



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

Specific Comments

GOVERNMENT REVIEW COMMENTS

Chapter 2

August 2006

Includes late comments at the end

Discussion of Government review comments and record keeping

IT IS RECOMMENDED THAT:

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

Substantive comments

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

Non-substantive comments

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

General

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

IPCC WGII AR4 SOD *GOVERNMENT* Review Comments

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Notes of the writing team
G-2-1	A	0				<p>This chapter should, but does not, describe the methods used to assess adaptive capacity and adaptation. The chapter on adaptation should tell us what is happening or expected regarding adaptation, but the methods should be treated here. In addition, the methods used may have large influence on the findings provided in the sectoral chapters.</p> <p>(Government of USA)</p>	<p>We have strengthened the section on methods of adaptation assessment, using material from Chapters 17 and 18.</p>
G-2-2	A	0				<p>There are methodological issues raised in other chapters that merit a mention in this chapter (e.g. comments on the Common Methodology for coastal vulnerability assessment in Ch 11, P. 21, L18-22)</p> <p>The chapter has a high information density and therefore it is not easy to read. The account seems fairly complete, but at some issues other insights/methods/disciplines could be mentioned. However the absence of such issues/methods in chapter 2, is in some of the cases due to (apparent) lack of presence in the climate research field instead of the editors having overlooked something.</p> <p>(Government of Finland)</p>	<p>We have looked at the section in Chapter 11 and while we acknowledge the point made about the weaknesses of the Common Methodology, since we do not mention this methodology in the chapter we do not think we need to comment on it in the chapter. IN any case, we have outlined some of the advances in methods in the section on sea level scenarios (2.4.6.3).</p> <p>The issues stated as absent are not specified, so the authors cannot respond to this comment. The space available does not allow non-climate methods to be addressed on the basis of their potential.</p>
G-2-3	A	0				<p>The purpose of this chapter is confusing as to whether its primary intention is to address what the methods are that are used to arrive at findings reported in other chapters (which is our understanding of the purpose), or in reviewing the state-of-the-art of methods development (not the best use of limited space in the WGII report), or to report key findings (not appropriate here). The purpose should be stated up front in the chapter, and then the rest of the text should be reviewed and trimmed or modified to be clearly consistent with that purpose. An example of findings that should be cut is on p. 26, lines 17 to 33. Given the need to better describe the methods actually underpinning the WGII sectoral findings, we recommend that Chapter 2 be confined to more thoroughly describing the methods used for those chapters. We recognize that this was difficult to do in parallel with development of those other chapters. Further, we believe that all findings should be left to the sectoral chapters unless they are used to explain the dependence of findings on different methods.</p> <p>(Government of USA)</p>	<p>We have clarified the purpose of this chapter in a revised introductory section.</p> <p>This section has been revised to focus more on methods and less on results.</p> <p>We have endeavoured only to report findings that illustrate how methods have been applied and/or used to obtain a given result. We have strengthened cross-referencing to other chapters in the report.</p>

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G-2-4	A	0				Several different kinds of analyses were cited in this chapter, but not all of the methods employed for the analyses in WGII have been described in this chapter. A review should be done to summarize and synthesize the various methods used in each of the subsequent sectoral chapters. This would largely improve the linkages between this chapter and the rest of WGII. For example, there is too little in this chapter on the methods to examine extremes, or communication of uncertainties, etc. Many of the assumptions are stated within the text associated with specific analyses. If/where those are insufficient, the critical underlying assumptions should be stated very briefly. (Government of USA)	We have attempted to provide improved links to other chapters in this report where these illustrate the application of methods that represent an advance on methods presented in the TAR. We have also improved our treatment of methods for examining extremes and uncertainties. Brief additions have been made in the adaptation section (2.2.3). There is a section on communication of uncertainties and stakeholders have been linked to adaptation to climate variability and extremes
G-2-5	A	0				Before submission of the final version, the authors should check the status of all references marked as "submitted" or "in press". Some of them have already been published by now. (European Union)	All references have been checked and updated where applicable.
G-2-6	A	1		17		Section 2.2.2 : A new subsection should be added to address methods for characterizing current and future variability and especially extremes in the context of climate change. We are asking for description of methods to assess the impacts of extremes. This section should be independent of (but could follow) 2.2.2.6. because it is not a down-scaling challenge, but is more likely to proceed “bottom-up” from observations. (Government of USA)	We have included a separate subsection on extremes in the discussion on climate scenarios following downscaling (new section 2.4.6.1). The section on analogues treats observed extremes and the sea level section also discusses extremes.
G-2-7	A	2	16	2	21	The discussion of risk management as a framework for decision making is very useful, however, it should also be made more clear that a risk-management framework allows the integration of climate change concerns into the broader decision making context. (Government of Australia)	This has been added to the Executive Summary and within the risk section (2.2.6)
G-2-8	A	2	19			The term “mental model” is highly disputed in psychology and different interpretations are possible. The Johnson-Laird theory proposes mental models as a way of describing the process which humans go through to solve deductive reasoning problems. Adversely, Gentner and Stevens’ Mental Models proposed that mental models provide humans with information on how physical systems work. This approach could be generalized to a number of situations that humans face, including the behavior of objects according to laws of physics. Finally, for Human-Computer-Interaction practitioners, a mental model is a set of beliefs about how a system works. Humans interact with systems based on these beliefs. (Norman, 1988) This makes mental models very important to HCI and its primary objective,	It actually doesn’t matter which definition is assumed here because properly constructed risk assessments should be able to cope with all of these. However, mental models in this context is the latter: a mental model is a set of beliefs about how a system works. Humans interact with systems based on these beliefs. The context in the chapter makes it clear this is what we intend – an earlier reference to risk and mental models (Morgan et al., 2001) was

