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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
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INFORMATION DOCUMENT

**REPORT OF AND UPDATE ON THE WMO-IOC-ICSU WORLD CLIMATE RESEARCH
PROGRAMME (WCRP) AND ITS REVIEW BY ITS SPONSORS**

Summary

This document provides information on the ongoing review of WCRP.

The document also provides an account of recent discussion between the IOC and WCRP Secretariats, and the Co-Chairs of relevant WCRP Core Projects and activities, related to the identification of areas for strategic collaboration in the future.

The document aims at informing discussions by Member States at the 29th session of the IOC Assembly on their views in relation to IOC's participation in and contribution to WCRP, including synergies between WCRP and relevant IOC programmes and activities.

Background

The World Climate Research Programme (WCRP) was established in 1980 under the sponsorship of the International Council for Science (ICSU) and the World Meteorological Organization (WMO). IOC joined ICSU and WMO as a co-sponsor of WCRP in 1993.

In 2009, WCRP underwent a review, which led to a number of recommendations to be considered in relation to future developments of the Programme. In 2016, the three Co-Sponsors agreed to undertake another review of WCRP in order to assess the Programme's achievements since 2009, including an assessment of the implementation of the recommendations that came out of the first review, and to provide directions for its strategic development in the future.

The composition and terms of reference of the Review Panel, including the timeline of its work, are reported in the annex to this document.

Through Decision IOC-XXVII/5.4.1, the IOC Assembly reiterated its support to the World Climate Research Programme (WCRP) in 2013.

The IOC Secretariat has provided support to the work of the secretariat of the Review Panel and has attended its meetings up to present as an observer. At the time of production of this document, the findings of the Review Panel are not known.

Identification of areas for strategic collaboration between IOC and WCRP in the future

The IOC and WCRP Secretariats and the Co-Chairs of relevant WCRP Core Projects and Focus Areas have held recent discussions (April-June 2017) aimed to the identification of areas for strategic collaboration in the future.

Pending the outcomes of ongoing WCRP review, and without discrimination to this review, below is presented an account of the areas for continued and for possible future cooperation between IOC and WCRP based on mutual synergies between WCRP and relevant IOC programmes and activities.

The identified areas for cooperation are aimed at informing discussions by Member States on their views in relation to IOC's participation in and contribution to WCRP, including synergies between WCRP and relevant IOC programmes and activities.

The annex constitutes a first attempts to show the service/deliverable/outcome related to cooperation with each WCRP component identified as being of particular interest to IOC, in which way it contributes to IOC objectives and priorities, and how relevant IOC programmes may complement or contribute to such WCRP activities. Further discussions with the WCRP Secretariat and the Co-Chairs of relevant WCRP Core Projects will be required to further elaborate the information presented in the annex into a coherent action plan.

Terms of Reference for the Review of the World Climate Research Programme

Background

The World Climate Research Programme (WCRP) was established in 1980 under the joint sponsorship of the [International Council for Science \(ICSU\)](#) and the [World Meteorological Organization \(WMO\)](#). In 1993 the [Intergovernmental Oceanographic Commission \(IOC\)](#) of UNESCO also became a sponsor. A joint agreement between three co-sponsors was signed in 1993, which provides definition of the WCRP, financial, governance and institutional arrangement for the international planning and co-ordination of research on climate.

WCRP mission is to facilitate the analysis and prediction of Earth system variability and change for use in an increasing range of practical applications of direct relevance, benefit and value to society. The WCRP aims to determine the predictability of climate, and to determine the effect of human activities on climate.

The WCRP organizational structure consists of the [WCRP Joint Scientific Committee \(JSC\)](#), comprised of 18 members appointed by the three co-sponsors. The JSC formulates the overall scientific goals and concepts of the Programme and organises the required international coordination and research efforts that underpin the Programme.

In addition to the JSC, WCRP uses two supporting bodies to coordinate its work. These are the [WCRP Modelling Advisory Council \(WMAC\)](#), which promotes, coordinates, and integrates modeling activities across WCRP, and the [WCRP Data Advisory Council \(WDAC\)](#), which acts as a single entry point for all WCRP data, information, and observation activities.

