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**PROGRESS REPORTS**

**Working Group I contribution to the Sixth Assessment Report**

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

(Submitted by the Secretary of the IPCC)

## PROGRESS REPORTS

### Working Group I contribution to the Sixth Assessment Report

#### 1. First Lead Author Meeting (LAM1) and internal review

LAM1 was held from 25 to 29 June 2018 in Guangzhou, China, at the invitation of the Chinese government and brought together nearly 250 participants. This meeting was an opportunity for authors to get acquainted with the objectives of their chapters but also with IPCC procedures. In addition to chapter meetings, several plenary and Q&A sessions were organized. An electronic system allowing participants to ask questions online during the plenary sessions and throughout the meeting was put in place to facilitate the participation of all. Various "general" topics such as procedures, planning, tools available, were addressed. This first meeting also made it possible to bring out certain transversal themes and to initiate the first discussions between chapters. Finally, the Working Group I (WGI) presented the IPCC Code of Conduct for the first time, developed in coordination with the IPCC Secretariat and the other Working Group (WG) Technical Support Units (TSUs) and in consultation with WGI Bureau members, with the aim of creating and guaranteeing a respectful working environment and raising awareness on issues related to implicit bias.

At the end of the meeting, an anonymous questionnaire was sent to all participants asking for their opinion about their experience (<https://www.surveymonkey.com/r/WG1LAM1>) to improve the preparation of future meetings and to take into account any difficulties and obstacles encountered by participants (e.g. a language barrier, gender issues, being a new author). Overall, the participants' experience was very positive. The recommendations for improvement focused mainly on the need for additional time for chapter meetings. Participants recognized the usefulness of informal Q&A sessions. Barriers to participation included proficiency in English, gender issues, being a young researcher or a new IPCC participant, some people dominating discussions. Training requests (on how to conduct "multi-cultural" meetings, on how to prepare an IPCC report, on biases related to prejudice) were noted.

Experts identified by Bureau Members, all WGI, WGII, WGIII Authors and Special Report Coordinating Lead Authors (CLAs) were invited review an initial chapter strawman prepared by WGI authors after LAM1. The objective was to test ideas on chapter structure, and check the coherence and logical flow of information. The review took place between 29 October and 25 November: 380 participants registered and 194 sent a total of 5294 comments. This review was a supportive process for WGI authors to design the chapter outlines and coordinate topics across chapters and reports.

#### 2. Second Lead Author Meeting (LAM2)

LAM2 was held on January 7-11, 2019 in Vancouver, Canada at the invitation of the Canadian government through its Environment and Climate Change Canada department. 212 participants attended the meeting. The priorities of the week were to discuss revisions to the draft building on the outcomes of the internal review, identifying policy relevant key messages and new findings for chapter Executive Summaries, to develop the report storyline and coherency across chapters and across the AR6 (SR15, SROCC, SRCCL, WGII, WGIII). Establishing coordination mechanisms across chapters was a key priority including addressing overlaps, gaps, inconsistencies and coordinating the use of common methodologies, datasets, indices and diagnostics. Coordination mechanisms established by chapters includes setting up cross-chapter thematic author teams, cross-chapter boxes, cross-chapter technical annexes and coordinating the assessment of case studies. Daily coordination meetings were held with CLAs and the WGI Bureau and TSU.

Two WGII participants attended the LAM2 (Brian O'Neill, CLA of Ch 16, and Linda Mearns, RE of Ch 14), participating in on plenaries, various chapter meetings, and breakout group discussions, and engaging in a variety of ad hoc meetings with authors. In addition, the three CLAs of the WGI Atlas chapter, two of whom (Richard Jones and Gemma Narisma) will attend the January 21-25 WGII First Lead Author Meeting in Durban, discussed topics for cross-working group coordination throughout the meeting. All five participated in a meeting with IPCC Bureau members partway through the week, and with a sub-set of Bureau and TSU members on the final day.

A report was prepared by O'Neill and Mearns, with input from Jones and Narisma as well as from the WGI Bureau and TSU<sup>1</sup>. It describes the major points of coordination identified during the week by all of these individuals and recommends follow-up actions, many of which would be best undertaken at the WGII Durban meeting next week, although others are longer term.

