

## ***Interactive comment on “Refining error estimates for a millennial temperature reconstruction” by M. N. Juckes***

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I am sure that the IPCC authors would not have used numbers if they did not intend them to be interpreted numerically. It is clear that there is a strong element of expert assessment in the IPCC conclusions, but they have expressed their assessment in numerical values and it is the accuracy of those values which is the considered in this paper. This study also depends on a certain element of expert assessment: the comparison against independent proxies is included to support the conclusions though it does not contribute directly to the numerical values given.

If there were a simple method of obtaining the "actual uncertainty" it would certainly have been cited in the IPCC reports and elsewhere, and this study would be redundant. However, the nature of the proxy temperature records is such that we can only estimate

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the uncertainty and this paper deals with such an estimation.

It is, as the reviewer points out, true that an error which is common to all proxy sources would not be detected here. This issue is discussed briefly in Juckes et al. (2007) with the comment that use of a broad range of proxies makes it extremely unlikely that there is such a coherent source of error. I will add a comment on this point when revising the paper.

The phrase '... and the extent to which the true NH-mean temperature variations are captured by the retained data' reflects the fact that the spread of the regressed temperatures is influenced by the spread or the regression coefficient. I will spell this out more clearly in revision.

(a) The statement about 95% confidence should apply to the last ten years to date, not the last ten years of the last millenium: the increase in confidence is a consquence of the rising temperature. I will reword the last sentence of the abstract to make this clearer.

(b) The 95th percentile of the reconstructions (figure 5) has its maximum in the 20th century. After scaling, the greater uncertainty in the 11th century (compared to the 20th) pushes the scaled 95th percentile in the 11th century higher. This does not mean that there are reconstructions going higher. As noted above, this study is about the relation of proxies to temperatures and what that enables us to say about temperatures.

(c) The numbers given come from Figure 7 – perhaps this needs to be spelt out more clearly. The calibration period is 1850 to 1980: I will add a comment to this effect.

(2632,9): Thankyou.

(2643,18): Apologies: the screening is described 4 lines later – I will reorganise this text.

(2635, 17...): A reference to Juckes et al. (2007) will be added.

(2636,20): Yes

(2637,3): It might be better to say 'exhibits no anomalous behaviour in the 20th century'.

(2637,6): I don't entirely understand the comment about 'focusing on positive correlations': the correlations are evaluated and plotted. It should be noted that here I am looking at correlations in the annual departures from the 50 year time mean in order to evaluate coherence of the signal.

(2638, 4): Different proxies produce different results – this is part of the uncertainty. The difference between the two is almost constant – this is inconsistent with temporally uncorrelated uncertainty.

(2640, 24):  $\bar{d}$  is a typographical error, it should be a plain d.

(2641, 15): A reference to equation (2) will be added.

(2642, 9): Equation (3) comes from comparing the equation immediately above it with the last equation on 2641: I will number these to equations and add further explanation.

(2643, 17): 'to obtain a Jackknife uncertainty estimate for the unscaled composites and combine it with the scaling uncertainty' is precisely the purpose of this section, though this obviously needs to be made clearer. Since neither uncertainty is Gaussian, the two are combined through a convolution of the probability distributions.

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Interactive comment on Clim. Past Discuss., 5, 2631, 2009.