Clim. Past Discuss., 9, C480–C488, 2013
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Climate of the Past Discussions

Interactive comment on "Temperature changes of the past 2000 yr in China and comparison with Northern Hemisphere" *by* Q. Ge et al.

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Dear editor and reviewers,

We have answered each comment carefully. Based on the coauthors and the third reviewer's suggestions, we changed and updated three new temperature proxies (including Liu et al.,2006 Chu et al.,2012 and Zhang et al., 2013, please see reference in our manuscript for details), which decreased the uncertainties during the first millennium. Thus the result of our reconstruction has a little different with the old version. In addition, two recent publications of temperature series of China (Shi et al., 2012) and

East Asian (Cook et al., 2013) suggested by the third reviewer have been added in Figure 3a. Please see our point-to-point response below, and use black and italic font to answer.

We would express our appreciation for your kind comments, which helped to improve the quality of this manuscript.

Thank you,

Quansheng Ge, Zhixin Hao, Jingyun Zheng, and Xuemei Shao

Anonymous Referee #1

General comments: Based on proxy temperature reconstructions for different locations (see also Ge et al., 2010) the paper presents a new 2000 years long temperature reconstruction for China. The study is purely statistical. The authors compared the results of a principal components regression (PCR) and a partial least squares (PLS) approach. Based on a decadal scale analysis they show that several warm intervals were comparable with the Present Warm Period. The results of the paper are important and significant, and justify its publication. But the paper needs major revisions including a clear description of the used data, a more precise representation and description of the figures and, above all, an improvement of the language.

A: We insert a new table 1 to manuscript, which included clear description of the used data. All figures have been improved. About the language, we try our best to revise the paper. May we request CP journal editing service to help us to improve it (CP journal has this service?) We will be very appreciating.

Specific comments: -Page 509, line 17: Please explain shortly what the differences are. -Section 2 (Data and methods): The reader expects you give a more precise description of the data. I recommend inserting a table representing (at least) the site with the coordinates, the proxy type, the observed period, and the temporal resolution of each proxy.

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A: The difference is climate variability, including warming level, starting and ending times of MCA and LIA. It has been inserted in Line 68 (maybe the line number changed with re-typesetting by CP journal). . A new table including all proxies what we used has been added, please see Table 1, and important information such as location, seasons of temperature indicating, time resolution, length of series and references were involved.

-Page 510, line 11: Maybe you have to explain what 0s and 1980s means. In addition, it has to be mentioned that a year (or a period) 0 does not exist. The calendar jumps from the year -1 (or 1 BC) to the year +1 (CE or AD), or from decade -1 to decade +1.

A: Yes, we agree. We changed 0s with "1", and replaced the expression of decades with their accurate year, e.g. 1980s was changed with the year of 1990.

-Page 511, line 12: Just add one reference for the MINITAB software.

A: Yes, added. Meyer, Ruth K.; David D. Krueger (2004). A Minitab Guide to Statistics (3rd ed.). NJ: Prentice-Hall Publishing, 448pp

-Page 511, lines 27 ff.: The expression "we believe" cannot be used. You must be more precise and define the temporal resolution of the data in the above mentioned table.

A: We agree, and deleted.

-Page 513, line 20: It is difficult to denominate a clear period for the Little Ice Age (see e.g., Matthews and Briffa, Geografiska Annaler 87A/2005). Based on different significant publications (e.g., Miller et al., Geophys. Res. Lett. 39/2012, doi:10.1029/2011GL050168) the Little Ice Age started earlier.

A: We added the two references, and stated that the timing of LIA could be varied depending on different publications.

-Page 514, line 15: Write 'unprecedented' for 'especially unusual' because this expression is widely used (e.g., in the IPCC reports).

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A: Yes, changed.

-Page 514, line 21: Insert a reference for the 'Roman Warm Period' (see e.g. Ljungqvist, Geografiska Annaler 92/2010) because this is rather a Eurocentric expression.

A: Yes, we deleted this expression.

-Page 515, line 13: Is this conclusion legitimate if no error bars are shown?

A: It is legitimate, and now we stated the values and associated with the 95% confidence interval.

-Page 515, line 20 ff.: Where is that shown? At least you have to add a reference.

A: We moved the reference here, and it is D'Arrigo et al., 2001

-Page 516: Similar problem. Where can we see the comparison with Mongolia and Japan?

A: temperature reconstruction from Japan was developed by Aono and Kazui, 2008

-Figure 1: Denominate the two Figures with a) and b). The small Figure in the lower right corner of the map is not readable. In addition, I recommend being much more precise in the text of the Figure (e.g., speak about 'temperature proxies' and describe what the different size of the points for Central East means).

