is now added
2-590	A	34	44		45	You haven't filled in the numbers yet, but have worried me by including contrasting units of meters for current forcing levels and units of cm per century for the next several centuries. Also, 'next several centuries' is quite vague. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Addressed, although a final check of consistency of units awaits WG1 results.
2-591	A	34	50	34	50	It takes a long discussion to get to the statement in the short sentence on this line. This highlights a need to be more selective in general. (Justin Wettstein, University of Washington)	Addressed, this conclusion has been moved up.
2-592	A	34				MORE FORTHCOMING PAPERS. YOU CANT USE THESE (James O'Brien, Florida State University)	All papers cited fit IPCC guidelines.
2-593	A	35	8			rewrite (Xiongwen Chen, Alabama A & M University)	Addressed.
2-594	A	35	8	35	18	What about using extreme events to bound potential futures? (Virginia Dale, Oak Ridge National Laboratory)	Addressed – discussion of this is included in the section on analogues
2-595	A	35	8		12	I applaud the appropriate level of skepticism expressed over the shutdown of the THC and collapse of WAIS, which seem to be widely regarded as foregone conclusions. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	No response needed.
2-596	A	35	8	35	18	Authors might consider reference to the work of ATLANTIS project (http://www.uni-hamburg.de/Wiss/FB/15/Sustainability/atlantis.htm) that did use scenarios to understand the consequences and management response and adaptation options available under extreme sea-level rise conditional on assumed singular events (a what-if!). [Note: discussed later on p. 54:lines 39-49] (Robert Willows, UK Environment Agency)	Addressed – this is extensvely referenced.
2-597	A	35	9			rewrite (Xiongwen Chen, Alabama A & M University)	Addressed.
2-598	A	35	13		14	It's not only that "understanding" is poor, but also that such events may be inherently and irreducibily uncertain (bifurcations in complex systems). This should be made explicit. Then, say "precise scenarios", not "realistic scenarios". This issue of inherent uncertainty (uncomputable risk) should also be addrssed in the first section in discussing the limits of using a "risk assessment" framework, with its emphasis on probablistic analysis, for CCIAV. (Paul Raskin, Tellus Institute)	Text removed – this issue is now commented on in a new uncertainties table in section 2.1..

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-599	A	35	16	35	18	This is true in these cases, but as in section 2.2.2.6, there may be other examples of "abrupt" changes in physical climatology which, though less "extreme" are more realistic to consider. Also, much of this discussion is repetitive with that section. Some objectivity could be discussed here in terms of the relative likelihood of these "thought experiments" relative to other "scenarios" relative to other "projections". What would be most helpful in this chapter that is a bridge between WG I and II is a measure that stretches across both socioeconomic and physical science uncertainty. (Justin Wettstein, University of Washington)	Addressed: definitions of terms now provided at the beginning of section 2.2.2, with an attempt to account for differences across research communities. Different sections addressing singular events have now been combined.
2-600	A	35	24	35	24	Include reference to Schröter et al. 2005 (Science) (Anthony Patt, Boston University)	Addressed – this is referenced several times elsewhere; these references are more general
2-601	A	35	28		36	Doesn't seem to actually mention adaptation in any of these bullets? (Geoff Jenkins, Met Office)	Not applicable – these points were not made in connection with adaptation
2-602	A	36	8	36	46	Remove Box 2.2, and refer to other sources instead (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed – Box has been completely changed and definitions revised
2-603	A	36	9	36	45	Section 2.3.1.3 - Box 2.2: As with the definitions of other key concepts, these terms should be defined across the report as necessary (thus giving an IPCC definition), and should not be highlighted in this section. (Thomas Henrich, N/A)	Not applicable – we introduce revised definitions in this chapter that require explanation here
2-604	A	36	9			Box 2.2: Reading the forecast / prediction and scenario paragraphs, one might get the impression that scenarios necessarily more accurately reflect the pdf of future climate outcomes. Is this the impression the authors want to give? If so, is this demonstrably the case? Note also that boundary conditions can change in a projection as well. (Justin Wettstein, University of Washington)	Addressed – Box has been completely changed and definitions revised
2-605	A	36	16	36	20	This is a pragmatic definition. It is worth noting that most if not all predictions are conditional on model assumptions and inputs. I would advise that a projection becomes a forecast/prediction when associated with some estimate of probability or likelihood conditional on assumptions (it may not be the most likely) (Robert Willows, UK Environment Agency)	Addressed – Box has been completely changed and definitions revised
2-606	A	36	22	36	31	Repeats text (Virginia Dale, Oak Ridge National Laboratory)	Addressed – Box has been completely changed and definitions revised
2-607	A	36	22	36	31	Some overlap and possible redundancy between this and text on page 33, line25-41. (Robert Willows, UK Environment Agency)	Addressed – Box has been completely changed and definitions revised
2-608	A	36	31	36	39	Box 2.2 -- Since on line 30-31, the authors indicate that "scenarios" is sometimes used as synonomous with "storylines", I wonder why there is a separate description	Addressed – Box has been completely changed and definitions revised

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						of "storylines"? I actually believe that there is a distinction so I would suggest deleting "storylines" being synonomous with "scenarios." (Eileen Shea, East-West Center)	
2-609	A	36	33			Suggest to replace "datum" by "level", also in the glossary (transmit to TSU please). Two reasons: First, most IPCC readers do not know latin. Second, datum is the singular of "data", and since "data" generally refers to observed facts, a future baseline can not be a datum. (Ha-Duong Minh, CNRS)	Not applicable – definition now omitted
2-610	A	36				Box. I suggest the distinction between prediction and projection is academic, and lost on most users. Planners want predictions, ie they want to know what climate future to base their adaptation on. (Geoff Jenkins, Met Office)	Not applicable – we have revised the definitions, but these terms are both used in CCIAV analysis and still require definition. This is not only about climate futures!
2-611	A	37	0			Reduce detail in Box 2.3, referring to other sources where possible (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed – this Box omitted and some definitions merged into earlier Box.
2-612	A	37	1	37	50	Box 2.3 is very good (Rachel Warren, School of Environmental Sciences)	No action required, but Box now merged with earlier Box.
2-613	A	37	5			Box 3.3: This terminology was introduced much earlier in the chapter. Is there a way to make the whole of the discussions more concise and organized? I would prefer to see one clear description earlier in the text that meets the needs of the whole chapter. In the "qualitative vs. quantitative" discussion, I would prefer a single description of the trade-offs in subjectivity, uncertainty and accuracy for exploratory / normative and descriptive / quantitative analyses. It might be possible to dramatically reduce text by replacing this with a 4-panel table? The last sentence of the qualitative / quantitative discussion is a very good example of the issues at work. (Justin Wettstein, University of Washington)	Addressed – new merged Box now appears in section 2.2.2. and contents are drastically shortened.
2-614	A	37	7		22	Discussions of mitigation scenarios (e.g., stabilization) area useful addition here. However the chapter does not clarify an important distinction – that these scenarios represent alternative decisions/policies and do NOT represent the range of uncertainty in future conditions. Because of this, they do not precisely meet the definitions of scenarios as on pp. 33, 36. It is critically important to distinguish between uncertainties and decision options in an analysis (see Morgan and Henrion, 1990). (Mort Webster, MIT)	Addressed – we have distinguished between uncertainties and policy deciions in the discussion under scenarios.
2-615	A	37	34	37	35	I wonder if this is a fair description of qualitative scenarios. Assumptions in qualitative scenarios can be more than subjective (by expert groups), and	Not applicable – text now deleted

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						undocumented and unspoken assumptions can be found also in quantitative model-based scenarios (Who knows all about the context of 100.000 data in economic models? Is the programmer of a computer-model aware of the context of all of his equations?). I agree that many published qualitative scenarios suffer stronger from these problems than many qualitative scenarios. But this is a matter of practice, not of principle. (Ortwin Renn, University of Stuttgart)	
2-616	A	38	0	71		There will probably be overlap with WGIII chapter 3. (Ha-Duong Minh, CNRS)	Addressed – we have cross-referenced WG III, chapter 3.
2-617	A	38	1	38	12	Where should results of these assessments be? I think in WGIII Ch 3 so cross reference (Rachel Warren, School of Environmental Sciences)	Addressed – we have cross-referenced WG III, chapter 3.
2-618	A	38	5	38	8	Please modify: "These efforts invoke an inverse modeling approach, which first requires that [delete: constraints on emissions / replace by: critical climate thresholds] .... (Thomas Bruckner, Technical University of Berlin)	Not applicable – text heavily revised and shortened.
2-619	A	38	10			analyzed (Xiongwen Chen, Alabama A & M University)	Not applicable
2-620	A	38	16	55	14	Section 2.3.2: Also much of this section addresses methodological issues and would be well placed in a reduced version within section 2.2. There is some overlap and repetition between sections 2.3.2.3 / 2.3.2.4 and the thematic discussions in section 2.3.3 and onwards. I suggest merging the relevant examples into the later section (e.g. land use issues), and to bring the methodological issues (e.g. down-scaling) into section 2.2. (Thomas Henrich, N/A)	Addressed – section moved to methods under 2.2.2.
2-621	A	38	16	67	37	Section 2.3.3, in which SRES-based scenarios studies are summarized, should be placed before Section 2.3.2. (Silvina Solman, CONICET)	Addressed – SRES scenarios are now described ahead of other global scenarios but after new scenario methods
2-622	A	38	27	38	30	I think it should be noted here that land use change is also important for climate change itself. Although most climate scenarios do not include land use effects, some are now beginning too. (Richard Betts, Met Office)	Addressed – included in several places.
2-623	A	38	32	40	35	Section 2.3.2.1: This section can be shorthened and reduced to a box/table with literature references. (Thomas Henrich, N/A)	Addressed – we have shortened the section but not as a Box (though that is still possible to consider).
2-624	A	38	32			2.3.2.1 Global NON-CLIMATE scenarios and storylines. Also add to 2.3.2.2 (Geoff Jenkins, Met Office)	Not applicable – most of the audience will understand that not all scenarios are of climate

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-625	A	38	32			Section 2.3.2.1: This section is illustrative, but very long. Is there a way to summarize this information? (Justin Wettstein, University of Washington)	Addressed – we have considerably shortened this information.
2-626	A	38	35	38	35	I suppose, Herman Kahn introduced the term even in the 1950s. (Ortwin Renn, University of Stuttgart)	OK, corrected
2-627	A	38	46	39	9	These don't seem like the wisest trio of scenarios. They are figured out for the whole world? (George Seielstad, University of North Dakota)	Yes, these scenarios were developed at global level, same as the other ones mentioned
2-628	A	39	14			"with" replaces "using" (Xiongwen Chen, Alabama A & M University)	OK
2-629	A	39	27	39	32	Jazz is my preferred approach. It captures the collective intelligence of many vs. the individual intelligence of a few experts. Sustainability requires rethinking of lifestyles by everybody. Therefore, engaging as many people as possible helps create a commitment that will prove difficult to impose from the top down. (George Seielstad, University of North Dakota)	No action required –the reviewer is merely expressing an opinion
2-630	A	39	34		41	Is the OECD scenario as useful and significant as others ? If not, consider omiting it (also in Table 2.4). (Ha-Duong Minh, CNRS)	OECD scenario has been taken out of scenario table for now
2-631	A	39	41	39	41	Nice reference to cost of inaction. (George Seielstad, University of North Dakota)	No action required
2-632	A	39	44			aims (Xiongwen Chen, Alabama A & M University)	The MA is now completed
2-633	A	40	33			Table 2.4 FROG! (Xiongwen Chen, Alabama A & M University)	Not applicable – this is indeed the name of the scenario
2-634	A	40	33	40		Table2.4: The presentation of studies based on SRES scenarios should be summarized at this stage, before the comparative table is discussed or, more generally, before new scenarios are described (which are usually compared with SRES-based scenarios). Changing the order of sections 2.3.3 and 2.3.2 as suggested above, should overcome this problem. (Silvina Solman, CONICET)	Addressed – this section now follows SRES
2-635	A	40	33			Table 2.4 will be interesting and useful for readers who want to compare future prospects among the different scenario development projects. This table may be used to make comprehensive policies with considering detailed prospect of water stress from WWV, that of ecosystem services from MA, and that of climate condition from SRES in an integrated way. However, it should be clearly noted that they are not completely compatible with each other. General view of the world (globalization or regionalization; emphasis on the	Text changed to address comment

