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THE IPCC FIFTH ASSESSMENT REPORT (AR5)

Progress Report of Working Group I

(Submitted by the Co-Chairs of Working Group I)

PROGRESS OF WORKING GROUP I TOWARDS THE IPCC FIFTH ASSESSMENT REPORT

Submitted by the Co-Chairs of Working Group I

1. Summary

The following is a report on the activities of WGI since IPCC-XXXI in October 2009.

Recent key activities and meetings for WGI, in chronological order, have been:

- Special Report on Managing the Risk of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX), First Lead Author Meeting held in Panama City, Panama, November 2009;
- Presentation on the WGI AR5 to the UNFCCC in Copenhagen, Denmark in December 2009;
- IPCC Expert Meeting on Assessing and Combining on Multi-Model Climate Projections held in Boulder, Colorado, USA, January 2010;
- Publication of the *Meeting Report of the IPCC Expert Meeting on Detection and Attribution Related to Anthropogenic Climate Change* and the *Good Practice Guidance Paper on Detection and Attribution Related to Anthropogenic Climate Change* in February 2010;
- SREX Second Lead Author Meeting held in Hanoi, Vietnam, March 2010;
- Nominations and Selection of Coordinating Lead Authors, Lead Authors, and Review Editors for the Working Group I contribution to the IPCC Fifth Assessment Report;
- IPCC Workshop on Sea Level Rise and Ice Sheet Instabilities, held in Kuala Lumpur, Malaysia, June 2010;
- IPCC Cross-Working Group Meeting on Consistent Treatment of Uncertainties, held in Stanford, California, USA, July 2010;
- Publication of the *Meeting Report of the IPCC Expert Meeting on Assessing and Combining Multi Model Climate Projections* and the *Good Practice Guidance Paper on Assessing and Combining Multi Model Climate Projections* in July 2010;
- Implementation of the WGI AR5 E-Journal Programme, August 2010;
- IPCC Cross-Working Group Meeting on Article 2 of the UNFCCC, held in Liege, Belgium, August 2010;
- *Workshop Report of the IPCC Workshop on Sea Level Rise and Ice Sheet Instabilities* finalized for publication in September 2010;
- Preparation of the WGI AR5 First Lead Author Meeting, to be held in Kunming, China, November 2010;
- Preparation of the IPCC WGII/WGI Workshop on Impacts of Ocean Acidification on Marine Biology and Ecosystems, to be held in Okinawa, Japan, January 2011.

2. WGI AR5 Nominations and Author Selection

2.1 The WGI AR5 Nomination and Selection Process

The call for nominations of Coordinating Lead Authors, Lead Authors and Review Editors was sent to IPCC member Governments and International Organizations on 15 January 2010. 1014 nominations were received by WGI. Nominations were checked for correct assignment and completeness (nomination form, CV) and, where necessary, IPCC Focal Points were contacted to supply missing information. This resulted in 949 complete nominations for consideration. Following receipt of the nominations, the WGI TSU distributed the list of WGI nominations, along with CVs, to the WG Bureau to begin the intensive and multi-step selection process.

The WGI TSU expanded the information provided in the nominations database to include information for all nominees on past IPCC involvement, where possible years since PhD, and recent (since AR4) and overall publication activity as well as its productivity and impact. Using the publications record, primary expertise listed in the nomination and information in the CV, the scientific expertise was considered against the detail of the approved chapter outline in order to ensure sufficient topical coverage within each of the chapters. This robust process enabled the WGI Bureau to develop a preliminary list that

focused on scientific excellence. Following this step, WGI Bureau members revisited the list to address gaps in regional and gender balance or scientific expertise. Where gaps were identified, WGI Bureau members nominated additional experts from their region or area of expertise, resulting in a total number of 977 complete nominations for consideration. A subsequent iteration by the WGI Bureau further refined the list and provided a first assignment of roles based on scientific expertise and coverage as well as regional and gender balance.

The WGI Bureau met for two full days in Montreux, Switzerland, immediately before the 41st Session of the IPCC Bureau to finalize its selection of CLAs, LAs and REs. The WGI Co-Chairs, on behalf of the WGI Bureau, presented the slate to the 41st Session of the IPCC Bureau. In response to feedback provided by the IPCC Bureau the WGI Bureau expanded its list and invitations were extended to 258 experts. Two regrets were received and those experts were replaced via discussion with the WGI Bureau by email.

