



PROJECT REPORT

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

WMO, Geneva, Switzerland
9 April 2015

May 2015

WCRP Report No. 10/2015



Guy Brasseur, Chair of the Joint Scientific Committee, at the informal evening WMAC4 session

Present: Christian Jakob (Co-chair), Gerald Meehl (Co-Chair), Joan Alexander, Guy Brasseur, Gokhan Danabasoglu, Michel Dequé, Greg Flato, Bill Gutowski, In-Sik Kang, Masahide Kimoto, Jon Petch, Adam Scaife, Cath Senior, Jean-Noël Thépaut, Ayrton Zadra (remotely)

Excused: Sandrine Bony, Otis Brown, Peter Cox, Toshio Koike, Joe Santanello (via email), Francisco Doblás-Reyes

WCRP JPS: Michel Rixen

1. Introduction – Chair C. Jakob

Christian Jakob welcomed all participants, the new WMAC Co-chair Gerald Meehl who took over from John Mitchell. He invited Guy Brasseur, Chair of the WCRP Joint Scientific Committee to provide the charge to WDAC4 attendees.

a. JSC charge to WMAC4 - Chair JSC

Guy Brasseur noted the need to attempt to streamline the structure of WCRP, which is complex and may seem obscure in the scientific community. He suggested a possible more prominent role beyond the current advisory mandate, for WMAC to which working groups could report prior to the JSC session. He posed the difficult equation that each group should be given the possibility to present its work to the JSC, to report specific modeling issues to WMAC, and for WMAC to report to the JSC.

Gerald Meehl recalled that WMAC was established by the JSC to play mainly an advisory role on modeling issues within the programme and to promote connections, coordination and communication across the modelling working groups, though it now also has initiated some specific new activities such as the model developments prize and the summer school. Several working groups arrange for joint meetings on a regular basis and the WMAC4 agenda has been designed to address and explore new connections

Christian Jakob described the WMAC as an extension of the JSC. He recalled that the current agenda structure and membership has been optimized to reduce travel pressure to members such that the working group co-chairs already attend JSC and can also attend WMAC meetings in concert with JSC, and recommended to use teleconferencing and written reports more extensively.

One member expressed concerns that the interaction between WMAC and core projects is mainly one way, to WMAC, whilst the feedback to core projects seems weak. It was stressed that these core project representatives are expected to play this active 2-way liaising. It could be advisable to include the core project co-chairs as WMAC members to alleviate this problem.

b. Adoption of agenda – WMAC Co-Chairs

The agenda was adopted without any changes.

c. Review of WMAC3 actions – WMAC Co-Chairs

WMAC3 were reviewed as follows.

Promoting model development

1. Model development, model and data impediments should be mentioned specifically in Project and GC reports (1 slide as a minimum) – **all projects, WGs and GCs (JSC36)**

Members agreed that most WGs, GCs and core projects fulfilled the request and advised to clarify further what specific actions might require WMAC's attention.

Regional climate information

2. Design and implement an evaluation strategy for regional climate information based on global and regional products – **WGRC (spring 2015)**

Members noted that this action was under development. The follow-up will depend on the fate of the GC on Regional Climate.

3. Develop a synthesis paper on the status of model-based climate information on regional scales. As part of this activity consider organizing a science workshop with CORDEX, WGNE, WGCM, WGSIP and core projects – **WGRC (spring 2015)**

Members noted the organization of the distillation workshop in Santander as a response to the WMAC recommendation but advised not to overstretch the community with too many meetings.

ESGF

4. Consider having ESGF representative/talk at next JSC meeting to implement proper governance within WCRP for a whole-of-programme liaison with the ESGF (Extension of WIP portfolio is one option, establishing other IPs is another), be an advocate to help raise the necessary funding – **JSC (JSC36)**

See 2b below.

Summer school on model development

5. Design invitation document that sets out requirements and selection criteria to host the school – **WMAC (fall 2014)**

See 1d below.