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						economy or environment) are similar among the scenarios which are layouted in a same row. But background philisophy and detailed assumptions are different among them. For example, all of SRES four scenarios are BaU in the sense that they do not consider any climate policy intervention, but it is not clear whether water policy intervention is considered in the SRES four scenarios. On the otherhand, consideration of water policy intervention in WWV is essential, while climate change is not explicitly considered in the WWV scenarios. (Kiyoshi Takahashi, National Institute for Environmental Studies)	
2-636	A	40	33			Table 2.4 is useful (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	OK, text will be changed a bit
2-637	A	40	35	40	50	In the table 2.4 what is the relationship between entries on the same row in the table and how were these derived? (Rachel Warren, School of Environmental Sciences)	Text explaining table updated
2-638	A	41	16		24	Difference between bullets 1, 3, and 4 is entirely unclear. Say either more or less. (Paul Raskin, Tellus Institute)	Description changed
2-639	A	41	24			develop (Xiongwen Chen, Alabama A & M University)	Addressed – text has been revised
2-640	A	42	9	45	2	The point of Section 2.3.2.3 is fundamental: get to the sacle where people live; regional is appropriate. However, I again sense a blizzard of approaches are presented. This is unlikely to deliver any message other than take your choice. (George Seielstad, University of North Dakota)	Addressed – we are trying to indicate new advances in the mathods of treating different scales in scenario development. We are not attempting to list all of them.
2-641	A	42	9	47	14	Studies described in section 2.3.2.3 are mainly related to SRES scenarios, they should be summarized under section 2.3.3. To be more specific, the majority of regional scenario developements are SRES-based. All the referencies related to extremes and regional climate should be placed under sectcion 2.3.3. Section 2.3.2 should be focused mainly on the definition of new scenario developement. In summary, I suggest to describe first SRES-based scenarios and related studies (regional climate, extremes, and so on). After SRES-based scenarios, I recommend to describe new scenario developements and references to studies based on these new scenarios. (Silvina Solman, CONICET)	Addressed – we have now separated new methods of scenario development in general from the descriptions of SRES scenarios in particular. The reviewer is correct to note that many recent advances are SRES-based, but not all. For this reason, we feel justified i treating methods first and descriptions later.
2-642	A	42	9			Section 2.3.2.3: I would suggest re-framing and reordering this section. (Justin Wettstein, University of Washington)	Addressed – this is now found in th methods section with cross-referencing to WG I.
2-643	A	42	17			A suggestion of references (if you are interested I can provide you with copies of the papers): The two following papers have been submitted to HESS for the SWURVE (Sustainable Water: Uncertainty, Risk and Vulnerability in Europe, an	Addressed – References will be considered but may be referenced en masse from chapter 11, WG I.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						EU-funded project) special issue, the estimated publication date is Jan/Feb 2006. The papers may be of interest to include as examples of regional impact studies (both papers use data from the PRUDENCE project): * Ekström, M., Hingray, B., Mezghani, A. and Jones, P.D. 2005. Regional climate model data used within the SWURVE project 2: addressing uncertainty in regional climate model data for five European case study areas. (accepted) * Hingray, B., Mouhous, N., Mezghani, A., Bogner, K., Schaefli, B. and Musy, A., 2005. Accounting for global-mean warming and scaling uncertainties in climate change impact studies: application to a regulated lake system. (I'm not 100 % on this but I think it is accepted). (Marie Ekström, University of East Anglia)	
2-644	A	42	17	43	12	This is the most important part of the chapter and is much too short. Rather than just listing new work, it needs to be evaluated. Please describe the advantages and disadvantages of each new work here and explain which approach will be used in 4AR. (Alan Robock, Rutgers University)	Addressed – this has been revised to treat the main advances since the TAR but note that there is extensive discussion of climate scenarios in chapter 3, WG I, so it is unnecessary to repeat this here.
2-645	A	42	17	42	17	The title of this sub-section should be "Application of high resolution scenarios" (Silvina Solman, CONICET)	Not applicable – development work for making climate projections applicable to CCIAV is not usually conducted by climate modellers. Heading retained.
2-646	A	42	17	43	12	The studies described should be under section 2.3.3; may be in page 62 after line 19, as all the studies are referred to SRES scenarios, and not to any other ones. (Silvina Solman, CONICET)	Not applicable – even if the majority of new methods apply SRES-based projections, we still wish to treat these separately from a description of the SRES-based scenarios themselves.
2-647	A	42	19	42	50	The PRECIS model is being applied in many parts of the world. I do not see a reference to this unless it is included in one of the studies whose acronyms are used in this section. It may be worth pointing out if this is the case. (Rachel Warren, School of Environmental Sciences)	Addressed – we have referenced this, and will consider doing so explicitly in the text.
2-648	A	42	21			"….higher resolution allows a MUCH more realistic response to topographic features (OMIT high resolution) (lakes, mountains, coastlines). In general, different impacts were predicted depending on whether the high resolution RCM scenario, or the GCM scenario, was used. IT IS REASONABLE TO ASSUME, BASED ON THEIR MUCH MORE REALISTIC CLIMATOLOGY, THAT RCMs WILL MAKE MUCH MORE REALISTIC PREDICTIONS OF FUTURE CLIMATE THAN GCMs, AND SHOULD BE USED IN ALL FUTURE IMPACTS STUDIES"	Addressed – this is a highly prescriptive statement, and is not in accord with the more measured conclusions in chapter 11, WG I, which we endorse here. There are still uncertainties attached to the use of RCMs, and these are only part of the armoury of tools available for climate scenario development.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Geoff Jenkins, Met Office)	
2-649	A	42	31		40	This para should reflect the debate about the utility of using LBCs from one GCM to drive an RCM with different physics. There is a view that this will allow the RCM to "find its own climate" inconsistent with the driving GCM; some PRUDENCE results clearly show this. Mixing GCMs and RCMs may not be a good way to investigate downscaling uncertainty; using many GCMs each forcing "its own" RCM (as will be done in the planned NARCCAP project) would explore modelling uncertainty in general. (Geoff Jenkins, Met Office)	Addressed – is this treated in chapter 11?
2-650	A	42	32	42	40	Where are the results of these studies? X reference to wherever in WGI or WGII of AR4 (Rachel Warren, School of Environmental Sciences)	Addressed – these studies are under review available in electronic form.
2-651	A	42	38	42	38	The last sentence in this paragraph is problematic. Another fundamental point is that regional climate models allow for dynamical (rather than solely statistical) downscaling and that is why the choice of RCM's is less important in expanding the envelope of variability. An alternate conclusion from this is that RCM's are a necessary component to the assessment because of their ability to incorporate local physical processes the large-scale climate models simply cannot. A missing component in this chapter is the trade-off between using AOGCM model results directly, using statistical downscaling and using dynamical downscaling through a RCM. If the point of this section is simply to say that agricultural impacts uncertainties are linked most fundamentally to uncertainties in the AOGCM, that's fine, but I'm not sure focusing on this uncertainty is the most appropriate way to generate scenarios (see the descriptions of uncertainty elsewhere in this chapter). (Justin Wettstein, University of Washington)	Addressed – the reviewer is correct to point out that focusing only on AOGCM uncertainties is too narrow. We have revised the section to indicate the value of using SD and dynamical methods in combination with AOGCM outputs, pointing out advantages and disadvantages (but building on earlier summaries and WG I material on such comparisons to conserve space)
2-652	A	43	6		12	Reflect the TGCIA comments on limitations of statistical downscaling here, particularly the untested assumption that large scale-small scale relationships derived empirically in a recent climate are applicable to future climates which change well beyond the conditions over which the relationships have been established. (Geoff Jenkins, Met Office)	Addressed – this is now mentioned explicitly.
2-653	A	43	7			Reference is missing for Hewitson (2003). More general note: needs check for match of citations with references, and citations need to be written in a consistent fashion, including agreement of the verb with the number of authors for the citation. (Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory)	Addressed – the reference list has been completely overhauled.
2-654	A	43	10	43	10	What does acronym SDSM stand for?	Addressed – this is now written in full at first

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Rachel Warren, School of Environmental Sciences)	mention.
2-655	A	43	16		50	In addition to the cites listed above in item #6, the authors might consider citing Webster and Reilly (2005) for an explicit discussion of the complementarities between probabilistic and storyline approaches for scenario design. Keller, K., B. M. Bolker, & D. F. Bradford (2004). Uncertain climate thresholds and optimal economic growth. J. Envir. Econ. Manage., 48, 723-741. Manne, A. S. and R. G. Richels (1995). "The Costs of Stabilizing Global CO2 Emissions: A Probabilistic Analysis Based on Expert Judgment." The Energy Journal 16(4): 1-37. Nordhaus, W. D. and D. Popp (1997). "What is the Value of Scientific Knowledge? An Application to Global Warming Using the PRICE Model." The Energy Journal 18(1): 1-45. Richels, R.G., A. S. Manne, and T. M.L. Wigley (2004). "Moving Beyond Concentrations: The Challenge of Limiting Temperature Change," Working Paper 04-11, AEI-Brookings Joint Center for Regulatory Studies. [Submitted, should be published in time for AR4]. www.aei.brook.edu/publications/abstract.php?pid=735 Scott, M.J., R.D. Sands, J. Edmonds, A.M. Liebetrau, D.W. Engel (1999). "Uncertainty in Integrated Assessment Models: Modeling with MiniCAM 1.0," Energy Policy 27: 855-879. Webster, M. and J. Reilly (2005). "Constructing Probabilistically-Based Emissions Scenarios," Energy Economics (submitted). [Part of special issue for papers from Jan. 2005 IPCC Expert Meeting on Scenarios, should be published in time for AR4.]. Yohe, G., N. Andronova, and M. Schlesinger (2004)."To Hedge or Not Against an Uncertain Climate Future?" Science 306: 416-417. Yohe, G., M. Schlesinger, N. Andronova (2005). "Reducing the Risk of a Collapse of the Atlantic thermohaline circulation." [Submitted, should be published in time for AR4]. (Mort Webster, MIT)	Addressed – to check references (presumably the post-TAR ones should take precedence?)
2-656	A	43	18			in which (Xiongwen Chen, Alabama A & M University)	Not applicable – grammar is correct
2-657	A	43	19			Climate model sensitivity (ie equilibrium temperature change after a doubling of CO2 concentration) is not a good way to describe future climate for integrated impacts studies; two climate models with the same sensitivity can have very different local responses, particularly in precipitation extremes. (Geoff Jenkins, Met Office)	Addressed – to consider

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-658	A	43	20		22	"key choices..." I think it needs to be stated explicitly that this methodology runs the risk of obscuring uncertainties that may be very important but for which probability distributions have not been specified, particularly the location of critical thresholds in the system, e.g., ecological thresholds, thresholds in the THC, etc. (Evelyn Wright, N/A)	Addressed – these are discussed here only in relation to thresholds in potential feedbacks to the climate system.
2-659	A	43	24	43	50	In these summaries of probabilistic approaches, studies that treat socio-economic uncertainties, of which there are several, have been categorically omitted. Whether deliberate or accidental, this group of work is in the published literature (and more forthcoming) and should be included here. These include: Nordhaus and Popp (1997), Manne and Richels (1994), Richels et al (2004), Webster et al (2003), Yohe et al. (2004), Yohe et al. (2005), Scott et al. (1999). (Mort Webster, MIT)	Addressed – this section was on probabilistic climate change futures. Non-climate futures are dealt with elsewhere,. In fact, the two are now merged into a single methods section on probabilistic futures (new 2.2.4.4), and these references will be taken into account.
2-660	A	43	28			In many cases, the input pdf used for the climate system has been climate sensitivity. Though this will indeed give a pdf of global quantities, these are of little use for impacts studies. Pattern scaling cannot be used as different climate sensitivities arise from different patterns of change. (Geoff Jenkins, Met Office)	Addressed – the reviewer is correct, and we discuss here and elsewhere how new work is seeking to develop probabilistic information at regional scale.
2-661	A	43	31			Some complete AOGCMs have been used for these integrated approaches - the C4MIP ensemble (Friedlingstein et al, accepted by Climate Dynamics- I can provide to TSU) (Richard Betts, Met Office)	Addressed – we will consider locating and adding this reference.
2-662	A	43	34			"intensity" change into "magnitude" (Xiongwen Chen, Alabama A & M University)	Not applicable – sentence revised.
2-663	A	43	34			To avoid confusion, best to keep to a single clear definition: Climate sensitivity is the global temperature rise following a doubling of atmospheric CO2 concentration. (Geoff Jenkins, Met Office)	Addressed – text has been revised.
2-664	A	43	35			"forcing" change into "change" (Xiongwen Chen, Alabama A & M University)	Not applicable – wording is correct
2-665	A	43	36	43	36	Include reference to Stainforth et al. (2005) (Nature) (Anthony Patt, Boston University)	Addressed – reference added.
2-666	A	43	40			I assume the estimate of the 95% C.I. is on the estimate of the mean value of climate sensitivity ? (Robert Willows, UK Environment Agency)	Addressed –
2-667	A	43	41			Note that the Murphy:Sexton 2004 paper used variants of the Hadley Centre model; parameter value uncertainty was explored but not structural uncertainty. (Geoff Jenkins, Met Office)	Addressed – text has been revised.
2-668	A	44	3			Delete "arguably"; there surely can be little doubt that RCM predictions will be	Addressed – we will consider using a different

