

Interactive comment on “The extra-tropical NH temperature in the last two millennia: reconstructions of low-frequency variability” by B. Christiansen and F. C. Ljungqvist

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Thanks for the constructive and thorough review. We will consider all the comments in the revised version. Here, we more briefly consider the reviewer's major points.

1) It is true that the 32 and 91 proxies refer to the situation before the screening and that only approximately 50 % pass the screening. This fact should indeed be more clearly stated, in particularly in the abstract and in the introduction. In the revised version we will eliminate this source of confusion.

However, the screening is an important part of the LOC method and the widths of the confidence levels depend on all the proxies and not just on the accepted proxies. If
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more proxies are considered then the chance for some non-informative proxies passing the screening by chance is larger. This effect is included in the ensemble pseudo-proxy approach which is based on all proxies.

It should also be remembered that whether a proxy is accepted or not depends on the calibration period. We therefore find it important to show all the considered proxies in Figs. 2 and 3. Note that in the right panel of Fig. 1 only proxies that pass the screening (with calibration period 1880-1960) is included.

2) It is correct that the local temperatures come from the HadCRUT's 5x5 lon-lat grid. We believe this resolution is sufficient to define the local annual temperatures as the spatial decorrelation length for the annual temperature is of the order of several thousand kilometers. This will be discussed in the revised version.

3) The reference period 1880-1960 is chosen because it is identical to our "main" calibration period. In Christiansen and Ljungqvist, J. Clim., 2011 the same reference period was used and we compared the LOC reconstruction to other reconstructions adjusted to this calibration period.

The reference period is somewhat arbitrarily chosen and we understand the reviewer's wish for a more standard period. However, we would like to be consistent with Christiansen and Ljungqvist, J. Clim., 2011. We already have a sentence on page 4001 informing that the extra-tropical mean temperature in AD 1880-1960 is 0.23°C colder than in AD 1961-1990. We will add the similar number for the NH mean temperature.

When (or if) the paper is accepted the reconstructions will be made available in electronic form through the World Data Center for Paleoclimatology (NOAA) and interested scientists will be able to adjust the reconstructions to any reference period.

4) In Christiansen and Ljungqvist, J. Clim., 2011 (section 6, Fig. 11) we investigated the robustness of the LOC reconstructions to different spatial averaging procedures. This included a method with weights proportional to the correlations between proxies

and local temperatures as suggested by the reviewer. We found that the extra-tropical NH mean reconstruction was not sensitive to the averaging procedure (based on 23 accepted proxies). We find comparable results for the present study. In the figure below the reconstruction from Fig. 5 in the submitted paper is shown together with a reconstruction obtained with correlation weighting (green curves). Only small differences are found. A discussion of these results will be included in the revised version.

Minor comments: We will consider all the reviewer's minor suggestions for improvements of the paper. In particular we will discuss the influence of the running average filter (this was investigated in details in Christiansen and Ljungqvist, *J. Clim.*, 2011, section 8).

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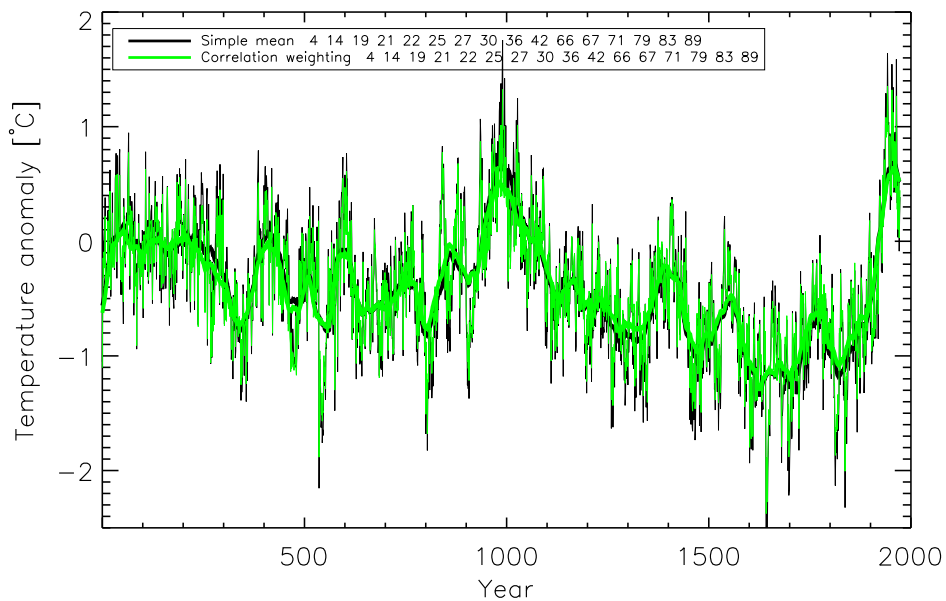


Fig. 1. The reconstruction from Fig. 5 in the submitted paper together with a reconstruction based on correlation weighting. All other conditions are similar.

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