6. Advertise school concept on website and link to specific school website and other relevant summer schools in the community - **JPS (fall 2014)**

See 1d below.

WCRP/WWRP International Prize for Model Development

7. Formalize the creation of an annual Model Development Prize together with WWRP specifying eligibility, selection process, nominations, etc. – **WMAC (fall 2014)**

See 1d below.

Climate dynamics

8. Encourage SPARC to be the WCRP Point of Contact on atmospheric dynamics and explore, through discussion among core projects, working groups and GCs, the need for a separate Climate Dynamics Panel – **SPARC (SSG, Jan 2015)**

Action closed. Members thanked the leadership and contribution of SPARC (e.g. http://www.wcrp-climate.org/images/documents/jsc/JSC36/atmosdyn_survey_summary.pdf).

CMIP and DECK

9. Clarify need (or not) for DECK experiments as an entry requirement for other activities – **WGCM/CMIP (Sept 2014)**

See 2c below.

d. Update on ongoing WMAC activities (Modelling prize, Summer schools) – WMAC Co-Chairs

Modelling Prize

Christian Jakob noted that 17 applications were received and were reviewed by WMAC, WGNE and WWRP chairs. Members recommended that criteria may need to clarify that nominations should be relevant to Earth System Modeling. It was decided to award the Prize every year. For top candidates, it was also suggested to encourage them to re-apply and to offer them honourable recognitions.

Summer school

Christian Jakob provided an update on the preparation of the summer school. 240 applications were received, of which 40 people were selected. The 2015 edition will focus on atmospheric moist processes. He will work on the invitation letter for hosts regarding the future editions, and it will be up to the host to pick the next focus topic. He noted that the original intention was to repeat the summer schools only every 2 years because of the resulting workload and funding involved, though the great interest and apparent large demand may lead WMAC to consider holding the summer school every year, and to adopt a ‘training the trainer’ approach to increase leverage.

Gerald Meehl pointed to the CESM tutorial held every year, though that was not a model development exercise but rather instruction on how to use a specific model (CESM). In any of these tutorials or summer schools, it is important to go beyond the use of the model as a

black box. It was suggested to involve one or two designated JSC members in the preparation of the summer school, thus making it a higher level activity coming from the JSC as well as WMAC, and recording the lessons to build some training material as a legacy of such efforts, like those archived from the Summer school on Extremes.

In-Sik Kang suggested involving ICTP, as there is an MoU to that effect.

Gokhan Danabasoglu noted that OMDP is organizing an ICTP summer school in Ankara (<http://www.clivar.org/events/ictp-school-ocean-climate-modelling-physical-and-biogeochemical-dynamics-semi-enclosed-seas>) and offered to explore NCAR's interest to host one school next year.

Jon Petch suggested to 'stamp' existing initiatives as 'WCRP summer school' and to collect videos to build up an archive of the training material. The Earth Academy could be helpful in building capacity in developing nations.

Guy Brasseur recommended seeking the help of professionals to ensure the quality of training/video material. A number of foundations teach courses on mathematics, physics, etc and offer options to build such legacy material.

Given the high demand, Joe Santanello suggested (via email) increasing the ambition of the school such that it could be held every year with a larger number of participants. This also could support a wider community effort to better understand the interfaces between Earth System Components. He mentioned on-going discussions with Michael Ek and Bill Lapenta to host a summer school at NCEP focused on LSM-PBL.

Aaron Bone suggested (via email) that perhaps Météo-France could host one summer school in the future too.

