

38th Session of the WCRP Joint Steering Committee

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The 38th session of the WCRP Joint Steering Committee (JSC) was hosted by one of the three WCRP sponsors, namely the intergovernmental Oceanographic Commission (IOC). The meeting was held at the IOC headquarters in Paris from 3-6 April 2017. Attending on behalf of SPARC were the co-chairs, **Judith Perlwitz** and **Neil Harris**, and the project office director, **Fiona Tummon**.

WCRP Strategy Discussion

The first day of the meeting was dedicated to discussing the new WCRP strategy, which will be presented as part of the review that WCRP is currently undergoing for its three sponsors: The World Meteorological Organisation (WMO), the IOC, and the International Council for Science (ICSU). Discussions were led by **Guy Brasseur**, JSC chair, who also opened the meeting by welcoming all participants. Several issues were highlighted, such as the need for WCRP to articulate the case for climate research, since no adaptation or mitigation is possible without fundamental climate science providing our best current knowledge. WCRP also needs to provide links between the various temporal and spatial scales, particularly the global and regional, the latter of which is where climate information is most urgently needed. Further focus should fall on how WCRP does its outreach, particularly beyond the traditional scientific community. It is essential that WCRP enhances connections with the stakeholders that could use the information that WCRP research provides, for example, disaster risk managers or engineers dealing with sea level rise. These connections need to allow for two-way interactions to ensure that WCRP science remains societally relevant. This strategy document is currently being drafted, with input from the core projects expected.

WCRP Sponsors and sister organisations

Vladimir Ryabinin, assistant director general of the IOC, opened by mentioning that the IOC defends

the values of science and honesty, particularly in the sense that good science is essential to supporting good decision making. The role of the IOC is to bring knowledge about the world's oceans to bear on various issues, as well as to build global capacity focused on the oceans. The IOC runs various important programmes, such as the Global Ocean Observing System (GOOS) and regional tsunami warning systems, and is responsible for maritime protected areas. Together with WCRP, the IOC helped organise a recent conference on sea level rise held in New York, USA, where a new report on ocean sciences was unveiled. WCRP is a major source of knowledge, experience, and talent for the IOC and the IOC is fully supportive of WCRP, doing its best to provide what funding and leadership it can as WCRP sponsor.

The WMO (represented by **Elena Manaenkova**, deputy secretary general) is aiming to better link its three research programmes, namely WCRP, the World Weather Research Programme (WWRP), and Global Atmosphere Watch (GAW). This is in an effort to provide seamless weather and climate products through a chain of services that should aim to reduce disaster risk, improve resilience, and allow for sustainable development in the face of climate change. The WMO is looking forward to working together with the IOC and ICSU to ensure an effective review of the WCRP. This was echoed by **Heide Hackmann**, executive director of WCRP's third sponsor ICSU, who also mentioned that the review provided an excellent opportunity for WCRP to develop a compelling strategic plan as well as to better define its relationship with its three co-sponsors. She also noted that ICSU is currently considering merging with the International Social Science Programme (ISSP), a discussion that was begun in 2014 when ICSU itself underwent a review.

The Paris Agreement was based on science, in large part underpinned by the work of WCRP (**Florian Vladu**, United Nations Framework Convention on Climate Change (UNFCCC)). By supporting the

IPCC assessments, WCRP has played a key role in the cycle that goes all the way from observations through to policy making; all of which is essential to meet the sustainable development goals. WCRP participated in a recent meeting of UNFCCC's Subsidiary Body for Scientific and Technological Advice, which was seen as very useful, particularly to help address the major funding issues facing the research community.

Valérie Masson-Delmotte, co-chair of IPCC Working Group One, outlined the progress made so far towards defining the scope of the sixth assessment report as well as the three special reports which will focus on the 1.5°C warming scenario, the oceans and cryosphere, and the land surface, respectively. A recurrent theme across the latter two is that of risk management, which will be specifically addressed in both reports. The 1.5°C report is the first due to be completed, with a deadline for contributing papers to be accepted by 15 May 2018. The timeline for the other two reports as well as the sixth assessment are still under discussion.

