WCRP REPORT

World Climate Research Programme

PROJECT REPORT

Report of the first session of the WCRP Modeling Advisory Council (WMAC)

16 July 2012, Beijing, China

September 2012

WCRP Informal Report No. 18/2012

WCRP Modeling Advisory Council
Session 1
16 July 2012
Beijing, China

Present: Christian Jakob (Co-chair, WGNE), John Mitchell (Co-chair), Sandrine Bony (WGCM), Michel Deque (Regional Climate), Francisco Doblas-Reyes (WGSIP), Gregory Flato (ad-interim, CliC), Ted Shepherd (SPARC), Masahide Kimoto

Excused: Peter Cox (IGBP), Joseph Santanello (GEWEX), Helge Drange (CLIVAR), Maria Silva Días

Invitees: Antonio Busalacchi (Chair, WCRP JSC), Gilbert Brunet (Chair, WWRP JSC), Michel Beland (Chair, CAS), Peter Van Ovelen (Director, IGPO), Kevin Trenberth (Chair, GEWEX SSG)

Staff: Michel Rixen and Valery Detemmerman (WCRP JPS)

1. Opening of the session

1.a Introduction – WMAC Chairs and M. Rixen

Dr Mitchell reviewed the JSC motivation for forming the WMAC, namely that there was neither enough expertise in JSC, nor time during the annual meetings, to discuss modeling issues in depth; the WMAC was to serve as extension of JSC. WMAC had sent a questionnaire to the WCRP modeling community asking what were their expectations from the Panel. Reactions had been mixed; some noted that there was already a lot of coordination in the existing modeling working groups and others saw a clear need for such a group. Further discussion on this topic can be found in sections 1.d and 4. of this report.

Dr Rixen thanked all the WMAC members for their willingness to serve and observed that the Council could serve as a sort of "think tank" to explore new research avenues and fill gaps. He reviewed the WCRP mission and identified some ways in which WMAC might contribute. He noted that the WMAC had been formed with the following guidelines in mind:

- Useful to modeling community
- Platform for modeling dialogue
- Build synergies within and outside WCRP
- Research-oriented and end-user focused (stakeholders).

There was some discussion as to who would be the end-users for WMAC and what was the relationship with the Global Framework for Climate Services (GFCS). It was agreed that the first users for WMAC outputs would be the research community itself and that the WCRP Working Group on Regional Climate (WGRC) would oversee most of the regional aspects of interest to GFCS.

1.b Welcome - Chair JSC

Prof Busalacchi presented the new emerging structure of the WCRP which included the two Advisory Councils (Modeling and Data) as well as the three modeling groups (Working Groups on Coupled Modeling (WGCM), on Seasonal to Interannual Prediction (WGSIP), on Numerical Experimentation (WGNE) and on Regional Climate (WGRC)) reporting directly to the Joint Scientific Committee. Prof Busalacchi reminded the participants that the Council's role was to facilitate, not to govern, and to advise JSC of important issues and gaps. He noted that the JSC would not be prescriptive regarding the functioning of WMAC and that it was free to determine the best approach to go forward.

Prof Busalacchi reviewed some of the JSC expectations regarding the WMAC:

- Communicate regularly
- Encourage joint meetings to promote communication or launch focused initiatives
- Should have flexibility and resources to promote action within existing WCRP projects and panels or by appointing limited duration task teams to accomplish its tasks.

He suggested that the WMAC might undertake activities related to:

- Identifying and advancing modeling aspects of the WCRP Grand Challenges
- Promoting global synthesis
- Coordinating atmospheric modeling
- Archival of model output
- Prediction of the earth system (with IGBP)
- Monsoon prediction
- Cryospheric modeling.

1.c Adoption of Agenda

The agenda was adopted, with minor adjustments on the sequence of presentations (see Annex B). The Joint session with WDAC was later dropped to allow more time for the individual Council meetings. An informal meeting of the two councils was held over lunch two days later.

1.d Review of the TORs

The Chairs proposed a shorter and more focused terms of reference, and after considerable discussion, the following was agreed:

In partnership with WCRP projects and working groups WMAC acts as a focal point for WCRP modeling and advises the JSC and WCRP community on issues pertaining to modeling.