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						usability. It is unclear which definition the text refers to. (Government of Japan)	removed due to space limitations.
G-2-9	A	2	31	2	31	The word "conditioned" is ambiguous, replace with "modified". (Government of Australia)	Revised as suggested
G-2-10	A	2				Standard the methods, so it will mitigate bias. (Government of Spain)	This comment is unclear and the text reference too vague to allow us to address it
G-2-11	A	2				Inter-comparisons of models. (Government of Spain)	This comment is unclear and the text reference too vague to allow us to address it
G-2-12	A	3	4	3	12	This section should also include a brief sentence stating that while regionalisation methods have become more prevalent, there is irreducible uncertainty inherent at the regional level. (Government of Australia)	We have tried to be very concise in these summary statements. Uncertainty is associated with many of the points raised, and if we describe uncertainties in regionalisation techniques, we would have to do this for each of the other methods and scenarios too. The section from which this statement is derived (2.6.1) does raise the issue of uncertainty in regionalisation, and uncertainty as a theme is emphasised elsewhere in the chapter.
G-2-13	A	3	28	3	28	The expression "too uncertain to be handled probabilistically" sounds odd: tossing a coin is uncertain, but geometrical considerations help to handle the problem. Here, the word "scientifically" should be used in place of "probabilistically". Indeed, we are faced to a phenomenon which is not reproducible, therefore not verifiable. There is no scientific approach leading to probabilities in this case, and we can rely only on our confidence in our present-day tools. (Government of France)	The paragraph has been merged into another and the expression omitted.
G-2-14	A	3				Develop new sceneries for quantitative impact studies (Government of Spain)	If this is a suggested addition, we have treated new scenarios in the final two points of the revised Executive Summary.
G-2-15	A	4	35		35	Change "Conditional" to "Quantified". This seems to refer only to Bayesian probabilistic analysis and does not include, for example, frequentist analyses. (Government of USA)	The paragraph was omitted due to repetition of points contained in the Executive Summary and Conclusions.
G-2-16	A	4	48		48	Add a new sentence: "In all countries, there is an important need for globally consistent, spatial (gridded) refinement of socio-economic data (Nordhaus 2006)." (Government of USA)	This paragraph was omitted, but the point is important and has been carried forward into section 2.3.5 (Data needs for assessment) where data provision for socio-economic and human systems indicators is listed as a key barrier to analysis, citing Wilbanks et al.

