

## ***Interactive comment on “Characteristics of cold-warm variation in the Hetao region and its surrounding areas in China during the past 5000 yr” by M. Li et al.***

**Anonymous Referee #1**

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The reconstruction of pre-historical temperature changes in key regions is essential both to the understanding of natural climate variability and to the assessment of the anthropogenic role in modern global warming. This manuscript provides a series of cold-warm variations with a 100-year time resolution for the past 5000 years based on the integration of six proxy records of the sedimentary sequences from a climatically sensitive region, the Hetao region of northern China. The authors analyzed the pattern of changes in temperature during the last 5000 years in the study area and discussed the possible link between climate changes in northern China and in the other representative regions of the Northern Hemisphere. The reconstructed temperature series is of great significance and would greatly contribute to a better understanding of the

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process of climate changes during the middle to late Holocene. I recommend acceptance of this paper for publication in CP after revisions. I suggest that the following points could be taken into consideration when the authors revise the manuscript.

1. Six proxy records were used to reconstruct an integrated series for the past 5000 years in this study. Two of them, however, lack the segment of the last 2000 years, and one lacks that of the last 3000 years. What is the reason for such lacks? If it is in the case that sedimentary hiatus or post-depositional erosion occurred during the last two to three millennia in the relevant localities, the availability of these three records to the integration may be problematic. Although the time period in this study pertains to the past 5000 years, the last 2000 years would be paid more attention than the first 3000 years of the past 5000 years.

2. The integrated series in this study is derived from proxy records and referred to as temperature index. Judging by the original indices used for the integration, four of them (oxygen isotope, organic carbon, magnetic susceptibility and carbonate content) are geological proxies except for the temperature index itself from two proxy records. To what extent, do these proxies represent temperature? Is there any possibility to extract the temperature signal from each geological proxy so as to convert the proxy curves to the temperature ones?

3. In Section 4, the authors compared the reconstructed temperature series in this study with the other ones from China and the other regions of the Northern Hemisphere. It may be more necessary to discuss the differences among the proxy records used in the integration and as well the reason behind such differences prior to regional comparisons. To do so would help the readers to understand the reliability of the reconstructed temperature series.

4. Yikezhaomeng and Zhuyeze are differently abbreviated in Table 1 and Figs. 1 and 2.