Aspects related to the preparation of an exhaustive, balanced and transparent assessment were addressed including the access and use of CMIP6 datasets, the preparation of the WGI Atlas and the preparation of open source, community software for the preparation of chapter figures, including its curation to provide traceable provenance of the assessed digital information.

CLAs completed a deliverables table that was submitted to the TSU by the end of the meeting. The outcomes of meeting requested were a revised outline including author allocations, key messages, FAQs, cross-chapter boxes, cross-chapter annexes, case studies, identifying cross-chapter issues and author representatives.

In addition, in answer to the feedback received from the authors after LAM1 asking for support in their teamwork, but also to support the establishment of the IPCC Code of Conduct (launched at LAM1) and the development of an inclusive work environment, WGI welcomed an external consultant, SHIFT Collaborative, to organize a training on the theme "Inclusive practices, collaboration and group dynamics".

At the end of the meeting, a questionnaire (<https://www.surveymonkey.com/r/WGILAM2>) was sent to all participants asking for their (anonymous) opinion about their experience. The full analysis of the answers to this survey are available in the LAM2 report.

The LAM2 report is available here:

<https://files.lsce.ipsl.fr/public.php?service=files&t=7d1b611783232ff767522fdb3cc7aaec>

### **3. Coordination of cross-WG topics**

Cross-WG coordination discussions are underway on topics that are cross-cutting and benefit from an integrated approach across all WGs to ensure a consistent and comprehensive assessment in AR6. Topics include scenarios, risks, regional information, and storylines. Bureau members and TSU support the coordination of these topics and foster close interactions between authors of different reports and across WGs, also as a key element of integration for the AR6 Synthesis Report.

The IPCC Expert Meeting on Assessing Climate Information for Regions was held on 16-18 May 2018 in Trieste, Italy, hosted by the Abdus Salama International Centre for Theoretical Physics (ICTP). The meeting explored the needs of regional information for the risk assessment framework and the current knowledge gaps in developing regional climate information, as well as the inter-linkage between regional climate information needs across the WGs. A report was published with the outcomes of the discussions, recommendations and the scoped outline of the WGI Atlas<sup>2</sup>.

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<sup>1</sup> [https://wg1.ipcc.ch/share/xwg%20report\\_WG1LAM2\\_19jan19.pdf](https://wg1.ipcc.ch/share/xwg%20report_WG1LAM2_19jan19.pdf)

<sup>2</sup> [https://www.ipcc.ch/site/assets/uploads/2018/05/AR6\\_WGI\\_EM\\_Regions\\_Low\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/2018/05/AR6_WGI_EM_Regions_Low_Res.pdf)

#### **4. Training on diversity and inclusion in the IPCC**

A package of training, dialogue and facilitation of inclusive practices, collaboration and participatory group dynamics has been piloted by WGI following the introduction of the IPCC Code of Conduct at LAM1 and recommendations of participants of the first WGI Lead Author Meeting (LAM1) on actions to foster an inclusive, welcoming and inspiring environment that is suitable for the preparation of the WGI report.

The WGI Bureau and TSU has involved external experts to support the development of a toolbox of resources that can be used in the preparation of the WGI report. Going forwards, after the LAM2, the work on developing the toolbox will continue towards supporting the consensus-based decision-making process that is at the heart of the IPCC process. The next stages of the training package are being prepared. On-side training will be provided at LAM3 and LAM4 as well as in preparation for the WGI Session at the 54th Session of the IPCC.

Lessons learned and recommendations have been made to the joint TSU-Secretariat Operations Action Team and as part of the WGI TSU contribution to the work of the Task Group on Gender.

#### **5. Communications**

The TSU is in the process of preparing the WGI Communications Strategy, building on lessons learned during the preparation of the SR15 and in the context of the communications opportunities related to the WGI assessment. The TSU organized a communication retreat in November 2018 with the aim of defining priority targets, essential subjects and the means to be put in place to achieve them. The meeting started with an overview of how the recommendations from at the IPCC Expert Meeting on Communication (February 2016) have been considered. All the actions carried out in 2018 and their impact as well as the projects for 2019 were discussed. A set of topics, targets, tools, potentially interesting approaches for the future were identified.