WCRP works through a network of:

- working groups ([on Coupled Modelling \(WGCM\)](#), [on Numerical Experimentation \(WGNE\)](#), [on Seasonal to Interannual Prediction \(WGSIP\)](#), and [on Regional Climate \(WGRC\)](#))
- core projects ([Climate and Cryosphere \(CliC\)](#), [Climate and Ocean Variability, Predictability and Change \(CLIVAR\)](#), [Global Energy and Water Exchanges \(GEWEX\)](#); [Stratosphere-troposphere Processes And their Role in Climate \(SPARC\)](#), and [Regional Climate Downscaling \(WCRP CORDEX\)](#)). Each project has an International Project Office (IPO) with its own scientific steering committee.
- Grand Challenges ([Melting Ice and Global Consequences](#); [Clouds, Circulation and Climate Sensitivity](#); [Carbon Feedbacks in the Climate System](#); [Understanding and Predicting Weather and Climate Extremes](#); [Water for the Food Baskets of the World](#); [Regional Sea-Level Change and Coastal Impacts](#); and [Near-term Climate Prediction](#)).

The work of the JSC and rest of the WCRP is supported by a [Joint Planning Staff \(JPS\)](#). The organisational structure of WCRP is provided in a diagram below.

The WCRP JPS is located at the World Meteorological Organization, Geneva, Switzerland.

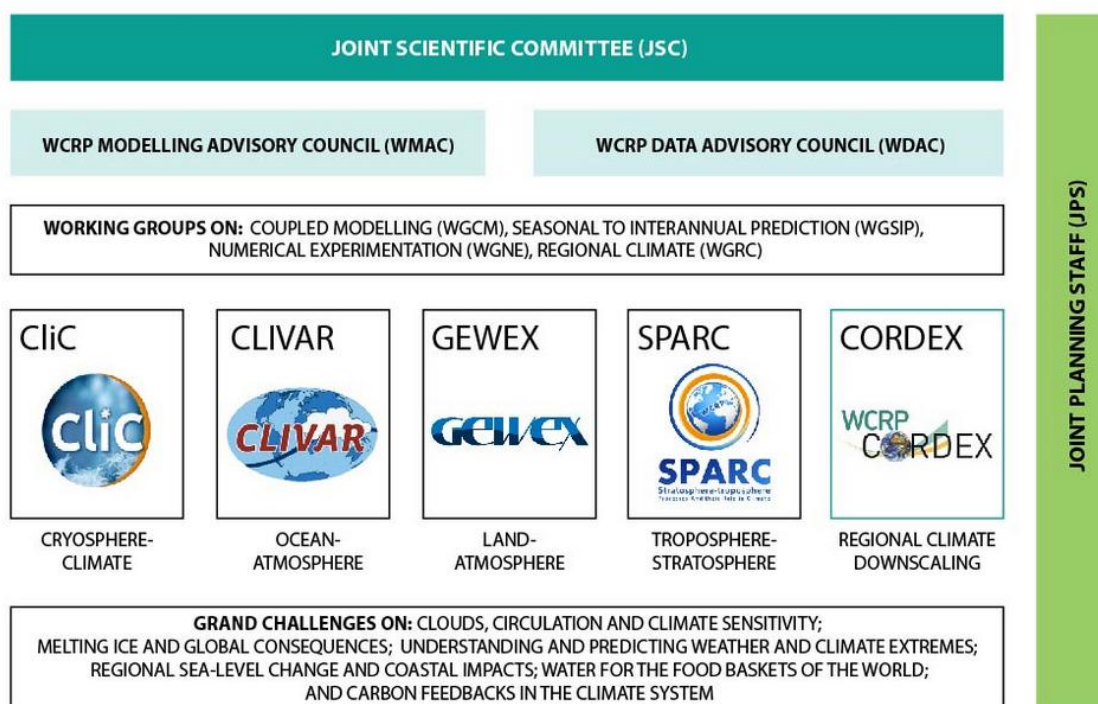


Figure 1: WCRP organisational structure

The previous review of WCRP was conducted in late 2007-2008 with the [review report](#) published in early 2009.¹ In short, the review recognized a number of important achievements of the Programme, however, it concluded that WCRP lacked the focus, planning, and funding to meet the challenges of global climate change.

In 2016 the three co-sponsors agreed to undertake another review of WCRP in order to assess the programme's achievements since 2009, including an assessment of the implementation of the recommendations that came out of the first review, and to provide directions for its strategic development in the future. In addition, the review should consider how to maximise the future synergies between the strategic aims of WCRP and three co-sponsors, while ensuring scientific independence of WCRP.