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							(2003).
G-2-17	A	5	48	5	49	The chapter is said to focus on four CCAV assessment approaches: standard climate scenario-driven, adaptation, vulnerability, and risk-management approaches. However, the rest of the chapter does not follow this structure and a number of other approaches are also discussed. Either the chapter structure needs to be re-adjusted or the word “focus” should be replaced with “covers” or “discusses”. (Government of Japan)	The chapter structure has been adjusted.
G-2-18	A	6	6	6	7	What the standard IPCC approach is should be explained briefly. (Government of Japan)	This has been done.
G-2-19	A	6	29	7	25	This section should include a discussion of the limitation of risk management frameworks to abrupt climate change and climate surprises. The Institute of Risk Management's "Emergent Risk" Research Paper by Bryan Richardson and Peter Gerzon (available online at http://www.theirm.org/publications/documents/irm_emergent_risks.pdf) could provide a resource for the analysis of such risk. (Government of Australia)	This paper is very thin and, despite that, examples are given in this chapter of where scenarios are used to assess emergent risks (e.g. singular climatic events).
G-2-20	A	6	43	6	47	Include the following reference: H.-M. Fussel, R.J.T. Klein: "Climate Change Vulnerability Assessments: An Evolution of Conceptual Thinking." Climatic Change 75(3):301-329, 2006 (European Union)	Text has been removed. The suggested paper is cited within this context in sections 2.2.4., 2.2.6 and 2.3.4..
G-2-21	A	6	49	7	8	There are at least two additional major forms of climate risk management that must be included here. The first is investment in gaining better information, and the second is capacity-building, such as building decision-making ability and other forms of adaptive capacity. These are not equivalent to actually “adapting” and are critically important in the face of uncertainty. There are a number of studies about learning (Yohe, Hope, Lempert, etc.), (Pretty on investing in social capital, Science 2004; Deitz, Ostrom and Stern, 2004?) (Government of USA)	We have added these as well as reference to some of these sources, either here or elsewhere in the chapter.
G-2-22	A	7	0	9		Table 2.2 and its accompanying text (pages 7-9) another dimension to distinguish scenarios or to understand differences between scenarios, is the influence of interest driven choice of scenario elements, prioritisation and research methods (related to scenario assessment) (Government of Finland)	Table 2.2 has been merged with Table 2.3 to produce a new Table 2.1. The scenarios category in the new table is too coarse to allow such refined distinctions to be drawn here. Rather, we seek to distinguish more generally the scenario types adopted under each approach to assessment.
G-2-23	A	7	3	7	3	Expression 'lower bounds' is unclear. (Government of Australia)	Text has been modified.

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G-2-24	A	7	6	7	6	Might be clearer to say ... 'will accumulate over...' (Government of Australia)	Good word choice – this is now in section 2.2.6..
G-2-25	A	8	8	8	44	(Box 2.1): How were the terms used in the Box selected and defined and are these terms officially IPCC-recognized? (Government of Japan)	Box removed but their provenance was given.
G-2-26	A	8	14	8	15	Please add the definition of "climate" (Government of Germany)	Box removed
G-2-27	A	8	28	8	28	Risk - it should not only include human values, but also ecological systems (Government of Germany)	Box removed – but what it said was things that humans value. If a tree falls in the forest and no humans are left on Earth to value it – what is it worth?
G-2-28	A	8	43	8	43	Vulnerability should not only include the extent to which a person or group, but also to which a process, system or activity is susceptible to harm or loss from exposure. (Government of Germany)	Box removed but IPCC TAR definition has been added in a footnote in section 2.2.4.
G-2-29	A	8				Box 2.1 The definitions of several words is very unclear, for example “cope” These are very vague terms that need to be defined much more clearly, at least for the purpose of this report. One definition of “cope” might be “The ability to manage risk, maintaining essential services, without crisis and without external assistance, but not necessarily without costs, and not reducing risk to zero”. In other places, the word “tolerable” suffers from similar vagueness or ambiguity. (Government of USA)	Box removed
G-2-30	A	10	3	10	22	This flow chart has been so highly simplified that the meaning has been made obsolete. (Government of Japan)	Figure removed
G-2-31	A	11	13			Willows (2003) should read Willows and Connell (2003) (Government of UK)	Problem with referencing software and it is now resolved
G-2-32	A	13	1	13	22	Figure B2.2.1 is quite difficult to understand. A clearer explanation of what it is and why it is a useful tool should be included. (Government of Australia)	The description of the figure in the main text and in the introductory text within the box has been edited to more explicitly state the purpose of the figure and the set of definitions.
G-2-33	A	13	10	13		Box 2.2: Figure b2.2.1 could also be depicted as cylinder; There are no (unsurmountable) methodological limits that prevent the combination of sensitivity analysis and artificial experiments with probabilistic projections (Government of Finland)	We have altered the figure to extend the category of sensitivity analyses to include plausible futures with ascribed likelihoods. However, in our definition, artificial futures are by definition not probabilistic; this could only occur if the probabilities were not

