

Interactive comment on “Experimental and diagnostic protocol for the physical component of the CMIP6 Ocean Model Intercomparison Project (OMIP)” by Stephen M. Griffies et al.

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Dear OMIP 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 outlined 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-

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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 OMIP contribution and the hugely valuable detailing of the diagnostic output that you currently cover in sections 3-8. OMIP is clearly providing leadership on the ocean diagnostics that will provide an important protocol for CMIP6.

However we would like to suggest that for consistency with the other papers these sections (3-8) are documented in an appendix rather than in the main body of the paper.

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

1. More discussion on the goal of OMIP in CMIP6 and what science gaps it is attempting to fill. Currently you do not mention the 3 science questions or the WCRP grand-challenges around which CMIP6 is organised. It would seem clear that OMIP is focussed on ‘understanding systematic biases’ and hence would be good to include this and also discuss what OMIP is hoping to achieve that is new.

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2. The discussion of the CORE II experiments is not framed in terms of the CMIP6 ideas of MIPs having tiered experiments. Again for consistency it would be good to include this in section 2.2

3. All MIPs have been asked to demonstrate connectivity to the DECK experiments and the CMIP6 historical simulations as one of the 10 endorsement criteria (see Table 1 in Eyring et al., 2016). Please document this for OMIP.

4. You have not provided an analysis plan for the science community engaged in OMIP. How are you going to use the experiments and diagnostics? Are you committing to analyse all the data that you are requesting (or can you point to other MIPs that will do so)?

5. You make a strong argument about the potential to compare the modelling data with new observations. Can you highlight diagnostics that will enable this comparison – do they make any particular demand on the model outputs? Are/Could the new observations you describe in section 1.1 be made easily available to the modelling community (e.g. through Obs4MIPs?)

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:

- The first sentence in the data availability section seems wrong “The model output from the DECK and CMIP6 historical simulations described in this paper will be distributed through the Earth System Grid Federation (ESGF) with digital object identifiers (DOIs) assigned.” This paper is not describing the DECK and CMIP6 historical simulations. Please change. The data availability section could also be shortened. The details on the MIP contribution seems unnecessary here.

- Somewhere at the beginning of the manuscript it should say that this is one of the 21 CMIP6-Endorsed MIPs.

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- For the diagnostic sections (3-8), what is the link to the CMIP6 data request? Perhaps you need to clarify where is the definitive documentation of what is actually being output from the models (e.g. via a link to the actual data request) and to reference the GMD paper by Martin Jukes?

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

The CMIP Panel

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