2. Update on existing activities with relevance to WMAC

a. WDAC – O. Brown

This agenda item was skipped, as it was going to be presented the following day at the JSC36 session, with the exception of the Earth System Grid Federation point further developed below.

b. ESGF & WIP – WGCM Co-Chairs

Greg Flato raised the issue that it is apparently not possible to host 2 ESGF nodes on same site. Cath Senior noted that the WIP does not have the control, but only some influence on the ESGF governance. Gerald Meehl recalled that Dean Williams is now chairing the ESGF. Adam Scaife remarked the important issue of competing NetCDF vs Grib data formats that is emerging as Climate Services develop, calling for some increased dialogue between the weather/operational (Grib) and climate/research and CMIP in particular (NetCDF) communities. Michel Rixen invited core projects to inform the JPS about their ESGF training needs so they can fully engage with and benefit from the ESGF infrastructure and tools.

c. CMIP and MIPs – WGCM Co-Chairs

Cath Senior briefed the JSC on WGCM and related CMIP and MIP activities. The main issue for WMAC relates to the CMIP entry requirements for modeling efforts and whether running all the DECK experiments would be mandatory or relaxed on a case-by-case.

Adam Scaife noted that some Decadal and HighResMIP MIP groups may not run all of the DECK experiments. Michel Rixen recalled that the CMIP design is a framework/general guideline and should not be over-prescriptive. Cath Senior highlighted the importance to address the GC questions and to demonstrate that some careful diagnostics and evaluation of the model simulations need to be conducted. Members agreed on recommending some flexibility within the CMIP design to accommodate important relevant modeling efforts.

CMIP aims at some standard metric and model evaluation being made available to everyone, ideally via ESGF. It was noted that several packages are available at NCAR and from CCMVal. Greg Flato recalled an outcome of the Bern meeting suggesting an activity to review attributes of models which are useful to applications. Jean-Noel Thépaut recalled the existence of the WGNE-WWRP Joint Working Group on Forecast Verification.

3. Possible new initiatives

a. Transpose-CMIP—WGNE Co-Chairs

The recently held WGNE30 session held 23-26 March at NCEP in College Park, MD, USA reviewed the lessons learned from the Transpose-AMIP effort.

WGNE shared the view that any new Transpose-AMIP experiments are best formed around a particular science question (e.g. continental warm bias; cloud biases; MJO; mid-latitude dynamics) and recommended to bring the current experiment to an end as a project (i.e. NOT as a separate MIP in CMIP6), but WGNE/WGCM/GASS/etc. strongly encourage the methodology be used within other MIPs (e.g. CFMIP, MJO-DP, NAWDEX, GEWEX-PROES). A Transpose-CMIP (raised at the WGNE systematic error workshop) – would require exploratory work. So far, no one has volunteered to take this on. Issues (and solutions) may fall out as NWP centers move to coupled modelling.

Christian Jakob noted the similarity with the WGSIP drift initiative. Climate models typically do not have data assimilation capabilities. Two different questions need to be addressed:

- *how do errors grow with a model's own initialization data set?*
- *how do errors grow with some other reanalysis data for initialization?*

Adam Scaife remarked that for retrospective forecasts, some groups use ERA-Interim for initialization. Jon Petch noted a lesson from MJO TF related work concluding that models' near-term simulations (e.g. 20 days) are not the same as climate long-range (e.g. decadal) runs, challenging the hypothesis of steady systematic errors. Members welcomed the WGSIP drift project as a suitable response to the proposed Transpose-CMIP exercise and encouraged WGSIP to report back to WMAC and WGNE.

b. Earth System Reanalysis – M. Rixen

Michel Rixen briefly presented the outcome of the Earth System Reanalysis scoping meeting held at IOC/UNESCO in Paris on 10 March 2015. Current WCRP Earth System research is limited for use of reanalyses as a fundamental resource for model development and evaluation, owing to overall (systematic errors) and physical (drifts, shocks, imbalances) consistencies. Cooperation exists amongst centers to share input observations but they could be strengthened. It is not immediately obvious what new observations or data streams could make substantial advances to make progress on this topic. Major issues remain even on the very basic standard atmospheric properties. There are some real challenges developing and using Earth System Reanalyses across many time scales (computing resources, process understanding). In the long run, assimilation of atmospheric composition and (especially ocean) carbon cycle has some potential utility. The parallel JSC36 Planet Data Initiative discussions could shape this effort in several directions.