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							meaningful, which is not a case that we encountered in the literature.
G-2-34	A	13				Box 2.2: If the terms presented here are consistent with how they are used throughout the report, then these definitions are acceptable, and should be stated that they are for the purpose of this report. If these definitions are not used consistently in the rest of the AR4, then that qualification needs to be stated clearly, as well as why they are being proposed here. These terms are not necessarily consistent with how they are used more broadly in various disciplines or in other research (including climate-related research). (Government of USA)	Text has been edited to make clear that these definitions were developed for the purpose of this chapter, and that the reason for including it is that in reporting developments across a wide range of types, which are defined differently across different fields, we needed a typology so that readers will understand what we mean by the terms we use.
G-2-35	A	14	47	14	49	The final two sentences need to be made clearer. An 'Artificial experiment' is defined on p13 as possibly being/not being plausible. So what 'commitment runs' are categorically 'unrealistic' (and which are not). (Government of Australia)	Text has been edited to clarify that the commitment runs from WG1 based on instantaneous stabilization of forcing (results of which are discussed in previous sentences) are not realistic.
G-2-36	A	15	13	15	26	In section 2.2.2.4 a discussion of how "analogues" are chosen, (i.e. what makes specific instances suitable for analogy with predicted climate change) would be useful. (Government of Australia)	We have added a sentence noting criteria for the selection of analogues
G-2-37	A	15	37			The "poleward side of continents" seems to be wrong. Couldn't the poleward side of a continent be anywhere? I wonder if "polar region" is the intended word. (Government of Japan)	Text shortened and no reference to "poleward side of continents"
G-2-38	A	18	0	20		The economic conceptual premises underlying social economic scenarios (self-standing or as part of a larger scenario) should fit with the economic conceptual premises underlying the social cost benefit studies (SCBA) carried out later to assess them. (Government of Finland)	A sentence has been added noting that policy responses are also influenced by socio-economic changes. Hence, this implies a link between scenarios adopted in CCIAM research and those assumed in policy. However, this link is not explicitly treated in the literature.
G-2-39	A	18	39	20	17	Section 2.2.2.8: Insert a brief box providing an overall description of the nature of a scenario that restates the caveats contained in the SRES about what scenarios are and are not, and how they are to be used properly. (Government of USA)	This information is contained in Box 2.1, which serves as an introduction to this section.
G-2-40	A	18	45	18	47	The discussion of the disconnect in scale between information availability and scenario operation is important and should be more clearly highlighted. (Government of Australia)	The issue of scenario scales has been highlighted both in the Executive Summary and as one of the areas for further research.
G-2-41	A	19	19		22	If these models are going to be described, they need to be referenced to where and how they are used in the WGII report or other sections of the IPCC assessment.	The HadCM2 and HadCM3 models are now identified as AOGCMs in the Table. These

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						(Government of USA)	models are also referenced elsewhere in the chapter (Box 2.3 and sections 2.4.6.2, 2.4.6.5 and 2.4.6.8).
G-2-42	A	20	0	20		Land- use change scenarios should be assessed bidirectionally. Furthermore, it seems that social-economic representation of land-use change is up to now based on technical-economic simulation approaches. Involvement of New Economic Geography (Fujita, Verhoef, Thisse, Krugman) as well as new insights from multidimensional input-output system (Duchin; EU MOSUS project, etc.) would be recommendable (though not easy). (Government of Finland)	The term “assessed bidirectionally” is not clear. Some of the reported scenarios have used the principles of New Economic Geography (e.g. Rounsevell et al., 2006), and reference is also made in the text to the use of input-output models in scenario development (e.g. Fischer and Sun, 2001).
G-2-43	A	21				Section 2.2.2.10: Add, in an appropriate place, a reference to Casman and Dowlatabadi that indicates that as uncertainty increases, especially in the distant future, assumptions such as technologies, should become correspondingly less specified. (Government of USA)	The exact reference (Casman and Dowlatabadi) is not clear. We assume, therefore, that the point refers to: Casman, Morgan and Dowlatabadi (1999). Mixed levels of uncertainty in complex policy models. <i>Risk Analysis</i> , 19 , 33-42. In this article the authors do not argue that technology assumptions should be less specified in the distant future, but that model representations of the future should be simpler to reflect increasing uncertainty. A sentence has been added to the text to make this point.
G-2-44	A	22	12	22	14	Are these “baseline scenarios” the SRES scenarios? Clarification needed. (Government of Japan)	The text has been changed to clarify this point: “... in comparison to scenarios without adaptation ...”
G-2-45	A	22	17	25		Sections 2.2.2.12-13 & 2.2.3.2 With reference back to earlier pages; it could be mentioned that in socio-economic assessments of climate change so far carried out, extreme events/singular events have been hardly taken into account instead these assessments usually assume gradually changes in temperature and precipitation (Government of Finland)	Text added to include this point
G-2-46	A	23	10	23	11	This is the first time the “Millennium Ecosystem Assessment” has been mentioned. A short explanation of this assessment is required. (Government of Japan)	An explanation has been added.
G-2-47	A	23	31		33	This statement is factually incorrect. Change to: “PDFs for emissions (as well as climate sensitivities, regional climate changes, etc.) have been probabilistically estimated (Webster et al. 2002; Pepper 2005). The socio-economic issues remain	Text has been removed.

