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PROGRESS REPORT

Expert Meeting on Assessing Climate Information for Regions

(Prepared by the Co-Chairs of Working Groups I and II)

(Submitted by the Secretary of the IPCC)

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PROGRESS REPORT

Expert Meeting on Assessing Climate Information for Regions

1. Introduction

The Intergovernmental Panel on Climate Change agreed at its 47th Session (Paris, France, 13-16 march 2018) a proposal from the Co-Chairs of Working Group I and II for an Expert Meeting on Assessing Climate Information for Regions. The Expert Meeting proposal aimed to address the inter-linkage between regional climate information needs of the Working Group I (WGI) and Working Group II (WGII) IPCC Sixth Assessment Reports (AR6). For the Working Groups main contributions in AR6 to comprehensively inform regional risk assessment and decision making, it is important to evolve from the traditional one-direction approach of WGI in providing "regional climate information" to WGII and Working Group III (WGIII), to a more integrated approach or “handshake” in which regional climate information and the associated uncertainty; building on observations, reanalyses, detection and attribution, as well as projections and hazards, exposure, vulnerability, impacts and risks as well as response options for adaptation are considered together.

The meeting was held in Trieste, Italy, from 16 to 18 May 2018 and hosted by the International Centre for Theoretical Physics (ICTP). It brought together 110 experts from 43 countries taking into account regional and gender representation, expertise and experience in this field (see Annex). The meeting included authors from the regional chapters of AR6 WGI and WGII reports, including experts in global and regional climate modelling, regional observations and reanalyses, climate extremes, and risks and impacts analysis. The Expert Meeting was scheduled one month prior to the first Lead Author Meeting (LAM1) of WGI, and thus its outcomes were carefully considered during LAM1 for the shaping of the WGI internal draft.

The meeting aimed to explore the needs of regional information for the risk assessment framework and the current knowledge gaps in developing regional climate information. The meeting also sought to foster a coordinated way for the Working Groups (WGs) to integrate/consolidate/communicate regional climate information that spans the domains of the three WGs in the AR6. This meeting built on the 2015 Brazil workshop – with the aim to provide more operational guidance for the AR6; the Future-Earth-PROVIA-IPCC workshop on integrated research on climate risk and sustainable solutions across IPCC Working Groups, held in Sweden in August 2016 – which included a dedicated task group on sharing information on risks and solution strategies across local to global scales; and the WGIII Expert Meeting on Scenarios, held in Ethiopia in April 2017 – which indicated that substantial literature is accumulating on potential future societal vulnerability at the regional level based on the Shared Socioeconomic Pathway (SSP) scenario framework.

The meeting’s outcomes are expected to feed into the WGI and WGII AR6 report, in particular on the issues of linking global to regional climate change, extending the overall narrative of the WGI report to explicitly assess the foundations for information about regional climate change and regional phenomena (Chapter 10); treating weather and climate extreme events in a changing climate, within the context of regional relevance for WGII and accounting for both driving mechanisms, observed changes, models ability and fitness-for-purpose, and projected changes of extreme events, as well as the role of natural variability and the interplay between dynamic and thermodynamic processes (Chapter 11); providing end-to-end assessment of climate change information for regional impact and risk assessment, contributing to regions specific assessment of the present and future climate risks (Chapter 12); and developing a regional Atlas.

The meeting’s discussions are summarized in Section 2 of this document. The indicative bullet points resulting from the scoping of the regional Atlas are presented in Section 3. Key recommendations are highlighted in Section 3.

The Co-Chairs of WGI and WGII would like to thank all those involved in this meeting, namely, the experts who participated, and the members of Scientific Steering Committee (SSC) and WGI and WGII Bureau and their Technical Support Units (TSUs), for their contribution to make this meeting a success. In particular, the Co-Chairs would like to express sincere gratitude to the International Centre for Theoretical Physics and IPCC Secretariat for their generous support to hosting this meeting.

2. Summary of the discussions

The expert meeting was scheduled over 3 days and its format consisted of two elements: three plenary sessions with invited scientific keynote speeches and perspective presentations, and nine breakout group (BOG) sessions to allow for extensive exchanges of ideas among participants.

The plenary deliberations first focused on assessing climate information, from global to regional changes, and provided participants with a broad perspective on the IPCC Sixth assessment cycle including its timescale, products, objectives, and dimensions central to the Expert meeting on Assessing Climate Information for Regions. IPCC Co-Chairs of WGI and WGII outlined the meeting objectives and the rationale for developing a joint WGI and WGII regional Atlas. The regional perspective of the WGIII assessment was also discussed, including the regional specificities associated with mitigation response options, the perspective of WGIII on the risk assessment concept, as well as the mitigation- adaptation- Sustainable Development linkages.

The AR6 places an important weight on integrating the risk framework with solution-focused information and the growing demand for policy-relevant regional climate information, in support of international climate policies within the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. The need of regional climate information is also relevant for the inclusion of responses to climate change in the broader global development agenda. Enhancing the policy-relevant regional aspects of the AR6 will also provide a robust scientific basis to strengthen regional cooperation on adaptation.