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						better for impacts studies than their driving GCM predictions. (Geoff Jenkins, Met Office)	word, but it RCM projections are not preferred over AOGCM projections in all CCIAV studies.
2-669	A	44	9			rewrite (Xiongwen Chen, Alabama A & M University)	Addressed – section has been rewritten.
2-670	A	44	10			rewrite (Xiongwen Chen, Alabama A & M University)	Addressed – section has been rewritten.
2-671	A	44	21			useful to define ensemble (Geoffrey Levermore, Manchester University)	Addressed – we have now defined this
2-672	A	44	21	44	25	This is a valid point, but I haven't seen a definitive statement about the objective in scenario development. Is the sole purpose to bracket the total uncertainty? Can there be other objectives in scenario development such as providing a central, traditional view of the future, followed by alternatives? In other words, can scenarios be used to generate a conceptual pdf or are they simply end member possibilities? Can scenarios also have a fundamental goal of testing the available parameter space for sensitivity? (Justin Wettstein, University of Washington)	Addressed – we now discriminate explicitly between scenarios and probabilistic futures, explaining when either might be applied.
2-673	A	44	23		24	"should be viewed as relatively conservative." I think this point should be stated even more strongly. Specifically, what is and is not the value of these studies? How should they and should they not be interpreted? What can they illuminate and what do they conceal? How should the results and their interpretation be communicated to decision makers? (Evelyn Wright, N/A)	Addressed – we are now more explicit about the role of alternative characterisations. We could consider a small explanatory table showing what types of CCIAV studies might apply different charcterisations.
2-674	A	44	27	44	32	This is a place where discussion of adequacy could be inserted. It seems there are other goals of impacts / risk management assessments, which may want to consider variance and consequent extreme events. (Justin Wettstein, University of Washington)	Addressed – we now focus more on the usefulness of alternative futures in CCIAV studies.
2-675	A	44	37	44	37	"…to produce regional climate change pdfs for ___ and ___ (variables of interest)." (Justin Wettstein, University of Washington)	Addressed – this section has been rewritten.
2-676	A	44	39	45	2	While such studies have considered uncertainties in a number of components of the climate system, uncertainties arising from interactions within the climate system also require attention. Eg: effects of vegetation on hydrology - if there are uncertainties in the veg response then this leads to uncertainties in the hydrological response. In TAR this was ignored - hydrological models were driven just by GCM output with no consideration of vegetation, but things have moved on now. Gedney et al (in review with Nature) and Betts et al (in review with Nature) may be of interest - I can provide to TSU.	Addressed – these additional forcings and feedbacks are now discussed in the section on integrating scenarios.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Richard Betts, Met Office)	
2-677	A	44	47			"DownScaling" (Hayley Fowler, Newcastle University)	Addressed – typo.
2-678	A	45	2			Note that this was also the conclusion of all the impacts work done in the PRUDENCE project. (Hayley Fowler, Newcastle University)	Addressed – these observations are now brought together.
2-679	A	45	4	45	7	As someone who, like some of the authors of this chapter, believes that building resilience to extreme events is going to be of central importance to adaptation (especially at local levels), I really look forward to seeing this section in the second order draft. (Eileen Shea, East-West Center)	No action required.
2-680	A	45	15	45	18	Scenario sensu lato (Robert Willows, UK Environment Agency)	Addressed – we now revised the definitions and omitted the Latin!
2-681	A	45	23	45	25	Maps and/or images showing the land the sea will cover if it rises 1 m and other levels will let people on coasts decide what to do. They will assess their vulnerability. Locals will do the planning. Share the information, not the analysis of what people will do when given the information. (George Seielstad, University of North Dakota)	Analyzing and presenting the risks is essential to enable adaptation but evaluating different adaptation options (through, e.g., CBA, MCA etc.) is also important to GUIDE the planning process for adaptation.
2-682	A	45	44			Not all subsidence is due to tectonic movements; some may be attributable to compaction of Holocene sediments. (Donald Boesch, University of Maryland Center for Environmental Science)	Not applicable
2-683	A	46	1	71	50	There is no mention of the CPI scenarios developed by RIVM (Rachel Warren, School of Environmental Sciences)	Not applicable
2-684	A	46	1	71	50	Suggest add ref to Potsdam Institute's DINAS COAST /DIVA coastal CCIAV framework (Rachel Warren, School of Environmental Sciences)	Addressed
2-685	A	46	1	71	50	From page 46 onwards we start to see results presented, of the methodologies described. My question is how has it been decided which studies to include results for and which not? Is this supposed to be (i) include illustrative results of the methods (especially new methods) to show how useful they are or (ii) summarise the literature overall on future SRES scenario interpretations at different scales and mitigation scenarios? The latter would overlap I think with other chapters in WGII e.g. Ch 19 (and the sectoral/regional impact chapters) and in WGIII Ch3 where long term mitigation scenarios are considered. Clearly a certain amount of overlap is good between chapters, but I am wondering what the purpose of the results (all very interesting and well reported) are - illustrative or meant to be a holistic comprehensive summary?	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Rachel Warren, School of Environmental Sciences)	
2-686	A	46	6			Table 2.5: for what duration of model run are these intercomparisons made? (Donald Boesch, University of Maryland Center for Environmental Science)	Addressed [These projections are for the last decade of the experiments, which for most models is 2091~2100. Details of the experiments are available from Tables 8.1 and 9.1 of the IPCC TAR WGI volume. The caption of the Table has been extended to include the source of the underlying data.]
2-687	A	46	6	46	8	Table 2.5 What "ocean processes"? And what about the contribution of glacial melt? Over what time frame are these projections? Also the description of this table on page 45 from line 40 doesn't address these questions either, unless I have missed something. (Susan Joy Hassol, Independent Scholar)	Addressed ["Ocean processes" refer to ocean circulation that determine the regional patterns of ocean thermal expansion under global warming."]
2-688	A	46	10	46	20	same remark as no. 10. You should use the DINAS Coast model as an example here too. (Marcel Marchand, Delft Hydraulics)	Addressed
2-689	A	46	21	46	22	I question the characterization of storm surge as "extreme sea level events that typically have a high impact BUT A LOW PROBABILITY OF OCCURRENCE." Coastal inundation associated with storms such as tropical cyclones are not what I would call a low probability occurrence and, in fact, some of my own work in the Pacific Islands point to the need to consider issues of storm surge and periodic events associated with natural variability (e.g., ENSO-related changes in sea level) in addition to long-term sea level rise. Subsequent text in this section suggests that the authors are well aware of this but the opening sentence would suggest that storm surge is somehow less of an issue because of a 'low probability of occurence.' (Eileen Shea, East-West Center)	Addressed
2-690	A	46	35	47	14	Remove detail - just list the three approaches (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed
2-691	A	46	35	46	40	So, in this example, these approaches don't account for changes in synoptic eddy location? Why not? Is this a fundamental shortcoming or a technical challenge? (Justin Wettstein, University of Washington)	Yes it is a fundamental shortcoming of statistical downscaling approaches.
2-692	A	47	4	47	4	Are the frequency distributions altered in ad hoc fashion or are they predicted? (Rachel Warren, School of Environmental Sciences)	Changes in the frequency distributions are derived from high resolution climate models.
2-693	A	47	4	47	6	Follow this last sentence up with a sentence on whether or not this is the most valid	Good point but text on this section was cut

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						thing to do and why. (Justin Wettstein, University of Washington)	down so there is simply no room for such deliberation.
2-694	A	47	8		14	I DISAGREE WITH THE ASSERTION ENTIRELY. (James O'Brien, Florida State University)	Not sure what part of the assertion the reviewer disagrees with, although the assertion is of a rather well-established nature (see common No.695 below).
2-695	A	47	8	47	14	Very useful pgph (Rachel Warren, School of Environmental Sciences)	No action needed
2-696	A	47	8	47	13	The distinctions between statistical downscaling and dynamical downscaling should be more robust and come much earlier (or the earlier sections should refer to this discussion). (Justin Wettstein, University of Washington)	Addressed – we have clarified this distinction up front as it affects several sections
2-697	A	47	10			Reference to the UKCIP02 scenarios, which derived changes in storm surges in this way.A figure from this report might be useful. Hulme:Jenkins et al (2002) as already in refs. The work was actually done by Gregory and Lowe and I will look for a replacement reference. (Geoff Jenkins, Met Office)	Addressed
2-698	A	47	11	47	13	I don't think this is technically correct unless I misunderstand the discussion (entirely possible). The RCM is forced by AOGCM results, so how does are local water levels not tied (at least indirectly) to coarse-scale synoptic conditions? (Justin Wettstein, University of Washington)	It is assumed that, the influence of the coarse-scale synoptic conditions on local water levels is sufficiently captured by models in a physically consistent fashion, rather than assuming a static relationship between them.
2-699	A	47	13			Reword sentence to "However, in order to capture extreme behaviour, sufficiently long runs or ensembles must be undertaken; the computational expense of this is becoming less of an issue with the advent of fast PCs". (Geoff Jenkins, Met Office)	Addressed
2-700	A	47	16			Section 2.3.2.4: The discussion in this chapter sometimes lacks balance. For example, how long is the discussion on the downscaling techniques used for economic variables relative to that in physical variables? Is this appropriate? Why? Are similar or at least analogous methods employed? Comment on the strengths and weaknesses of current efforts in regionalization in socioeconomic scenarios and how futuer efforts can enhance the strengths and alleviate the weaknesses. Compare the strengths and weaknesses between socioeconomic regionalization of scenarious and the physical or statistical regionalization of climate model output. (Justin Wettstein, University of Washington)	Addressed: length of socio-economic section has been reduced, and space allocation across topics adjusted. Text has been focused on strengths and weaknesses of various approaches.
2-701	A	47	31	48	46	The box presents descriptions of 3 different scenarios, but it doesn't say what the	Addressed. Box removed, text greatly

