

Interactive comment on “Arctic hydroclimate variability during the last 2000 years – current understanding and research challenges” by Hans W. Linderholm et al.

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We would like to thank Dr. Kaufman and the data review team for their valuable comments on our manuscript cp-2017-34: “Arctic hydroclimate variability during the last 2000 years – current understanding and research challenges”. Below are our responses to their queries.

Essential additions for this paper:

(1) Table 1: Add Data Citations for all of the proxy datasets listed in this table and shown in Fig 11. For those data not already in a public repository, submit essential

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metadata and data, and add the corresponding Data Citations.

Response: In the updated version of the manuscript, “Data citations” will be added with the Data URL for all the series used in this study. All series except one (which we could not get hold of, and which will be removed from the study if it turns out to be impossible) have been uploaded and are now publicly available. Also, to give additional credit to those providing the data, we have added them as co-authors on the paper.

(2) Table 2: List the proxy climate time series shown in Figs 8, 9, and 10, along with a corresponding Data Citations. Add the original publication citations for each record in Table 2 (like in Table 1).

Response: OK

(3) Submit the time series of the resulting hydroclimate composites (Figs 14, 16 and 19) for archival and include the data citation.

Response: They will be made available prior to publication

Possibly essential, depending on source of the data:

(4) If the data shown in Fig 6 are based on chronologies already archived and easily accessible in the ITRDB, then all is well. If instead the chronologies from the ITRDB were detrended or otherwise modified by the authors, then those new chronologies must be submitted for archival as part of this study. Either way, please clarify the data methods used to create Fig 6.

Response: All chronologies included in Fig. 6 are freely available from the ITRDB. In order to make them comparable, they were all standardised in a similar fashion. We will clarify the methods used to standardise the tree-ring data used in Fig.6 as follows:

“The biologically induced age trend was removed from the TRW data through standardization with a cubic-smoothing spline with a 50% frequency cut off at 35 years (Cook and Peters, 1981). This detrending preserves annual to decadal scale variations in the

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detrended tree-ring data. The resulting dimensionless indices were arithmetically averaged into single site chronologies. Variance changes arising from changes in sample replication over time were corrected (Frank et al., 2007). Resulting chronologies were truncated where the sample size dropped below 5 trees”.

Since the chronologies standardised using the above described method are presently being used in another study, the standardised chronologies will not be archived until that study is finished. However, since free software and code to standardise tree-ring data are freely available, given this description the data used here are easily re-created. It should also be noted that the method of standardisation used depends on the purpose of the study and the tree-ring data itself, so the tree-ring data set described in this study is just one of many potential versions of it.

Recommended:

(5) Contrary to what is shown in Table 2, many of the records appear to have been taken from Ljungqvist et al.'s global compilation. Essential metadata that are needed for intelligent reuse of the data in new synthesis are missing from the Ljungqvist et al. compilation, which undermines a primary goal of the PAGES data stewardship activity. We strongly encourage the authors to use the opportunity of this synthesis paper to start with the original datasets and to submit a more complete set of metadata for archival. We note that the Ljungqvist et al. dataset is truncated at 850 AD (the time frame considered in their study). For the current study, the full time series should be used and archived.

Response: The data from Ljungqvist et al.'s series were chosen for the compilation of a high-resolution hydroclimate composite for the Arctic. A more complete set of metadata of the series used will be added to the revised version of the manuscript and will include: location, archive type, proxy measurement, dating control, time cover but also original reference and data citation. Even if the dataset is truncated at 850 AD, it is sufficient to have an overview of the expression of the major climatic period that

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occurs during the last two millennium (i.e. the MCA and the LIA), and for this particular review we find that to be sufficient. As more data becomes available, we envisage that the analysed period will be extended back in time, but this is not within the scope of this paper.

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