Geosci. Model Dev. Discuss.,
doi:10.5194/gmd-2016-106-SC2, 2016

Geoscientific Model Development Discussions

Interactive comment on "PMIP4-CMIP6: the contribution of the Paleoclimate Modelling Intercomparison Project to CMIP6" *by* Masa Kageyama et al.

C. Senior

cath.senior@metoffice.gov.uk

Received and published: 21 July 2016

Dear PMIP authors,

The CMIP Panel is undertaking a review of the CMIP6 GMD special issue papers to ensure a level of consistency in answering the key questions that were outlined in our request to submit a paper to all co-chairs of CMIP6-Endorsed MIPs. These questions are outline in the overview paper (Eyring et al, GMD, 2016) and the relevant section is summarised below:

'Each of the 21 CMIP6-Endorsed MIPs is described in a separate invited contribution to this Special Issue. These contributions will detail the goal of the MIP and the major sci-

entific gaps the MIP is addressing, and will specify what is new compared to CMIP5 and previous CMIP phases. The contributions will include a description of the experimental design and scientific justification of each of the experiments for Tier 1 (and possibly beyond), and will link the experiments and analysis to the DECK and CMIP6 historical simulations. They will additionally include an analysis plan to fully justify the resources used to produce the various requested variables, and if the analysis plan is to compare model results to observations, the contribution will highlight possible model diagnostics and performance metrics specifying whether the comparison entails any particular requirement for the simulations or outputs (e.g. the use of observational simulators). In addition, possible observations and reanalysis products for model evaluation are discussed and the MIPs are encouraged to help facilitate their use by contributing them to the obs4MIPs/ana4MIPs archives at the ESGF (see Section 3.3). In some MIPs additional forcings beyond those used in the DECK and CMIP6 historical simulations are required, and these are described in the respective contribution as well.'

We very much welcome the PMIP contribution and the detailing of the experimental design, analysis plan and diagnostic output that you currently cover in sections 3 and 4. We also welcome the strong links that PMIP has clearly forged with other CMIP6 MIPs and look forward to the joint analysis that you describe.

Additionally, we would like to see some more detail on some of the issues raised above, notably;

a. More discussion on the specific goals of PMIP4 in CMIP6 and what science gaps it is attempting to fill. You describe the 3 CMIP6 science questions and PMIP links to them in Section 1.3 and the links to the WCRP GCs in section 4.3, but it would be good to see some discussion on what PMIP4 is hoping to achieve that is new since PMIP3.

b. The description of the experimental design for each experiment is comprehensive and very useful. There are however, a worrying large number of papers 'to be submitted'. Is it clear that once this paper is published modelling groups will be able to rely on

it to provide a comprehensive start point for setting up their experiments?

c. A lot of focus in the analysis plan is given to the multi-time period analysis, but not all modelling centres will be contributing to all (or indeed in some cases more than 1) of the entry card/tier 1 experiments. Could more be said about analysis of the specific experiments and what new we will learn from these experiments since PMIP3-CMIP5 (higher resolution, better data, more ES components)?

d. You make the point that the comparison of these time periods to palaeodata is one of the key drivers but say very little about the observational data sources or whether these products will be made available to the community to facilitate comparison. In section 4.4 you describe the new metrics and forward modelling you request the models output. It would be good to document how these will be evaluated.

We hope you agree that some level of consistency across the MIP papers in this special issue is valuable and that the above suggestions can be accommodated in your paper.

Other comments:

e. There is a lack of consistency in the naming of the experiments e.g. notably the use of LM and past1000 somewhat interchangeably. Please clarify

f. In section 3.2, the implementation of the ice-sheets needs to be a bit clearer. For example do all points 2-5 refer to both midplioceneEoi400 and lgm?

With many thanks for your ongoing efforts in the CMIP6 process.

The CMIP Panel

Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2016-106, 2016.