1. Regularly assess modeling capabilities within WCRP and identify gaps, overlaps and opportunities for synergy.
2. Provide advice on priorities for modeling across WCRP including the Grand Challenges.
3. Facilitate effective communication on modeling issues within the WCRP and with the broader community.
4. Promote capacity development in model development, evaluation, and applications.

The revised TORs were later adopted by the JSC (see Annex A).

2. Report on Model Development Workshop – C. Jakob

Prof Jakob reported that 120 researchers, amongst them 40 students, participated in the WGNE Workshop on Physics of Weather and Climate Models that was held in Pasadena, CA, earlier in the year. There was recognition that there were fewer and fewer real changes to models and that improved funding was needed to advance model physics development. The length of funding needed to increase, there was a need to commit to a few key issues and follow through on these, and both large teams and small, targeted efforts needed to be supported. Various suggestions were put forward on how to "grow" the model developer community including prizes to improve recognition and presenting the field as more appealing than had been done in the past. It was suggested that the Council should promote joint university/operational agency programmes for students that would allow the time and resources for model development activities.

3. Overview of WCRP modeling activities

3.a WGCM and CMIP5 – S. Bony

Dr Bony reviewed the recent WGCM activities including CMIP, PMIP and CFMIP and noted that a balance was sought between prediction, evaluation and understanding and that there were more experiments aimed at the latter than previously. She observed that there was already a lot of coordination of modeling efforts through the CMIP5 design process.

Dr Bony outlined the new CMIP distributed archival system (ESGF) and suggested that an improved governance structure was needed. She felt that the long-standing biases in models were an issue for the WMAC. There was also a growing need for community reviews and synthesis of CMIP5 results and that this was an opportunity for WCRP to make its activities highly visible and to facilitate the IPCC process. She identified three major areas where WMAC could help:

- Promote confrontation of models with observations and results of observational studies
- Promote application of models to problems of societal relevance
- Promote model development and improvement.

3.b WGSIP and sub-seasonal project – F. Doblas-Reyes

Dr Doblas-Reyes began his presentation by stressing the value of the seamless approach to climate modeling. There was a lot the prediction community could learn from the climate change projections. He gave the example of a recent IRI-Red Cross collaboration that highlighted the value of climate information on all timescales for disaster preparedness.
He stressed that predictions in this time range are expected to be probabilistic. Important sources of predictability such as the MJO, SST, sea-ice, land and 2-way coupling have provided the rationale for the establishment of the WCRP-WWRP Subseasonal-to-seasonal prediction project which fills the gap between medium-range and seasonal forecasting and which implementation plan has just been finalized. The community is also interested in enhancing the role of sub-seasonal to seasonal predictions in the WWRP Polar Prediction Project, which is expected to be linked somehow to the WCRP Polar Climate Predictability Initiative.
WGSIP, through its CHFP effort, the 3 additional experiments on land surface, stratosphere and sea-ice and its joint effort with WGCM on decadal predictions can contribute to several WCRP challenges such as 1) skillful regional climate predictions 3) cryosphere in a changing climate 5) past and future changes in water availability and 6) prediction and attribution of climate extremes. Key questions to be addressed in the future are the coupling between the various components, model biases and model developments.

3.c WGNE and grey-zone project – C. Jakob

Dr Jakob reviewed the WGNE Terms of Reference and gave and overview of progress on the major WGNE activities:

- Transpose-AMIP, *good progress*
- SURFA, *slow progress*
- Cloudy-radiance, *done*
- Grey-zone, *good progress*
- Verification
    - NWP performance (eg TCs, precipitation), *ongoing*
    - Polar (CBS-style; ConcordIASI intercomparsion), *new*
    - Climate metrics, *good progress*
    - Issues with verification against own analysis, *new*

He described in some detail the Grey-zone project that was joint with the GEWEX Global Atmospheric System Studies (GASS) and that was looking at a cold air outbreak. Nine modeling groups were participating in an intercomparison of Global Climate Models and Local Area Models. The goal was to evaluate how well models represent convection and the evolution of the boundary layer in a cold air outbreak. High resolution 'truth' was being used to investigate parameterization issues for coarser resolution models.

