

## ***Interactive comment on “The 4.2 ka event: multi-proxy records from a closed lake in the northern margin of the East Asian summer monsoon” by Jule Xiao et al.***

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The paper reports on the analysis of a sediment core from Hulun Lake in NE China, focusing on the interval from ~3000-5000 years B.P. The authors examine grain size, pollen, ostracods and conclude that there was a dry episode centered on 4230-3820 calendar years B.P., which they ascribe to a weaker summer monsoon. The paper begins with a 1-2 page preamble which is very similar to the introduction to Xiao et al., 2018 in Quaternary International. I suggest that this section be significantly reduced...the paper could really begin somewhere around line 106. The manuscript is in fact, a summation of research reported elsewhere, as studies of the ostracods,

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pollen and grain size have already been reported (Zhai et al., 2011, Wen et al., 2010 and Xiao et al., 2009, respectively) though here they focus on the mid to late Holocene section. I suggest that the Results section be shortened by eliminating the headers to sub-sections 4.1 to 4.4, & simply combining the results into one shorter paragraph. I offer some additional edits on the file I uploaded. By the way, it's too bad that you cut up the core in the field—it would have been better to have had a complete core to study using non-destructive methods first (e.g. scanning XRF) to obtain a much higher resolution record than your individual samples provided.

Some specific issues/: Add “B.P.” after 4.2ka in Title and elsewhere in the paper

Forget about the Bond cycle connection—it is non-existent (Figure 5) & has no logical place in your argument. The connection to the Stott et al SST reconstruction is also weak, given the uncertainties in their reconstruction. You should be careful not to over-interpret that record; it is interesting but hardly definitive. I don't think Figure 5 is very useful at all.

The reconstructed precipitation during the “4.2ka event” (based on pollen) is only 10% less than modern values (~260 v 285mm) so saying this represents “a large decline of the EASM” (line 367) seems unjustified. I think the most significant aspect is the persistence of the reduced rainfall period, rather than the absolute amount. Did temperature play a role in driving P-E to extreme values? You don't discuss that, or the overall water balance very much.

Could there have been an increase in eolian sediment input that contributed to a rise in the sand fraction?

Overall, this is a useful contribution to a Special Issue on the 4.2ka B.P. event, as it demonstrates that there was a detectable climatic anomaly even at the northern limit of the East Asian summer monsoon.

Editorial Criteria: 1. Does the paper address relevant scientific questions within the

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scope of CP? YES 2. Does the paper present novel concepts, ideas, tools, or data? YES 3. Are substantial conclusions reached? YES 4. Are the scientific methods and assumptions valid and clearly outlined? YES 5. Are the results sufficient to support the interpretations and conclusions? YES, but amend discussion related to Fig 5 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? YES 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES 8. Does the title clearly reflect the contents of the paper? YES (add B.P.) 9. Does the abstract provide a concise and complete summary? YES 10. Is the overall presentation well structured and clear? YES 11. Is the language fluent and precise? YES; minor edits needed (as provided) 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? YES—see comments above 14. Are the number and quality of references appropriate? YES 15. Is the amount and quality of supplementary material appropriate? Not applicable

Please also note the supplement to this comment:

<https://www.clim-past-discuss.net/cp-2018-66/cp-2018-66-RC1-supplement.pdf>

Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-66>, 2018.

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