

## ***Interactive comment on “Millennial temperature reconstruction intercomparison and evaluation” by M. N. Juckes et al.***

**M. N. Juckes et al.**

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The main findings of this study differ significantly from those of Jones and Mann (2004), though there are many areas of agreement.

The coolest period in our reconstruction is substantially cooler than suggested by Mann et al. (1999) or by reconstructions presented in Mann (2007). We do not claim to have a definitive answer, but it is important to recognise that there is disagreement on this issue.

(3) The two reconstruction techniques represent different assumptions about the quality of the data. This needs to be explained more clearly in the manuscript (change [1] below). A trawl through a sample of text books on statistical theory will reveal a huge range of potential techniques, some of which are listed by the reviewer. As mentioned

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in the manuscript, different techniques are suited to different data sets. In our comparison it appears that, for millennial reconstructions, the simplest technique, which makes the smallest number of assumptions about the data, works best.

(4) The difficulty with using paleo runs to test the method is that we do not have a comprehensive predictive model of how the proxies respond to temperature. Such tests typically model the proxies by prescribing a linear dependence on temperature and adding random noise. Reality is clearly more messy. There are, however, important issues which can be addressed with such paleo runs. This is discussed, for instance, in Mann (2007). As explained in the Appendix, it is possible to construct a situation in which one or the other method is optimal.

(5) Yes, we show annual averages (now clarified in the introduction).

(6) Sensitivity to calibration period: we refer to one sensitivity test, extending the calibration period to 1985. This issue has been dealt with in more detail in a paper by Zorita, Gonzalez-Rouco and von Storch which is now accepted for publication in the Journal of Climate.

(7) We do not presume to judge different applications. The volume of data available for, say, the 15th century, is so much larger than that used here that a new study would be required. It is more important to make clear that the choice of method needs to be carefully re-considered for every application. We do not intend to talk about sub-hemispheric reconstructions or rainfall reconstructions in this study. There is clearly valuable work being done in that direction.

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