

WCRP Task Team on Regional Activities

Input to the WCRP Implementation Plan

December 2, 2019

CORDEX, Working Group on Regional Climate, Grand Challenge on Weather and Climate Extremes, and CORA with representatives from JSC and JPS

1. Introduction

The mandate of the [Task Team \(TT\) on Regional Activities](#) is to propose implementing structures for activities on *climate knowledge and information for regions* and develop a concrete work plan for the next two years how they will intersect with each other and with WCRP core activities while each pursuing its unique role.

To date, three TT teleconferences have been held, with additional discussion by email and Skype.

The TT agreed to work on the following principles:

- The TT should work within the context of all four objectives of the WCRP Strategic Plan but with a strong emphasis on Objective 4 “Bridging climate science and society”.
- The TT should take as a starting point previous discussions and their outcomes on these issues - with respect to both WCRP and service partners. In particular, the TT has drawn on Recommendations on a Framework for WCRP Regional Activities ([JSC-38/Doc. 11](#)), though recognising that these need to be reframed in the context of the four WCRP Strategic Plan objectives rather than the three legs in the recommendation document.
- The TT agreed to postpone the start of this task to after the AGU fall meeting, as the TT must first have the results from the consultations and then figure out the structure and elements to be recommended to the JSC. The work plan will be prepared in the period Jan-April 2020 and presented at the JSC-41 in May 2020.

2. Consultation with Service Partners (Appendix A)

The TT decided to launch a consultation to the climate services (CS) community, to gather views and recommendations on how to build strategic partnerships with the WCRP for the co-production of climate research and information for regions. Given the desire to have some information to include in this initial report to the JSC by

December 2019, the decision was to target two high-level individuals within the WMO and GFCS: Celeste Saulo, WMO's first vice president, and Felipe Lucio, ex-director of GFCS respectively. Unfortunately, to date F. Lucio has not responded to the request. In addition, a member from the Climate Services Partnership has been addressed (more will follow).

The TT will discuss some of the specific recommendations from this consultation over the coming months focusing on those relating to enhanced collaboration with the WMO. The TT recommended that CORA furthermore carries out a review of existing GFCS documents and reports based on previously undertaken regional and sectoral consultations.

3. Preliminary Recommendations for Elements and Structures

3.1 Elements

The TT has identified a first set of elements for inclusion in a two-year work plan. These elements will be further developed more specifically towards the final report in May 2020. Additional elements that are likely to be added:

- **Frontiers of Climate Information (FoCI):** The concept of FoCI has been updated as a potential way forward for regional activities as it expands current WCRP climate research towards objective 4 of the strategic plan, by including translational science as a vehicle for operation with stakeholders, social scientists, etc. The revised document is presented in Appendix B.
- It is proposed to explore the potential to turn the topics raised by the Core Projects initiative, i.e. Himalayas (Third Pole Experiment), ANDEX Programme, and Arctic/Greenland Sheet into FoCIs in order to link the two regional activities together.
- It is proposed to draw on the experience and expertise of IPCC AR6, in particular the three new 'regional' chapters at the end of the Working Group I report. This material will help to identify gaps and research questions relevant for WCRP's regional agenda.

3.2 Structures

In proposing any new structure or additional body, existing regional activities and the presence of the newly established CORA need to be acknowledged. The particular scope of each new element should be clearly specified and distinctive. Any proposals made with respect to new WCRP structures needs to be contingent on wider WCRP discussion and should not add to the complexity.

Thus at this stage, the TT does not want to add a new layer of bureaucracy, but rather focus its discussion on finding new mechanisms to identify areas where WCRP members can work together across the horizontal activities regarding regional research. As a first step, the TT has begun to identify the organisations and communities who should be involved in such partnerships:

- GFCS
- Future Earth
- WMO/CCI, including Regional Associations and Regional Climate Centers
- Social science community (e.g., WWRP's SERA)
- Climate Services Partnership and the International Conference on Climate Services
- IPCC
- Early Career Scientists (e.g., YHS, APECS, YESS)
- Disaster Risk Reduction Community
- Other UN entities e.g. UNESCO, UNDP, UNEP
- Private foundations, e.g., Bill and Melinda Gates Foundation, MacArthur Foundation, etc.
- World Bank, Green Climate Fund, etc.

In terms of linkages across and within the WCRP, CORA has started with a stocktake of WCRP links to stakeholders which will be elaborated in the future and used for identifying specific activities and areas for cross-cutting interaction. CORA has also undertaken a survey among WCRP bodies on already existing regional activities, which provides relevant material and will be assessed by the TT over the coming months.