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						conclusions from the scenario assessments were. (George Seielstad, University of North Dakota)	reduced and focused.
2-702	A	47	31	49	7	Reduce to a paragraph - maybe extend Table 2.6 with the information from Box 2.4 in it? (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed, although Table dropped as well.
2-703	A	47	48			I prefer "ecological services" to "ecosystem services," for the former term captures all levels of the biological hierarchy. (Virginia Dale, Oak Ridge National Laboratory)	Text removed.
2-704	A	48	0			The observation that, in multi-model studies, inter-model differences are larger than the effects of other uncertainties, occurs in so many places in the chapter (two are Page 48, line 43; and page 61, lines 33-35) that it deserves some comment. How are we to interpret this? Does this mean we should not believe any model results? What can we learn from these models in spite of the differences? These are the sort of questions that decision-makers will, and can reasonably, ask. (Evelyn Wright, N/A)	An attempt has been made to address relative uncertainties in each section.
2-705	A	48	9			rewrite (Xiongwen Chen, Alabama A & M University)	Text removed.
2-706	A	48	37	48	40	The sentence that begins on line 37 ["The SRES scenarios … greater inequality (A1FI and A2)"] is only valid if one looks at the impacts of climate change in isolation. However, as shown in if one looks at the total risk of hunger in 2085 due to both climate change and non-climate change related causes, according to Parry et al (2004), hunger is lowest in B2, followed by A1FI, B1 and A2, in order. This is noted in Goklany (2005a). Accordingly the following changes should be made: [1} On line 38, after "reduction in yield: add "due to climate change". [2] Add a new sentence after the period on line 40 as follows: "However, as shown in if one looks at the total risk of hunger in 2085 according to Parry et al (2004), hunger is lowest in B2, followed by A1FI, B1 and A2, in increasing order (Goklany 2005a). That is, by the measure of population suffering from hunger, through 2085 , at least, B2 would be the most sustainable, followed by A1FI, B1 and A2, in increasing order, and the warmest world would not, until that point, be worse of than cooler worlds." (Indur Goklany, Office of Policy Analysis, Department of the Interior)	Addressed. Text has been edited to indicate that risk of hunger depends more on the development path than on the effect of climate change, to add the suggested reference, and to clearly differentiate the climate-related impacts.
2-707	A	48	40	48	43	This study did not consider uncertainties in effects of vegetation on hydrology - if there are uncertainties in the veg response then this leads to uncertainties in the hydrological response. Hydrological models were driven just by GCM output with no consideration of vegetation. Gedney et al (in review with Nature) and Betts et al (in review with Nature) may be of interest - I can provide to TSU.	Addressed by addition of text noting limitations of the study.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Richard Betts, Met Office)	
2-708	A	49	4			Comment on table in the bottom right corner. This table is misleading with respect to water shortage. It only provides estimates for the population with a "potential incraes in water stress", but there will also be people for whom water stress will be reduced. This table ought to provide the net change in the poluation under water stress. This is discussed in Goklany (2003, 2005) with respect to precisely this matter. (Indur Goklany, Office of Policy Analysis, Department of the Interior)	Text removed.
2-709	A	49	4	49	7	Figure 2.6, aor almost the first time, presents results. The information is presented in a way that captures attention. (George Seielstad, University of North Dakota)	Not applicable.
2-710	A	49	6			Figure 2.6: Are the changes labeled 2050 and 2080 cumulative or since the previous period? (Elizabeth Malone, Joint Global Change Research Institute)	Figure removed.
2-711	A	50	0			The BESEECH project has been developing socio-economic scenarios at a sub-UK level and also investgating adaptive capacity under different socio-economic conditions. Contact Kristina Dahlstrom (k.dahlstrom@psi.org.uk) who can provide a copy of their report. (Richenda Connell, Acclimatise)	Contact information did not work, was not able to obtain report.
2-712	A	50	11	50	14	"In most cases, changes in socio-economic conditions are inferred from the examination of current trends in key socioeconomic indicators and stakeholder consultation on their possible future patterns (e.g. Heslop-Thomas, 2004, vulnerability and adaptation; Pulhin, 2004, people and places}." It would be good to point out here the limitations of this approach, e.g., inferring changes based on current trends may not capture some of the profound structrural transformations that may result from globalization processes such as the relocation of industries and services. (Karen O'Brien, University of Oslo)	Addressed.
2-713	A	50	44			"one case" not "once case" (Donald Boesch, University of Maryland Center for Environmental Science)	Addressed.
2-714	A	50	50			What are "population shares?" (Virginia Dale, Oak Ridge National Laboratory)	Text removed.
2-715	A	51	6	51	22	Both of these paragraphs could use more language to describe the acceptability of the current situation and how to improve it. What is the collective "take" on these methods from the perspective of the authors? What are the uncertainties of these models in 2050? 2100? What is the synthesis gained from these approaches? Are the "implausibly high" / "unrealistic" scenarios useful as thought experiments, with	Addressed, suggestion followed.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						relation to the climate scenarios or are they simply not useful? If they are not generally useful, economize on words, mention the existing work using these approaches and, in the same sentence, say they are generally regarded as lacking in utility because of implausibly unrealistic depictions of population in certain areas. (Justin Wettstein, University of Washington)	
2-716	A	51	19			What does "with earlier work" mean? (Virginia Dale, Oak Ridge National Laboratory)	Text removed.
2-717	A	51	24	52	42	The impression is that uncertainties are being piled on top of uncertainties. Why try to achieve greater precision on a model based on unavoidably uncertain assumptions? (George Seielstad, University of North Dakota)	Addressed in uncertainties table and supporting text
2-718	A	51	26	51	27	"…climate change impact studies" -- AND ADAPTATION DECISIONS -- need to account for future changes in land use and land cover. (Eileen Shea, East-West Center)	Comment has been acted upon
2-719	A	51	33	51	33	As well as "feedbacks" (eg. response of vegetation to climate change exerting a further effect on climate change), land surface change can act as an additional FORCING of climate change (in addition to the radiative forcing of GHGs etc). It is important to be clear about the distinction between feedbacks and forcings (often "feedback" is used when "forcing" is more appropriate, ie: in the case of direct human-induced land cover change. There is some discussion of this in WG2 ch2. (Richard Betts, Met Office)	Comment has been acted upon ('feedback' has been changed to 'forcing')
2-720	A	51	45			explain the acronym IAMS (Marcel Marchand, Delft Hydraulics)	Comment has been acted upon
2-721	A	51	45			IAMS - write in full (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Comment has been acted upon
2-722	A	52	0			Ad 1: Thresholds and scoping The issue is now dealt with in more detail, an I have no more comments. Finally, sustainable consumption and production patterns are high on the UN/UNEP/UNDP agenda, but are not mentioned at all in the Chapter 2 draft as a a key uncertainty to be taken into account in modelling and in interpreting model results – as they are essential, as consumers and as voters, will they be covered somewhere else? One example regarding land use: The ATEAM estimates of future land use are based on the assumption of steadily increasing productivity in the agricultural sector, characterised as "assumptions that are difficult to validate" on p. 53. What is known, however, is the intention of the EU to increase the share of organic agriculture, up to 20% by 2020 (and some call for 50% by 2050). The	To discuss consumption/production at Vienna meeting ATEAM included an 'extensification' scenarios, which was their interpretation of B2. This (and 'organic production') is explicitly mentioned in the text.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						current average productivity in organic agriculture is 20% less than for conventional agriculture, leading to a decline which could overcompensate the expected productivity increases and thus reverse the scenario trends (this even holds true for 2050 if the expectations of seed companies to cut the productivity difference by half within the next two decades turn out to be realistic). Another example is the trend in meat consumption, determining much of the global food balance (although not the distribution issues currently responsible for hunger). (Joachim Spangenberg, Sustainable Europe Research Institute SERI)	
2-723	A	52	24	52	25	Is this bad or good or neither? Is sensitivity analysis preferred in this case or would scenarios or predictions provide a more useful treatment? (Justin Wettstein, University of Washington)	Comment has been acted upon
2-724	A	52	25			"rather than" instead of "than to" (Xiongwen Chen, Alabama A & M University)	Comment has been acted upon
2-725	A	52	42	52	42	Some sort of synthesizing statement would be good here. (Justin Wettstein, University of Washington)	Comment has been acted upon
2-726	A	52	44	53	30	Section 2.3.2 / 2.3.3: The GECAFS (global environmental change and food systems) exercise addresses the need for adaptation in regional-global scenarios (see www.gecafs.org). Approaches and outcomes should be included in the comprehensive examples of scenario exercies in this section (Thomas Henrich, N/A)	Addressed – this section has been rewritten. GECAFS can only be included if there is published literature available.
2-727	A	53	2			Replace "ecosystems" with "ecological systems" (Virginia Dale, Oak Ridge National Laboratory)	Not applicable – section rewritten and shortened.
2-728	A	53	7	53	9	The statements at the end of this paragraph seem incoherent to me. (Justin Wettstein, University of Washington)	Addressed – section rewritten and shortened.
2-729	A	53	11	53	17	With respect to technical change in the agricultural sector, the assumption more or less is that the sector has historically innovated and adapted, therefore it always will--even if the new adaptive technologies are unknown. (George Seielstad, University of North Dakota)	Addressed – this issue is discussed in the revised section.
2-730	A	53	19	53	30	Why try to find more appropriate ways of treating technological development? What makes one think knowledge of the technologies of 2050 and 2100 will improve? Anyone who dared to predict the technologies of the 20th century in 1900 would, in retrospect, look absurd. (George Seielstad, University of North Dakota)	Addressed – if technology is not treated, recent studies indicate that large errors are possible in analyses of potential impacts. So despite low predictive ability, we would argue that it is useful to study the sensitivity of future outcomes to possible technological changes, however uncertain.
2-731	A	53	19	53	30	Comment on the role of technology, GDP, population, land use--which drive what sectors or can't we say?	Addressed – we have tried to cover this within the constraints of the available literature.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Justin Wettstein, University of Washington)	
2-732	A	53	32	71		leave some of the details of the results out - refer to other sources (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Addressed – we have shortened the text and examples significantly.
2-733	A	53	35			Again, delete reference to surprises, in the context of events which we know to be potentially rapid, non-linear. (Geoff Jenkins, Met Office)	Addressed.
2-734	A	54	1		4	The THC is known to have undergone significant changes during past climate change. Some models produce behavior that appears to replicate past change better than others. This may have implications for their ability to represent potential future change. I'm not up on the current state of this research, but I believe it would be worth mentioning here. (Evelyn Wright, N/A)	Not included explicitly due to space constraints, but dealt with in references, particularly to NAS study.
2-735	A	54	6	54	19	Is continued "global warming" the most important consideration? What about the stability of the thermohaline circulation shutdown? Most models I know of seem to show a re-initiation fo the THC after some time (though the time it is "shut down" may still be significant). Does this affect any of the conclusions? (Justin Wettstein, University of Washington)	The impacts of a re-initiation have not been investigated in the literature.
2-736	A	54	8	54	13	Mention potential of Greenland ice sheet melt (Rachel Warren, School of Environmental Sciences)	This is mentioned on line 27 of FOD and retained in SOD.
2-737	A	54	17			"…..but not to offset it GLOBALLY entirely. It can offset it, and indeed reverse it, locally." (Geoff Jenkins, Met Office)	Addressed.
2-738	A	54	25	54	25	And what are the results / conclusion of these approaches? (Justin Wettstein, University of Washington)	Text removed. Results of recent approaches have been made more explicit.
2-739	A	54	27	54	27	Maybe this is a nuisance comment, but what kind of models show what kind of deglaciation rates? Is there some reference to WG I which can help sort out the discrepancy between ____ models and the recent observations cited? (Justin Wettstein, University of Washington)	Addressed, reference to WGI added.
2-740	A	54	34			Please provide here the definition of “unlikely” (Ha-Duong Minh, CNRS)	Uses definitions in IPCC Uncertainty guidance.
2-741	A	54	39	54	49	There is sometimes in this chapter a seeming disconnect in the apparent willingness to accept scenarios / thought experiments depending on whether they originate on the "climate" or "society" side. Again, it would be best if the chapter could be clear about the distinguishing characteristics of believability are. (Justin Wettstein, University of Washington)	Plausibility now discussed in 2.2.2.1

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-742	A	55	15	71	50	Section 2.3.3: This section is at the heart of the 'Characterising the Future' section. It would benefit from following the 'cascade of uncertainty' addressed earlier. Also, it would be useful, pick up the DPSIR scheme as an organising prinicple (DPSIR - Driving Forces, Pressures, State, Impacts, Responses - For more information see European Environment Agency publications), and give an overview of the key drivers and uncertainties with regard to CCIAV. (Thomas Henrich, N/A)	Addressed, but in the new methods section 2.2.2. DPSIR is described in the section on the "natural hazards" approach in the introduction (section 2.1.1.3). This is only one approach, however, so we cannot adopt this as a general organising principle here.
2-743	A	55	17	53	33	Repeats earlier words - needs to be linked to earlier sections better. (Virginia Dale, Oak Ridge National Laboratory)	Addressed – this section on SRES is now separated from the "methods" section, 2.2.2.
2-744	A	55	35	55	37	As pointed out later SRES are not internally consistent and there is no feedback between impacts and the economy. Make clear that advantage of using SRES is that many different groups of researchers can analyse the implications for climate change and resultant impacts. (Rachel Warren, School of Environmental Sciences)	Addressed
2-745	A	55	41	55	42	Section 2.3.3: The notion of 'scenarios that encompass the full range of socio-economic and environmental changes' is somewhat misleading. It would be better to replace 'the full range' with 'a wide range'. (Thomas Henrich, N/A)	Addressed
2-746	A	55	42	55	45	Does downscaling reduce this inconsistency? (Justin Wettstein, University of Washington)	Addressed – the next paragraph discusses the subjectivity involved.
2-747	A	56	6	56	6	Please reword this line (Rachel Warren, School of Environmental Sciences)	Addressed
2-748	A	56	8	56	8	How well is consistency assured? What measures of scenario consistency are employed and how are they evaluated? (Justin Wettstein, University of Washington)	Addressed in earlier section on methods, 2.2.2
2-749	A	56	16	56	17	use of "status" unclear. Refer back to discussion earlier re pros and cons of putting probabilities on SRES (Rachel Warren, School of Environmental Sciences)	Text removed.
2-750	A	56	21	56	36	This paragraph refers to many studies "in preparation". It missed Fisher, Jakeman et al. (submitted), who argue that the SRES population projections are too low. (Richard S.J. Tol, Uni. Hamburg)	Studies cited are now submitted or in press. Fisher et al. citation added.
2-751	A	56	21	56	36	Cross reference WGIII Ch 3 (Rachel Warren, School of Environmental Sciences)	Addressed.
2-752	A	56	29	56	36	So, what is the suggestion for the changed pdf of population estimates? Compare this discussion with the discussion of climate uncertainty. Are the approaches to the uncertainty in each consistent? (Justin Wettstein, University of Washington)	There is no suggested population pdf. This sections reports on new projections in the literature as compared to SRES assumptions.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-753	A	56	32	56	36	These changes occurred with only a few years between reports. That shakes confidence in longer scenarios and emphasizes the need for basic models and scenarios, not intricately detailed ones. (George Seielstad, University of North Dakota)	No response needed.
2-754	A	57	1	57	11	the text on PPP and MER illustrates my point in General Comments above about the need for clarity in identifying issues. Perhaps the answer to my concern is that it is properly addressed in WG III Chapter3. (Ian Burton, University of Toronto)	PPP/MER is much more fully addressed in WG3, and we have made clearer the pointer to that material.
2-755	A	57	4	57	11	It is interesting that you know what a yet-to-be-reviewed chapter in the WG3 report will conclude. No one has argued that the effect of switching from MER to PPP is small. People have argued that the effect is small FOR EMISSIONS. The economic effects are not at all small. See Tol (in press), Exchanges rates and climate change, Climatic Change. (Richard S.J. Tol, Uni. Hamburg)	Text was written by a WG3, Ch. 3 lead author and was consistent with that chapter's then-current version in our FOD, and remains consistent with it in the SOD.
2-756	A	57	6	57	9	Some citations and a more complete description of the arguments might be useful here. (Justin Wettstein, University of Washington)	Addressed.
2-757	A	57	15	57	33	I don't have a good knowledge of the literature in this area, but I'm aware that it is attracting considerable discussion. Isn't the issue that any one scenario-conditional precise emissions trajectory has a probability that approaches zero (because there are a very large number of possible emissions trajectories)? If this is the case saying one scenario is relatively more likely than another is essentially meaningless (since all Probs approx 0!) . Meaningful subjective probabilities could be associated with the difference in emissions between a pair of scenarios (more simply if these form a consistent rank order), or as the probability that emissions would exceed (or not exceed) the modal value indicated by the scenario. Or a scenario could encompass a range of emissions values that includes the modal or median value. If different scenarios have overlapping ranges of emissions, the naive sum of probabilities across all scenarios would >1. If each scenario only covers a discrete range of potential emisions values, the naive sum of probabilities across scenarios would <1 (but, by design, >>0). I suspect that to achieve emissions scenarios with attached subjective probabilities requires a more structured approach to generating the underlying scenarios in the first place. (Robert Willows, UK Environment Agency)	It is true that an individual scenario will have a probability of zero, but its probability density (which is what is described in a pdf) need not be zero. That is, the probability of emissions falling within an interval containing a given scenario is not zero, and this is what is meant (usually implicitly) when probabilistic projections are produced.
2-758	A	57	17	57	17	What are the scenarios conditional upon? (Rachel Warren, School of Environmental Sciences)	Addressed by explaining they are conditional on a given storyline (in this case).