Dr Jakob reported that WGNE was in principle supportive of the formation of WMAC but noted that WGNE was a micro-WMAC for the atmosphere since it already included ex-officio membership of GASS, GLASS, SPARC and WWRP.

3.d SPARC and polar project – T. Shepherd

Dr Shepherd reviewed the very vigorous SPARC modeling programme that included CCMVal, DynVar, a data assimilation activity and the new SNAP project. CCMVal involved stratosphere-resolving AGCMs with interactive ozone chemistry (i.e. chemistry-climate models) and recently models were beginning to include tropospheric chemistry and to be coupled to ocean models. This project was evolving into a joint IGAC-SPARC "Chemistry-climate modeling initiative" and the next workshop would be in Boulder (May 2013). DynVar was dealing with stratosphere-troposphere dynamical variability in stratosphere-resolving models and was a complement to CCMVal. Many problems were being addressed, including systematic errors, low frequency variability and mechanisms of dynamical coupling. The next DynVar workshop would be held in Reading in April 2013.

Dr Shepherd observed that stratospheric data assimilation was now "mainstream" so the goals of the data assimilation group were evolving. A long-standing issue remained assessing unresolved gravity-wave drag. The "Stratospheric Network on Assessment of Predictability" (SNAP) project was joint with WGNE and the goal was to assess the added value of the stratosphere for NWP, for both initial state estimation and dynamical evolution. Dr Shepherd also mentioned two other SPARC activities: SOLARIS, focused on climate effects of solar variability, and GeoMIP, which though not a SPARC activity per se, has liaison with SPARC on stratospheric aspects of geo-engineering.

Dr Shepherd outlined the outcomes of the planning meeting for the WCRP Polar Climate Predictability Initiative that took place in Toronto in April 2012. He noted that there were several imperatives of importance to WMAC including:

- Improve the climate models that are used for simulating past and future polar climate
- Improve process parameterizations
- Assess model performance and inform new model development
- Assess how much confidence we can place in models
- Define proper use of models to answer frontier questions
- Improve prediction.

3.5 CliC – G. Flato

Dr Flato observed that modeling has not been a major focus of CliC recently, though it is increasingly recognized as an area in which CliC should be more active. Some on-going modeling activity was connected to regional climate modeling, cryospheric prediction, analysis of modelled feedbacks, and ice sheet dynamics. There was certainly an opportunity to play a bigger role in:

- fostering analysis of the cryosphere in climate and Earth System models;
- promoting/coordinating improvement of process models and parameterizations;
- collaborating on improving models of various kinds.

These would be contributions to the WCRP Cryosphere Grand Challenge and WMAC could provide a means of integrating the more specialized work on cryosphere modeling with Earth System Modeling, climate prediction and regional downscaling. The Polar Prediction initiative was also an avenue for better CliC engagement in weather and climate modeling activities.

3.6 Regional Climate Modeling and CORDEX – M. Déqué

Dr Deque reviewed the CORDEX history, approach and domains and presented some recent results for Africa and Europe. He suggested that WMAC could advise CORDEX on what kinds of experiments to run to look at model weaknesses, resolution, lateral boundary conditions, etc. The Council agreed that there was a role for WMAC to facilitate communication with this group by other modeling groups, for instance to test the regional models. Dr Bony suggested that WMAC could advise JSC on the relative merits of global versus regional climate models, noting that CMIP5 would have a much better assessment of robustness at the regional level than was previously available.

3.7 GEWEX - report presented by C. Jakob

Dr Jakob presented a brief report on GEWEX modeling activities based on input he had received. He noted that the GEWEX Land Atmosphere System Study (GLASS) was now collaborating more closely with the carbon biogeochemical community and suggested that WMAC could assist GLASS with this, as well as with benchmarking activities. Dr Trenberth remarked that modeling activities under the GEWEX Hydroclimatology Panel also needed some form of representation, either on WMAC or the WGRC.

