

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

Anonymous Referee #2

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The paper reports a new temperature reconstruction for China based on multiple types of temperature-sensitive proxy. The principal components regression (PCR) and partial least squares (PLS) approaches were used to reconstruct decadal temperature variations. Some new findings are clear. The paper shows that the present warm period is only the fourth warmest period. The authors suggested that similar warm-cold patterns in temperature variations occurred in both China and the NH during the last millennium. I would say that the period 250-400 AD was the warmest period in their reconstructions but not obvious in the NH temperature records and even a relative cold period in the recent NH temperature reconstruction (Christiansen and Ljungqvist, 2012). I guess it is partly caused by a small number of samples. If possible but the authors need to do some discussions. Overall, this paper adds very valuable information in climate of the past in China since very few temperature reconstructions covering the past two millen-

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nia are available yet. The results may contribute to a better understanding of climate changes over East Asia, and provide an opportunity to evaluate the current warming trend over the China in a long-term perspective. After minor corrections, the paper can be accepted for publication.

Specific comments: 1) The CRU has developed several versions of temperature datasets. It is useful for the authors to give some reasons for choosing Lin et al. (1995) data rather than the CRU data, maybe there is an effect in final results using different calibration datasets. 2) The authors stated that the PCR reconstruction is better in preserving the common variations of proxies whereas the PLS is better in capturing extreme climate signals. Thus I suggested that maybe a combination of two reconstructions is more indicative of temperature change. 3) Five temperature proxies for five subregions were used to derive a composite temperature in China. The readers hope to know the details (how many original time series, locations, seasonality of temperature, explained variances (correlation with local instrumental temperatures, the correlations between different pairs of subregion temperature records and so on) for these proxy records.

Minor comments: Page 510, line 10: It should be the exact year (e.g. 1900-1950 C.E.) rather than the 1900s–1950s. Page 512, lines 6 and 12: For calculation of the amplitude of the temperature change, the authors should consider the associated error bars shown in Figure 2. Page 514, lines 8-10: the author wrote “...due to the low number of proxy samples”. How many samples were used in this period? Please add a figure to show the sample depth used for each year during the period of reconstruction. Page 515, lines 13-15: “China is well correlated with the NH during two periods...” There is something wrong with this sentence, please rephrase. Figure 1 should be divided into two subfigures as (a) and (b). In the right subfigure, do the dashed lines indicate the average for the separate temperature series? In Figure 2, how the uncertainties for the two reconstructions were calculated should be given a description. In the figure caption the author wrote “the referenced value is the mean temperatures from the 1870s

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to the 1990s”, but in Page 511, lines 24 and 25: you write “Figure 2 contains a plot of the decadal temperature variations (with respect to the mean value for the period 0s–1990s). . .” Please unify the referenced period in the two sentences. In Figure 3, are the NH temperature time series smoothed by 5-point FFT or 200-yr FFT filter, or neither? As far as I know, the NH temperature “raw” data had already been interpolated to the annual resolution by the original authors (e.g. Mann et al. 2008 and Christiansen and Ljungqvist 2012), different from the decadal resolution in the authors’ reconstructions. Thus, the running correlation between the PLS reconstruction and NH temperature series was calculated at annual or decadal resolution in Figure 3? Some clarifications for the above two issues are needed in the figure caption or the main text. In addition, as shown by the color bars in Figure 3, the 200-yr moving correlation coefficients are not clear enough to read because of mixed colors. Maybe the author can try to show them as the lines, and if necessary, a new subfigure could be added.

Interactive comment on Clim. Past Discuss., 9, 507, 2013.