

## ***Interactive comment on “Northern Hemisphere temperature patterns in the last 12 centuries” by F. C. Ljungqvist et al.***

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Received and published: 14 October 2011

### **General comments**

I believe the authors' approach of combining multiple temperature-sensitive palaeoproxies to bring our current view of temporal into a spatiotemporal context is highly relevant. The combination of very different archives has been seen as very problematic, especially with consideration to diverging interpretation and chronologies, and often missing quantification. The authors demonstrate how to arrive at a detailed and robust spatial picture of temperature anomalies despite these known problems.

While the focus of this study is clearly on robustness and spatial correlations, I think it

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is necessary to elaborate some more—possibly in the supplementary section—on the different proxy archives and and their quantification. This foreseeably won't change the robust conclusions; it should be made clear, however, that two different proxies can give locally opposite warming signals, evident in the Mg/Ca versus Alkenone SST debate (e.g., Leduc et al. 2010).

The authors discuss extensively the 1000-2000 km radial coherence of the spatial warming anomalies; they base the length scale on Jones et al. (1997) who use weather data to obtain this value. I would like to refer the authors to our more recent study (Wirtz et al. 2010), where we calculate a typical length scale of 1500 km radius for the spatial coherence of climate variability. This value is obtained from 124 globally distributed climate proxy archives. We approached the weighted averaging very similar to the authors, and support with our study their weighting procedure.

I do not agree with the authors' choice of color scale in their figures (2/3/5/6, C1), which I find misleading and which conveys a wrong message. Their color scale differentiates between red (warming) and blue (cooling) colors already at tiny and not significant deviations from the mean. A more acceptable way would be to choose a neutral (grey or green) color for small (both positive and negative) anomalies.

I would like to see the results of their study not only presented as movies, but also as data files for other researchers to investigate. Why not put the numeric results of the study on PANGAEA?

## 1 Small remarks

- in the reference list, Wilsen et al. (2010) is missing
- p.3358 : "proves" is the wrong word, shouldn't we all rather "disprove"
- p.3359 local=>location

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- p.3359 qualify "systematically"
- p.3365 iid assumption invalid, not "difficult" (as was shown by clustering analysis)

## References

- G. Leduc, R. Schneider, J.-H. Kim, G. Lohmann (2010) Holocene and Eemian sea surface temperature trends as revealed by alkenone and Mg/Ca paleothermometry *Quaternary Science Reviews* 29, 989–1004
- A. Tudhope, and R. Allan. 2010. Reconstructing ENSO: the influence of method, proxy data, climate forcing and teleconnections. *Journal of Quaternary Science*, Vol. 25, Issue 1, pp. 62–78, January 2010. DOI: 10.1002/jqs.1297, ISSN 0267-8179.
- Wirtz, K.W., G. Lohmann, K. Bernhardt and C. Lemmen (2010): Mid-Holocene regional reorganization of climate variability: Analyses of proxy data in the frequency domain, *Palaeogeography, Palaeoclimatology, Palaeoecology* Volume 298, Issues 3-4, Pages 189-200 <http://dx.doi.org/10.1016/j.palaeo.2010.09.019>

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Interactive comment on *Clim. Past Discuss.*, 7, 3349, 2011.

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