The regional emphasis of past IPCC reports has been rich, but highly heterogeneous and varied across WGs, often leading to regional statements with low confidence. This is due partly to the heterogeneous nature of climate observations across regions worldwide and the limitations of historical records. Therefore, it is essential to distinguish climate information from climate data, and place climate information into a relevant context in order to construct “useful” climate information. Recent climate modelling advances and research initiatives (e.g. CORDEX[1], Future Climate for Africa[2]) offer a wide range of opportunities to integrate across multiple regional climate information sources, enhance the recognition of context in constructing and constraining regional climate messages, and to foster co-assessment within and between IPCC Working Groups. However, there is a need to assess methods used for climate downscaling and the associated uncertainty, and to provide clear recommendations for the AR6 Authors – more specifically on the issues of regional scale use of IPCC guidelines for detection and attribution (hereafter D&A), multi-models assessment and treatment of uncertainties.

The second plenary discussions focused on the regional climate information needs for the assessment of sectoral and climate change impacts and risk. Specific consideration was devoted to the Fifth Assessment Report (AR5) climate risk analysis and management framework, highly differentiate impacts, and the decision-making under uncertainty, with particular attention to near-term and long-term regional climate information and communication challenges. Discussions further expanded on the regional requirements for the impact modelling community and the development of a unified concept of risk, including both hazards associated with climate change and risk - reduction from the climate change response (adaptation and mitigation strategies). It was noted that the

[1] Coordinated regional climate downscaling experiment (CORDEX): http://www.cordex.org/

[2] Future climate for Africa (FCFA) : http://www.futureclimateafrica.org/fr/

demand for regional climate information may be stimulated through research advances and needs, legislation, improved understanding of climate services and disaster risk reduction.

The third plenary discussions focused on Scoping of the AR6 Regional Atlas and spanned a wide number of critical dimensions to be accounted for. Perspectives from ongoing Atlas experiences included the CORDEX based Atlas for Africa and the NARCCAP (North American Regional Climate Change Assessment Programme) based for North America, and the IPCC AR5 WGI Atlas. There are challenges and research opportunities tied up to the development of the AR6 regional Atlas including the distillation and consistency of regional climate information from multiple methods, which can lead to conflicting results and messages. The IPCC AR6 regional Atlas was suggested to be a key resource of information for the regional risk assessment framework.

The parallel breakout groups (BOGs) sessions provided an opportunity for participants to discuss in small groups some of the key dimensions related to assessing climate information for regions. Each BOG was supported by members of the Scientific Steering Committee and led by a team consisting of two facilitators and a rapporteur selected from within the participants, and who reported back to the plenary a summary of the discussion and conclusions.

BOG discussions addressed the following issues:

- ✓ Detection and attribution, its application across Working Groups and across regions.
- ✓ Definition of regions and sub-regional areas for consistent treatment by regional chapters and Atlas.
- ✓ Alternative approaches to regional information, such as climatic zones, mountain areas, the use of case studies.
- ✓ Information needs for various impact sectors.
- ✓ Information quality/uncertainty/availability in different regions and at different scales.
- ✓ Presentation format and communication issues related to regional climate.
- ✓ Atlas list of indicative bullet points.
- ✓ Atlas variables/indices/scenario info.
- ✓ Atlas methodology.

3. Scoping of the regional Atlas – indicative bullet points

- Framing: purpose, scope, limitations, and introduction; beyond AR5, from past to future and an interactive product.
- Regions, time slices; data selection, observations; scenarios, levels of warming; attribution, models, and other tools.
- Treatment of biases, inhomogeneity and data gaps combining information from multiple sources e.g. CMIPs, CORDEX and observations; communication of confidence and uncertainty.
- Key variables, indices and metrics linked to WGI chapters.
- WGII-relevant variables/sector-specific indices/hazard information.
- Spatially resolvable phenomena (e.g. monsoons, storm tracks).
- Presentation and communication approaches: Guidance, Maps, figures, tables, animations, narrative, uncertainty.
- Traceability to WGI chapters, processing and curated datasets; IPCC stamp.
- Regional summaries and case studies.
- Detection and attribution

4. Key recommendations

(1) Guidance on detection and attribution, its application across Working Groups and across regions

- Update the 2010 IPCC Good Practice Guidance document on detection and attribution related to anthropogenic climate change (Hegerl et al, 2010[i]). The goal is to develop a process that provides some brief update on guidance in order to provide guidance in the development of AR6, for instance in relationship with regional information and with the attribution of single events.
- Make consistent use of the risk assessment framework across WGI and WGII and regions.
- Explore the extent to which event attribution methodologies and language developed in WGI can be applied consistently to impacts and attribution of changing risk in WGII.

