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# Reliability and Skill of Climate Models.

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The use of information from paleoclimates as a means of assessing the performance of global climate models has long been considered an important motivation of paleoclimate research, but this tenet has only recently become widely accepted in the mainstream climate modelling community, with several standard paleoclimate simulation experiments being, for the first time, included in the forthcoming CMIP5 model intercomparison project.

We have analysed the reliability of the two LGM multi-model ensembles (PMIP1 and PMIP2) with respect to the MARGO LGM SST data synthesis, and found that both ensembles may be considered reliable. While it is generally expected that more complex climate models should exhibit greater uncertainty due to the additional uncertainties in the extra components, in the case of the PMIP experiments we found that the inclusion of a coupled dynamical ocean in PMIP2, rather than the simpler slab oceans in PMIP1, resulted in a narrower spread in sea surface temperature anomalies, as well as leading to consistent and systematic differences between the ensembles. There is weak evidence that the MARGO temperature data may be indicative of only small changes in meridional overturning in the North Atlantic between the LGM and the present day, however, the small size of the PMIP2 ensemble prevents statistically significant results from being obtained.

The analysis has been continued with PMIP2 and an extended LGM dataset which includes the land pollen dataset from Bartlein et al. as well as information from ice cores in the polar regions. The ensemble remains reliable. Skill calculations indicate increased skill with respect to the combined dataset, compared to considering MARGO alone, indicating that the land-sea contrast is reproduced. Calculations are currently underway looking at the mid-Holocene climate, and seasonal data. CMIP5 will be incorporated into the analysis as available.