Appendix A

Consultation with Service Partners

Status: November 28, 2019

The TT launched a consultation to the climate services (CS) community, to gather views and recommendations on how to build strategic partnerships with the WCRP for the co-production of climate research and information for regions.

The consultation was based on the following questions:

1. *What is needed to make strong and sustainable connections with WCRP for the provision of climate information for regions targeted to climate services and policy makers?*
2. *How can WCRP climate science be responsive to the climate services community?*
3. *Which on-going activities would you envision the WCRP community providing input to?*
4. *Whom should we contact to discuss the climate science?*

For a timely outcome, the survey concentrated on those parties that are either in the immediate vicinity of WCRP or easy to access. Besides conducting interviews, information was extracted from a number of relevant documents.

1. Information from Interviews

Respondent: WMO 1st vice-president, Dr Celeste Saulo

Saulo pointed out the WCRP should develop links to WMO's Global Framework for Climate Services (GFCS), Regional Associations and Regional Climate Centres (RCCs).

Because of WMO's reorganisation, the GFCS will be overseen and implemented by a new body: the Climate Coordination Panel (CCP; adopted by [Resolution 4 \(EC-71\)](#) replacing the Intergovernmental Board on Climate Services (IBCS; dissolved by [Resolution 21 \(Cg-18\)](#)). The governance structure of GFCS includes the Partner Advisory Committee (PAC; the stakeholder engagement mechanisms of GFCS) and the Climate Services Information Systems (CSIS, the operational part of GFCS). The composition of the CCP is being defined, and will be operational in early 2020 (find ToRs [here](#)).

Below is a summary of Saulo's comments and recommendations:

- WCRP and WMO to set up a Regional Climate Science Agenda

- WCRP to establish a sustainable partnership with the Global Framework for Climate Services (GFCS) for the co-production of actionable knowledge. This partnership will feedback to the WCRP community on the climate science needed by defining key scientific questions
- WCRP scientists to participate in the bi-annual events of WMO's Regional Associations to be informed of the requirements, needs and priorities of stakeholders and users
- WCRP could provide quality checks and verification of the quality of climate science behind CS products and applications. By assisting in the verification process, it enhances the credibility of CS products and services
- WCRP should get involved in programmes on disaster risk reduction and climate change adaptation to provide advice and climate information
- WCRP to organize knowledge sharing events with WMO's Global, Regional and National Frameworks for Climate Services
- WCRP to enhance its presence in the regional academic community by engaging ECR (e.g. Young Earth System Scientists -YESS) in WCRP activities and to facilitate their connection with local & regional Climate Services

Respondent: Climate Services Partnership Secretariat (Dr María Manez)

Manez pointed out that the biggest opportunity to actually establish connections to the service partners is to be present at events that are relevant for this community (e.g., [Adaptation Futures](#), [International Conference on Climate Services](#), COP, etc.). Most members from this community don't even know the WCRP. When asked to which bodies service partners usually turn to for scientific input, it became clear that this is usually some entity on the regional or national level (e.g., universities, meteorological services, NOAA, NCAR, [COPERNICUS](#), etc.) and not international organizations like WCRP.

In summary, she gave the following comments and recommendations:

- WCRP should consider involving at least to some degree social scientist in some of its activities.
- For some activities it might be necessary that people from a different discipline (social science, communication science) are employed.
- While WCRP addresses current science topics, it does not address all topics that are relevant for the effects of climate change on society. Topics like high-resolution modelling of small islands and coasts are currently not at all addressed or neglected. This holds for both modelling and observations.
- The process of connecting to service partners will take time, as the two communities are very different. Thus, to really engage with this community, WCRP needs to plan for a long time span (full lifetime of the strategic plan).
- WCRP needs to approach the respective communities to make itself known.

- WCRP should actively seek opportunities to get together with service partners and listen to their concerns and needs. This would allow for finding the “gaps” in current research activities.

2. Information extracted from relevant documents

[2.1 Report from WMO international workshop on “Climate Services Information System Operations and Coordination” \(2017\) to WCRP JSC-38](#)

The workshop discussions identified a number of areas where research input from, and collaboration with WCRP would bring mutual benefits, such as: Strengthening of linkages between the research and operational (particularly Regional Climate Centres -RCCs -and NMHS) communities and thus enhanced direct societal relevance of WCRP activities; more effective and targeted incorporation of regional and national expertise in specific WCRP research activities; added authority of national climate information products; enhanced capacity building at the regional and national level through RCCs and NMHSs; and, efficient and open data and knowledge exchange.