Review panel and Terms of Reference

A Review Panel will be established by the three co-sponsors of WCRP, namely WMO, ICSU, IOC of UNESCO, to carry out a review of the performance and future strategic remit of the Programme. The Review Panel will consist of six members, with two members being nominated by each co-sponsor. A possibility of engaging additional members will be considered as necessary. The composition and the chair of the Review Panel will be reviewed and approved by the ICSU's Committee on Scientific Planning and Review (CSPR) and by Chief Executive Officers of WMO and IOC.

The duties of the Review Panel will be to:

1. Provide strategic directions for future development of the Programme.

¹ The review was undertaken simultaneously with a review of the International Geosphere-Biosphere Programme (IGBP).

2. Review scientific achievements and impacts of WCRP since 2009 and the future plans, with specific attention to:
 - setting international scientific agenda on climate prediction and climate change,
 - providing opportunities for innovative research, including inter/trans-disciplinary research of high quality,
 - generating high quality scientific outputs,
 - involving the scientific communities from all parts of the world, including developing countries, as well as attracting a younger generation of scientists,
 - generating scientific knowledge for climate services,
 - providing scientific input for major international policy processes and assessment activities (e.g. the Paris Agreement of UNFCCC, Agenda 2030, IPCC assessments, etc.).
3. Review appropriateness and effectiveness of the governance, operational structure, management and resourcing of WCRP. Specific attention should be given to:
 - providing recommendations on changes to be made in the existing agreement signed by three co-sponsors in 1993,
 - reviewing the roles and contributions of three co-sponsors,
 - assessing the adequacy of the competence, size and terms of reference of the Joint Scientific Committee,
 - assessing roles, effectiveness and complementarity of WCRP operational structures (groups, committees, etc.),
 - assessing the adequacy of Joint Planning Staff structure, its human and financial capacities, and modes of work, and
 - evaluating the adequacy and effectiveness of WCRP fundraising efforts.
4. Assess the implementation of the recommendations that came out of the WCRP review of 2007-2008.
5. Assess WCRP linkages and relationships within the climate science community (including with members and other programmes run by the co-sponsors, e.g. Future Earth, SCOR, SCAR), and also with non-academic stakeholders.
6. Assess the appropriateness and effectiveness of WCRP communication efforts for visibility of the Programme and its co-sponsors, as well as their positioning in the overall climate arena (including policy fora e.g. the Paris Agreement).
7. Assess how the aims and strategy of WCRP complements and supports the strategies and priorities of three co-sponsors, and make recommendations on how synergies can be enhanced.

Review Process

To initiate the review process, the Panel will be provided with background information by the WCRP JPS, ICSU, WMO, and IOC of UNESCO. The WCRP JPS, in close consultation with the three co-sponsors, will ensure access to key documents/reports that were developed since the last WCRP review.

The WCRP JPS and the Joint Scientific Committee will be asked to prepare their self-assessment reports on the performance of the Programme and its future plans. The Joint Scientific Committee will also be invited to submit additional comments if it so desires.

The review process will comprise three meetings. The first one will be virtual and will focus on presenting the objectives of the review, its work plan, timeline and background information about WCRP.

The second meeting of the Review Panel will take place in Paris on 3-5 April 2017. This meeting will provide an opportunity to collect input from the JSC members as they will come to Paris for their statutory meeting.

The third meeting will be a site visit to the WCRP Secretariat in Geneva, Switzerland (end May-early June 2017, dates tbc). The site visit will include discussions with WMO, WCRP staff, funders, co-projects, IPCC representatives, and other relevant stakeholders.

The final review report will be prepared by the Review Panel by correspondence and, if required, by teleconference with support from the ICSU, WMO, and IOC Secretariats. The Director of JPS and Chair of JSC will be invited to comment in writing on the report. The revised report will be submitted to the ICSU Committee for Scientific Planning and Review (CSPR), WMO and IOC for examination. CSPR will also make recommendations to the ICSU Executive Board (EB). Then the review report will be submitted to ICSU EB, and Chief Executive Officers of WMO and IOC for approval and actions.

