

WCRP Statement to SBSTA 49, 3 December 2018

The World Climate Research Programme (WCRP)¹ leads the way in addressing frontier scientific questions related to the coupled climate system — questions that are too large and too complex to be tackled by a single nation, agency or scientific discipline – that produce actionable, accessible, inclusive and authoritative information on the evolving climate of the Earth system.

Improving the usability and use of climate science provides fertile ground for collaboration with a wide range of international research communities as well as co-production of project design directly with policy and decision makers. Climate science worldwide continues to take on these new challenges. Continuous support for fundamental climate science is essential to ensuring that the foundations of knowledge for action are broad as well as deep. I wish to take this opportunity to re-emphasize the compelling need that the Parties continue and strengthen support for climate research at national, regional and global levels.

It is our pleasure to provide a brief report on the progress in pursuing global coordination of climate research since the previous SBSTA session:

[2019-2028 Scientific Strategy]

Building on the remarkable achievements of the climate research community, WCRP is now presenting the vision and pathway for the world's climate research for the coming decade (2019-2028)². Our new Scientific Strategy, supported by the key science questions and implementation plans of research projects, clarifies the critical roles of WCRP in pursuing bedrock science related to the coupled climate system that underpin the implementation of the Paris Agreement of 2015, 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction and multilateral environmental conventions. In doing so, the Strategy emphasizes the need

¹ The WCRP is a co-sponsored programme of the World Meteorological Organization (WMO), Intergovernmental Oceanographic Commission (IOC) of UNESCO and the International Science Council (ISC).

² <https://www.wcrp-climate.org/wcrp-sp-overview>

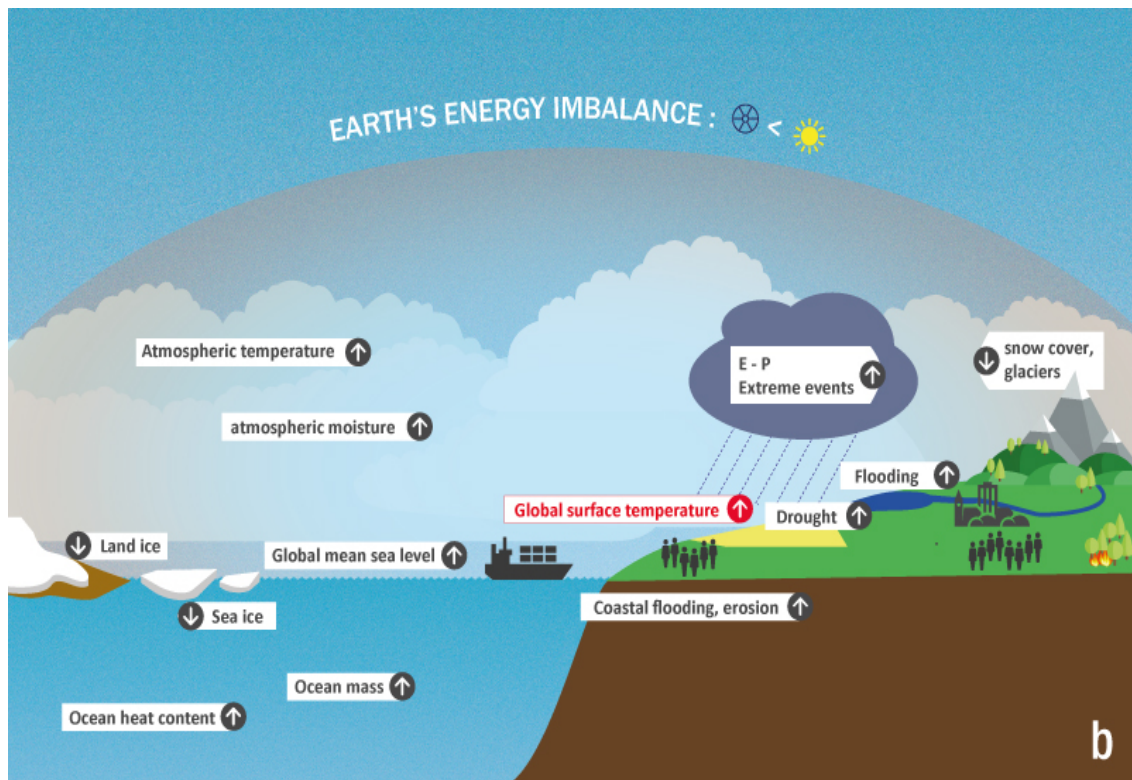
for joint planning, joint execution of coordinated experiments, and sharing of data and information.