It was stressed that current atmospheric reanalyses still have major issues, for example in the tropics, and that the same holds for some ocean reanalyses. Even so, science has made substantial progress, thanks to the pioneering reanalyses. Jon Petch suggested exploring hydrology as a way to constrain reanalyses, as closure is an important quality element of any reanalysis. Earth System reanalysis represents a pioneering effort, but the community should not lose sight of the need to improve the component/physics reanalyses.

c. Urban environments – coastal megacities – M. Rixen

Michel Rixen briefly presented key elements regarding a growing science focus on urban issues and climate, promoted by D/WCRP and the JSC Chair. He noted several on-going efforts which could deserve some WMAC advice to help coordinate or streamline some of these into a dedicated initiative, in particular:

- GURME, a GAW Urban Research Meteorology and Environment Project (<https://www.wmo.int/pages/prog/arep/gaw/urban.html>)
- The WGNE Aerosol Project (http://www.wmo.ch/pages/prog/arep/wwrp/new/documents/03_Freitas_Aerosols.pdf)
- The CMIP HighResMIP initiative (<http://www.wcrp-climate.org/modelling-wgcm-mip-catalogue/modelling-wgcm-mips/429-wgcm-hiresmip>)
- The WGNE Grey Zone Project (http://www.wmo.ch/pages/prog/arep/wwrp/new/documents/13_gass_grey_zone.pdf)
- The CORDEX Flagship Pilot Studies (http://wcrp-cordex.ipsl.jussieu.fr/images/pdf/meetings/SAT2/FPS_Filippo.pdf)
- Increased collaboration between GAW, WWRP and WCRP regarding chemistry, weather and climate modeling (http://eumetchem.info/index.php?option=com_content&view=article&id=85%3Asymposium-on-coupled-chemistry-meteorology&catid=11%3Anews&lang=en)

Christian Jakob noted that this is a highly regional issue. Joe Santanello (via email) suggested a possible GLASS role in the Urban Environments idea in terms of modeling and coupling in urban settings (building on PILPS-urban).

Gerald Meehl remarked that many global climate models now have urban parameterizations and allow study of urban phenomena such as heat islands. Joan Alexander recommended keeping track of relevant initiatives on this topic to find out if WMAC advice is needed.

It was suggested to focus such efforts around key science questions, such as “What is the impact of a regional heat wave combined with the urban heat island effect?”

SPARC and IGBP/IGAC should have a stake in such initiatives. The WCRP Grand Challenge on Extremes and WWRP HiWeather could also contribute where appropriate.

4. Modeling activities connecting WGs and Core Projects in the context of the Grand Challenges

- a. WGSIP- WGCM (seasonal-decadal, presented by WGSIP representative)
- b. WGNE-WGSIP-WGCM-WGRC (cloud processes and systematic errors, presented by WGCM representative)
- c. WGNE-WGCM (transpose-CMIP, presented by WGNE representative);
- d. WGCM-WGRC (regional climate: embedded regional models/high resolution global models (presented by WGRC representative);
- e. Modeling in Core Projects connected to WGSIP, WGCM, WGNE, and WGRC (Core Project representatives)

Because of limited time remaining to address agenda items 4 and 5, Co-chairs proposed to address the above points by inviting members to provide short statements in their respective area of expertise. See details under point 5 below for individual statements and summary.

5. Discussion on the future of modeling in WCRP – Requested by the Director of WCRP and Chair of the JSC following from previous presentations

D/WCRP and Chair JSC invited attendees to address items under point 4 above and the following questions:

“Why do we have so many W*** groups? Can we afford so many groups?

As our focus turns toward seasonal to decadal time scales, and perhaps multi-scale multi-component integrated earth system modeling, do we have in place an effective structure? Why do we speak the word 'seamless' but divide our activities across so many separate structures? Do we have adequate support in place for CMIP, one of our most prominent efforts? Should we rather combine regional and global? Can we use systematic errors common to different applications to organize our activities? Is the CMIP6 science focus on this topic useful for this purpose? Should we increase synergies with sister programmes

(WWRP, AIMES, etc)? What should be the place of modeling in distilling *MIP*s simulations?”