Future Earth, which focuses very broadly on sustainability and stakeholder engagement, is continuing to ensure good collaboration with WCRP (**Thorsten Kiefer**). So far, the strongest links have been at the project level, for example, between SPARC and IGAC (International Global Atmospheric Chemistry), but there is also collaboration with the WCRP Grand Challenges and the Future Earth Knowledge Action Networks, as well as further opportunities to work together to contribute to the IPCC special reports. Finally, there is engagement across the two communities at the early career level through the 'Network of Networks', a grouping of the various early career researcher networks from both programmes. Thorsten also highlighted the Future Earth Open Network (<http://network.futureearth.org/home>), which is an online communication platform that has a wide range of capabilities that can be freely used by all registered users.

WCRP regional activities

A scoping workshop was held in early 2017 in Hamburg, Germany, with the aim of better defining where WCRP can play a role in regional climate-related activities. The participants drafted a set of recommendations that focused around three "legs"

on which the framework for WCRP regional activities would rest. These three "legs" were: fundamental climate science, application-inspired climate science, and transdisciplinary engagement. It was noted that the WCRP regional activities should go beyond what CORDEX does and that there needs to be real engagement with the various regions since there is already a wide range of ongoing activities at this level. It was also mentioned that it was vital that links be made with the VIACS (Vulnerability, Impacts, Adaptation, and Climate Services) activity that is part of CMIP6 (see below).

CORDEX (**Bill Gutowski**) has developed and refined their scientific vision over the past 2-3 years. Part of this revisioning has been focused around scientific challenges which aim to provide concrete examples of where regional downscaling can provide added value. A recent example, showed using high resolution regional models (12km resolution), that future high-altitude precipitation over the European Alps is likely to increase due to enhanced convection, in contrast to what lower resolution simulations have previously shown (Giorgi *et al.*, 2016).

One of CORDEX's biggest activities in the past year was the ICRC Conference in Stockholm, Sweden, which was organised various scientific challenges so that researchers focused on different regions participated in session together. There was also a discussion led by early career researchers about how they could be more engaged in CORDEX science. CORDEX also participated in the climate services conference which was held in February 2017 in Cape Town, South Africa, and has organised a series of workshops focused on statistical downscaling in an effort to further advance these techniques.

CMIP6

Gerry Meehl, of the Coupled Model Intercomparison Project (CMIP) Panel, described the CMIP6 experimental design that includes base simulations which all modelling teams will run as well as the large range of sub-projects to which groups will contribute differently. Currently 32 modelling groups will participate in CMIP6, a large increase from the 11 involved in CMIP5. Two model performance metric tools have been developed, the ESMVal Tool and the PCMDI Metrics Package, which will initially be made available to modelling centres, then to other researchers. An online tool will also

be created to subset the huge datasets that will be produced. The core CMIP6 simulations are to be run in late 2017 and 2018, however, before these are begun various forcing datasets, mostly those focused on future scenarios, need to be completed.

WCRP core projects

Judith Perlwitz and **Neil Harris** both made presentations during the SPARC parallel session. Neil presented some recent SPARC science highlights, including results from the reports on carbon tetrachloride and the SPARC data initiative, as well as from the very unusual disruption to the quasi-biennial oscillation which occurred in 2016. Judith focused on how SPARC contributes to climate dynamics activities across WCRP, both directly through SPARC activities as well as through organisation of cross-cutting workshops and training schools. During the subsequent discussions the links between SPARC and various other projects and programmes, for example, with GAW and IGAC, as well as between the SPARC SATIO-TCS activity, GEWEX, and the Grand Challenge on Clouds, Circulation, and Climate Sensitivity (see below).

The summary of the CliC session, which was held in parallel to the SPARC discussion, was presented by **Gerhard Krinner**, who is stepping down as CliC co-chair at the end of 2017 (to be replaced by Fiamma Straneo). CliC's structure is fairly similar to that of SPARC, with limited-lifetime activities, but also with several long-term groups and panels. Over the past few years they have significantly increased the number of modelling activities, and in general the cryospheric research community has grown considerably given the high-profile nature of science related to the rapid changes currently occurring in the Arctic. There is an increasingly crowded network of initiatives and project in this domain and thus coordination is key. CliC has several new activities of interest to the SPARC community, including the BEPSII project focused on biogeochemistry and linking observations with models, and a possible new focus on polar-lower latitude linkages. The latter of which, would have very clear links through the atmosphere and several of SPARC's activities.

