

## ***Interactive comment on “Ice Sheet Model Intercomparison Project (ISMIP6) contribution to CMIP6” by Sophie M. J. Nowicki et al.***

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Received and published: 21 July 2016

### **Comments from CMIP Panel**

The CMIP Panel is undertaking a review of the CMIP6 GMD special issue papers to ensure a level of consistency among the invited contributions, also in answering the key questions that were outlined in our request to submit a paper to all co-chairs of CMIP6-Endorsed MIPs. We very much welcome the important contribution from ISMIP6 to the CMIP6 special issue, below are a few comments:

Please consistently use the term ‘*CMIP6-Endorsed MIPs*’ when you refer to other MIPs that are endorsed by CMIP6.

Please ensure consistency of the experiment names and abbreviations with the CMIP6

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overview paper (Eyring et al., 2016).

Please ensure that all ISMIP6 ‘*experiment\_ids*’ and ‘*sub\_experiment\_ids*’ are consistent with those used in the CMIP6 data request and experiment table, and with the CMIP6 terminology (see email exchange with Karl Taylor).

Please ensure that the ‘*source\_id*’ for the offline models is compliant with CMIP6 terminology.

p.5,11ff. Section 3.1

- Is there a more intuitive title that actually describes what is envisaged here? *Use* seems vague.
- The last two paragraphs (l21ff and p6,11ff) on the definition and explanation of the DECK, CMIP6 historical simulation, ScenarioMIP, and PMIP experiments should be deleted since they are already defined elsewhere in this special issue. It seems sufficient to simply refer to the other papers.
- Would it be possible to list some observations that could be used to assess the models (l15ff)?
- Possibly merge the first paragraph with Section 4.1 which is on the same subject and seems repetitive as it stands now with bits of information scattered across these two sections.

p7,119ff: please add to the text that both the downscaling method and the spin-up should be well documented. Also it might be good to expand a bit on the methods used for the spinup.

p8,18: ‘*then holds concentrations fixed for an additional two to four centuries.*’. This is not how the *1ptCO2* experiment is defined. Note that in contrast to previous definitions, the experiment has been simplified so that the 1% CO<sub>2</sub> increase per year is applied

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throughout the entire simulation rather than keeping it constant after 140 years as in CMIP5, see Section A1.4 in Eyring et al. (2016).

p8,l21: Here you encourage the extension of the projections until 2300 which is certainly a valid addition when it comes to the assessment of future sea level change. It is however only recommended, whereas in Table 1 this experiment is listed until 2300. Please could you make this consistent, e.g. either make it mandatory or - similar to ScenarioMIP (e.g. SSP5-8.5-Ext) - separate the two simulations in Table 1 into one that goes until 2100 and one that extends to 2300, and additionally list the Tier?

p9,l5ff: Section 3.3: Could you confirm that all the output from the offline and standalone ISM experiments is conform to the output requirements of CMIP6? If ISMIP6 relaxes this requirement on output for some of its offline experiments, then those experiments should be considered not a part of CMIP6 (and therefore not listed in this paper). They could be described elsewhere. Our experience with past MIPs has been that initially the threshold effort required for standardizing data output (CMORization) is perceived as an obstacle by many groups, but time and experience has shown that this effort is well worth it. We have found that only standardized data gets widely used by the community, and the analysis of that data, especially by researchers outside the major modeling centers, has been central to CMIP's success.

p9,l13ff: 'A key concern is that ISMIP6 assess uncertainty associated with both emission scenario and the AOGCMs' simulation of these scenarios. To this end, we anticipate identifying a subset of the CMIP6 AOGCM ensemble for use as ISM forcing which captures the full range of potential ice-sheet forcing.' This paragraph is too vague and the sentence seems contradicting - first a subset is selected and this should then be the full range? Please clarify. Please also add more explanation on how this selection process is done and why it is necessary.

l18,p15: Data availability:

- Please delete '*the majority*' in the first sentence. All CMIP6 simulations will be dis-

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tributed through the ESGF and non-CMIP6 experiments shouldn't be described in this paper.

- Could you please add the following additional sentence after the first sentence? '*In order to document CMIP6's scientific impact and enable ongoing support of CMIP, users are obligated to acknowledge CMIP6, the participating modelling groups, and the ESGF centres (see details on the CMIP Panel website at <http://www.wcrp-climate.org/index.php/wgcm-cmip/about-cmip>).*'

Table 1: The table lists experiments that are defined by ISMIP6 and experiments that are already defined elsewhere in CMIP6, this is confusing.

- Suggest to remove all experiments that are already defined elsewhere from this table (i.e., please remove the entire row for *amip*, *abrupt-4xCO2*, *historical*, *ssp5-8.5*, and *lig127k*).
- The titles of each category could be more specific by for example saying 'ISMIP6 DECK experiments' or something similar.
- Please could you also add a column that shows the Tier for each experiment?
- There could be another category that lists the ISMIP6 offline experiments from Section 3.3 if they are proposed to be part of CMIP6 (in which case the output has to be compliant with CMIP6 standards, see above).

Table 2:

- is it possible to add a column with some specifics on the ice sheet models used and a reference if available?
- GFDL and MPI-ESM were two more models that initially indicated interest in participating but are not listed?

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- Except for CanESM that only participates in the diagnostic part of ISMIP6, are all other models listed using fully coupled ice sheet models, or are some of the models listed only contributing with standalone ice sheet models? Maybe this is not fully decided yet?
- Maybe it would be good to also list in a similar manner the standalone ice sheet models?

Tables A1-A3: This is a very helpful overview of the variables requested by ISMIP6 but it would be good to clarify either in the caption or in a separate column from which CMIP6 experiments these variables are requested.

Table A2: Some additional information from the models is required to regrid the ocean data to standard grids. OMIP is proposing a weights file that model groups should provide to enable regridding from the native grid to one or two CMIP6 standard grids. Please refer to Griffies et al. (2016) and follow the same procedure for the ISMIP6 Omon requests if regridding is required.

Reference:

Eyring, V., Bony, S., Meehl, G. A., Senior, C. A., Stevens, B., Stouffer, R. J., and Taylor, K. E.: Overview of the Coupled Model Intercomparison Project Phase 6 (CMIP6) experimental design and organization, *Geosci. Model Dev.*, 9, 1937-1958, doi:10.5194/gmd-9-1937-2016, 2016.

Griffies, S. M., Danabasoglu, G., Durack, P. J., Adcroft, A. J., Balaji, V., Böning, C. W., Chassignet, E. P., Curchitser, E., Deshayes, J., Drange, H., Fox-Kemper, B., Gleckler, P. J., Gregory, J. M., Haak, H., Hallberg, R. W., Hewitt, H. T., Holland, D. M., Ilyina, T., Jungclaus, J. H., Komuro, Y., Krasting, J. P., Large, W. G., Marsland, S. J., Masina, S., McDougall, T. J., Nurser, A. J. G., Orr, J. C., Pirani, A., Qiao, F., Stouffer, R. J., Taylor, K. E., Treguier, A. M., Tsujino, H., Uotila, P., Valdivieso, M., Winton, M., and Yeager, S. G.: Experimental and diagnostic protocol for the physical component of the

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CMIP6 Ocean Model Intercomparison Project (OMIP), *Geosci. Model Dev. Discuss.*, doi:10.5194/gmd-2016-77, in review, 2016.

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

The CMIP Panel

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Interactive comment on *Geosci. Model Dev. Discuss.*, doi:10.5194/gmd-2016-105, 2016.