[CMIP, Climate Analyses, Detection and Assessment]

WCRP continues to provide a critical foundation of the IPCC Assessment through the Coupled Model Intercomparison Project Phase 6 (CMIP6)³. Many CMIP6 projects are underway, the first CMIP6 dataset was released in August 2018 with a significant improvement in the infrastructure for data management, and further efforts are made to enhance the interoperability and data accessibility. These products are also the foundation to the climate data service and to the development of climate change scenarios at the national and local levels. The growing dependency on CMIP products is a demonstrated success of science providing society with robust and reliable information, and requires substantial efforts of global, regional and national climate modelling centres that require the full support of the Parties.

The scope and rate of global change are determined by the Earth's Energy Imbalance (EEI), which is a fundamental metric of climate change and the basis of various climate indicators. Increased understanding of how this affects warming oceans, rising temperatures and sea level, and loss of land-based ice are fundamental concerns for society. The EEI can be currently best estimated over the past decade from changes in ocean, land and atmospheric heat storage, net radiation at top-of-atmosphere, and heat used for melting ice based on in situ and remote sensing observations. A WCRP concerted international effort is under-way to estimate EEI and its impacts, to assess gaps in the global climate observing system, and the performance of Earth system models and reanalyses of past data. A main challenge is to reduce uncertainties in EEI, and to understand its variations from the annual cycle, El Niño and decadal changes to long-term anthropogenic climate change.

³ <http://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip6>



'Symptoms' of positive EEI, including rises in Earth's surface temperature, ocean heat content, ocean mass, global mean sea level, atmospheric temperature and moisture, drought, flooding and erosion, increased extreme events, and evaporation – precipitation (E–P), as well as a decrease in land and sea ice, snow cover and glaciers. (von Schuckmann et al., doi:10.1038/nclimate2876)

The international community, through the WCRP Grand Challenge on Regional Sea Level and Coastal Impacts, has recently published an extensive study assessing the various datasets used to estimate components of sea-level rise since the start of the altimetry era in 1993⁴. These datasets are based on the combination of a broad range of space-based and in situ observations, model estimates, and algorithms. The altimetry-based global mean sea level rise averages 3.1 (\pm 0.3 mm) per year, with an acceleration of 0.1 mm per year over the 25-year period, according to the study⁵. It also compared the observed global mean sea level with the sum of components. Ocean thermal expansion, glaciers, Greenland and Antarctica contribute 42 %, 21 %, 15 % and 8 % to the global mean sea level over the 1993–present period. Substantial uncertainty remains for the land water storage component, in particular.

[Climate Research to Services]

WCRP continued to develop activities that are cross-cutting across WMO and which transfer knowledge from research to operations. Toward the seamless service delivery

⁴ <https://www.seaonoe.org/data/00437/54854/>

⁵ <https://www.earth-syst-sci-data.net/10/1551/2018/essd-10-1551-2018.pdf>

chain, WCRP has led a coordinated study examining the interplay of the general global warming trend with natural variability in the context of temporary excursions above 1.5°C and according interpretations of the Paris Agreement. Critical work is undertaken to integrate the work of science experts on predictions for all scales, of service providers and applications community.