WMAC Co-chairs welcomed suggestions to improve seamlessness and on adjusted reporting lines. They stressed the tension between sizeable science groups and seamless spanning all time-scales by definition. Budget constraints were also considered an important factor forcing possible restructurings. However, in plenary David Carlson stated that the current budget difficulties of WCRP should not influence decisions made in WMAC regarding structure (i.e. WMAC would not need to cut modelling activities in WCRP commensurate with current 50% budget shortfalls)

Christian Jakob highlighted a number of tensions in the WCRP structure, model development vs applications, Earth System Modeling vs domain specific efforts, working groups and (core and other) projects. Any structural change should pose the question whether this serves the community better. Joint meetings between working groups should be encouraged such as those currently being done by WGCM (meeting jointly for one day with the other modelling working groups in successive years). He raised the issue of visibility of model development, an area where the summer school and the prize are trying to offer some partial solution. He also suggested some kind of wider ‘Pan-WCRP’ meeting on model development involving all working groups.

Gerald Meehl noted that AIMES, which WGCM depends on critically to provide expertise in biogeochemistry in earth system models of interest to WGCM, has not found a home yet (IGBP, AIMES current home, will cease to exist in December, 2015) but AIMES members are assuming it will continue. A proposed Grand Challenge on Biogeochemistry that has emerged from AIMES for WCRP consideration will probably need further consultation with WCRP leadership since it was originally expected that grand challenge would be in the IGBP domain. WMAC recognized the importance of AIMES and supported its continuation. Merging entities reduces headcount, which poses a number of issues. He supported the idea of Joan Alexander, and cited the MIP ESM conferences as an example. He suggested CORDEX-WGRC should have similar arrangements as CMIP vis a vis WGCM. WMAC should remain an important forum to review model development issues from all groups.

Greg Flato did not see compelling arguments to make big changes. Seamlessness is a nice philosophy, but in practice, science deals with tractable problems, e.g. initialization, coupling, bias correction, etc. He stressed the need for WMAC to remain as a coordinating voice on modeling issues within WCRP and for its connection between modeling, core projects and Grand Challenges. Model development efforts being spread in various entities should not pose a problem as long as WMAC provides the necessary coordination and communication functions across the modelling working groups.

Jon Petch advised against changes in the WCRP structures which can sometimes create a lot of confusion. Model development admittedly crosses time scales by nature. He recommended a stronger interaction between CORDEX and WGNE.

Adam suggested shorter presentations at the JSC (e.g. 10 mins) with more time for discussion, a possible merge of WGOMD and WGNE, and an evolution of WGSIP into something like a “Working Group on Initialized Prediction” or “Working Group on Seasonal

to Decadal Predictions". He acknowledged the value of putting people from different fields together.

Jean-Noel supported Adam Scaife's idea. He noted that WGNE, whilst having a special status because of the co-sponsorship of CAS, could be trimmed down to bring in more scientists (e.g. ocean modelers or model developers). He suggested that briefings to the JSC could also include a specific slide on model development.

Masahide Kimoto was satisfied with the current structure of the programme.

Bill Gutowski highlighted the need for communication between modeling groups, which occurs in several ways.

Gokhan Danabasoglu wondered whether ocean model development needs of the Grand Challenges are satisfied by the current WCRP structure. He suggested raising OMDP to trans-WCRP status outside CLIVAR.

Cath Senior noted some practical difficulties in arranging meetings jointly with other groups but did not have any particular issues with time scale separation.

Joan Alexander suggested periodic model development fora.

Joe Santanello noted (via email) that "seamless" is an attractive concept philosophically, but is often impractical, as centers tend to compartmentalize their structure anyway.