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						controversial (existing citations in line 33). (Government of USA)	
G-2-48	A	23	37		37	After expert judgment add and econometric analysis (Government of USA)	Original text has been omitted.
G-2-49	A	23	38		38	Another reference that could be added after Richels et al 2004) is Singer, C. E., T. S. G. Rethinaraj, S. Addy, D. Durham, M. Isik, M. Khanna, B. Kuehl, J. Luo, W. Quimio, K. Rajendran, D. Ramirez, J. Qiang, J. Scheffran, T. N. Tioririne, and J. Zhang, Probability distributions for carbon emissions and atmospheric response, submitted to Climatic Change; (Government of USA)	Request was made to obtain a copy of the paper but no response was received by the time of submitting the FGD. In any case, this text was removed in the interests of brevity.
G-2-50	A	23	38		38	Add citation to Pepper et al. (2005) in Journal of Environment and Development (Government of USA)	Text has been omitted.
G-2-51	A	24	26	24	33	It would be useful for the authors to provide an assessment of the debate on the use of subjective probability assignments. Stating that there are two opinions and then providing little guidance on the accuracy of the opinions is not helpful for a policy audience. (Government of Australia)	Our assessment of this debate is that at the moment it has no clear right answer. We have aimed to reflect this in the text, rather than choosing a side.
G-2-52	A	24	45	24	45	The title of Section 2.2.3: "Methods of measuring and interpreting CCIIV" is unintuitive, in particular with the acronym. A shorter and more accessible title should be used. (European Union)	This heading has been removed, and the subsection is now a full section 2.3 (Development in methods).
G-2-53	A	24	45			Section 2.2.3. would benefit from a brief introduction that guides readers through the material. There should be one place where the major advances in climate change impact, vulnerability, and adaptation assessment are mentioned. These advances are currently dispersed in Section 2.2.3.2 "Advances in impact assessment", 2.2.3.5 "Adaptation assessment", 2.2.3.6 "Advances in vulnerability assessment", and 2.2.3.7 "Integrated assessment". Such a list should include the following: Increased application of risk management frameworks to climate change assessments; increased application of regional climate change projections and probabilistic characterizations of future climate change; assessments addressing large-scale climate changes (e.g., INTEGRATION project for THC weakening or breakdown, ATLANTIS project for large-scale sea level rise); development of assessment guidelines that focus on informing adaptation policy-makers (e.g., UNDP Adaptation Policy Framework); integration of climate change with current climate variability and non-climatic stressors (e.g., Millennium Ecosystem Assessment, Adaptation Policy Framework, "double exposure" approach by K. O'Brien et al.; ATEAM project, see Schröter et al., 2005, Science); several	The whole section has been reformatted, we think along the lines of those suggested here. The examples provided are nearly all reflected in the revised text.

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						horizontally integrated (i.e., multi-sectoral) assessments for large regions (e.g., US National Assessment; Arctic Climate Impact Assessment); increased participation of stakeholders (e.g., UKCIP, ATEAM, DINAS-COAST, cCASHh). (European Union)	
G-2-54	A	25	10	25	22	Unnecessary repetition (lines 10-16, and lines 19-22). (Government of UK)	Have kept this for sake of examples, but it has been edited
G-2-55	A	25	34	25	36	This statement on GBR needs careful assessment against other parts of the report dealing with GBR/Corals. (Government of Australia)	Findings reported here are consistent with information in Chapters 4 and 11 (see Box on GBR in section 11.6).
G-2-56	A	26	11	26	15	The use of “quasi-neutral” is obscure. It is suggested to state simply that, “A study by Mendelsohn and Williams, working at the national scale found total impacts of climate change to be lower than 0.1% of GWP in developed countries, but with significant consequences for developing countries.” (Government of Japan)	Term removed
G-2-57	A	26	13			“significant consequences for developing countries” should be elaborated. Specific examples of such consequences would be beneficial to the reader. (Government of Japan)	The text has been omitted for space reasons.
G-2-58	A	28	24	28	35	(a) and (b) are not labeled on this graph. The graph does not clearly represent how adaptation reduces vulnerability (the top and bottom graphs are virtually the same). (Government of Japan)	Lower graph retained, upper omitted
G-2-59	A	28	33	28	33	It should be made clear in Figure 2.5 that the "Coping Range" shown is an illustrative conceptualisation. (Government of Australia)	The caption (of Figure 2.3 now) indicated that it is an idealized version of a coping range.
G-2-60	A	29	0	29		SCBA applications are very tricky, the criticism on their use (without denying their large usefulness) is to be considered (Government of Finland)	Text has been omitted.
G-2-61	A	30	20			“operationalising” is a technical (social science) term referring to finding a measurable, quantifiable, and valid index for a variable (independent and dependent variables), and (sometimes) finding a way to manipulate that variable in such a way as to have two or more levels. (http://jan.ucc.nau.edu/~pe/hp602web/HP602VA14.htm). This term should have a directive reference to glossary/appendix. (Government of Japan)	Term has been removed.
G-2-62	A	30	21	30	22	A figure/illustration giving an example of “identification of “hotspots” through vulnerability mapping” would be useful here. (Government of Japan)	Space restriction prevents the inclusion of examples here.
G-2-63	A	31	44			ADD NEW SECTION “Integrating Vulnerability and Adaptation into Integrated	New section cannot be added due to space