[CORDEX and Regional/Urban Climate Knowledge Production]

The WCRP Coordinated Regional Downscaling Experiment (CORDEX)⁶ continues to advance and coordinate the science and application of regional climate downscaling through global partnerships and provide useful, regional-scale climate information to climate services who apply the information to user needs. The CORDEX-CORE (Coordinated Output for Regional Evaluation) framework aims at delivering a high-resolution climate data-set (~0.22 degrees) for all major land-masses of the world, and making these data publicly available for use in climate change and climate impact studies. Reliable observation data are essential for the evaluation of historical CORDEX-CORE simulations and the detection and correction of bias in the downscaling. This forms a critical component in the development of robust regional climate messages by the scientific community and climate services. CORDEX implicitly informs the development of adaptation knowledge in the Lima Adaptation Knowledge Initiative (LAKI) sub-regions through the production of downscaled data, flagship pilot studies and regional workshops.

The CORDEX Africa Impacts Atlas continues to develop, providing a web-based information about (a) regional climate change information over Africa at global warming levels of 1.5, 2, 3 and 4 degrees above pre-industrial period and (b) over West Africa, the impact of this warming on agriculture in terms of crop suitability. The prototype climate atlas⁷ is currently accessible for external testing and the agriculture-focused prototype atlas is in development. Observation data of both climate and agricultural yield are essential for methodological evaluation and the development of co-produced change messages. The Atlas explicitly provides information relevant to the African LAKI sub-regions and supports activities of CORDEX-Africa⁸. Other sectors (e.g. hydrology, health) will be developed as funding facilitates and observation data within these sectors will be essential for the development of robust change messages.

⁶ <http://www.cordex.org>

⁷ <http://atlas.climatechange.africa:5000/map>

⁸ <http://www.csag.uct.ac.za/cordex-africa>

The Cities Alliance, C-40 Cities Leadership Group, Future Earth, ICLEI - Local Governments for Sustainability (ICLEI), Sustainable Development Solutions Network (SDSN), United Cities and Local Governments (UCLG), United Nations Human Settlements Programme (UN-Habitat), United Nations Environment Programme, and the World Climate Research Programme (WCRP) have formed the partnership to address key scientific challenges in climate change in cities. As the primary outcome of the Cities and Climate Change Science conference (March 2018, Edmonton, Canada), the Global Research and Action Agenda on Cities and Climate Change Science⁹ was co-developed with all 700 conference participants, and was taken note by the 48th IPCC Plenary session (October 2018, Incheon, Korea). The Agenda has showcased not only the important role cities play in terms of climate impact and opportunities to address it, but the breadth of knowledge needed to support decision-makers and urban practitioners to tackle these challenges; The first highlights four cross-cutting issues where there are knowledge gaps related to methodology and understanding that would benefit from better uptake of existing science and knowledge, new research and new perspectives. These cross-cutting issues are Systems Approach, Governance and Institutions, Scale and Observation, Data, Modelling and Scenarios at the City Level. Six topical knowledge areas where the availability of more evidence-based knowledge would support practitioners and decision-makers in addressing specific city-level challenges arising from climate change were also presented. These key topical knowledge gaps were around Informality, Urban Planning and Design, Built and Blue and Green Infrastructure, Sustainable Consumption and Production, Finance and Uncertainty. The last section presents approaches to support the implementation of the Research and Action Agenda through strengthening the science practice and policy interface to advance climate action in cities. This Research and Action Agenda serves as a call for continued collaboration to develop the knowledge needed to mitigate and adapt to climate change in cities.

Open access and interoperability of climate information, capacity development in climate science and allied fields, diversity and inclusion in all scientific endeavours, and collaboration across institutions and programmes are critical to achieving a sustainable world with human dignity. The new Scientific Strategy of WCRP emphasizes those critical infrastructures to lead our way for harmonized effort across the communities. We look forward to the proactive support of the presenting Parties to achieve this goal together.

⁹ <https://citiesipcc.org/beyond/global-research-and-action-agenda-on-cities-and-climate-change-science/>