(2) Guidance on the definition of regional and sub-regional focus areas

- Consider options to facilitate the definition of regions and sub-regions in the context of risk and sectoral assessment. This will ensure consistency between WGI and WGII definitions of regions, taking into account cross-regional information on hazards like compound events. It is suggested to start off with the regional definitions proposed by AR5 (including SREX), SR1.5, and SROCC reports.
- There is a critical need for WGI and WGII authors to work closely together in identifying trade-off and balance between the regional climate information needs, as well as confidence/uncertainty and scales at which regional climate information is assessed. This will foster consistent regional treatment across the WGs contributions to the AR6.
- Consider options to identify cross-WGs issues that need a coupled implementation process in order to ensure oversight and foster the coordination.

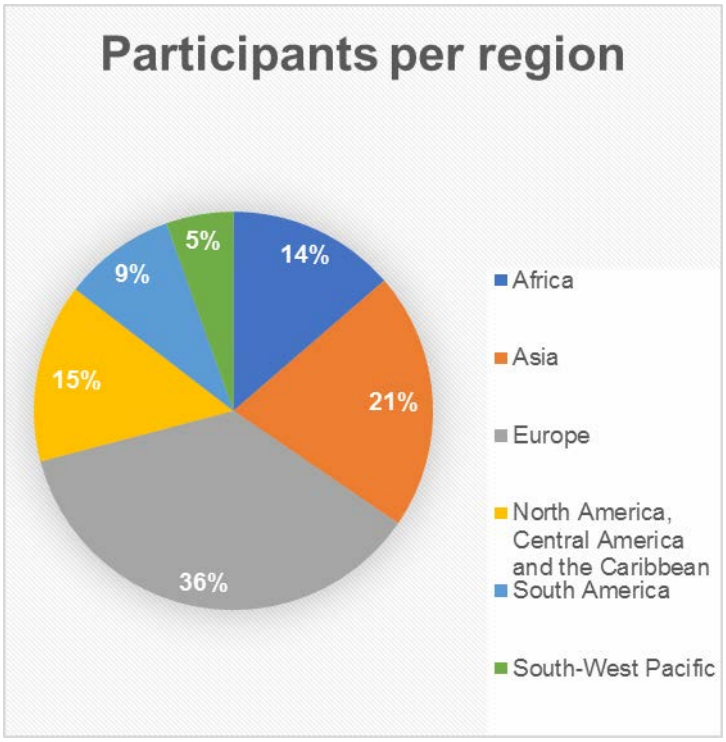
(3) Guidance on alternative approaches to providing regional information

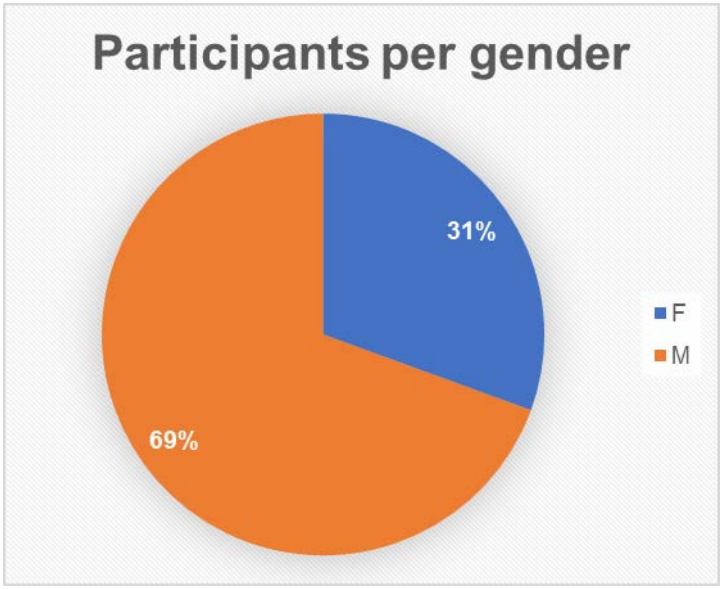
- Consider various approaches to pull together multi-sources of information and obtain an improved regional perspective.
- Consider options to move beyond the use of simple maps and examine other types of figures and aggregations methods (e.g. time-series, bar charts), as well as impact-relevant and risk relevant thresholds.
- Consider options to assess narratives that factor in risk exposure.
- Consider options to assess timescales of interest and natural variability in systems.

(4) Guidance on regional information needs for various impact sectors

- Engage in a dialogue with the WGII authors of the AR6 to scope the sectoral regional information needs and metrics. Ideally, WGII authors would provide key sectoral variables, while WGI authors focus on assessing the methodological issues. SREX as well as Chapter 3 of SR1.5, Impacts of 1.5°C global warming on natural and human systems, is an illustration of WGI and WGII working together and will serve as a starting point for the identification of impact metrics and variables of interest.
- Prepare guidance document on assessing and portraying multiple sources of regional climate information.

Annex: Statistics of participants in the expert meeting





[i] Hegerl, G. C., et al., 2010: Good practice guidance paper on detection and attribution related to anthropogenic climate change. In: Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Detection and Attribution of Anthropogenic Climate Change [T. F. Stocker, et al. (eds.)]. IPCC Working Group I Technical Support Unit, University of Bern, Bern, Switzerland, 8 pp