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						Assessment”: Within the U.S., several programs have been initiated to develop and test methods to integrate vulnerability and adaptation into integrated assessment for the purpose of decision support. (Government of USA)	restrictions but we have tried to show these links throughout the text and in Table 2.1.
G-2-64	A	32	28	33	9	The section on methods to communicate risks is far richer than what is described here. The methodologies for communicating risk in studies cited in the sectoral chapters should be described here, especially the frameworks used and how they may have affected results. For example, in [roger will provide some methods] Further, the current text is too prescriptive; much has been learned about contextual factors in communicating and perceiving risks. (Government of USA)	Limit of page length prevents a more expansive discussion.
G-2-65	A	32	37			“events that have a strong emotional impact”. An example of this would be beneficial, as the connection between and event having a strong emotional impact and climate change is not readily obvious. (Government of Japan)	This example has been omitted.
G-2-66	A	34	4	34	7	States that, “information on coastal and marine environments and stock and materials in the built environment is difficult to obtain in useable form.” A reasoning of why such data is difficult to obtain would be useful. Is something wrong with the data? (Government of Japan)	Text has been omitted.
G-2-67	A	34	10	34	10	The title of Section 2.3: "Characterizing the future in this assessment" is unclear since the meaning of "this" is not explained. (European Union)	The section has been integrated with other text and the heading removed
G-2-68	A	35	6	35	24	It is difficult to interpret the labels on the four axes of Fig 2.6. Which directions are increasing/decreasing? (Government of Australia)	Directional arrows have been added to the figure
G-2-69	A	36	19			States, “for precipitation, changes with both sign occur”. The meaning of “sign” is not understood. This sentence doesn’t make sense. (Government of Japan)	The wording has been revised to clarify this.
G-2-70	A	36	32	36	36	The first three bullet-points are critical for policy makers as it confirms the growing certainty in the projected temperature increase up to 2030 and then out to 2100. These points need to be more clearly highlighted in the section. (Government of Australia)	These points are taken from the WG I report, where they are already given high prominence. We think it is sufficient to reinforce the message here.
G-2-71	A	36	37	36	44	The final three dot points need to be re-written to more clearly present their key message. For instance the discussion of the B1:A1B:A2 scenario ratio at line 38 is particularly confusing. The key point of these three points seems to be that while at the global scale uncertainty is decreasing, at local levels the uncertainty is greater,	We have completely revised these statements, which are now based on material in WG I, Chapters 10 and 11. Reference to the ratios has been reworked.