CLIVAR has just completed its new science plan, which was widely discussed and largely finalised at their Open Science Conference in September 2016 (**Detlef Stammer**). This new plan has a number of long-term objectives that they aim to achieve

through their various panels as well as through existing and new partnerships. CLIVAR has a number of regional activities, for example on Monsoons and upwelling regions, which have obvious links with other WCRP projects and other outside groups, such as the IOC, the Global Climate Observing System (GCOS), and the Global Ocean Observing System (GOOS). As of April 2017, the CLIVAR office in China has a new executive director, Jose Santos, who was warmly welcomed to the WCRP community at the JSC meeting.

GEWEX has been making good progress across three of its four panels, with the fourth panel undergoing some major changes, particularly in terms of leadership (**Sonia Seneviratne**). There are obvious links between GEWEX and the Grand Challenges on extremes and water in the food baskets, as well as with other core projects through their Process Evaluation Studies (PROES). For example, SPARC has collaborated on the PROES focused on upper tropospheric convection and clouds (PROES-UTCC). A recent finding from this activity showed that as convective intensity increases the amount of thin high clouds increases, while thick high clouds decrease. Similar to SPARC, GEWEX is planning an Open Science Conference in 2018, although the dates and location remain to be confirmed.

Early Career Researchers

Sebastian Sonntag presented the report from the Young Earth System Scientists (YESS) community. He introduced the network and highlighted some of the achievements of the past year, which include the publication of a white paper, the establishment of a YESS Office with the support of the Argentinean MetService, and involvement in various international programmes. In the next year YESS plans to organise a second science workshop, continue involvement in WCRP activities, develop a working group on promoting interdisciplinary science, and to enhance its involvement in various international research programmes further.

WCRP Advisory Councils

Christian Jakob started the WCRP Modelling Advisory Committee (WMAC) report by highlighting the 2016 WWRP/WCRP modelling prize, which was awarded to Irina Sandu for her work on parameterisation of the planetary boundary layer.



Figure 1: Participants at the 38th session of the WCRP Joint Scientific Committee held in Paris, France, from 3-6 April 2017.

The 2017 call for this prize is currently open and all nominations can be made online at: www.wcrp-climate.org/wmac-activities/ipmd2017. WMAC is helping to organise the pan-WCRP model working group meeting which will take place from 9-13 October at the UK MetOffice. The council is also involved in the organisation of the 2nd WCRP model development summer school, which will focus on grey-zone parameterisations and is being hosted by CPTEC-INPE in Brazil in January 2018 (more information at: <http://eventos.cptec.inpe.br/wcrpsummerschool>). WMAC carried out a survey to get a clearer idea of the breadth of modelling activities across WCRP, finding that there are 67 individual modelling activities that focus on various aspects. There is thus a significant need for coordination, to ensure efficient use of resources throughout WCRP.

The WCRP data advisory panel (WDAC) will soon undergo a leadership change, with Jean-Noël Picot to take over from **Otis Brown** in the coming year. In 2016, WDAC initiated a Task Team for the Intercomparison of Reanalyses (TIRA), which has members from across the WCRP projects and working groups. The SPARC representative is Masatomo Fujiwara. Over the past months WDAC have also had several discussions with the GCOS to see how communications between the GCOS panels and WCRP projects, Grand Challenges, and working groups can be improved. This would be beneficial to both programmes, with WCRP being able to provide the scientific knowledge to understand the scientific drivers behind the observational requirements that are laid out by GCOS.

WCRP Grand Challenges

The Grand Challenge on Regional Sea-level Change and Coastal Impacts (**Detlef Stammer**) is a highly inter-disciplinary activity, since understanding sea-level change requires focusing on so many processes, for example, ground subsidence, glacial changes, and thermal expansion. The group has recently initiated the Coordinated Ocean Storm Surge Climate Project (COSSCLIP), which aims to improve the representation of storm surges in models, since these features are typically not included but cause much of the damage in coastal regions resulting from sea-level rise. The group was also very involved in the aforementioned conference on sea level rise held in New York, USA, in June.