2.2 The WGI AR5 Chapter Team Compilation

On 25 June the slate of Coordinating Lead Authors, Lead Authors and Review Editors for the 14 Chapters of the Working Group I contribution to the IPCC Fifth Assessment Report *Climate Change 2013: The Physical Science Basis* was finalized. This table provides summary statistics for the experts nominated and selected for the WGI AR5. Note that all country designations and regional calculations are based on the country of residence.

Working Group I contribution to the IPCC Fifth Assessment Report <i>Climate Change 2013: The Physical Science Basis</i>		
Coordinating Lead Authors, Lead Authors and Review Editors	WGI AR5 Nominations	WGI AR5 Selection
Total	977	258
Countries Represented	68	44
New to Working Group I in the role of CLA, LA or RE	849 (87%)	168 (65%)
Female	161 (17%)	48 (19%)
DC/EIT	268 (27%)	63 (24%)
WMO Regional Distribution		
Africa	34 (4%)	12 (5%)
Asia	209 (21%)	39 (15%)
South America	29 (3%)	10 (4%)
North America, Central America and Caribbean	279 (29%)	80 (31%)
South West Pacific	45 (5%)	19 (7%)
Europe	381 (39%)	98 (38%)
WGI AR5 Chapter Team Members: http://www.ipcc-wg1.unibe.ch/AR5/wg1authors.pdf (updated August 2010)		

The WGI AR5 report will cover a wider scope than before with a separate chapter for the first time on clouds and aerosols and end-to-end assessments of sea level change and of the carbon cycle. There is a strong emphasis on regional climate change with this forming part of two chapters on climate change projections, a separate chapter on climate phenomena and an important new feature of the WGI AR5, the Atlas of Global and Regional Climate Projections. The greater scope and complexity in the outline is reflected in a larger average size of the chapter author teams and an increase in the total number of authors as compared to AR4.

Scientific expertise is paramount in an assessment of the physical science basis of climate change and it is vital that all aspects of the approved chapter outline are well covered. WGI is conscious of its role as part of an intergovernmental panel and is committed to ensuring good representation of regional expertise as well as gender balance. Serious efforts were made to ensure good coverage of experts from developed and developing countries and countries with economies in transition (DC/EIT). There was also a conscious effort to include a substantial number of scientists new to the IPCC process in the author teams, allowing this assessment to take a fresh look at all the issues.

In selecting Review Editors, emphasis was placed on selecting experts who have considerable international stature in their fields and/or who have previously acted in senior roles in previous IPCC assessments. This is intended to provide authoritative advice to the author teams as well as to bring the benefits of prior experience with the assessment process, while at the same time facilitating an influx of new experts to actually write the chapters.

It is anticipated that the already considerable workload involved for REs in considering all the authors' responses to the comments received is likely to increase in AR5. In order to cope with this and because of the importance of the RE role in providing well balanced advice to the author teams, the WGI Bureau chose to have three REs on all chapters. As has been the previous practice, the WGI Vice-Chairs will complement the RE selection on some of the key chapters, bringing the total number of REs on those chapters to four.

2.3 Linkages to other Working Groups and Treatment of Cross-Cutting Themes

Extensive discussions were held among the Co-Chairs and TSUs of the three WGs to ensure that experts nominated for more than one WG would be used to their best capacity and where possible could provide a contribution to more than one WG. Recognizing that dual roles place a very large burden on the individual concerned, the selection of dual LAs was minimized. Another option that was exercised sparingly was for an expert to be an LA in one WG and an RE in another WG. Following discussions with the Co-Chairs of the other WGs, the best option is that of designated Contributing Authors (dCA) where an author of a chapter in one WG would be identified by the Co-Chairs to provide a specific contribution to a chapter in another WG report. This would be a much more limited dual role than that of a joint LA but would ensure good transfer of knowledge between the WG reports. WGI will also encourage specially invited expert reviewers who would carry out an expert review of selected chapters in two WG reports.

WGI's strategy for incorporating the IPCC Cross-Cutting Methodologies (CCMs) and Cross-Cutting Themes (CCTs) was presented at the 11th Session of WGI in Bali (see WG-I:11th /INF.1) and met with government approval there. As noted in WG-I:11th /INF.1, the WGI AR5 will link to the other WGs as appropriate and will give special consideration to those CCMs and CCTs that have a home in the contribution on the physical science basis. This includes the following CCMs and CCTs: *Consistent Evaluation of Uncertainties and Risks* (CCM), *Regional Aspects* (CCM), *Water and the Earth System* (CCT), *Carbon Cycle including Ocean Acidification* (CCT), *Ice Sheets and Sea Level Rise* (CCT), and *Issues related to Article 2 of the UNFCCC* (CCT). The use of WGI dCAs will support the treatment of the CCMs and CCTs within the WGI AR5 and across the other WG Reports.