4. Discussion of WMAC roles and responsibilities

There was considerable discussion concerning the role of WMAC. Dr Kimoto expressed his view that WMAC should perform what he referred to as “traffic control” in order to relieve some of the pressure on modeling groups. Other members had already presented their views (see previous sections). Dr Jakob presented an extensive list of areas where WMAC could play a role, including:

1. model evaluation - bring in measurement and process community; inter-disciplinary focus; use of different types of models , e.g., single column model versus CMIP5 models; encourage coordination and traceability; tie modeling activities to downstream uses - build the chain by illustrating how things learned from a study will impact other domains.
2. model development – because there are not enough people working on this, need to make current community more efficient, effective; also need capacity development – communication issue: make field more attractive. Improve communication amongst model developers (workshop); set up model developers’ forum; advise JSC on communication with funders etc about community successes, e.g. to encourage academic/operational agency interaction;

3. model diversity and independence
    a. Societal relevance – develop means to communicate uncertainty, limitations of models (workshops); how to better communicate uncertainty to end-users and also about tuning – what is it, what are implications.
    b. Communication – determine best ways to communicate WMAC advise, to JSC, but also to national agencies – research approaches; write position papers for a specific community.

Council members agreed that the main responsibility for working-level coordination should remain with the individual modeling groups and hence the WMAC membership should be at the level of Chair of the various groups.
A request was made to invite a representative from the WMO Weather Research Programme (WWRP) to future meetings in the interest of increasing interaction between the weather and climate communities. It was noted that the representation by WGNE did already address this interaction to a certain extent.

In general the participants felt that WMAC should act as a forum for discussion and should identify and promote priority areas. The Council proposed to facilitate coordination amongst the groups and Projects through the use of online communication tools. It was suggested that WMAC could create a report repository on their webpage and that each WCRP modeling group report should include a distillation of key issues for WMAC. It was recognized that there was a need for staff support for to develop and maintain forums, web pages, etc.

5. Joint meeting between WDAC and WMAC

This agenda item was cancelled during the course of the meeting at the request of the WMAC who needed more time for their discussion. Co-chairs of respective groups and interested people met over lunch to clarify the boundaries of responsibilities of both groups.

It was agreed that WDAC would remain the prime entity for osb4MIPs, reanalysis, data assimilation, and satellite simulators matters, with involvement of - and coordination with - WMAC when necessary.

6. WMAC Business

The WMAC would prefer to meet for one day after the project and working group reports at the annual session of JSC. It was recommended that JSC assign a liaison to WMAC who would be kept informed of the Council's intersession activities and be included on email lists, etc.

The Chairs thanked all participants for their contribution and inputs.

7. WCRP Joint Scientific Committee 33rd Session

7a. Summary of first WMAC meeting

Dr Mitchell reviewed the JSC motivation for forming the WMAC, namely that there was neither enough expertise in JSC, nor time during the annual meetings, to discuss modeling issues in depth; the WMAC was to serve as an extension of JSC. WMAC had sent a questionnaire to the WCRP modeling community asking what their expectations from the Panel were. Reactions had been mixed; some noted that there was already a lot of coordination in the existing modeling working groups. WMAC discussed this at some length during this first meeting and concluded that there was a role for this group in addition to existing groups. They proposed a shorter and revised terms of reference, as follows:

In partnership with WCRP projects and working groups to act as a focal point for WCRP modeling and advise the JSC and WCRP community on issues pertaining to modeling.
1. Regularly assess modeling capabilities within WCRP and identify gaps, overlaps and opportunities for synergy.
2. Provide advice on priorities for modeling across WCRP including the Grand Challenges.
3. Facilitate effective communication on modeling issues within the WCRP and with the broader community.
4. Promote capacity development in model development, evaluation, and applications.

Main responsibility for working level coordination should remain with the individual modeling groups and hence the WMAC membership should be at the level of Chair of the various groups. A request was made to add a representative from the WMO Weather Research Programme (WWRP) in the interest of increasing interaction between the weather and climate communities. WMAC would act as a forum for discussion and should identify and promote priority areas. The Council proposed to facilitate coordination amongst the groups and Projects through the use of online communication tools. The Council would prefer to meet for one day after the project and working group reports at the annual session of JSC.

Discussion

The need for a joint activity with IGBP to advance prediction of the Earth system (in addition to the biannual joint meetings of WGCM and IGBP AIMS) was highlighted. The issue of the relationship between the WMAC and the joint WMO CAS/WCRP Working Group on Numerical Experimentation (WGNE) was raised. It was concluded that the two groups were complementary – WGNE addressed mainly atmospheric modeling whereas WMAC was about the earth system as a whole. A question was raised as to where interactions with the end users would be considered. In general these would be dealt with in the existing modeling groups, but if WMAC saw a gap, it would advise the JSC on appropriate action. It was emphasized that the Councils were primarily advisory and would not to take on activities themselves.