The following WCRP research areas were identified as the most pressing priorities by workshop participants:

1. Optimised approaches for the use of multi-model ensembles across all forecasting/prediction timescales, from subseasonal to decadal, and including climate projection timescales for which no standard methods currently exist
2. Improved access to CMIP5/6 and CORDEX outputs and evaluation of these outputs at the regional and national level
3. Improved methods for, and appropriate use of, downscaling and bias adjustment - across all forecasting/prediction/projection timescales
4. Improved and advanced methods for the construction and analysis of national observational climatologies, including extreme events and the effective use of multiple data sources
5. Enhanced understanding of the linkages between local/national weather and climate (including extreme events) and regional/large-scale climate dynamics and circulation – both to improve understanding of current trends and variability (which is important for climate resilience and adaptation decision making), and for improved forecasting/prediction/projection
6. More robust and objective approaches to the interpretation and distillation of observations and model outputs into climate information (as outlined in the proposed WCRP Frontiers of Climate Information (FoCI) project concept)
7. Improved predictability of extreme rainfall (including drought) on subseasonal to decadal scales

8. Improved understanding and forecasting ability of processes with regional impacts, such as the variability in the Niño 1+2 region
9. There is an evident demand from in-country users for information on decadal prediction timescales, and thus interest in a number of NMHSs in this developing research area

These research topics cut across a number of WCRP activities, but the following (in alphabetical order) are considered particularly relevant:

- CORDEX
- CMIP (including from CMIP6: DCP, ENSOMIP, HighResMIP, ScenarioMIP)
- Grand Challenge on Near-term Climate Prediction
- Grand Challenge on Understanding and Predicting Weather and Climate Extremes
- Grand Challenge on Water for the Food Baskets of the World
- WGRC/WGIR (Information for Regions)
- WGSIP (working with WWRP in the case of subseasonal timescales)

Note: this report does not seem to have been tabled at the JSC-38.

[2.2 Regional Climate Projections: WCRP input to the WMO's Inter-Programme Expert Team on Regional Climate Activities \(IPET-RCA\)](#)

Summary of recommendations

1. The IPET- RCA should contribute to the development and review of guidance on the use and interpretation of climate change projections, even though lead responsibility for developing this guidance lies elsewhere.
2. There is a clear and pressing need for RCCs to assist users in accessing CMIP5, CMIP6 and CORDEX data.
3. Regional Climate Centres (RCCs) are well placed to provide advice and guidance on climate model selection, particularly based on expertise in relevant regional phenomena.
4. Further discussion is needed as to the scope of guidance that RCCs should be expected to provide on the post-processing and tailoring of information for vulnerability, impact and adaptation assessments.
5. IPET-RCA and RCCs should develop stronger linkages with the research community (including the WCRP) in order to effectively address these issues.

[2.3 GFCS and \(WCRP\) research needs, gaps and priorities](#)

The following information was extracted from a presentation from Filipe Lucio to the WCRP Grand Challenge Near-Time Climate Prediction group on 4 September 2018[2]:

Climate information needs for decision making	Time scales	Climate Research Frontier Knowledge gaps
Strategic ahead of season planning	1-12 months	Improved seasonal prediction, Remote and local drivers
Risk monitoring and management droughts/wet spells	7-40 days	Sub-seasonal prediction: Improved understanding of sources of variability
Long-term strategic planning/policy development	1-10 years	Decadal prediction: Drivers AMO, PDO/ Role of aerosols
Climate change adaptation policy development	Next 50 years	Climate Change scenarios ESM, attribution methodology, uncertainty

Gaps in Research, Modelling and Prediction

- Communication between communities of scientists and practitioners
- Last mile between science products and service-oriented climate information
- Lack of seamless suite of climate products for contiguous time scales from weather to centennial climate projections
- Limited or unknown predictability for a range of key time-space scales
- Dealing with uncertainty

Priorities

- Improve the availability of regularly updated standardized climate diagnostic and prognostic information.
- Climate research to deliver sustained improvement of climate information identified as feasible and most needed in the five priority areas of GFCS implementation.
- Support applied climate research for developing practical applications for the four near-term GFCS priorities through pilot and demonstration projects that bring together all five elements of the GFCS with a primary focus on integration and delivery of best climate information to users and decision makers.

Appendix B

Implementation Framework for WCRP Frontiers of Climate Information (FoCI) Projects

(Status December 2019)

Background

In 2015, the 36th session of the WCRP Joint Steering Committee (JSC-36) concluded that climate information for regions is a key issue across all deliverables of WCRP projects and activities and therefore called for a more inclusive and harmonized effort in support of the WCRP's Key Deliverable on Regional Climate.

