Clim. Past Discuss., 5, C87–C88, 2009
www.clim-past-discuss.net/5/C87/2009/

Climate of the Past Discussions

Interactive comment on "Changes in atmospheric variability in a glacial climate and the impacts on proxy data: a model intercomparison" *by* F. S. R. Pausata et al.

Anonymous Referee #1

Received and published: 24 April 2009

The conclusion that efforts to reconstruct past variations in models of variability like the NAO are potentially impacted by non-stationarity of either teleconnections and/or surface climate impacts of those modes is not new. It is a caveat of the majority of reconstruction studies. While the demonstration of the issue is here very clear, it is rather overplayed. The LGM represents a significant change in boundary conditions w.r.t. present day, whereas most sensible NAO reconstruction efforts have focussed on time periods in the last millennium (or at least in the Holocene) in which climate boundary conditions are relatively similar to today. There is less of a risk therefore that those reconstructions would be effected in such an extreme way as in this study. If a similar result had been obtained by looking at model simulations of the last millennium,

then the paper would really make an impact on the reconstruction community. As it stands, I doubt it will bother them much.

With that conclusion of the study significantly weakened, what is left is a rather superficial examination of the output of a handful of climate model simulations using standard techniques. What I was really hoping to see was some insight into why the models produce different leading modes of variability at the LGM in comparison with the present day. In using climate models there is an opportunity to perform sensitivity studies to determine which components of LGM boundary conditions are responsible for the changes in the NAO ? running experiments with modified greenhouse gas concentrations and ice-sheets separately for example. In addition, it is possible to delve much more deeply into the mechanisms for changes by looking at the dynamical fields of the model for example. What is presented is, no doubt, a useful effort to document the models but it is hardly a major scientific breakthrough.

While there are no fundamental flaws in the model experiments or analysis techniques, the paper does not really represent a significant step forward. The authors are leaders in their field and it would be great to see some dynamical/physical insights into LGM extratropical variability derived from these model experiments. I would encourage the authors to continue with their work along these lines.

Interactive comment on Clim. Past Discuss., 5, 911, 2009.