

Interactive comment on “The 4.2 cal ka BP Event in Northeastern China: A Geospatial Perspective” by Louis A. Scuderi et al.

Anonymous Referee #1

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General comments:

The spatial pattern of the 4.2 ka BP climatic event is a key point to understanding the mechanism responsible for operating the Earth's climate system on millennial to centennial scales. In northeastern China, there are three large Sandy Lands (currently vegetated and with semi-stabilized dunes) that experienced changes between deserts and forest grasslands in response to climate changes in the geological past. Previous studies on eolian and lacustrine records suggest that abrupt environmental changes occurred in these Sandy Lands during the Holocene. However, an integrated view of these events is still far beyond reach. In this manuscript, the authors developed a spatially explicit Geographic Information System to capture regional climatic events and analyze the timing and spatial pattern of the 4.2 ka BP event, not only revealing

C1

the regional manifestation of the event but providing a promising approach for research of abrupt climate changes as well. I recommend acceptance of this manuscript for publication in CP after revisions.

Specific comments:

1. Page 2 Line 23. Delete "mean" because the precipitation is given as an amount range rather than a single amount.
2. Figure 1 on Page 3. Show more numbers of the latitude in panel for the readers to recognize latitudinal intervals easily.
3. Page 2 Line 30. Better to change "the 4.2 cal ka BP event" to "climate changes".
3. Page 4 Lines 8-13. I can understand the result of the eastward shift in the drainage of the Xilamulun River: water level lowering at Dali Lake and environmental drying in the eastern Hunshandake. But I have wondered whether the Horqin Sandy Land became somewhat wet in this condition in terms of its location at the lower reaches of the Xilamulun River.
4. Figure 7 on Page 8. Change "HulongLake" to "Hulun Lake"; "Dalainoer" to "Dali Lake"; "Jingchuan" to "Jinchuan"; and "Qingdeli" to "Qindeli".
5. Page 8 Line 10. Add some words after "the distribution of".
6. Page 10 Lines 2-3. Additionally how do you consider the effects of the topographic relief and groundwater runoff in the study region?
7. A newly published paper (Xiao et al., 2018. The 4.2 ka BP event: multi-proxy records from a closed lake in the northern margin of the East Asian summer monsoon. *Climate of the Past* 14, 1417-1425.) refers to Hulun Lake shown in Figs 1 and 7 in this manuscript and may be of some help to this study.

Related aspects: 1. Does the paper address relevant scientific questions within the scope of CP? Yes. 2. Does the paper present novel concepts, ideas, tools, or data?

C2

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. 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. 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. 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? No. 14. Are the number and quality of references appropriate? Yes. 15. Is the amount and quality of supplementary material appropriate? Yes.

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