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Climate of the Past Discussions

Interactive comment on "A chironomid-based record of temperature variability during the past 4000 years in northern China and its possible societal implications" *by* Haipeng Wang et al.

Anonymous Referee #1

Received and published: 8 November 2017

General Comments:

Principal Strengths: This is a very well-written paper, including an especially interesting analysis of the correspondence between a chironomid record and Chinese written history

Principal Weaknesses: For unknown reasons the authors have relied on a rather subjective indicator (% of cold water taxa) for the climate reconstruction, rather than more statistically rigorous reconstruction methods (e.g., weighted averaging). As a consequence, the conclusions are not especially convincing and are open to criticism. I recommend that the analysis be repeated using these more robust techniques.

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Discussion paper

Specific comments:

page 7: The statement that most chironomid taxa “barely survive in winter” is untrue. Many taxa thrive, and grow most rapidly in winter.

Page 9: The statement that temperature plays “the dominant role in controlling the abundance of chironomid taxa in freshwater” is an overstatement. The dominant environmental control depends very much on circumstance. For example, salinity/osmolarity is more important than temperature in saline lake systems.

Page 12: I see no basis for the statement, “It is evident that the cold-preference taxa were more sensitive to temperature fluctuations and provide more detailed information about temperature variations than warm-preference taxa”. The reader is left with no objective evidence to support this statement. It appears to be wholly based on the authors’ bias and probably wishful thinking. It would be preferable to include plots for both warm-preference and cold-preference taxa to facilitate the reader’s independent assessment. It also raises another issue – how objectively have taxa been assigned to these categories?

p. 14: The statement, “This result has rarely been observed in the previous literature, although it has been noted that chironomids often respond significantly to mean July or summer temperature”, reflects the authors’ strong bias. Since only a handful of climate variables, and no chemical variables (or other physical variables) were included in the analysis, the authors have forced the RDA to select one variable among a series of several very highly correlated variables. This is not an unbiased approach.

p. 15: The authors’ proclamation that the temperature variability “is clearly revealed by changes in the abundance of the cold-preference chironomid taxa” also reflects bias. The reader is supplied with no objective means for assessing that statement’s validity

also on p. 15: Similarly, the statement that cold preference taxa “responded rapidly and sensitively to even minor temperature fluctuations” cannot be objectively supported. To

conclude this would require a highly accurate, highly precise, and independent temperature record. To conclude this on the basis of the chironomid-inferred climate record is clearly circular reasoning.

further along on p. 15: I have long been highly skeptical of the use of sediment organic content as any measure of lake productivity. The most organic sediments ($\geq$95%) occur in bog-enclosed dystrophic sustems. In contrast, the small hypereutrophic lakes of temperate grasslands have sediments with much lower (<50%) organic matter content. I strongly suspect that much of the organic matter accumulating in small, forest lakes is actually derived from the surrounding forest and has little or no correspondence with lake productivity.

finally on p. 15: The temperature preferences of chironomids in Norway has questionable relevance to a Chinese record.

p. 17: The statement that two reconstructions "were chosen for comparison" worries me. In response to such statements I always worry: were these records selected objectively? Was this choice biased, instead selected because these records best support the author's narrative?

p. 18: The statement, "The foregoing demonstrates that our chironomid-based temperature reconstruction is reliable", is not supported by independent evidence. Such a statement requires very strong, independent evidence.

also on p. 18: On what basis can the chronology be described as robust? This adjective likely reflects bias and overstatement.

further on p. 19: On what objective basis can we conclude that this is "a detailed record of temperature changes", as opposed, for example, to a detailed record of noise in the temperature reconstruction?

p. 22: The statement that "Chironomids are a stenotypic and sensitive temperature proxy" does not appear to be well supported by this study. Stronger evidence can be

found in earlier research by other authors.

Overall: This is an interesting paper, but it is marred by the author's apparent bias(es) with respect to the analysis and interpretation.

Technical comments:

Throughout: Chinese surnames are less diverse than in other countries, which creates some problems when trying to match citations in the text with the reference list. To circumvent this issue, it is customary in most journals for in-text citations to include the given name initials for very common surnames (i.e., instances where two or more first authors share the same surname). See notes on edited manuscript.

The authors are overly reliant on the use of undefined acronyms in the manuscript text. This detracts from the paper's readability, especially for non-specialists. Example acronyms include GDGT, YD, and STWP.

The figures should be numbered in the same order as cited in the text. This should be corrected. For example, Fig. 3 is cited (p. 6), before Fig. 2 (p. 8); and Fig. 6 (p. 13), before Fig. 5 (p. 17).

p. 24: Regarding Brooks et al. reference order: Papers with three or more authors should appear in the reference list after two-authored papers. Papers with three or more authors, and the same senior author, should be listed chronologically.

p. 25 & 26: Regarding J.H. Chen et al. and Heiri et al. reference order: Papers with three or more authors, and the same senior author, should be listed chronologically.

p. 27: Regarding Liu et al. reference order: Papers having senior authors who share the same surname, should be organised alphabetically, by the initials of the senior author's given name(s).

p. 30: Regarding E.L. Zhang et al. reference order: Papers with three or more authors, and the same senior author, should be listed chronologically.

Figures 1 & 3: These figures are too small to be legible.

Additional minor editing is indicated directly on the edited manuscript.

Please also note the supplement to this comment:
https://www.clim-past-discuss.net/cp-2017-126/cp-2017-126-RC1-supplement.pdf

Interactive comment on Clim. Past Discuss., https://doi.org/10.5194/cp-2017-126, 2017.