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-759	A	57	19			rewrite (Xiongwen Chen, Alabama A & M University)	Addressed.
2-760	A	57	20			rewrite (Xiongwen Chen, Alabama A & M University)	Addressed.
2-761	A	57	23	57	33	Still struck by these repeated discussions of analyses, but with none of their results presented. (George Seielstad, University of North Dakota)	Revised to highlight new insights.
2-762	A	57	26	57	26	Remove comma (Rachel Warren, School of Environmental Sciences)	Addressed.
2-763	A	57	27			Same point as comment 10; SRES say the emissions scenarios are NOT equally likely. (Geoff Jenkins, Met Office)	Addressed.
2-764	A	57	32	57	33	There is also some work towards probabilistic concetration scenarios (as distinct from emissions scenarios, because of a recognition that feedbacks in the climate system mean that a given emissions trajectory does not result in a unique trajectory of concentrations. See the C4MIP work (Friedlingstein et al, accepted by Climate Dynamics). (Richard Betts, Met Office)	Addressed – we have added this information and reference.
2-765	A	57	35			The BESEECH project has been developing socio-economic scenarios at a sub-UK level and also investgating adaptive capacity under different socio-economic conditions. Contact Kristina Dahlstrom (k.dahlstrom@psi.org.uk) who can provide a copy of their report. (Richenda Connell, Acclimatise)	Addressed – contact to be made, but no publications found in a web search.
2-766	A	57	38	57	39	I would argue that we need to do more than "characterize potential adaptive responses" and that we need adaptation scenarios. This means scenarios of the adaptation process. The term "adaptation scenarios" is incorrectly used in the literature to refer to climate scenarios for adaptation. (Ian Burton, University of Toronto)	Addressed – the point is now raised as a gap in knowledge in the final section.
2-767	A	57	42			Hijioka et al (2002) used the narrative description of SRES worlds in conjunction with the quantitative scenarios (GDP/capita) for assuming the future change in the access to safe water in their study which estimated diarrheal incidence per capita under climate change. (Hijioka, Y., K. Takahashi, Y. Matsuoka, H. Harasawa, 2002. Impact of global warming on waterborne diseases. Journal of Japan society on Water Environment, 25, pp.647-652.) (Kiyoshi Takahashi, National Institute for Environmental Studies)	Addressed – this reference is now included, thanks. Need to check the regional scope.
2-768	A	57	42	57	42	Don't need Tim's Christian name	Addressed – reference deleted

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Rachel Warren, School of Environmental Sciences)	
2-769	A	58	1	58	50	Add table for SRES results that matches Figure 2.6 (Rachel Warren, School of Environmental Sciences)	Addressed – the discussion of the fast track studies has been severely shortened
2-770	A	58	4	58	9	I would just like to offer strong reinforcement for the authors' decision to highlight this very important problem associated with downscaling assumptions about protection strategies from SRES macro-regions to the country level. (Eileen Shea, East-West Center)	No action required
2-771	A	58	25	58	28	I think this statement is too definite, saying "they found the dominant factors … will be .." This is just one study using one set of scenarios. Climate change could have major effects on biodiversity in the tropics, eg: some GCMs suggest drying of Amazonian climate (Cox et al 2004, Betts et al 2004, both in Theoretical and Appplied Climatology). In some cases, synergisms between land use and climate may be important, rather than one verus the other (eg: forest fires in Indonesian region in 1997 - human-ignited fires become out of control due to the climatic conditions in El Nino event). (Richard Betts, Met Office)	Addressed – paragraph was deleted (already mentioned in TAR).
2-772	A	58	31	60	35	Section 2.3.3.3: This section focusses mostly on land cover changes in Europe. This is rather specific and could be shortened, or moved to Chapter 12 altogether. (Thomas Henrich, N/A)	The section will be edited down to highlight the main new knowledge. The focus on Europe is an accurate reflection of the literature, which has a European bias
2-773	A	58	36	58	37	"Grassland" means natural grassland? Grassland come from loss of forests by carbon cycle feedback? Or agricultural pasture? (Rachel Warren, School of Environmental Sciences)	Grassland includes all types
2-774	A	58	40	58	45	Useful pgph (Rachel Warren, School of Environmental Sciences)	No action required
2-775	A	59	1	59	2	It is not clear what the different thicknesses of the lines represents. (Richard Betts, Met Office)	The figure has now been removed
2-776	A	59	1	59	4	These scenarios span enormous ranges. Even the sign of change is not known. I don't know what readers are expected to grasp. (George Seielstad, University of North Dakota)	The figure has now been removed
2-777	A	59	2			Legend does not relate to multiple lines in figures (Virginia Dale, Oak Ridge National Laboratory)	The figure has now been removed
2-778	A	60	11	60	11	Explanation or refs needed for GTAP and IMAGE (Rachel Warren, School of Environmental Sciences)	Comment has been acted upon
2-779	A	60	26	60	27	The world's population will continue to grow until at least 2050 and more people in the rapidly developing countries of Asia are enjoying richer diets. The result is the need for 1.5-2 times more food needed by 2030. It is difficult to imagine why	The details of the appropriate assumptions are discussed in the cited literature. These results are not surprising is one considers that

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						agricultural land abandonment is expected. Is that true only for Europe? What is the global expectation? (George Seielstad, University of North Dakota)	agricultural land abandonment has occurred in Europe over the past 50 years, inspite of increases in global population and food demand. It is not possible to generalise from the European to the global context, although global scenarios are discussed.
2-780	A	60	39	62	10	Presumably other intercomparisons based on CMIP with "AR4 models" will be added? (Geoff Jenkins, Met Office)	Addressed – these have been added.
2-781	A	60	43	60	49	Per comment #4, I would like to again encourage the authors to consider whether they would like to expand the Executive Summary discussion of SRES Scenarios to include the discussion in Section 2.2.3.4 (page 60) highlighting the need to address not just temperature changes but also changes in other "key climate variables to which natural and human systems are exposed." (Eileen Shea, East-West Center)	Addressed – this is now included in the Executive Summary.
2-782	A	60	44	60	48	This is a good discussion of the requirements for the analyses. (Justin Wettstein, University of Washington)	No action required
2-783	A	60	45	60	49	Strong points that need is for regional projects of CC, better temporal resolution, and more emphasis on changes in variability and extreme occurrences than on changes in the mean. (George Seielstad, University of North Dakota)	No action required
2-784	A	61	9	61	9	Earth system models are models of intermediate complexity and are not GCMs (Rachel Warren, School of Environmental Sciences)	Addressed – term is now omitted.
2-785	A	61	12	61	12	also land surface forcings as well as feedbacks (direct human land use which is a forcing, as opposed to vegetation responses to climate change which are feedbacks). At least one of the models (IMAGE) used to generate the SRES emissions scenarios have also been used to produce spatially-explicit land cover change scenarios consistent with the emissions, and these have been used as forcings in at least one GCM study reviewed by WG1 (HadGEM1) (Richard Betts, Met Office)	Addressed – text revised.
2-786	A	61	26	61	27	Presumably this diagram will be repeated from WGI which is a good thing (Rachel Warren, School of Environmental Sciences)	Addressed – Table has been prepared.
2-787	A	61	35	61	42	Would it be useful to cite all "fundamental" changes anticipated in climate change? Such as: 1) more land warming than ocean warming, 2) more warming at night, 3) more warming at high latitudes, 4) more warming at elevation. (Justin Wettstein, University of Washington)	Not applicable. The descriptions in then text are specific to those reported for the TAR and summarised in the scatter plots and Table.
2-788	A	61	42	61	42	What are the relative magnitudes (either quantitative or qualitative) resultant from	Addressed – summarised in Table.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						the models? (Justin Wettstein, University of Washington)	
2-789	A	61	45			"indicated" instead of "simulate" (Xiongwen Chen, Alabama A & M University)	Not applicable.
2-790	A	62	2	62	2	This summary seems more worthy of a table or figure than Figure 2.8--or maybe the two could be combined? (Justin Wettstein, University of Washington)	Addressed as requested.
2-791	A	62	12	62	19	There are a few difficulties with this paragraph. One is that fixed boundary condition models of low-order AGCM's will likely give you substantially different (and maybe less correct) results in general. Second, this is nitpicky, but I think it might be clearer and more correct to say "use the results of the GCM as boundary conditions for the RCM..." One way around some of these difficulties is to explain a path for future work that would help alleviate these inconsistencies / difficulties. (Justin Wettstein, University of Washington)	First point is not applicable as it offers an opinion, and doesn't affect the message of the paragraph. Second point has been addressed.
2-792	A	62	15		19	Isn't this mainly a repeat of page 42 line 33? (Geoff Jenkins, Met Office)	Addressed – we have elimitaed the repetition.
2-793	A	62	21	62	31	These two paragraphs could be reworded and merged to link more smoothly with the rest of the section. (Marie Ekström, University of East Anglia)	Addressed.
2-794	A	62	21	62	26	A suggestion of reference (if you are interested I can provide you with a copy of this paper): This reference would be useful in this section, it was submitted by Malcolm Haylock (CRU) to IJC in September 2005. *Haylock, M., Cawley, G.C., Harpman, C., Wilby, R.L. and Goodess, C.M., 2005. Downscaling heavy precipitation over the UK: a comparison of dynamical and statistical methods and their future scenarios. International Journal of Climatology. Submitted (Marie Ekström, University of East Anglia)	Addressed and reference added
2-795	A	62	25			Goodess (2003) (Goodess, Osborne and Hulme) actually concluded (in addition) that "Validation against observed data supports the use of HadRM3 rather than SDSM or HadCM3 (which both overestimate persistence, for example)", and "For time periods for which HadRM3 output is available…this is the preferred approach". For a fairer representation of her work, these comments should be reflected. (Geoff Jenkins, Met Office)	Addressed.
2-796	A	62	26	62	26	This is another opportunity to discuss the relevance of differences in statistical vs. dynamical downscaling. (Justin Wettstein, University of Washington)	Not applicable here. This is discussed briefly in Section 2.2.2 and in detail in WG I, chapter 11.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-797	A	63	2	63	8	This may not be the most appropriate place for this paragraph, perhaps move it to an earlier part of section 2.3, e.g. last under section 2.3.2 (page 38 row 31)? (Marie Ekström, University of East Anglia)	Not applicable. We considered following this suggestion, but feel that the position at the end of this sub-section is more appropriate.
2-798	A	63	24			Comment on Table 2.7. I would re=label the last column as "Examples of projected impact", and add a column that would provide past trends, if any, over a suitable length of time, so the reade has an idea whether those trends match projected trends. Of course, it is possible that the direction of change may vary if one projects to 2100 instead of, say, 2050. Despite that complication, it would really serve the reader well to know whether recent trends are in-line (or not) with projected trends. (Indur Goklany, Office of Policy Analysis, Department of the Interior)	Not applicable – Table has been revised in WG I, chapter 11 and is not now presented here. Observed trends have not been incorporated in the Chapter 11 table, but may be combined for the WG I Technical Summary and SPM. Not yet available to WG II authors.
2-799	A	63	24	64	1	What do maxTmax and mxTmin mean? This is a very important table, yet it gives no reference to the actual projections. Don't you have to read the WGI report before proceeding? Also, it is "tropical storms" and not "tropic storms." I suggest much more involvement from climate scientists in this chapter. (Alan Robock, Rutgers University)	Not applicable – Table deleted
2-800	A	63	24	64	1	Table 2.7 is an excellent summary. It needs to be elevated to a more prominent position. (George Seielstad, University of North Dakota)	Not applicable – Table deleted
2-801	A	63	24			Table 2.7: This has the looks of a very good summary table! (Justin Wettstein, University of Washington)	Not applicable – Table deleted
2-802	A	63	25			Table 2.7 "??" (Xiongwen Chen, Alabama A & M University)	Not applicable – Table deleted
2-803	A	64	25	64	31	Sentence is too long! (Virginia Dale, Oak Ridge National Laboratory)	Addressed
2-804	A	65	23	65	44	Add that SRES hasn't allowed for changes in aerosol concentration - or perhaps some model interpretations of SRES may have done so - comment on situation in literature. This may be a WGI issue of course. (Rachel Warren, School of Environmental Sciences)	Addressed – for the Finnish case
2-805	A	65	39	65	44	Changes in CO2 may also affect hydrology via the vegetation responses which affect transpiration and soil moisture (Wigley and Jones, 1985, Nature; also Gedney et al, Betts et al, both submitted to Nature - I can supply to TSU). (Richard Betts, Met Office)	Addressed – text revised and references added
2-806	A	65	44	65	44	What is the relative role of changes in "natural" versus "anthropogenic" influences on the carbon cycle in this paragraph? (Justin Wettstein, University of Washington)	Not applicable – this is a WG I issue. Text has been re-ordered to indicate this.
2-807	A	65	46	67	37	Last repeat of my frustration at reading a comprehensive listing of references to	Addressed – this and other sections have been

