

## ***Interactive comment on “The effect of greenhouse gas concentrations and ice sheets on the glacial AMOC in a coupled climate model” by Marlene Klockmann et al.***

**Anonymous Referee #1**

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This is an excellent paper. It discusses the role of ice sheets and atmospheric CO<sub>2</sub> levels for the water mass distribution and meridional circulation characteristics of the LGM. It shows that the MPI model is able to produce a weaker and shallower AMOC as reconstructions suggest, but the atmospheric CO<sub>2</sub> value used to produce it is too low.

The only comment that I am going to make on this paper is on the way comparisons are made. Instead of comparing different experiments (LGM GHG, LGM ice sheets, etc.) to a sole default run (e.g., a preindustrial run), they compare the LGM GHG experiment to an LGM run with preindustrial GHG to get GHG effects, and then compare the latter one to a preindustrial run with LGM orbital parameters to isolate ice sheet+topography

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effects. Although correct, I think this is confusing. When looking at the pictures, I had to switch back and forth to the experiment design section because I didn't remember what was being compared with what in each of them. A way to solve this without having to restructure all the images would be to add a footnote in each panel specifying what is being compared.

Otherwise the paper should be published by Climate of the Past

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