As a way to develop mechanisms to advance the research on developing climate information for regions, the JSC requested the Working Group on Regional Climate (WGRC) to take responsibility as an implementing agent of FoCI¹ Projects with a city/regional focus. In this role the WGRC would facilitate and support relevant scientific efforts across the WCRP as well as initiate activities within the WGRC terms of reference. This would also include developing guidance and catalyzing linkages with external partners for climate services.

In 2016, the 37th session of the WCRP Joint Steering Committee (JSC-37) asked an ad-hoc group to organize a workshop to discuss the status of and issues regarding WCRP regional activities and design a concept to explain [climate information for regions](#) in the WCRP context. This activity resulted in the report [Scoping a framework for WCRP regional activities](#). One of the recommendations was to launch an international call to establish a coordinator office for WCRP regional activities (CORA). The office is jointly hosted by GERICS in Germany and the BCCR in Norway, and become fully operational in June 2019.

In 2019, and regarding [WCRP Strategic Plan 2019-2028](#), the JSC assigned a number of short-lived Task Teams to address specific questions relevant towards the Implementation Plan over the next two years about the new structure of the WCRP. A Task Team on Regional Activities (TT) was then appointed with members from CORDEX, WGRC, GC Extremes and CORA and representatives from the JSC and JPS representatives. The TT was to make recommendations to the JSC about future structures dealing with climate information for regions and how they will intersect with each other and within WCRP core activities while each pursuing its unique role.

It is in this context that the TT recommends the implementation of FoCI projects, in revised form as shown in this document, as an element in the future structure of the WCRP. The FoCI is meant to address the challenge of the rapidly expanding availability of different climate data sets from a multiplicity of global and regional models and other downscaling techniques. This is matched by an increasing pressure from a wide range of stakeholders and organizations for scale-relevant information to support regional decision-scale needs.

¹ At the time of JSC-36, these projects were referred to as 'frontier projects' – the WGRC-3 meeting subsequently established the FoCI title.

These data, along with new observational datasets that are themselves not fully congruent, convey mixed and contrary messages about climate change and variability. This presents a clear challenge to the scientific community and there exists a fundamental and critical research frontier on how to move from the expanding production of data to the construction of defensible and scale-relevant information. The FoCI project notably targets objective 4 of WCRP's Strategic Plan, *Bridging science and society*, in that it will be a primary vehicle to engage in collaborative research with boundary organizations² in order to support the generation and delivery of decision-relevant information and knowledge about the evolving Earth System.

Concept

A FoCI project adopts a specific phrasing of “information for regions” – as distinct from “regional information”. While the latter implies a focus on resolution and location specific data, especially via downscaling, the concept of “information for regions” infers a broader scope to consider scales of processes ranging from local to global in-so-far as these inform our understanding of the regional climate dynamics and the local response to climate forcings. FoCI projects would approach this through a lens whereby the needs for robust, scale-relevant information for regional decision making expressly help steer and prioritize foundational research on the relevant climate processes that operate and interact across all scales.

Explicitly a FoCI project seeks to engage with the research challenge of *data distillation*. The term “distillation” refers here to the conflicting information from across the range of observational, Earth System Models (ESMs), Global Climate Models (GCMs), Regional Climate Models (RCMs), and empirical-statistical downscaled (ESD) data. These data represent a conflated mix of natural variability, deterministic responses to anthropogenic forcing, and multiple sources of bias and error. The response to the distillation challenge is to develop new approaches and analysis techniques to contribute to building physical understanding of robust scale-relevant information for decision needs.

The objectives for FoCI projects are to:

- Comply with all WCRP's Strategic Plan objectives regarding regional climate science and climate information.
- Work on the appropriate spatial and temporal scales for decision-relevant issues
- Distillate climate system information from varied sources.
- Integrate and link climate information in the context of risk management of the Earth and societal systems.
- Develop and support research capacity, especially in developing nations.
- Co-produce cross-cutting, trans-disciplinary and translational science with boundary organisations.

FoCI projects will provide opportunities for engagement by all relevant activities of the future WCRP and across the Strategic Plan objectives. In particular, CORDEX's Flagship Pilot Studies (FPS) and the Coordinated Output for Regional Evaluations (CORE) will be of

² The term “boundary organizations” is used broadly to include climate services and activities that engage across the science-society gap, such as WMO's GFCS, Future Earth, etc.

relevance to FoCI Projects, while the GEWEX Regional Hydroclimate Projects (RHP) afford additional potential for the establishment of FoCI Projects as these translate fundamental knowledge into actionable information (objective 4). FoCI will also encompass process understanding of the climate system and the near-term evolution of the climate system (objectives 1 and 2).