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						work done but not many results of the work nor prioritization of which of the approaches was most useful. (George Seielstad, University of North Dakota)	shortened in order to extract key messages.
2-808	A	66	5			Difficult to discern different types of lines in figure (Virginia Dale, Oak Ridge National Laboratory)	Addressed – Figure deleted to conserve space.
2-809	A	66	7	66		Figure 2.9 is too specific and should be omitted in order to reduce the lengh of the chapter. (Silvina Solman, CONICET)	Addressed – Figure deleted
2-810	A	67	27	67	35	In lines 27 and 35 these is partial duplication on explaning the FINSKEN results (Rachel Warren, School of Environmental Sciences)	Addressed – explanation has been shortened substantially
2-811	A	67	40			To my knowledge, Nicholls and Lowe and Tol (forthcoming, Environment and Development Economics; forthcoming, Environmental Science and Policy; forthcoming, Mitigation and Adaptation Strategies for Global Change) are the only studies that estimate the benefits of emission reduction. They are not mentioned, though. (Richard S.J. Tol, Uni. Hamburg)	Addressed: references included in section on "Policy Benefits" under 2.2.3.
2-812	A	67	50	68	20	On page 67 the same list of assessments are possible for global mitigation as are listed on page 25 for adaptive policies. Cost benefit analysis, as I comment above, may be more subjective than MCA or cost-effectiveness analysis and hence all are important. Use of CBA alone would be very dangerous. Hence a combination of methods, including CBA, needs to be used. THe problems with CBA are extensively mentioned in WGIII Ch 3 so could cross reference here. For global mitigation all these methods are integrated assessment model driven, so this could be linked to my suggested section on IA methodology or cross referenced to where this is done in WGIII. Also would help with suggested explanation needed of IMAGE model. On page 68 the pgph mentioning work by Richels and EMF21 goes some way to describing IA so this should be related back to the methodological section also. Note that the economic optimisation models commonly used in EMF21 are only one kind of IA, which can also include scenario analysis with IMAGE and the tolerable windows approach. You could go on to say here that a risk assessment framework is highly suitable for analysis of global migtigation policy as well as CCIAV but this might be outside the scope of this chapter I don't know. (Rachel Warren, School of Environmental Sciences)	Some of the text referred to here has been removed. Only a very basic typology of mitigation scenarios is given. IA models are covered in a new section on integrated assessment. However the reference to WG3 Ch 3 is meant to direct readers there for more details, since this material in this section of Ch2 is simply to provide a little context for the climate change information associated with mitigation scenarios.
2-813	A	68	7	68	20	There is a valid point here, but what is the major effect of the policies? Is the impact described here of primary or secondary importance and under what conditions? Is it acceptable in some circumstances to focus on the mitigation	Comment is unclear, since the text explicitly states that the aim of the policies in mitigation scenarios is to reduce greenhouse gases.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						aspects of the policy? (Justin Wettstein, University of Washington)	
2-814	A	69	8	69	9	Emphasise that this means that mitigation is required to reach a 450 ppm scenario for any of the SRES futures. (Rachel Warren, School of Environmental Sciences)	Addressed
2-815	A	69	10	69	35	In Figure 2.10 which simple model was used, and why are there no uncertainty ranges? (Rachel Warren, School of Environmental Sciences)	Addressed – this figure is from the TAR and has been omitted.
2-816	A	69	10		43	More evidence is needed to support Figure 2.10 (Yinlong Xu, Chinese Academy of Agricultural Sciences)	Addressed – this figure is from the TAR and has been omitted.
2-817	A	69	12	69	43	Be sure the range of temperature changes expected by 2100 match what IPCC projected. These changes seem smaller. (George Seielstad, University of North Dakota)	Addressed – this figure is from the TAR and has been omitted.
2-818	A	70	7			"impact" instead of "impacts" (Xiongwen Chen, Alabama A & M University)	Done: "to a particular impact"
2-819	A	70	14	70	16	The meaning of Table 2.8 is not obvious. (George Seielstad, University of North Dakota)	Addressed – we have attempted to clarify the Table.
2-820	A	70	14	70	20	Table 2.8: this may be in the literature, but how different would it look for different strengths of carbon cycle feedback? This is as important as the climate sensitivity in determining whether stabilisation is achieved or not. Also, the potential for big transition from forest to grassland, and release of methan clathrates (non-linear changes) might mean that these SRES scenarios would not stabilise. (Rachel Warren, School of Environmental Sciences)	Not applicable – we cannot add information that is not available in the literature. We may add a caveat.
2-821	A	70	14	70	15	Suggest to add stabilisation targets in units of CO2 equivalent to this table to aid comparison. (Rachel Warren, School of Environmental Sciences)	Could be done − to investigate
2-822	A	70	39	71	2	Suggest provide a cross reference to Box 2.4 and Fig 2.6, which expressly considers impacts under emissions leading to stabilisation of climate. (Geoff Jenkins, Met Office)	Addressed – these are now cross-referenced and shortened
2-823	A	71	1	71	3	There is some repetition here with earlier accounts of Fast Track (Rachel Warren, School of Environmental Sciences)	Addressed – these are now cross-referenced and shortened
2-824	A	71	15			"combined" instead of "combine" (Xiongwen Chen, Alabama A & M University)	Addressed
2-825	A	71	20	71	23	Very good aggregation and simplification of the message. (Justin Wettstein, University of Washington)	No action required
2-826	A	71	28	71	31	Why would this be considered an important shortcoming when recent studies (e.g., Wigley, 2005) show we are already committed to a 1C increase?	Addressed – text has been revised

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Susan Joy Hassol, Independent Scholar)	
2-827	A	71	34	71	50	Section 2.3.5: This section is too short to be meaningful and focusses only on land use change in Europe. Either this should be expanded to a lenghty discussion about a more comprehensive set of insight of the SRES scenarios, or deleted altogether. (Thomas Henrich, N/A)	Addressed – this section has been merged with other scenario methods in section 2.2.2.
2-828	A	71	34	71	50	Section 2.3.5 should highlight the main advances reached by application of new scenarios. It should be enlarged and should summarize more results (if available) applied to several impacts in several regions. (Silvina Solman, CONICET)	Addressed – this section has been merged with other scenario methods in section 2.2.2.
2-829	A	71	34	71	50	Heading is "new" scenarios and then talk about SRES which are not new. The insights are actually only one detailed insight regarding LUC. There would be key insights about the levels of stabilisation needed to prevent certain impacts, although this will overlap with WGII Ch 19 no doubt. "insights" however implies a similar outcome to Ch 19 and clearly that is not wanted in this chapter. (Rachel Warren, School of Environmental Sciences)	Addressed – this section has been merged with other scenario methods in section 2.2.2.
2-830	A	71	36		49	Section 2.3.5 As currently written, this is not a section, it's a one paragraph description of a single study. The section title promises much. If there's more to say on this subject, the section should be expanded. If not, it should be deleted and the description of the study moved somewhere else in the chapter. (Evelyn Wright, N/A)	Addressed – this section has been merged with other scenario methods in section 2.2.2.
2-831	A	71	39	71	46	Again, I state surpise that the area of ag land is expected to decline substantially. (George Seielstad, University of North Dakota)	No action required
2-832	A	72	0			It would be good to see discussion of the need for more integrated approaches which allow for feedbacks from "impacts" to climate (eg: from ecosystems and hydrology via the carbon and water cycles), and which allows for synergisms between impacts sectors (most impacts studies are still isolated from each other, but there can be significant interactions eg: vegetation responses to climate and CO2 affecting hydrology). It was also be good to discuss the important of designing GCM and RCM experiments with impacts in mind when setting up the driving data for these "top-down" studies. Land use change is often neglected because it is not considered important at the global scale so is oten not of interest to global modellers who are interested in global mean temperature change, but if it is important at the regional scale (which seems likely) then it should be included in models used for impacts studies (both in the RCMs, used directly as inout to impacts models, and in the GCMs which supply boundary conditions to the RCMs). Some studies are beginning to do this but it is not yet common practice. (Richard Betts, Met Office)	Addressed – the final part of section 2.2.2.3 is now titled integrating scenarios and includes these issues among others.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-833	A	72	0			Another suggestion for further research: explore more deeply how scenarios (in which uncertainty is inherently embedded) are used by stakeholders, what constraints may come into play when using them for decision-making (UKCIP have some experience of this) and how they can be coupled with other tools to drive mitigation / adaptation and behavioural change (Irene Lorenzoni, University of East Anglia)	Addressed in revised section
2-834	A	72	3			This section is good as developed so far -- an excellent start on articulating future needs identified in the literature. (Elizabeth Malone, Joint Global Change Research Institute)	No action required
2-835	A	72	5		16	What real-world planners really, really want is a single reliable prediction of climate change, at unrealistically high spatial and temporal scales. However, they recognise that model uncertainty is large, and appreciate that, in many applications, they are going to have to use probabilistic predictions to prepare risk-based assessments of impacts and adaptation responses. (Geoff Jenkins, Met Office)	Addressed – we have added a refined discussion of needs for climate information
2-836	A	72	7			Modify the sentence starting with "Climate change…" as follows: "Regardless of its cause, climate change is underway…" (Indur Goklany, Office of Policy Analysis, Department of the Interior)	Not applicable – this caveat is unnecessary as the message of currently changing climate is clear and unambiguous from WG I. It's cause is not mentioned here, so why press the point?
2-837	A	72	8	72	9	Are there really clear demands from the policy community on CCIAV analysts or is it supply-led? (Merylyn McKenzie Hedger, Environment Agency)	Addressed – we have revised the sentence to offer a more neutral stance
2-838	A	72	10			"high" instead of "good" (Xiongwen Chen, Alabama A & M University)	Not applicable – good is sufficient as an adjective
2-839	A	72	10	72	10	In addition to good quality information on what impacts are occurring now, there is a need to assess which regions and groups are most affected by these impacts. (Karen O'Brien, University of Oslo)	Addressed – these have been added
2-840	A	72	10		16	EXCELLENT STUFF (James O'Brien, Florida State University)	No action required
2-841	A	72	10	72	10	I think it's important here to emphasize that we need good quality information not only about current climate processes and impacts but also about what adaptation measures are already being applied and how information about climate variability and change is -- or is not -- being used to support risk management, decision-making and policy formulation. (Eileen Shea, East-West Center)	Addressed – we have modified the fourth bullet point on adaptation. The issue of whether climate information is being appropriately applied to support risk management belongs elsewhere, probably in the methods sections.
2-842	A	72	11			Modify this bullet as follows: "Reliable estimates of impacts to be expected due to current climate variability and probable changes in climate."	Addressed – bullet has been modified