Michel Rixen noted the previous recommendation of WMAC to WGRC on the need to focus on modeling issues, and this is now particularly relevant given the uncertain focus of WGRC. He welcomed Adam Scaife's suggestion to redefine the WGSIP scope to encompass initialization and/or decadal issues as a nice gradual step forward in improving seamlessness.

In summary, WMAC members agreed there is no need for a major reorganization. Groups should report to the JSC, covering model requirements and development issues using crisp reports following some agreed format and allowing enough time for discussion. It was also recommended, to the extent possible, to meet jointly with another group over 1 day on a regular basis and all working groups meet together maybe every 4-5 years. MPI offered to host the first instalment in 2017 in conjunction with their Earth System Modelling workshop. WMAC supports the proposed change for WGSIP to 'merge with the 'Decadal' group into a new focus on 'initialized prediction' or 'seasonal to decadal'.

6. WMAC Business – Chair C. Jakob

a. AOB

An informal evening session was proposed to continue the discussion on these topics with those interested and available.

b. Membership

WMAC Co-chairs thanked Joan Alexander for her active involvement in WMAC and noted the nomination for her replacement to be confirmed by the JSC.

c. Next meeting

The format of the WMAC session held in conjunction with the JSC was deemed appropriate. Members indicated their willingness to adopt to the same approach next year.

d. Review of actions and decisions

Decisions were reviewed and are summarized in Annex B.

Annex A – List of contacts

Members

Prof. Christian Jakob (Co-Chair)
School of Mathematical Sciences
Monash University
Wellington Road
Clayton, VIC 3800
Australia
E-mail: christian.jakob [at] sci.monash.edu.au

Dr Gerald Meehl (Co-Chair)
National Center for Atmospheric Research (NCAR)
Climate and Global Dynamics Division
P.O. Box 3000
Boulder, CO 80307-3000
USA
E-mail: meehl [at] ucar.edu

Dr Joan Alexander
NorthWest Research Associates
CoRA Office
3380 Mitchell Lane
Boulder, CO 80301
USA
E-mail: alexand [at] cora.nwra.com

Dr Sandrine Bony-Lena
Laboratoire de Météorologie Dynamique (LMD/IPSL)
CNRS/UPMC, Tour 45-55, 3ème étage
4 place Jussieu, boîte 99
75252 Paris cedex 05
France
Email: Sandrine.Bony [at] lmd.jussieu.fr

Professor Peter Cox
University of Exeter
College of Engineering, Mathematics and Physical Sciences
Exeter EX4 4QF
United Kingdom
Tel: +44-1392-725220 ext 5220
Email: P.M.Cox [at] exeter.ac.uk

Dr Gokhan Danabasoglu
Oceanography Section
Climate and Global Dynamics Division
National Center for Atmospheric Research
1850 Table Mesa Drive
Boulder, CO 80305
USA
E-mail: gokhan [at] ucar.edu

Dr Francisco Doblas-Reyes
ICREA Research Professor at IC3
Institut Català de Ciències del Clima
Doctor Trueta 203
08005 Barcelona
Spain
E-mail: f.doblas-reyes [at] ic3.cat

Dr Greg Flato
Environment Canada
Canadian Centre for Climate Modelling and Analysis
PO Box 3085, STN CSC
University of Victoria
Victoria, BC, V8W 3V6
Canada
E-mail: greg.flato [at] ec.gc.ca

Dr William Gutowski
3021 Agronomy Hall
Dept. of Geological & Atmospheric Sciences
Dept. of Agronomy
Iowa State University
Ames, Iowa 50011-1010
USA
E-mail: gutowski [at] iastate.edu

Prof. Masahide Kimoto
General Science Building
5-1-5 Kashiwanoha
Kashiwa, Chiba, 277-8568
Japan
Email: kimoto [at] aori.u-tokyo.ac.jp

Dr Joseph A. Santanello, Jr.
Physical Scientist
Hydrological Sciences Laboratory
NASA-GSFC Code 617, Bldg 33, Room G-220
Greenbelt, MD 20771
USA
Email: Joseph.A.Santanello [at] nasa.gov