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						although it tends to follow the global trend. The authors should review to ensure this key point is more clearly presented. (Government of Australia)	Issues of uncertainties at different scales should be more apparent from the revised text.
G-2-72	A	36	37		40	Please provide a direct and clear statement of what the global mean near-surface temperature change was, averaged across the GCMs in the A2 scenario. This information is vital for interpreting the assessment report, which organizes information by global mean temperature change (e.g., Summary for Policymakers page 7). (Government of USA)	We have provided the mean values for the three SRES scenarios, in line with the WG I SPM.
G-2-73	A	36	44	36	44	very' linear? (Government of Australia)	The original statement has been replaced by "Local temperature responses in nearly all regions closely follow the ratio of global temperature response".
G-2-74	A	37	1	38	51	Figure 2.7: The readability of this very useful figure might be slightly improved by adding legend information to the first of the series of graphs. E.g. "AR4: A2, 15 models" in red pointing to one of the red bars, "pre-TAR: A2, 7 models" in blue pointing to one of the blue bars. (Government of Finland)	A legend has been added to the figure (Figure 1 of Box 2.3).
G-2-75	A	37	1	38	50	Figure 2.7 is almost incomprehensible. The authors have tried to include far too much information in a condensed version, and the text supporting and explaining the figure is unhelpful. The authors need to either more clearly explain the figure or consider replacing the entire figure with a more clear depiction of the AOGCM projections for temperature and precipitation changes. (Government of Australia)	We have attempted to simplify the figure by removing the whisker plots, altering the colour shades and adding a legend.
G-2-76	A	39	1	39	9	Table 2.5 will need to be altered to reflect changes to the WG1 TS table. (Government of Australia)	The table has been revised incorporating WGI material.
G-2-77	A	40	49	41	1	The information about atmospheric CO2 levels should be updated. Observed atmospheric concentrations currently are ca. 377 ppm. (For 2005, CO2 concentrations are 379 ppm, according to NOAA/NCDC.) Use of the SRES emissions scenarios is perfectly understandable. However, a clear statement of what current levels are and what future levels are currently accepted to be realistic (Working Group 1 report?) is very much needed. For example: Chapter 19 page 3 lines 34-37 should reflect that stabilization of CO2 at 450 ppm is unlikely. The 450 ppm level is referred to in various locations in this report; it's usefulness as a benchmark should be made clear. Note the statement by Hoffert et al. (2002, Science Vol 298:981) that "Targets of cutting to 450 ppm, and certainly 350 ppm, could require Herculean effort. Even holding at 550 ppm is a major challenge." For	The CO ₂ values have been updated (both observed and projected for SRES) but no reference is made here to stabilisation scenarios and it is not the role of this chapter to pass judgement on their realism or otherwise. That is the task of WG III. We are not able to include a figure for reasons of space.

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						current CO2 information see http://cdiac.ornl.gov/trends/trends.htm . A figure showing recent and projected future CO2 concentrations, perhaps but not necessarily containing the SRES projections, would be very useful here, to parallel Figure 2.7. (Government of USA)	
G-2-78	A	41	6			Refer to “four large world regions” in this sentence. This definition is far too broad and it is not clear which four regions are represented. (Government of Japan)	Definition of these regions was added in Box 2.6.
G-2-79	A	43	8	43	18	The authors need to explain why they have chosen the non-SRES global scenarios for comparison. The authors should also indicate whether other scenarios based on work done by the IEA, ABARE and MIT have been reviewed, illustrate a similar consistency. (Government of Australia)	This section is now considerably shorter, and the table has been omitted. Other global scenarios are referred to as alternatives that have been adopted in some CCIIV studies.
G-2-80	A	44	7			Section 2.3.2 contains no references to articles in the Special Issue "Climate change stabilization scenarios - socioeconomic and technological transitions" of Environmental Economics and Policy Studies Volume 7, Number 3, 2006. In particular the articles by Nakicenovic et al. (p. 137) and by Hanaoka et al. (p. 367) should be included. (European Union)	Articles in this issue are related only to mitigation, and not to use of these scenarios in CCIIV, so are relevant to WG III not to this chapter of WG II.
G-2-81	A	44	39	44	39	This should read „for stabilisation at 450 ppm or below, stabilisation levels often considered in policy analysis“ since also levels below 450 ppm CO2 are considered (Government of Germany)	The sentence has been revised so that 450 is not specified
G-2-82	A	44	39	44	40	This last sentence should be deleted, there is no need to single out a figure of 450 ppm and state that there is no SRES surrogate for it. (Government of Australia)	The sentence has been revised so that 450 is not specified
G-2-83	A	45	10	45	18	The two italicised sub headings when read in couplet are not useful. Suggest amending sub-headings. (Government of Australia)	Bullet points have been re-written into a single paragraph, with the explanations clarified.
G-2-84	A	45	16	45	16	Although there are the climateprediction.net estimate which increase the range for CS as compared to the TAR, the IPCC-Workshop in Paris in 2004 has narrowed the range to 2-4 °C with a best guess at 3°C. So essentially, one should say that, although the range is broader, confidence in values around 3°C has increased (Government of Germany)	This example has been replaced with one on increased consensus among GCM projections.
G-2-85	A	45	36		36	Section 2.4: The authors need to make sure that there is substantial underpinning in the preceding sections for each of the conclusions here. We do not necessarily disagree with the recommendations listed here, but we do not find discussion in the chapter of what the issue or methods are for each point. An example is, for	Chapter has been reformatted and conclusions are better supported. For instance, the reference to early warning was not in relation to early warning systems, but to warnings

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						example, line 36: There is no discussion in the chapter on early warning systems. (Government of USA)	concerning potentially severe impacts. These are treated in section 2.4.7.