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Indur Goklany, Office of Policy Analysis, Department of the Interior)	
2-843	A	72	14	72	14	Shouldn't mitigation be considered here as well as adaptation? (Risk treatment) (Rachel Warren, School of Environmental Sciences)	Addressed in the final bullet point
2-844	A	72	18	72	49	What about more focus on local and regional assessments? (Virginia Dale, Oak Ridge National Laboratory)	Addressed – we have added some text on this
2-845	A	72	20			Ahead of any of these bullets, I would put "Better predictions of future climate change, at high spatial and temporal resolution, requiring a vastly improved understanding of the climate system (via theoretical and, especially, observational approaches) and the accellerated development of climate models" (Geoff Jenkins, Met Office)	Addressed – contrary to this opinion, better predictions of future climate change, while important, are not commonly regarded as the highest priority for future CCIAV analysis. The point has been added, but not up front.
2-846	A	72	20	72	23	Some statement of the relative importance would be helpful. (Justin Wettstein, University of Washington)	Addressed – the order of these points will be reconsidered, but we may not be explicit about assigning relative importance, as this is inevitably subjective and probably controversial.
2-847	A	72	23	72	23	Add the inconsistency of SRES that the effects of climate change impacts upon the economy is not included (Rachel Warren, School of Environmental Sciences)	Addressed – bullet point has been modified.
2-848	A	72	30	72	30	Unitalicise "one of these" (Rachel Warren, School of Environmental Sciences)	Addressed
2-849	A	72	33	72	34	The communication of results to policy makers--and to the public--is the best strategy for triggering mitigation. This chapter is not a good example of communicating to those audiences. It communicates only with fellow experts. (George Seielstad, University of North Dakota)	Addressed – "the public" have been added. Otherwise, we seek to improve our performance in this second-order draft!
2-850	A	72	33	72	34	See Comment 5 (John Turnpenny, Tyndall Centre for Climate Change Research, and School of Environmental Sciences, University of East Anglia)	Unclear – this comment may refer to the use and manipulation of research for political ends. Noted but no action taken.
2-851	A	72	35	72	41	No doubt cross-sectoral assessments are more realistic than single-sector ones. But getting realistic cross-sectoral assessments may be a wish not likely to be realized. Not because good people don't work diligently and cleverly rather because no degree of diligence overcomes fundamental uncertainties--in future technologies, feedback from adaptations, human behavior, and more. (George Seielstad, University of North Dakota)	Addressed – the reviewer may be justified in highlighting the difficulties, but his pessimism should not be used as a reason to overlook this acknowledged deficiency in analysis.
2-852	A	72	42	72	49	This paragraph seems to conflate "traditional knowledge" with "empirical knowledge from past experience" with climate-related events such as droughts or floods to help inform adaptation. I really think these are two separate though equally important points: (1) local knowledge, including traditional knowledge	Addressed – this bullet has now been split into two points, as suggested.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						from indigenous populations; and (2) knowledge/insights being gained from experience dealing with past and current climate-related (extreme) events. The first is perhaps appropriately contrasted with "modern/formal science" methods but the documentation of the second is coming from modern/formal science as well as traditional knowledge. Another key point here is to note that traditional ways of learning and knowing can be just as formal in terms of the processes of observation and interpretation; as some of my Samoan colleagues reminded me in a recent Training Institute on Climate and Extreme Events -- it's not science versus traditional knowledge but, more appropriately, modern science versus traditional science. (Eileen Shea, East-West Center)	
2-853	A	72	50			I would add a new bullet that would address the need for improving methods to estimate changes in adaptive capacity over time as a function of its various determinants (Goklany 2005b). (Indur Goklany, Office of Policy Analysis, Department of the Interior)	Addressed – a new bullet point has been added on adaptation
2-854	A	73	7	73	7	the full citation for the ACIA synthesis report is as follows: ACIA, 2004, Impacts of a Warming Arctic: Arctic Climate Impact Assessment. Cambridge University Press. Also, FYI, both the synthesis report and the full scientific report are available on line at www.acia.uaf.edu (Susan Joy Hassol, Independent Scholar)	Addressed
2-855	A	73	18			"of" instead of "Of" (Xiongwen Chen, Alabama A & M University)	Addressed
2-856	A	73	19			The correct reference for the publication refered to as "Alcamo, 2001" is the following: "EEA - European Environment Agency, 2001. Scenarios as a tool for international environmental assessments. Environmental Issues Report No 24. European Environment Agency, Copenhagen." Please replace. (Thomas Henrich, N/A)	Addressed
2-857	A	73	23			journal abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-858	A	73	41			journal abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-859	A	73		92		THERE ARE NUMEROUS REFS TO PAPERS ON A WEB SITE FOR A MEETING IN BUENOS AIRES, THESE ARE NOT REFEREEDED PAPERS AND MANY DO NOT RELATE DIRECTLY TO GLOBAL WARMING. I SUGGEST REMOVING THEM ALL (James O'Brien, Florida State University)	Addressed – non-published and non-directly relevant references have been removed.
2-860	A	74	16			"of" instead of "Of"	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Xiongwen Chen, Alabama A & M University)	
2-861	A	74	21			"and" instead of "And" (Xiongwen Chen, Alabama A & M University)	Addressed
2-862	A	74	28			"and" instead of "And" (Xiongwen Chen, Alabama A & M University)	Addressed
2-863	A	75	47			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed – deleted
2-864	A	75	50			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-865	A	76	28			Correct referencing Dutch names such as de Nijs is: Nijs, de (Marcel Marchand, Delft Hydraulics)	Addressed – we will pass on this advice, but for the present we will stick to the style recommended for the report as a whole.
2-866	A	76	29,42			"of" instead of "Of" (Xiongwen Chen, Alabama A & M University)	Addressed
2-867	A	76	3,22,27			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed – deleted and replaced
2-868	A	77	3			"of" instead of "Of" (Xiongwen Chen, Alabama A & M University)	Addressed
2-869	A	78	1			"and" instead of "And" (Xiongwen Chen, Alabama A & M University)	Addressed
2-870	A	78	11			abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-871	A	78	32			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-872	A	79	37			abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-873	A	79	38			abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-874	A	79	45			abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-875	A	80	8			abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-876	A	80	42			abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-877	A	80	46			abbreviation (Xiongwen Chen, Alabama A & M University)	Addressed
2-878	A	81	9			incompleted references	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Xiongwen Chen, Alabama A & M University)	
2-879	A	81	22			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed – deleted
2-880	A	81	38			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-881	A	81	49			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-882	A	82	3			"modelling" instead of "modeling" (Xiongwen Chen, Alabama A & M University)	Addressed
2-883	A	82	8			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-884	A	82	16			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-885	A	82	24			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-886	A	82	41			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-887	A	82	48			incompleted references (Xiongwen Chen, Alabama A & M University)	Addressed
2-888	A	91	34			ref details missing (Geoffrey Levermore, Manchester University)	Addressed
2-889	B	0				The climate change impact, adaptation and vulnerability (CCIAV) assessment methods are described in Chapter 2. "Bottom-up" methods are explained and I expected to see some results based on that approach in the ensuing chapters. However, I did not find any explicit results from bottom-up CCIAV assessment in them. Maybe I overlooked that. Perhaps results based on that method could be emphasized. The chapter describes the progress made since TAR on a range of assessment methodologies of climate change impact, adaptation and vulnerability (CCIAV). Some examples of results are given (cfr section 2.2.2). Details of results from CCIAV assessments appear in other chapters. However, Chapter 2 could contain a summarized overview of the results from CCIAV assessments worldwide. This has not been done or it is perhaps missing. However, I'm not sure that it is technically possible as the geographic distribution of impacts is very large and the number of impacts to be mentioned is equally large. (Philippe Tulkens, TERI)	Addressed – we have indicated some examples where such approaches are to be found elsewhere in the report. Not applicable – this is a task for the AR4 as a whole, and particularly the Summary for Policy Makers.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-890	B	2	1			Section executive summary. I feel that the executive summary misses some key messages that appear in the chapter text. The text should be revisited in order to extract from it more key messages and more policy-relevant ones. P. 72. L 33 emphasizes the need for effective communication results to policy makers. Making the executive summary of this chapter more focused may be a good exercise for effective communication. (Philippe Tulkens, TERI)	Addressed – the reviewer is correct, and we have completely reviewed our key messages in this draft.
2-891	B	2	3			Section executive summary. I feel that the executive summary misses some key messages that appear in the chapter text. The text should be revisited in order that more key messages and more policy-relevant ones may be extracted there from. P. 72. L 33 emphasizes the need for effective communication results to policy makers. Making the executive summary of this chapter more focused may be a good exercise for effective communication. (Philippe Tulkens, TERI)	Addressed (see previous response)
2-892	B	7	28			"Assessment" should read "Convention" I suppose. (Philippe Tulkens, TERI)	Addressed
2-893	B	25	8	25	21	I wonder if inverse modelling approach cited on p. 38 (box 2.3) should be mentioned in the present list of methods. Tolerable windows approach is also a to prioritise possible policy measures. (Philippe Tulkens, TERI)	Addressed – the inverse approach is included in the revised Box and TWA s included in the policy measures section of the methods (2.2.3).
2-894	B	38	18	38	24	The information given in this paragraph should be reflected in the executive summary. It indicates a very significant development in this field which is worth emphasizing. (Philippe Tulkens, TERI)	Addressed – we have added a point describing the inportance of local and regional assessments
2-895	B	42	9	45	2	Section 2.3.2.3. I feel that this section (although quite interesting) repeats to a large extent what is described in WG 1 draft report (ch 11). If the text of WG 2 chapter 2 needs to be shortened, there is scope for text deletion in this section. However, reference to WG 1 report is essential. (Philippe Tulkens, TERI)	Addressed – yes, we are following this advice wherever we can.
2-896	B	57	38	57	50	The comparison of SRES growth rates with more recent estimates and the conclusion on the question of MER vs PPP should be reflected in the executive information. It justifies the relevance of SRES scenarios in AR4. (Philippe Tulkens, TERI)	Addressed – we have considered this but feel that this important discussion is more appropriately highlighted in WG III (chapter 3), where it is dealt with in depth.
2-897	B	47	31	48	46	Box 2.5, describes some results from three set of scenarios considered in the "fast-track studies". The set of scenarios with GHG stabilization levels seems quite explicit on the impact of different stabilisation level. If these studies are representative of our current knowledge, the results described in this box (in	Box removed and edited down to one paragraph. The results of the mitigation studies are discussed elsewhere (2.3.2) and also in Ch. 19.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						particular p. 48. L. 17 to 33) should also be reflected in the executive summary. (Philippe Tulkens, TERI)	
2-898	B	72	1			Section 2.4: Some elements from section 2.4. (Future Directions) should be reflected in the executive summary. It is not the case in the FOD. (Philippe Tulkens, TERI)	Addressed.
2-899	B	0	0			There is much excellent material in this chapter, and the considerable effort of the authors is clearly obvious. Readers, myself included, will benefit from the information provided, and the thorough review of CCIAV methods and future scenarios will help readers place the remaining chapters of the Working Group II volume in better context. However, the chapter is very long and I found it to be quite repetitive. Multiple subsections refer to, for example, probabilistic representations, uncertainty, the ATEAM project, sea-level rise scenarios, land use change scenarios, the Fast Track assessment, mitigation scenarios, etc., and the additional new information that was being provided each time a topic was referred to was not always clear. Also, some of the same references are cited many times and in multiple places throughout the chapter – this suggests to me that consolidation and tightening are both possible and necessary. One factor contributing to the rather repetitive feel of this chapter is the lengthy, separate section on the SRES scenarios. Because of this choice of format, many topics (sea level rise scenarios as just one example) are discussed twice – once in 2.3.2 and again in 2.3.3. Also, it was not always clear to me why some studies were included in 2.3.2 rather than 2.3.3, as the scenarios described in 2.3.2 often were related to, or derived from, SRES scenarios. If the authors decide to keep the separate sections (2.3.2 and 2.3.3) then I recommend that the discussion of the SRES scenarios go first, since, as pointed out by the authors on page 55, the SRES scenarios provide a "useful staring point for impact assessors". Also, the numerous references the SRES scenarios in 2.3.2 are rather awkward, and suggest that reorganization is warranted. However, my "vote" would be to combine sections 2.3.2 and 2.3.3 which are discussed twice, once in 2.3.2 and again in 2.3.3. Also, it was not always clear to me why some studies were included in 2.3.2 rather than 2.3.3, as the scenarios described in 2.3.2 often were related to, or derived from, SRES scenarios. If the authors decide to keep the separate sections (2.3.2 and 2.3.3) then I recommend that the discussion of the SRES scenarios go first, since, as pointed out by the authors on page 55, the SRES scenarios provide a "useful staring point for impact assessors". Also, the numerous references the SRES scenarios in 2.3.2 are rather awkward, and suggest that reorganization is warranted.	Addressed – repetition is now avoided and length minimised. Addressed – we have re-strucutured the chapter to split off methods from descriptions of SRES. The latter is now much shorter. Not applicable – SRES is still placed last because the methodological issues are moved into the methods section and because the SRES discussion is meant to be introductory (for the remainder of the report) rather than methodological.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						However, my "vote" would be to combine sections 2.3.2 and 2.3.3. The chapter covers a wide variety of topics ranging from those that fall more on the social science (e.g., decision making) to the physical science (i.e., thermohaline circulation) of the spectrum. As such, the chapter will likely be a challenging "read" for most people. Also, because the material included in the chapter is so diverse, it is sometimes hard to follow the transition from one section (or subsection) to another. One suggestion is to add short (only a few sentences) summaries after each section (or subsection). A good example of this format is Chapter 8: Model Evaluation from the TAR. [I assigned several TAR chapters to a graduate seminar course this semester, and the model evaluation chapter was very highly rated by the students for its readability.] Thanks for including the section on climate scenarios. I thought it was well written and an important addition to this chapter. I hate to suggest any other additions given the chapter's length, but, nevertheless, recommend that you expand the discussion of the probabilistic representations of climate change. I don't think that the limitations of the probabilistic approaches (such as frequent violation of the assumption of independence) are sufficiently discussed. There are so many limitations to probabilistic interpretations, that this needs to be addressed more explicitly and also more critically. Please keep in mind when reading this review that I am a climatologist (although one who is collaborating with economists, agronomists and others), and some of my comments are likely naïve (and even wrong). Hopefully, though, this review will provide you with some insights on what material might be confusing to your readers who are climatologists. There are a number of grammar errors, etc. in the chapter; however, I didn't bother to note them in my review. There are more comments on the earlier part of the manuscript, fewer on the later parts, partly because I "ran out of steam", which is another argument for shortening the chapter(!). (Julie Winkler, Michigan State University)	Addressed – we have tried to extract key messages from the chapter and have re-written the chapter around these. However, we don't have space to include summary statements. Rather, these are placed in the Executive Summary. Addressed, but only briefly. These aspects of probabiistic climate scenarios are addressed at length in WG I chapters, which we refer to heavily here.
2-900	B	2	29			Will readers know what is meant by "forecast-response methods"? I wasn't entirely clear what you meant here. I am assuming you mean "prediction-based analysis" as described on page 34 (Julie Winkler, Michigan State University)	Not applicable – paragraph removed
2-901	B	2	44			"needs"? What is meant here? Is there a better term? (Julie Winkler, Michigan State University)	Not applicable – paragraph removed
2-902	B	3	17	3	31	Note that the headers for the previous subsections were complete sentences (Julie Winkler, Michigan State University)	Not applicable – paragraph removed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
2-903	B	4	13			of subsection is not a complete sentence (Julie Winkler, Michigan State University)	Not applicable – paragraph removed
2-904	B	4	18			What is meant by "problem"? The climate change "problem"? (Julie Winkler, Michigan State University)	Not applicable – paragraph removed
2-905	B	4	20			"overlaps" in what? Approach? Objectives? Outcomes? People involved in the scenario construction? (Julie Winkler, Michigan State University)	Not applicable – paragraph removed
2-906	B	4	27			How is "accurate" defined? What distinguishes an "accurate assessment" from an "inaccurate assessment"? (Julie Winkler, Michigan State University)	Addressed – the term "well-crafted" is now used
2-907	B	5	7	5	9	Sentence starting with "Progress…" is not clear (Julie Winkler, Michigan State University)	Addressed – sentence removed
2-908	B	5	25			How does "addressing a variety of spatial scales…" work to "manage" uncertainty? I can see how it might illuminate uncertainty, but am not certain how it would manage uncertainty (Julie Winkler, Michigan State University)	Take one as a prersor to knowing another
2-909	B	5	34			awkward wording (Julie Winkler, Michigan State University)	Addressed
2-910	B	7	3			Descriptors under "Subject Matter" could be clearer. For example, "PSIR" shows up in left column but the full term used in the right column. Should there be line above "policy-driven"? (Julie Winkler, Michigan State University)	Addressed
2-911	B	7	12	7	13	".. where adaptation to climate change becomes part of a larger set of adaptive actions of which adaptation to climate change constitutes one element" ??? seems repetitive (Julie Winkler, Michigan State University)	Edited
2-912	B	7	16	7	19	Are you recommending this definition? Why are you singling out this definition? (Julie Winkler, Michigan State University)	Cross-reference to Chapter 17
2-913	B	7	21	7	22	"… reveals several layers …" Meaning is unclear. Also, what exactly is meant by "exercised"? (Julie Winkler, Michigan State University)	Edited
2-914	B	7	26	7	29	What is outlined by the UN Framework? Adverse effects? Or natural and human systems? (Julie Winkler, Michigan State University)	Text heavily edited
2-915	B	8	8			In general I found 2.1.1.3 hard to follow. (Julie Winkler, Michigan State University)	Reformatted and rewritten
2-916	B	8	16			Does "Article 2" need to be defined (in case someone doesn't know what it is)?	To consider