Dr Jean-Noël Thépaut
ECMWF
Shinfield Park
Reading, Berkshire RG2 9AX
UK
E-mail: Jean-Noel.Thepaut [at] ecmwf.int

Invitees

Dr Otis Brown (Co-Chair, WDAC)
CICS-NC
NOAA's National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801
USA
Email: Otis_Brown [at] ncsu.edu

Professor Guy Brasseur (Chair, JSC)
Helmholtz-Zentrum Geestacht, GmbH Climate Service
Center
Fischertwiete 1
D-20095 Hamburg
Germany
E-mail: gpbrasseur [at] gmail.com

Prof In-Sik Kang
Seoul National University
Korea
Email: insik.kang1 [at] gmail.com

Dr Jon Petch
Met Office
Manager of Clouds and Radiation Group
FitzRoy Road
Exeter EX13PB
UK
E-mail: jon.petch [at] metoffice.gov.uk

Dr Adam Scaife
Met Office Hadley Centre
FitzRoy Road
Exeter Devon, EX1 3PB
UK
E-mail: adam.scaife [at] metoffice.gov.uk

Dr Catherine Senior (representing WGCM)
Head of Understanding Climate Change
Met Office Hadley Centre Fitzroy Road
Exeter EX1 3PB
United Kingdom
E-mail: cath.senior [at] metoffice.gov.uk

Dr Ayrton Zadra (Co-Chair, WGNE)
Environment Canada
2121, route Transcanadienne
DORVAL, QUEBEC H9P 1J3
Canada
E-mail: ayrton.zadra [at] ec.gc.ca

JPS for WCRP

Dr Michel Rixen
Senior Scientific Officer
World Climate Research Programme
World Meteorological Organization
7bis, avenue de la Paix
Case postale 2300
CH-1211 Geneva 2
Switzerland
E-mail: mrixen [at] wmo.int

Annex B – Action list

Working Groups

1. WGSIP to propose a name change to recognize its role in all initialised prediction (WGSIP to propose options at next JSC/WMAC in consultation with DCPD)

Reports to JSC

2. Individual modelling WGs to report to the JSC directly with even shorter and more targeted reports (including model development issues) to allow time for discussion with JSC in plenary (JSC).

Earth System Grid Federation

3. Form a small team to engage with ESGF to see what can and cannot be done and to begin developing a plan accordingly (WGCM/WIP in close coordination with WMAC)

4. Inform JPS about training needs regarding the ESGF (Core projects, GCs)

WMAC Summer Schools (and other training programmes)

5. Design a plan for providing a legacy, e.g., recording and web hosting of lectures (JPS)

6. JSC to consider nominating members to oversee and help implement the summer school/training programme (JSC)

Model Development prize

7. Refine selection criteria and encourage re-nomination of excellent candidates from last round (WMAC)

CMIP

8. WMAC supports the role of the DECK experiments as an entry card to CMIP, but urges the introduction of some limited flexibility where appropriate, e.g., Decadal MIP (WGCM, CMIP panel)

AIMES

9. WMAC recognizes the important role played by AIMES in connecting to WGCM with expertise in biogeochemistry in Earth System Models. There are issues around the future of AIMES. WMAC will monitor the situation and report at next JSC (WMAC)

Model evaluation

10. WMAC recommends expanding the scope of the WGNE-WGCM Climate metrics panel to (i) include model diagnosis and (ii) cover the WCRP as a whole. This will likely require a multi-step process (JSC to approve and communicate to the panel)

Earth System Reanalysis

11. Monitor existing efforts in modelling centres and potentially invite a presentation at next JSC/WMAC meeting (WDAC)

12. Communicate the need to continue supporting re-analyses of the physical systems as many improvements are still needed, e.g., water cycle, tropical states. (WDAC, WMAC)

Transpose CMIP

13. Use WGSIP "Drift" project as pilot study and potential nucleus. Invite report on this at next WMAC meeting (WMAC)