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LATE GOV COMMENTS:

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2-1	LATE	0				With respect to Chapter 2, it may be said that it has been cleverly developed and completed with Section 2.4.- Key conclusions and future directions presenting a set of bullets bringing to decision making the majority of issues requiring attention to better respond to a changing climate change. Although it is understood that “good quality information” (page 45, line 32) also means better observations and monitoring, it would be wise to be more explicit, putting in black and white the urgent need to improve the observation and monitoring systems. Many developing countries, including Argentina, do not run sufficiently dense, well equipped, reliable operated surface and spatial observation systems and fail to produce convergent socio-economic information to enable, for instance, the evaluation of climate change impact 's costs and hence, avail information to decide on adaptation actions and their priorities. This chapter also emphasizes the need of new approaches regarding scenarios development. In this regard, the steps been taken under TGNES should be referred to the attention of policy makers. The activities of the TGCIA need also more disclosure (Government of Argentina)	We have added a separate point in new section 2.5 on enhanced observation systems. We also emphasise this point in the section on data needs (2.3.5). The TGICA is also mentioned in section 2.3.5.
2-2	LATE	2	51	3	2	Suggesting change “few” to “a few”, for there still some studies about adaptation scenarios for future have been developed at regional scale. (Government of China)	This point has been revised (omitting the wording being commented on) and moved from the Executive Summary to the concluding section under "Improved scenarios for poorly specified indicators".
2-3	LATE	3	11	3	13	Suggesting delete the sentence of “, but the importance of regional aerosol emissions and land use change to regional climate change has become more evident”, for the complexity of climate effect for both aerosol emissions and land use change. (Government of China)	This sentence has been omitted.
2-4	LATE	3	15	3	15	Suggesting change “singular events” to “extreme events” or “abrupt climate change”, for that the former is uncommon in climate change studies. (Government of China)	We now refer to these as "large scale singularities" and provide a definition in section 2.4.7. This terminology is in common with WG I and with other chapters in the WG II report.
2-5	LATE	9				In Table 2.2, the position of “qualitative” and “Quantitative” should be reversed, for “mathematical modeling approaches” should be quantitative and “stakeholder elicitation, narrative approaches” should be qualitative. (Government of China)	Table has been omitted and replaced with another. These terms are not now used.

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2-6	LATE	11	4	11	6	Suggesting redefine the concept of “risk management” more commonly, and combine with its “measured as likelihood × consequence” for the implication of measured equation is more clearly and directly than that “defined as the culture, processes and structures”. (Government of China)	This definition is a standard one found in the literature. We have made a slight revision to the text describing the equation.
2-7	LATE	17	20	17	20	Suggesting change the example of “wave height” as “extreme value” to a variable that is affect by climate change significantly, while discussed the methods of statistical downscaling. (Government of China)	We have included this example to illustrate the expanded range of variables being estimated using statistical downscaling. It is also useful to include because it illustrates extreme events.
2-8	LATE	20	28	20	28	Suggesting change “emission” to “sources and sinks”, for land use change mainly changes the source and sinks of GHS. (Government of China)	We have followed this advice.
2-9	LATE	24	18	24	18	Adding the various suggestions about “probabilistic representations of future climate change and socio-economic conditions suitable for use in impact assessment”, for some experts have different suggestion about change “deterministic prediction” to “probabilistic representations” (Government of China)	The section referenced here has been omitted.
2-10	LATE	31	35	31	42	Coupling of impacts, adaptation and vulnerability assessment with “Earth System Model” is difficult for it developed immaturely. The singular singular shows the condition in Amazon rainforest and integrating only the atmosphere with biosphere, so more convictive case should be add about the application of “Earth System Model” being developed to assess impacts, and elucidating the composition of “Earth System Model” mentioned here. (Government of China)	We have removed the subtitle, and revised the paragraph to make direct reference to WG I where these issues are discussed in more depth. In particular, WG I compares results from numerous model experiments that have simulated this coupling.
2-11	LATE	45	6	45	6	Deleting “as a speculative, narrowly defined academic curiosity” because it is not proper to say so here. (Government of China)	This has been revised.
2-12	LATE	45	11	45	14	Knowledge about “uncertainty has been reduced” for “Inter-model differences in projected climate have narrowed” is not suitable. The inter-model difference have no obviously decreased according the result of model sensitivity test. (Government of China)	These bullet points have been re-written into a single paragraph and the explanations clarified.
2-13	LATE	46	48	46	48	Suggesting change “Weather” to “Weather and climate” . (Government of China)	Implemented.