7b. Summary of first WDAC meeting

Dr Brown briefed the JSC on the outcomes of the first WDAC meeting. The council was seeking only minor adjustments to their terms of reference. The first meeting had been very busy with many issues to address, as reflected in the action items below. Dr Brown highlighted the SCOPE-CM collaboration between research and operational groups on the transition of data sets and remarked that these initiatives were worthy of wider participation by WCRP projects, and that significant scientific support from WCRP was needed to make the operational processing tasks successful. The Council had also considered the inventory of Essential Climate Variables (ECVs) proposed at the recent meeting co-sponsored by WCRP and GCOS in Frascati (see recommendation below). The WDAC would take responsibility for organizing the next reanalysis conference that would most likely be held in Europe within 4-5 years. In the mean time, there is a need to better coordinate the observation data sets input into reanalyses among the data producers and the reanalysis developers. It was proposed to hold a specialized workshop on this matter. The objectives of the workshop would be to determine the state of observation and reanalysis development, and to determine the best mode of communications among the interested institutions (e.g. a task group or committee). The WDAC was also already planning for its next meeting that would include on the agenda a discussion of the Earth System Grid and possible need for further governance.

Discussion

A question was raised as to what would be WDAC's advisory role vis à vis the core Projects, for instance for CLIVAR that worked closely with OOPC on data issues. Dr Brown reaffirmed that the WDAC did not wish to supplant anything that was ongoing, but rather wanted to ensure that all core projects had representatives on WDAC so they could raise issues of broader concern. It was noted that the GEWEX Data and Assessments Panel had expressed concern that some of the data sets being considered by Obs4mips might not have been sufficiently quality controlled. Dr Brown remarked that the WDAC was aware of this issue and wanted to develop a more uniform quality assessment approach; this would be an opportunity for WCRP to make expert assessments of these data sets. The need for coordination between the WDAC and WMAC on issues such as Obs4mips and model data was highlighted; Dr Brown said discussion would take place between the two groups to coordinate on common topics.

Annex A - Revised Terms of Reference

Mandate

Modeling is a core activity for WCRP. Models are the main climate diagnosis and prediction tool. The three modeling and prediction groups, WGCM, WGSIP and WCRP/CAS WGNE oversee the development of various types of modeling. Every WCRP project has a set of modeling activities. The WCRP Modeling Advisory Council (WMAC) will coordinate high-level aspects of modeling across the WCRP, ensuring cooperation with main WCRP partners such as IGBP and WWRP, and act as a single entry point for all WCRP modeling activities. The WMAC will work with the WCRP Data Advisory Council to promote effective use of models with observations and address aspects of modeling in data assimilation, reanalysis, Observing System Sensitivity Experiments and in paleoclimatic research.

Terms of Reference

In partnership with WCRP projects and working groups WMAC acts as a focal point for WCRP modeling and advises the JSC and WCRP community on issues pertaining to modeling. It will:

- Regularly assess modeling capabilities within WCRP and identify gaps, overlaps and opportunities for synergy.
- Provide advice on priorities for modeling across WCRP including the Grand Challenges.
- Facilitate effective communication on modeling issues within the WCRP and with the broader community.
- Promote capacity development in model development, evaluation, and applications.

Membership

Members will be appointed by JSC for a 3-year term with a possibility of two 2-year extensions.

Two Co-Chairs, one being independent (i.e. having no formal affiliation to WCRP modeling groups) and the other being a Co-Chair of one of the three modeling panels and working-groups (WGNE, WGSIP, WGCM). Co-Chairs would have a rotating position with a 2-year term.

The members of the WCRP Modeling Advisory Council should at least include:

- Co-chairs of remaining two WCRP modeling panels and working-groups (WGNE, WGSIP, WGCM)
- Representatives of WCRP projects (GEWEX, CLIVAR, SPARC, and CliC)
- Representative from the WCRP Data Advisory Council

- Representative from the Working Group on Regional Climate Science and Information (WGRC)

Mode of functioning

The WCRP Modeling Advisory Council is expected to:

- Communicate regularly by e-mail
- Meet once a year
- Encourage joint meetings of working groups and/or panels to promote communication or to launch focused joint initiatives
- Avoid duplicating or have overlap with existing working groups or panels

The Council should have the flexibility and resources to promote action within existing WCRP projects and panels or by appointing limited duration task teams to accomplish its tasks.