3. Other Activities in Support of the WGI AR5

Additional key activities that have been completed in support of the WGI AR5 since IPCC-XXXI:

- In February 2010, WGI published the *Meeting Report of the IPCC Expert Meeting on Detection and Attribution Related to Anthropogenic Climate Change* and the *Good Practice Guidance Paper on Detection and Attribution Related to Anthropogenic Climate Change*. The Guidance Paper, written by a core writing team of participants from Working Group I and Working Group II and reviewed by all the participants of the meeting, seeks to clarify methods, definitions and terminology across the two working groups and is intended as a guide for the IPCC Lead Authors. This paper also outlines guidelines for how to assess the relative quality of studies and provides recommendations for good practice in detection and attribution studies. In this respect, it discusses criteria for assessing confidence, outlines data requirements and addresses methods for handling confounding factors. The published Meeting Report is available from the Secretariat and electronic copies of the Meeting Report and the Good Practice Guidance Paper are available from both the IPCC and WGI websites.
- In July 2010, WGI published the *Meeting Report of the IPCC Expert Meeting on Assessing and Combining Multi Model Climate Projections* and the *Good Practice Guidance Paper on Assessing and Combining Multi Model Climate Projections*. The Guidance Paper, written by a core writing team of participants from Working Group I and Working Group II and reviewed by all the participants of the meeting, summarizes methods used in assessing the quality and reliability of climate model simulations and in combining results from multiple models, and provides recommendations for good practice in using multi-model ensembles. It is intended for IPCC Lead Authors of AR5 as well as for scientists working in model intercomparison projects. The published Meeting Report is available from the Secretariat and

electronic copies of the Meeting Report and the Good Practice Guidance Paper are available from both the IPCC and WGI websites.

- Recognising that the high cost of scientific journals may be prohibitive for the Coordinating Lead Authors, Lead Authors and Review Editors from developing countries and countries with economies in transition (DC/EIT), WGI has developed a programme that will provide the qualifying experts free on-line access to key journals on climate science through the University of Bern Library, with additional support provided by the Library of ETH Zurich. This resource will enhance the ability of the WGI DC/EIT authors to follow and assess the new science as it unfolds during the assessment period. Implementation of the WGI AR5 E-Journal Programme was completed in August 2010 and all qualifying experts have been invited and provided individual access details. The Programme has been well received by the participants and preliminary reports indicate that there is significant usage of this resource in advance of our First Lead Author Meeting in November 2010.
- In September 2010, WGI finalized the Workshop Report of the IPCC Workshop on Sea Level Rise and Ice Sheet Instabilities for publication. The Workshop Report provides a synthesis of the workshop proceedings, including reports from breakout groups. The extended abstracts submitted by the participants in advance of the Workshop are also included as an annex to the Report. The Workshop Report is currently being published and will be available from the Secretariat. Electronic copies of the Workshop Report will be available from both the IPCC and WGI websites.

4. Meetings in Support of the WGI AR5

Several key IPCC Expert Meetings, Workshops, Cross-Working Group Meetings, and Lead Author Meetings have already been held or are in planning in support of the development of the WGI AR5:

