

Observations and Analyses for evaluating global climate models

5 October 2009

From Sandrine Bony (Co-chair WGCM)

As faithfully summarized by Karl (below), WGCM has discussed extensively the need to facilitate the access of observational datasets to the modeling community (as you may know, WCRP is organizing a community-wide survey about model evaluation and improvement, and this was identified as a key need in many of the responses that we have received so far). The CMIP5 framework would provide a nice opportunity for setting this up. Recently, NASA JPL (Juaq Teixeira, Duane Waliser and Jerry Potter) has proposed a useful initiative in that direction, and you may want to contact them for more information. However, relaying this request to the different data providers and organizing at the large scale the response to this request fits well with the WOAP's mission. For this reason, it would be great if this issue could be added to the agenda of your next meeting.

Best regards,
Sandrine

From Karl Taylor on behalf of WGCM:

The main input from WGCM is a suggestion that observational data providers make concerted efforts to serve the anticipated needs of the CMIP5 analysis community. This could include:

1. examining the list of requested CMIP5 model output (which fields? how have they been sampled in time? approx. resolution and pressure levels requested?), and attempt to provide "validation" data that is similar. (The list of CMIP5 requested output can be found at: http://cmip-pcmdi.llnl.gov/cmip5/data_description.html).
2. writing observational data in compliance with the CF-metadata standards and structuring the data similarly to the CMIP5 model output.
3. providing clear guidance on the limitations of the observational data and the relative merits of different alternative observational datasets. When possible, provide error estimates for the data.
4. selecting (or recommending) an "official" version of a dataset when multiple options appear to be available on the web. . There seem to be, for example, several versions of the ERBE data out there.
5. linking the observational data into the same cataloging and delivery system that will be used to make CMIP5 model output available. The observations could then be downloaded in the same way that model output is downloaded. There are already groups (e.g., a group at JPL) who are working in collaboration with PCMDI to demonstrate that this can be done. I think NOAA and some European projects (e.g., IS-ENES) may also have plans to

do this and have been in touch with PCMDI. The model of having a distributed database (with many of the modeling centers hosting their own data, but linking them together in what is called the "Earth System Grid Federation") could be followed by the observational community.

If the observational community were to take this on, I think they would see a noticeable growth in the use of their data products. I think this would speed our understanding of errors in climate models.

My impression is that the WGCM would welcome WOAP's interest in promoting some of these ideas. Do you think a discussion of this would be appropriate under agenda items 3.1 and 3.2 or where?

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Brief commentary (Kevin Trenberth)

I agree that WOAP should do what it can in this regard. At the same time, the above comments make some questionable assumptions. In particular it assumes there is an "observational community". There are of course World Data Centers, and other major data centers, such as the NASA DAACs. Most of these are not in the business of evaluating datasets and making them available for a targeted use, such as model evaluations. They are distributed and with very diverse missions, not just climate oriented. This does not mean that we should not try to highlight certain issues for them, and we can try to do that.

Within WOAP, we have two working groups who should provide input on this as per the request below. These are:

- 1) Task Group on Data Management, chaired by Howard Cattle, and
- 2) Joint Working Group on Observational Data Sets for Reanalysis, chaired by Russ Vose.

Reanalyses are the main observationally-based product that look like and feel like model output, and therefore are most easily used for evaluating models. But reanalyses are not constrained to satisfy energy or water budgets; in fact the extent to which they do, and the extent that they match top-of-atmosphere observed radiation and fields like precipitation, provide useful metrics on their fidelity and value. The joint WG is focused on the input data rather than the output products, but they should weigh in on this, as many of the input data can be used in their own right for model evaluation. [Action: Russ Vose to check with the WG members and provide thoughts and recommendations]

Atmospheric reanalyses are proceeding at ECMWF, NASA, NCEP, and JMA. Indeed there is a proliferation and the number of choices to users is increasing enormously. There is a desperate need for increased vetting and evaluation of these products, something my own group is involved in. Plans are underway, I believe, to hold a workshop in the US to provide initial reactions to the two new US contributions. [An update on reanalyses is available from a white paper for the OceanObs'09 conference: Trenberth; [Atmospheric reanalyses: A major resource for ocean product development and modeling](#)]. Plans are underway for the next International Reanalysis Conference, to be held in 2011 in the U.S., although this may be included as part of the 2011 WCRP conference in May. This will be

considered in more detail at the next WOAP meeting in March 2010. [Note [Mike Bosilovich](#), [Randy Dole](#)]

The Task Group on data management is more focused on basic data information aspects for WCRP, but we can ask them also to weigh in on this topic. Many of the members have a lot more expertise than I do in this area. [[Action Howard Cattle](#)]

In the U.S. there are many other groups or institutions that ought to be part of this. These include the World Data Centers at NCDC and NODC [cc [Tom Karl and Syd Levitus](#)], NASA [cc [Jack Kaye](#)], NOAA [cc [Chet Koblinsky](#), [Don Anderson and Tom Karl](#): this should be part of data services; [Tony Busalacchi](#) Chair Climate WG], and NCAR [cc [Don Middleton and Steve Worley](#) (the latter is out at the moment after a bad accident)]. Also the NRC CRC should be engaged on this issue [cc [Jerry Meehl](#)]. The GCOS climate panels, which are represented on WOAP, should also be aware of these issues. Also CEOS [[Ivan Petiteville](#)] and ESA [[Mark Doherty](#), [Steven Briggs](#)].

A desired outcome of this initial message should be a cleaned up white paper on this topic that could be sent out to many organizations around the world, and part of that task is simply compiling a listing of who it should go to. Regionally (e.g., the US, the EC) can potentially play major leadership roles, and globally be brought together under WCRP and GCOS. The GCOS-SC meeting is the week of 28 October [cc [John Zillman](#), [Carolin Richter](#), [Bill Westermeyer](#)]. However, to compile listings of datasets and their merits for the tasks in mind takes real resources, and WOAP, WCRP and GCOS do not have that capability. This will be an agenda item at the next WOAP meeting.

Please respond by the end of October with thoughts (such as we will take this on board and report by such-and-such a date), comments, etc.