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Open Access Earth System Science Data Discussions

Interactive comment on "A Last Glacial Maximum forcing dataset for ocean modelling" *by* Anne L. Morée and Jörg Schwinger

Anonymous Referee #1

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The authors present a model-derived product intended to be used for forcing ocean-only simulations at the Last Glacial Maximum. This product includes a seasonal cycle of atmospheric conditions, which serve as boundary conditions in ocean models, as well as upper-ocean salinity, which is often required as a relaxation boundary condition to avoid drifts.

The manuscript is very clear and well-written, with methods presented in adequate detail. I was easily able to access the product on the linked website. It might be good to tell the user what to do with the *.md5 files. The netcdf files provide useful documentation and appear to have dimensions consistent with their description in the paper.

My main concern with this dataset is that it is not especially novel, as it was derived

very straightforwardly from the PMIP3 archives, which are already publicly available. As such, I am not sure that it will be useful in the future to other studies, given the relative ease with which one can compute anomalies and make the necessary interpolations for running new ocean-only experiments.

I agree that the goal of having a CORE-like set of forcings for the LGM is a useful one, and there are numerous challenges involved in such an exercise. For instance, how does one estimate "normal-year" (intra-annual) forcing typical of a glacial-interglacial anomaly? How should we handle the range of inter-model spreads? How can we include information from available observations? None of these problems is addressed in this work.

More specific concerns:

- Why are some fields interpolated to 6-hourly and others to daily fields?

- While model spread is plotted in the figures, I could not locate this as a variable in the data.

- There may be some grid-scale interpolation artifacts along coastlines (Fig. 1)

- The salinity fields look strange and unlike the figure in the manuscript (Fig. 2) (unless I'm doing something wrong to access the file; I used ncread('Salinity_anomaly_1deg.nc','sos',[1,1,4],[360,180,1]); in MATLAB).

- Please say what NCO is

- There are several thorny issues associated with forcing a model with multi-model means. For one, the fields are no longer dynamically consistent. An implication is that there could be strangely conflicting contributions e.g. to surface salinity from relaxation and precipitation. Second, have these models all been run to equilibrium? Third, computing ensemble means tends to damp uncorrelated variability between members, which reduces the variance of forcing fields. Is there a way to correct for this and generate a "normal year"?

- Are effects from evaporation included in the precipitation file?

- It would be helpful to provide a river runoff file.

- Sec 3.6 line 10: "due to" changes?

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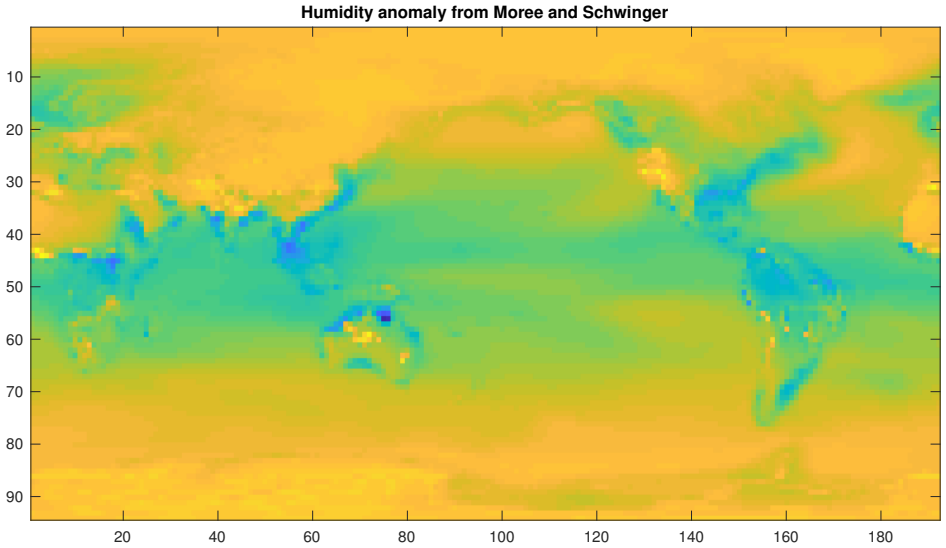

Fig. 1. Interpolation artifacts?

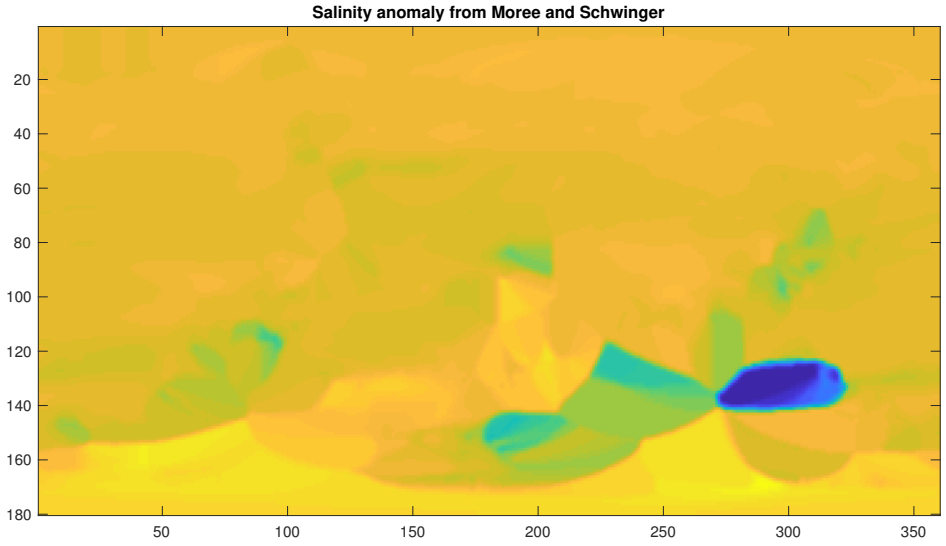

Fig. 2. Surface salinity