Work plan and Timetable

Approval of ToR by ICSU CSPR and by Chief Executive Officers of WMO and IOC	End of 2016
Appointment of the Review Panel and its Chair by all co-sponsors	End of 2016
The review panel is set up	Mid Jan 2017
Information gathering (including a WCRP self study)	Starting from Dec 2016
Review launch, 1st teleconference of the Review Panel	early February 2017
Launch of a consultation with key stakeholders	End of February 2017
1st Physical meeting of the Review Panel (back to back with the JSC meeting)	Week of 3-7 of April 2017, Paris
Site visit to the WCRP Joint Planning Staff at WMO HQ	(end May-early June 2017, tbc)
Possible presentation of draft recommendations and key findings at the WMO Executive Council, 10-17 May 2017, Geneva and at the IOC Assembly, 19-21 June, Paris, will be explored	10-17 May 2017, tbc 21 June 2017, tbc
Development of the draft report	June - End July 2017
Draft report provided to WCRP Director and JSC Chair for factual checking and comments	End July 2017
Revised report submitted to ICSU, WMO, IOC for examination	August 2017
Examination of report by ICSU CSPR, WMO, IOC	Sep-Oct 2017
Report is submitted to the ICSU Executive Board, Chief Executive Officers of WMO and IOC for approval and actions	Oct-Nov 2017

Resources

Travel (economy class) and accommodation costs will be covered, if required, by three co-sponsors for their respective nominated Panel members. Local costs of the meeting in Paris will be covered by ICSU, and local costs of the site visit will be covered by WMO. ICSU, WMO and IOC

will provide secretariat support to the Panel to carry out the activities necessary to the review (consultation, organization of meetings, etc.).

ANNEX II

Preliminary list of identified areas for cooperation between IOC and WCRP, including synergies between WCRP and relevant IOC programmes and activities

I. Collaboration with activities under the WCRP Climate and Ocean Variability, Predictability and Change (CLIVAR) Core Project

a. Regional Sea Level Change and Coastal Impacts

This is one of the WCRP Grand Challenges, led by CLIVAR, and organized around six interconnected working groups that aim to deliver:

- An integrated approach to paleo time scale sea level estimates
- Quantifying the contribution of land ice to near-future sea level rise
- Causes for contemporary regional sea level variability and change
- Predictability of regional sea level
- Sea level science for coastal zone management
- Global sea level budgets

The science and implementation plan of this WCRP Grand Challenge can be found at http://www.clivar.org/sites/default/files/documents/GC_SeaLevel_Science_and_Implementation_Plan_V2.1_ds.pdf. More info on the GC structure, membership and activities under the Grand Challenge are available at <http://www.clivar.org/research-foci/sea-level> and <https://www.wcrp-climate.org/grand-challenges/gc-sea-level>

Next activity: WCRP-CLIVAR/IOC Conference on Regional Sea-level Changes and Coastal Impacts, New York, 10 to 14 July 2017.

This activity is directly relevant to, and complements, IOC's activities in the area of sea-level rise research and sustained observations.

a. Research Focus on Eastern Boundary Upwelling Systems (EBUS)

EBUS conducts research focused – up to now – on the California, Peru, Canary and Benguela current systems. There are also possibilities for engaging with the Eastern Indian Ocean upwelling system, currently part of the IMBER project EIOURI (IMBER is a core project under Future Earth). EBUS was initiated in 2016, and its lifespan is 3- 5 years. The Research Focus aims at:

- Identifying key physical processes, similarities and differences between EBUS using data, reanalyzes and model outputs
- Improving model representation of EBUS (still responsible for large biases in the CMIP family of climate models)
- Examining biogeochemical interactions and role in carbon and nutrient cycling
- Understanding future variability both in terms of physics and ecosystems

The Research Focus benefits from collaboration between CLIVAR, IMBER and SOLAS (SOLAS is also a core project under Future Earth).

More information on EBUS structure, membership and activities can be found at <http://www.clivar.org/research-foci/upwelling> and <http://www.clivar.org/sites/default/files/EBUS-Prospectus.pdf>.

Next activities: EBUS is planning a meeting in 2018 (location to be determined). A possible EBUS- ICTP training school will be held in Africa in late 2018 or early 2019.