A: We agree, and Figure 1 has been marked with a and b; the small map is South China Sea, and it is clear now. the description about the proxies in Figure 1 has been explained in Table 1, and the representing size has been merged in the table1.

-Figure 2: You write 'PCR and PLS with uncertainties'. Should you not denominate it as 'error bars' and define the confidence intervals in %? I also recommend to add a second graph below which is representing the number of the proxies used in the different periods. Possibly the strong positive peak around 300 AD must then partly be

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interpreted as uncertain due to a low number of proxies (?).

A: Yes, we changed the caption as 95% confidence intervals; and the figure of proxies number what we used has been plotted; the uncertainties were explained according to the low number of proxies, please see the end of result section.

-Figure 3: Please split the two Figures in a) and b). As I mentioned before the comparison with Mongolia and Japan is neither shown nor underpinned by a reference. What do you mean with 'referenced period' (calibration period)?

A: We agree, and split the figure3 into a and b. the series of Mongolia and Japan are supplemented with references. In order to calculate the departure value (anomalies) from the mean of a certain period, we define a referenced period from 1851-1950.

Technical corrections: -Page 509, line 12: Omit 'and' before 'stalagmites'.

A: Yes, we changed.

-Page 509, lines 18-21: This sentence is very long and complicated. Please reformulate.

A: Yes, we reformulated.

-Page510, lines 6-9: Rearrange this sentence. 'Based on their geographical locations: : :..'

A: Yes, we reformulated.

-Page 511, line 6: Temperature 'profiles'? Do you mean 'time series'?

A: Yes, we changed with time series.

-Page 511, line 24: Write 'shows' instead of 'contains'.

A: Yes, we changed.

-Page 511, line 25: Write : : :.centennial 'scale' temperature signal: : :.

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A: Yes, we changed.

-Page 511, line 27: Write ‘Because’ the raw temperature: : :..

A: Yes, we changed.

-Page 513, line 3: ‘and so may go some way’ is unclear. Please reformulate.

A: Yes, we reformulated.

-Page513, line 5: Write ‘Finally, the periods with large: : :..’

A: this section was deleted in this revised version.

-Page 513, line 14: Write ‘Eastern China, and three from: : :’

A: Yes, we changed.

-Page 514, line 8: Write ‘However, a large difference: : :.’

A: Yes, we changed.

-Page 514, line 17: ‘Seeing from the procedure of temperature variations’ is unclear. Please reformulate.

A: Yes, we reformulated.

-Page 514, line 26: Write ‘IPCC 4AR’ instead of ‘fourth report of the IPCC’

A: Yes, we changed with IPCC AR4.

-Figure 3, 4th line of Figure captions: You mean ‘moving correlation coefficients’?

A: Yes, and changed.

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Interactive Comment

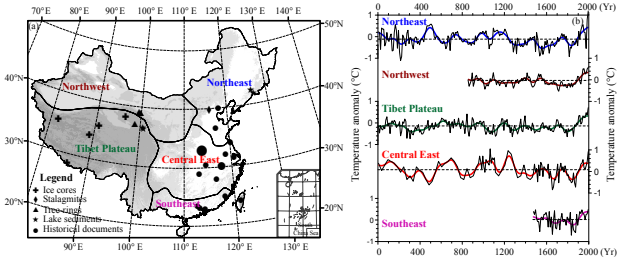

Fig. 1. Station distribution

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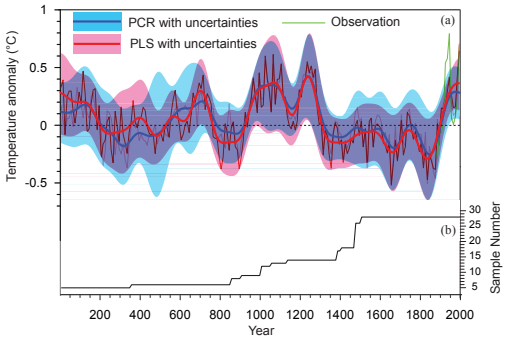

Fig. 2. temperature reconstruction

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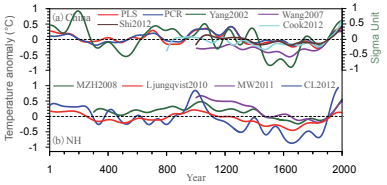

Fig. 3. Comparison of temperature reconstructions

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