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Julie Winkler, Michigan State University)	
2-917	B	8	28			am not clear what is meant by the "different stages of risk". (Julie Winkler, Michigan State University)	Outlined in Box 2.1
2-918	B	8	31			"Actions" are not included in Table 2.2. (Julie Winkler, Michigan State University)	Text has beeen edited
2-919	B	8	44	8	50	Verb tense is confusing. (Julie Winkler, Michigan State University)	Addressed
2-920	B	9	25			What "relationship"? Do you mean instead "This distinction"? (Julie Winkler, Michigan State University)	No
2-921	B	9	32			"This report …"? The AR4? Or just this chapter? (Julie Winkler, Michigan State University)	This Report – addressed
2-922	B	9	39			Section 2. 2 is too long, in my opinion, and somewhat repetitive in places. (Julie Winkler, Michigan State University)	Addressed
2-923	B	10	22			"parallel"? (Julie Winkler, Michigan State University)	Addressed
2-924	B	10	30			"+"? Plus and minus? (Julie Winkler, Michigan State University)	Addressed
2-925	B	12	36			Incomplete. (Julie Winkler, Michigan State University)	Addressed
2-926	B	13	32			Need some references here. (Julie Winkler, Michigan State University)	Text removed
2-927	B	13	33			"such issues"? Are you referring to policy-related risks? (Julie Winkler, Michigan State University)	Text removed
2-928	B	14	6			"Inverse methods" is used in this section several times but not defined. Are you assuming your readers will all know what is meant by this? [Note that inverse methods is defined considerably later in the chapter.] (Julie Winkler, Michigan State University)	Addressed
2-929	B	14	10			What is meant by "baseline adaptation"? Where is baseline adaptation in Figure 2.3? (Julie Winkler, Michigan State University)	Addressed
2-930	B	16	36	17	50	I assume this section isn't finished yet. Is the intent to provide examples? (Julie Winkler, Michigan State University)	Addressed
2-931	B	19	17	20	34	Section 2.2.1.4 is rather choppy, and its organization and "take home message(s)" are unclear. (Julie Winkler, Michigan State University)	Addressed
2-932	B	20	42			I think it is more than a "wish"; rather it is a necessity for many assessments to	Addressed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						explicitly include climate variability and extremes. (Julie Winkler, Michigan State University)	
2-933	B	21	41			What exactly is meant by the "significance of risk"?	Significance of the risks being addressed
2-934	B	22	27			It is not clear from what is written what is used to define the coping range. (Julie Winkler, Michigan State University)	Climate and climate related phenomena
2-935	B	23	48			"upper tier political and institutional arrangements" -- not clear what is meant by this. (Julie Winkler, Michigan State University)	Will be clarified
2-936	B	26	24			Will all readers know what THC and WAIS are? [These terms are defined considerably later in the chapter.] (Julie Winkler, Michigan State University)	Addressed
2-937	B	26	40			A short (one paragraph) summary of the preceding section would be useful here. (Julie Winkler, Michigan State University)	Section heavily edited and addressed
2-938	B	26	42			I liked this section (2.2.3). One minor critique is that the authors refer frequently to pdfs, but I don't think they sufficiently (in my opinion) describe the difficulties in coming up with a pdf, particularly the violation of assumptions (i.e, independence) for the frequentist approach (Julie Winkler, Michigan State University)	Insufficient space – must refer on
2-939	B	33	22			In the TAR, the chapter on scenarios indicates that often the terms "scenario" and "projection" are used interchangeably, at least in reference to climate change scenarios. Does this need to be clarified here? (Julie Winkler, Michigan State University)	Addressed – we have now redefined these terms
2-940	B	34	14	34	20	This paragraph is excellent. (Julie Winkler, Michigan State University)	No action required
2-941	B	34	29			and again line 8 on page 35. Does the italics mean that these are also non-scenario characterizations of the future? The organization here is confusing. (Julie Winkler, Michigan State University)	Addressed – organisation has been revised
2-942	B	36	13	36	14	It is not clear what the "more specific interpretation" is from this definition. Just that the projections are derived from models? (Julie Winkler, Michigan State University)	Not applicable – definition has been revised and shortened
2-943	B	37	22			"Inverse methods" is highlighted here and either should be defined at this point or "see below" added to the sentence. (Julie Winkler, Michigan State University)	Not applicable – definition has been revised and shortened
2-944	B	37	43	37	35	References are needed here to support this statement, and for readers to search out examples. (Julie Winkler, Michigan State University)	Not applicable – definition has been revised and shortened
2-945	B	37	47	37	49	Examples (i.e., references) would be useful here.	Not applicable – definition has been revised

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Julie Winkler, Michigan State University)	and shortened
2-946	B	38	32			I would recommend describing the SRES scenarios first, and then the other (non-SRES) scenarios. (Julie Winkler, Michigan State University)	Addressed – yes this has been done
2-947	B	39	2			Will readers know what the "PoleStar System" is? (Julie Winkler, Michigan State University)	Addressed – we have revised this section and dropped this reference.
2-948	B	39	9			What are the two variants based on? (Julie Winkler, Michigan State University)	Not applicable – this section has been shortened
2-949	B	41	3			Here is one reason that I think the SRES scenarios should discussed first. "Linking scenarios at global and regional scales" is appropriate for the SRES scenarios as well as the other scenarios. (Julie Winkler, Michigan State University)	Addressed
2-950	B	41	17			"higher" and "lower" à "coarser' and "finer"? (Julie Winkler, Michigan State University)	Addressed – we have revised the text accordingly
2-951	B	42	2	42	7	References are needed. (Julie Winkler, Michigan State University)	Not applicable – this paragraph has been deleted
2-952	B	43	14			See my comment for page 26, line 42. These concerns are particularly important when using ensembles to come up with probabilities as ensemble members are not independent of each other. (Julie Winkler, Michigan State University)	Addressed – this point is included in the revised text.
2-953	B	44	9			REA? (Julie Winkler, Michigan State University)	Addressed – this is now written in full
2-954	B	45	24			What is a "comprehensive set of sea-level scenarios" and how does it compare to a "range of sea-level rise scenarios" referred to in line 20? (Julie Winkler, Michigan State University)	'Comprehensive' here means sea level scenarios not only account for climate change related changes but also those from other processes (e.g., vertical land movements etc.).
2-955	B	46	6			I don't think this table is necessary. If included, what is the source of the information? Also, some of these models are quite "old" (e.g., CGCM1). What about the AR4 models? (Julie Winkler, Michigan State University)	Addressed – we are considering using AR4 nformation, though this section relates to applications in CCIAV, not the most recent projections.
2-956	B	46	14			"Pattern scaling technique" is used several times in this chapter, but I didn't see where it is defined. I doubt if all readers will know what is meant. (Julie Winkler, Michigan State University)	Addressed – we have added a brief explanation of pattern-scaling.
2-957	B	46	18			Are you referring to a stochastic "generator", similar to a weather generator? (Julie Winkler, Michigan State University)	Addressed – we have clarified the meaning of "generator" here. No, this is not stochastic.
2-958	B	46	35	47	14	Some references as examples are needed for the different approaches for developing storm surge scenarios.	Addressed – we have now added some examples.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
						(Julie Winkler, Michigan State University)	
2-959	B	47	18	51	22	Most of this material is concerned with downscaling SRES scenarios. I think it would fit better after the discussion of the SRES scenarios, rather than before. (Julie Winkler, Michigan State University)	Text reorganized, downscaling is now part of methods section.
2-960	B	49	2			This table is for the Fast Track study? (Julie Winkler, Michigan State University)	Table removed.
2-961	B	51	45			IAMS needs to be defined before the abbreviation is used. Also, IAMS is written out later in the chapter. (Julie Winkler, Michigan State University)	Comment has been acted upon
2-962	B	52	7	52	9	This sentence is difficult to follow. (Julie Winkler, Michigan State University)	Comment has been acted upon
2-963	B	58	11			The relationship of the Parry study to the SRES scenarios is not clear. Same goes for the Sala study cited on line 25. (Julie Winkler, Michigan State University)	Addressed – we have shortened this section and referred to the Parry et al. work in one place. The Sala work is now referred to separately (it is not SRES-based).
2-964	B	60	39	60	50	This material is very general and for the most part has been discussed elsewhere in the chapter. (Julie Winkler, Michigan State University)	Addressed – we have now shortened the section to treat only summary SRES-based projections and reference WG I
2-965	B	61	10	61	13	References are needed. (Julie Winkler, Michigan State University)	Addressed – this paragraph has been revised and shortened, with some new references added.
2-966	B	63	2	63	8	This paragraph is out of place and probably unnecessary. (Julie Winkler, Michigan State University)	Addressed – the paragraph has been moved, but we believe it is important to indicate that not only SRES scenarios have been adopted in CCIAV studies evaluated for this report.
2-967	B	63	24			Table 2.7. References are needed to back up some of the projected changes and their likelihood. Using "more wet days per year" as an example, what studies suggest this? Is this conclusion regionally-specific? [Our regional downscaling efforts for the Great Lakes, based on four GCMs and two SRES scenarios, suggest fewer wet days per year.] (Julie Winkler, Michigan State University)	Addressed – this table, if it is included, is based on a WG I table. It has also been much revised since the FOD. However, the result for wet days still remains. This comment has been passed on the WG I, chapter 11.
2-968	B	71	34			This section is too brief. Perhaps this (i.e., new insights) should be the theme used to organize the preceding material on SRES scenarios, rather than the descriptive approach that was taken. (Julie Winkler, Michigan State University)	Addressed – new insights are now brought into each of the sections on methods as well as underpinning the reporting of SRES scenarios.