This activity is directly relevant to IOC's programme on Large Marine Ecosystems, with a particular focus on eastern boundary upwelling systems. Specifically, collaboration with EBUS would allow to expand the science basis of the IOC LME portfolio.

c. El Niño Southern Oscillation (ENSO)

The IV International Conference on El Niño Southern Oscillation: ENSO in a Warmer Climate in October 2018 in Guayaquil, Ecuador with participation of members of the CLIVAR Pacific panel, of the research focus on ENSO in a changing climate (<http://www.clivar.org/research-foci/enso>), and in collaboration with CIIFEN. The objectives of the conference are:

- To review the role of different physical processes that influence ENSO characteristics and the diversity of El Niño events on decadal time scales
- To synthesize the existing ENSO evaluation methods in GCMs
- To review ENSO evaluation protocols and strategies for coordinated ENSO analysis of CMIP models
- To update on the status of ENSO specific simulations for consideration by CMIP6 ("ENSOMIP")
- To discuss new observations needed to better constrain ENSO processes, both for the current climate and for past climates (via paleo proxies and TPOS)
- To update on the understanding of how ENSO might change in the future
- To update our understanding of global ENSO teleconnection patterns and related regional impacts
- To review the global and regional challenges of ENSO prediction and climate information services

This activity is relevant to IOC's participation in observation and information programmes related to ENSO.

d. Ongoing dialogue with IOCCP, IMBER and SOLAS

In relation to ocean carbon cycling, IOC and WCRP-CLIVAR are engaged in a dialogue with IOCCP, IMBER and SOLAS on new integrative strategies/plans to be discussed at the ICDC10 conference in August 2017. Ideally, such new integrative strategies/plans will define the next ten years of IMBER and SOLAS research on ocean carbon thus replacing CLIVAR's Working Groups on Surface Ocean Systems and Ocean Interior that have been recently disbanded.

This work stream will contribute to relevant elements of the Global Ocean Observing System.

e. Joint CLIVAR-CliC Northern Ocean Regional Panel (NORP)

This newly formed panel relates to changes in the northern high latitudes and teleconnections to other parts of the world. The panel's membership is being formed, and a first meeting is envisioned to take place in 2017. The NORP science plan will be soon available on the CLIVAR and CliC web pages (cf. below with regard to the possible involvement of IOC in CliC activities).

II. Collaboration with projects under the WCRP Climate and Cryosphere (CliC) core project

a. Biogeochemical Exchange Processes at the Sea-Ice Interfaces (BEPSII)

This activity focuses on sea-ice biogeochemistry. It started in 2009 as an informal activity promoted by a group of researchers and was formalized as a SCOR working group in 2012. CliC, SOLAS and SCAR have since sponsored it. BEPSII serves as a unique forum linking modelers and field scientists studying sea-ice biogeochemistry. The activity has been organized around three task groups, focused on:

- Improving observation methods
- Building large-scale databases
- Upscaling processes within models.

More information on BEPSII is available at <https://sites.google.com/site/bepsiiwg140/home>.

This activity is of relevance and complements IOC's research and observation activities in the area of ocean biochemistry.

b. The Sea Ice Model Intercomparison Project (SIMIP)

This project conducts research to better understand the role of sea ice in a changing climate and is an endorsed Coupled Model Intercomparison Project 6 (CMIP6). To reach this aim, SIMIP requests sea-ice-related variables from climate-model simulations that allow for a better understanding and, ultimately, improvement of biases and errors in sea-ice simulations with large-scale climate models.

More information on SIMIP is available at <http://www.climate-cryosphere.org/activities/targeted/simip> and <http://www.geosci-model-dev.net/9/3427/2016/>.

c. The CliC sea ice and climate modelling forum

This forum has the goal to improve the development and performance of sea ice models by addressing the following priorities:

- Model evaluation
- Causes of model biases
- Model development

The forum meets annually to discuss model development needs, coordinate model analysis and determine observational needs for the upcoming CMIP6 process. More information on the forum are available at <http://www.climate-cryosphere.org/activities/groups/seaicemodeling>.

d. Other relevant activities of CliC

CliC has recently engaged with the Arctic-Subarctic Ocean Fluxes project (ASOF) based at AWI in Germany. The overarching science issues driving ASOF are:

- What are the fluxes of mass, heat, liquid freshwater and ice from the Arctic Ocean into the subpolar North Atlantic?
- What are the terms in the budgets of mass, heat, liquid freshwater and ice for the Arctic and subpolar North Atlantic Oceans, and how are they changing with time?

This project is also closely linked with NORP, being formed between CLIVAR and CliC.

More information on ASOF are available at <http://asof.awi.de/>.

The above-mentioned activities taking place in the context of CliC may constitute the basis for a possible collaboration between IOC and WCRP-CliC on a new IOC focus area on polar regions.

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