Framework of FoCI Projects

The heart of a FoCI Project is to develop climate information for regions, framed by relevance to regional stakeholders, and approached through innovation in analysis and methods. Thus, FoCI will play a key role in fulfilling WCRP's objective 4, *Bridging Science and Society* in that they will:

1. Relate to regional aspects of one or more **WCRP activities in their new form**, with the goal to:
 - Understand the separation of local and remote contributions to natural and forced variability and change
 - Leverage existing climate research targeting different time-scales
 - Integrate research across multiple topics; e.g. understanding of extremes with local feedbacks and inter-annual variability of global drivers.
2. **Develop new approaches to distill decision- and scale-relevant information** from different sources within the WCRP and related external programs to reconcile differences across data sources, data types, and relevant scales of time and space.
3. **Improve the quality of regional information** through innovation of methodology and analysis with **special emphasis on multi-scale climate processes**. Focus on scales of user relevance, by which is implied a domain of notable societal vulnerability to climate where there is limited understanding of the co-behavior of the multi-scale driving climate processes, and for pragmatic purposes also likely to attract a high level of funding interest from a range of agencies.
4. **Adopt data criteria of "free sharing for researcher use"** and full and free public access wherever possible.
5. **Target stakeholder relevant information about the regional climate**; recognizing that data is not necessarily information, but that information for regions is about messages backed by robust physical understanding, of scale-relevant climate attributes, tailored to the decision and risk management needs of stakeholders and defensible through understanding of multi-scale climate processes.
6. **Address the information needs of regional stakeholders**. This will imply finding a mechanism to engage with pertinent stakeholders, or to use existing opportunities for collaboration to access user information to inform the research. This is not a simple needs-driven approach, but a process to inform the research through a user-directed identification of key attributes of the climate system that have identifiable relevance to thresholds and vulnerabilities in the coupled socio-ecological regional system.
7. **Focus on relevant time scales** from sub-seasonal to multi-decadal.
8. **Includes linkages with relevant research communities** in impact modeling, vulnerability assessment, and adaptation and policy.

Criteria for selecting FoCI Projects

A FoCI project

- Identifies varied sources of climate information and steps to be followed for distillation.
- Identifies the added value of involving relevant WCRP projects/activities to be synthesized into the FoCI project.
- Identifies the engagement of participants from stakeholder/users and eventually, the need of capacity building.
- Defines relevant temporal and spatial scales (e.g., decision and climate scales, etc.).
- Contributes to well-defined policy questions.
- Assesses the effectiveness of distillation messages.

Monitoring and success metrics for FoCI Projects

- To what degree the project draws on WCRP activities and encompasses the program's objectives
- Measure of different types of information incorporated
- Success in synthesis of different sources of information
- Distillation:
 - the formulation of scientifically, physically robust, credible and scale appropriate messages on changing climate
 - Measures of uptake of the distillation messages to the targeted audience
- Self-reflection on how well the group has engaged the varied participants (including stakeholders)
- Capacity building: activities and outcomes /sustaining elements
- Lessons learned from the interaction with the boundary organisations/ stakeholders/users
- Impact: What policy relevant outcome(s) has been produced? What policy has been affected? Is there a demonstrable link to policy?
- To what degree the project has contributed to advance/refocus the fundamental research by identifying new scientific questions

An implementation plan for FoCI Project Portfolio and potential funding

The process of identifying and implementing an initial portfolio of FoCI projects should be the task of a **new WCRP coordinating element or structure on regional activities**, to be in place in the coming two years of the WCRP implementation plan.

However, the activities proposed by the “Core Project joint initiative” at the JSC-40 (2019) are potential candidates to include in a preliminary FoCI portfolio. The initiative of CLIVAR, CliC, GEWEX, SPARC and CORDEX proposes to launch coordinated, cross-cutting and societal relevant fundamental research on selected regional topics (e.g. ANDEX, Arctic Greenland Ice Sheet and the Third Pole project). At least one of these topics could be implemented under the FoCI framework and run for 3-5 years after which the project(s) would be evaluated to assess future modalities. If successful, and with the new WCRP structure in place, open calls for new FoCI would then be issued.

An open and early dialogue with potential funders and regional scientists should be explored. This could be done by funding for a meeting between potential future funding agencies (e.g., USAID, development agencies, World Bank, DFID, SIDA) and regional scientists.