To follow up, the TSU invited authors who were interested to share their experience and best practices in communication and to discuss opportunities for the AR6. A mini-workshop was held during LAM2 where the main elements of the Communications Strategy were presented and discussed. The mini-workshop addressed how communication aspects reflect and feedback onto the preparation of the report (e.g. FAQs, graphics, SPM, Glossary) and how authors' communications experience and interests can be leveraged to regionally contextualise the communication of the WGI assessment.

A key direction that will be taken is the regionalisation of the WGI Communications Strategy. This may include a regionalisation of the collaboration undertaken in 2018 on the preparations of the Climate Outreach Communications Handbook, sourcing knowledge and experience from authors and Bureau members in 2019 on regional outreach, user and stakeholder interactions, regional context, narratives, analogies and means of communicating WGI science in these contexts. This may be developed into a resource for authors and contribute to the media engagement training and preparation that will be undertaken in 2020.

The representation of visual information will be supported by graphic design expertise, particularly for the FAQs, and information design and cognitive science for the SPM. The evidence-based photo library developed for the SR15 will be extended and developed for the communication of the WGI report. Innovative visual representation of the report will be explored to produce the front cover.

The web-based delivery of the report will be developed with the perspective of increasing accessibility and navigability of the report online.

## 6. Climate education and climate literacy

The WGI TSU continues to support the development of material of the report or based on the report that is relevant for education and climate literacy. The TSU collaborates on the international initiative Office for Climate Education (OCE - <http://www.oce.global/>). Activities and outreach events are organised in schools by Bureau and TSU members. The TSU also organises sessions and workshops at international meetings including the annual meetings of the European Geophysical Union and the Earth Educator's Rendezvous.

The WGI TSU has also participated at the International Symposium on Climate Change and Museums held in May 2018 and is collaborating on a project led by the Scott Polar Research Institute Museum, Cambridge, UK on developing a travelling exhibition related to the SROCC.

## 7. Development and curation of scripts underlying figures

The development of open access community software that underlies the figures produced by the WGI assessment is encouraged by the WGI Bureau and TSU. Science officers with technical expertise in script and data development are being incorporated into the TSU. WGI TSU has established an internal GitHub repository for chapter script. The objective is to publish on a public IPCC GitHub repository<sup>3</sup> hosted by the DDC the scripts, statistical packages and pre-processed data that accompany the report figures once the report is published.

In order to facilitate the visualisation of WGI results, a development environment within the community software ESMValTool has been organized for WGI Authors<sup>4</sup>. ESMValTool has the capability to reproduce figures from selected AR5 chapters and community analysis and diagnostics packages, including as the NCAR Climate Variability Diagnostics Package (CVDP) and the Expert Team on Climate Change Detection and Indices (ETCCDI) statistical package. For ESMValTool developments for IPCC AR6, we have set up an ESMValTool-AR6 private GitHub repository.

## 8. TG-Data

WGI is placing significant emphasis on the treatment of digital information such as data and software, including the innovative development of an online interactive Atlas platform to navigate assessed digital information. WGI has an opportunity to make significant progress within the AR6 in terms of data handling and accessibility of code for producing figures and tables for transparency and traceability and to ensure the accessibility of assessed model and observational data. This is important to build trust in the assessment process as whole, ensure provenance and the subsequent implementation of the error protocol if needed, as well as supporting the work of the broader research community. TG-Data will provide guidance on data and software issues for the long-term curation, transparency, traceability and stability of data and scenarios.

WGI representatives on TG-Data will support data access and distribution of coordinated quality-controlled data sets across chapters for their assessment, particularly in coordination with global data centres and infrastructure. The selection of representatives for WGI on TG-Data has therefore sought experts in hardware and software aspects of climate data, the development, maintenance and curation of climate data, and the development, maintenance and curation of open access code used in the preparation of the WGI report. Expertise was also sought in the development of data products and software systems for users.

Nominations have been screened for their expertise and a first evaluation has been made by WGI Bureau members by email and in two teleconferences. A preliminary list was identified from the nominations. The final selection was made during Bureau 56.

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<sup>3</sup> GitHub is an open source code and software development platform

<sup>4</sup> [https://wg1.ipcc.ch/AR6/documents/IPCC\\_WGI\\_ESMValTool\\_Instructions.pdf](https://wg1.ipcc.ch/AR6/documents/IPCC_WGI_ESMValTool_Instructions.pdf)