- The IPCC Expert Meeting on Assessing and Combining Multi-Model Climate Projections was held in Boulder, Colorado, USA, 25-27 January 2010. This meeting, attended by 49 experts from the Working Group I and Working Group II communities, provided an important opportunity for the experts to discuss the establishment of a framework for using and assessing climate model results in the AR5. The meeting included Keynote Presentations, Breakout Groups and Poster Sessions. The *Good Practice Guidance Paper on Assessing and Combining Multi Model Climate Projections* has been published as both a stand-alone paper and a component of the *Meeting Report of the IPCC Expert Meeting on Assessing and Combining Multi Model Climate Projections*. Further collaboration between the authors of the relevant chapters within the two working group reports is planned.
- The IPCC Workshop on Sea Level Rise and Ice Sheet Instabilities was held in Kuala Lumpur, Malaysia, 21-24 June 2010. Following the approval of the WGI Proposal (Bur-XL/Doc. 6, IPCC-XXXII/Doc. 10) to hold this Workshop, a call for nominations went out to all IPCC Focal Points of member Governments and Observer Organizations from the Secretariat on 5 December 2009, with a close date for nominations of 29 January 2010. 138 nominations from 63 countries were received. Where gaps in scientific expertise or gender and regional balance were identified, Scientific Steering Committee and WGI Bureau members nominated additional experts from their region or area of expertise. A total number of 197 complete nominations were considered. The Workshop brought together 93 of the leading world experts to discuss the latest results from observations related to sea level rise from oceanographic, cryospheric and paleo records, including information on thermal expansion of the ocean, melting of glaciers and small ice caps, changes in the mass balance of Greenland and Antarctica, changes in ocean circulation, and changes in water storage on land. The Workshop addressed the current understanding, and limitations, of ice sheet and ice stream dynamics, including information on their sensitivity to changes in the forcings and on potential irreversibility associated with ice stream or whole ice sheet instabilities. Modelling tools used to project sea level rise were critically evaluated. Both the uncertainties and the possible constraints of the resulting projections were discussed. A Workshop Report was finalized in September 2010 and is in publication.
- IPCC Cross-Working Group Meeting on Consistent Treatment of Uncertainties was held in Stanford, California, USA, 6-8 July 2010. A key cross-cutting issue in IPCC assessments is uncertainty, its terminology, use, and coherency across the Working Groups. In the AR4, uncertainty language was sometimes inconsistently used across the Working Groups and thus caused confusion among the readers of the AR4. In order to address this important issue in the preparation of the AR5, the Co-Chairs of all three WGs organized a small cross-WG meeting, with the goal of providing concise and standardized guidelines to AR5 authors on characterizing levels and sources of uncertainty in order to improve their consistent application, and to improve communication with the users of the AR5. A small core writing team from the meeting is currently finalizing a revision of the *Guidance Notes on Addressing Uncertainties for AR4 Lead Authors*.

This revision will be reviewed by all the cross-WG meeting participants before its publication which is planned in advance of the WGI First Lead Author Meeting in November 2010.

- IPCC Cross-Working Group Meeting on Article 2 of the UNFCCC was held in Liege, Belgium on 24 August 2010. Results of the AR5 informing on issues raised by Article 2 (e.g., levels of stabilization, dangerous interference, etc.) are of key relevance to policymakers. In order to address this important issue in the preparation of the AR5, the Chair of the IPCC organized a small cross-WG meeting, with the goal of discussing possibilities of facilitating the flow of information on these issues into the AR5 Synthesis Report. Rather than a possible Expert Meeting, it was found that a more continuous process in all WGs should be established to ensure a consistent delivery of information to the Synthesis Report. A proposal by the WGI Co-Chairs of synthesizing, in each WG, material relevant to Article 2 in the form of one Box and one FAQ has met wide support. The Synthesis Report core writing team would then have available 3 Boxes and 3 FAQs from which further synthesis could start.
- The Working Group I First Lead Author Meeting will be held 8-11 November in Kunming, China. This first meeting of Coordinating Lead Authors and Lead Authors will be critical in making a substantive start to the WGI contribution to the AR5.
- A WGII/WGI Workshop on Impacts of Ocean Acidification on Marine Biology and Ecosystems will be held in Japan in January 2011. This workshop is being organized primarily by WGII and will provide an opportunity for the experts from the WGI and WGII communities, as well as the relevant authors from each of the Reports, to discuss the rapidly advancing research in this area. The workshop will stimulate communication among the scientists and authors across the disciplines and WGs, encourage efficient transfer of information, and provide an opportunity to further the information that will be assessed in the AR5.

A complete listing of all planned meetings in support of the development of the WGI AR5 is available from the WGI website: <http://www.ipcc-wg1.unibe.ch/meetings/meetings.html>

5. Special Reports

Working Group I is actively engaged in the WGI/WGII Joint Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). Operational oversight resides with Working Group II, but the WGI Co-Chairs, Bureau and TSU have remained heavily involved throughout the process in particular in support of Chapter 3, which is the responsibility of WGI and is entitled "Changes in Climate Extremes and their Impacts on the Natural Physical Environment". In response to comments received during the Zero Order Draft Review, Chapter 3 has made some minor changes in structure to better present the information. In particular, for better user accessibility, text of any specific extreme (e.g., tropical cyclones) that was dispersed across five separate sections is now collected in subsections. The First Order Draft was completed in July 2010 and the Expert Review has recently been completed. Authors and Review Editors will meet later this month for the Third Lead Author Meeting to consider the comments received. A full Progress Report on the SREX has been provided by the Co-Chairs of WGII (see IPCC-XXII/Doc. 10).