

EGU22-3771

<https://doi.org/10.5194/egusphere-egu22-3771>

EGU General Assembly 2022

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Drivers of LGM AMOC change from PMIP2 to PMIP4

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Understanding the response of the Atlantic Meridional Overturning Circulation (AMOC) to different climate conditions is a crucial part of understanding the climate system. Proxy-based reconstructions suggested that the AMOC during the Last Glacial Maximum (LGM) was likely shallower than today. Generations of climate models from PMIP2 to PMIP4 have shown large inter-model differences and often struggled to simulate a shallower AMOC. In the present study, we revisit hypotheses that have emerged over time and test them consistently across the PMIP ensembles from phase 2 to 4. We start by repeating the analyses by Weber et al (2007), who showed that there was a relationship between the glacial AMOC change and the density difference between the Southern Ocean and the subpolar North Atlantic in many PMIP2 models. Additional analysis will include hydrographic changes (e.g., stratification, water mass properties), the role of global and local LGM cooling as well as biases in the models. In our model evaluation, we will also consider recent reconstructions based on multi-proxy evaluations which indicate that the response of the glacial AMOC geometry and strength may have been less unambiguous than previously thought.