Gaby Hegerl presented the Grand Challenge on Understanding and Predicting Weather and Climate Extremes. They have had several very successful workshops over the past few years, and have produced quite a large number of papers as a result. The Grand Challenge focuses on four main extremes: heatwaves, droughts, heavy precipitation, and storms; and do so through four themes on documenting, understanding, simulating, and attributing these types of events. The group has made considerable effort to make links with the statistics community, as well as with paleoclimate researchers, the WWRP HiWeather project, and the Future Earth extremes community.

The Grand Challenge on Clouds, Circulation, and Climate Sensitivity is already going into its second five-year phase (**Sandrine Bony**). During this second period they will continue to develop

the activity until 2021 or 2022, when they will conclude the Grand Challenge and establish how best to continue relevant activities, for example on storm tracks, through the core projects. The group is working hard on a review paper on climate sensitivity, led by Steve Sherwood and Mark Webb, which is due to be completed in 2018. They are also planning to make use of the DynVar diagnostic MIP data from CMIP6, particularly to look at the tropical rain belt, convective aggregation, and storm tracks. Finally, since a main source of uncertainty in models stems from low clouds, for which few observations are available, the Grand Challenge is heavily involved in the EREC4A experiment which is to make exactly such observations.

Jan Polcher presented the Grand Challenge on Water for Food Baskets, which is being led by GEWEX. The group have been working to refine the focus of this Grand Challenge and are planning several workshops in this context. They also would like to encourage the other WCRP core projects to become more involved as well as to reach out the other communities researching water resources. There is a clear link to SPARC through their focus on the impact of fertiliser use on air quality.

The mission of the Grand Challenge on Near-term Climate Predictions (**Masahide Kimoto**) is to bridge the gap between sub-seasonal to seasonal and IPCC-style century-scale projections. The group involved in this Grand Challenge has been very active, holding teleconferences every two months. SPARC was invited to give a presentation at one of these teleconferences and has been participating in the teleconferences. The WMO committee on basic systems endorsed the idea of a WMO lead centre for near-term climate prediction to ensure that these predictions become operational. Currently the UK MetOffice is the main candidate for this. The Grand Challenge has outlined the proposed content for the “global annual to decadal climate update” that will be produced. This includes a one-page executive summary, a description of current observations and various climate indices, as well as maps of several key variables for one year, years 1-5, and years 5-10. In addition, some description of the estimated forecast skill as well as an assessment of previous forecasts will be presented. The Grand Challenge is considering how to contribute to the IPCC Special Report on the 1.5°C Warming Scenario, likely through a summary of the climate outlook for the next decade.

The Grand Challenge on Carbon and Climate has, since the last JSC meeting in 2016, further developed its structure and leadership (**Pierre Friedlingstein**). The group organised their first workshop in Hamburg, where much of this was discussed. They have also defined two main activities for 2017, which focus on extending the framework for understanding and simulating carbon cycle feedbacks, as well as on understanding how feasible it might be to produce decadal predictions of the carbon cycle. This latter issue would be hugely relevant to the Intended Nationally Determined Contributions of the Paris Agreement, particularly in terms of the idea of a limited carbon budget. SPARC's emerging activity on short-lived climate forcers is to complement and contribute to the activities of this Grand Challenge.

The Grand Challenge on Melting Ice (**Gerhard Krinner**) falls directly under CliC and is mainly focused around modelling activities, many of which will contribute to CMIP6. There are also various collaborations between this Grand Challenge and permafrost networks, and in this respect, there are clear links with the Grand Challenge on Carbon and Climate.

New WCRP Communication Strategy

Narelle van der Wel provided an overview of the new WCRP communications strategy, which covers a wide range of planned activities. Considerable effort has been made to update the WCRP website and other communication material, including the community newsletter, templates for project reports, and other promotional material. The main objectives of the new strategy are to increase the visibility of WCRP, showcase WCRP science, inform and engage the WCRP community, build strategic partnerships – also with outside partners, and to encourage current and future leadership in climate science.

References

Giorgi, F., et al., 2016: Enhanced summer convective rainfall at Alpine high elevations in response to climate warming. *Nature*, doi:10.1038/ngeo2761.