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Annex B - Agenda

Time	*Agenda Item*	*Docs*
<u>Monday 16 July 2012</u>		
1. Introduction – Chair C. Jakob		
09h00 – 09h20	a. Introduction – WMAC Co-Chairs and WCRP JPS	8
09h20 – 09h30	b. Welcome - D/WCRP or Chair JSC	6
09h30 – 09h40	c. Adoption of agenda	1
09h40 – 10h10	d. Review of the TORs	2
2. Actions/Recommendations from recent Meetings – Chair J. Mitchell		
10h10 – 10h30	Pasadena Model Development Workshop – C Jakob	
10h30 – 10h50	*Coffee break*	
3. Overview over WCRP modeling activities and views on WMAC roles – Part 1 (includes 5 mins for questions) – Chair: J. Mitchell		
10h50 – 11h10	a. WGCM, CMIP5, obs4MIPs – S. Bony	9, 3, 17
10h10 – 10h30	b. WGSIP and sub-seasonal project– F. Doblas-Reyes	4, 5
10h50 – 11h10	c. WGNE and grey-zone project – C. Jakob	10
11h10 – 11h30	d. SPARC and polar project – T. Shepherd	19
11h30 – 12h00	e. CLIVAR– H. Drange	20
12h00 – 13h00	*Lunch*	
3. Overview over WCRP modeling activities and views on WMAC roles – Part 2 (includes 5 mins for questions) – Chair: C. Jakob		
13h00 – 13h20	f. CLiC – G. Flato	15
13h20 – 13h40	g. Regional Climate – M. Deque	18
13h40 – 13h55	h. Individual views – M Kimoto, Others?	
13h55 – 14h10	i. Written contributions received from those not attending (C. Jakob/J. Mitchell)	16
4. Discussion (Chairs: J. Mitchell and C. Jakob)		
14h10 – 15h10	a. How could WMAC be most useful to the	11,12,13

	existing modeling activities? b. Are there any emerging common projects and activities? c. What should future WMAC meetings look like?	
15h10 – 15h30	*Coffee break*	
5. Joint meeting between WDAC and WMAC – WDAC and WMAC Chairs		
15h30 – 16h30	a. Short reports from the individual meetings (5 minutes each) b. Interaction on themes of mutual interest (e.g. data assimilation, reanalysis, OSSE, model evaluation, model-data archives and ESG, osb4MIPs, etc) c. Long-term common strategy	2, 7, 17
6. WMAC Business – Chair J. Mitchell		
16h30 – 17h00	a. Review of planned meetings/events – gaps, duplicates, requirements	
17h00 – 17h15	b. WMAC – WDAC interactions	14
17h15 – 17h30	c. Next WMAC Meeting – Date/Venue/Length d. AOB	
17h30 – 18h00	e. Review of Draft actions list	
18h00	*Dinner*	
<u>Tuesday 17 July 2012</u>		
7. WCRP Joint Scientific Committee 33rd Session		
11h00 – 11h15	a. Summary of first WMAC meeting – WMAC Co-Chairs Drs John Mitchell and Christian Jakob	
11h15 – 11h30	b. Summary of first WDAC meeting – WDAC Chair Dr Otis Brown and Vice-Chair Dr Toshio Koike	

Annex C – List of contacts

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Annex D – List of actions

	Action	POC	Date
1	Adopt revised WMAC Terms of Reference		Done
2	Form task team with IGBP on prediction of the Earth System	Co-chairs	

Post meeting notes

Three work points have been identified since the WMAC session:

1) Progress the idea of a prize for model development achievements
2) Progress the idea of summer schools specifically aimed at model development
3) The lack of "dynamical" or "circulation" research was identified, especially in the troposphere within WCRP, and discussion on how to fill this gap needs to be discussed

The establishment of an-online Wiki or discussion forum space for WMAC to carry out these discussions throughout the year is considered.