

## ***Interactive comment on “Wet/dry status change in global closed basins between the mid-Holocene and the Last Glacial Maximum and its implication for future projection” by Xinzhong Zhang et al.***

### **Anonymous Referee #2**

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Dear editor and authors of the manuscript “Wet/dry status change in global closed basins between the mid-Holocene and the Last Glacial Maximum and its implication for future projection”, I have no ability to assess the use of lake sediment data due to my professional restriction, and propose my opinion about the model results. This work is encouraged to help future projection using the paleoclimate information. The Global model-data comparison over the orbital scale and short-scale is important to understand the difference in the local hydroclimate variations. The analysis is logical and fruitful. I was attracted by the idea of the manuscript, but still felt unsatisfied about the mechanism. Thus, I suggest that the manuscript should be accepted for publication after a minor revision.

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#### Main comments:

1. The mechanism should be furtherly improved. e.g. the influence of the insolation is not derived from the current study. A regional difference and its reason should be emphasized in the abstract and the conclusion. e.g. the difference of the hydroclimate variation mechanisms in the Central Eurasia and other regions.
2. The reason for choosing the analysis period is obscure. It is hard to understand to compare a centennial and longer variation of glacial-interglacial cycle with a decadal variation (AD 2006-2015 and AD 2091-2100). Is it better to choose the period as long as possible, e.g. the entire 20th century and 21th century?
3. The conclusion should be furtherly verified. It is challenging that a decadal variation in the late 21th century is attributed to the ENSO variability. The Pacific decadal oscillation or the Inter-decadal pacific oscillation may be more appropriate, if the analyzed period would be extended to the entire century.

#### Specific Comments:

1. Page 1, line 17. The location of these basins should be provided, which is your contribution. e.g. There is an opposite significant AI-MEI relationship between in the Southern Africa and in the Central Eurasia.
2. Page 2, line 30. The abbreviation of the term ‘wet get wetter dry get drier’ could be revised to ‘DGDWGW’ according to the previous study [Hu et al., 2019].
3. Page 2, line 56. ‘Zhan et al.’
4. Page 3, line 73-75. How to know that the proxy should be indicative of moisture changes and its drive is climatic change? Following the original descriptions?
5. Page 3, line 83. What does the ‘direction’ mean? Is it a trend?
6. Pages 3-5. The table 1 should be changed with a Figure 1b to show model-data comparison.

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7. Page 6, line 120. References of these experiments should be added.
8. Page 7, line 138-143. A new Figure 1b would be helpful to describe this part.
9. Page 7, line 153. The L21-PI difference is a future scenario not a modern warming.
10. Page 8, line 174. Why to select the period 1979-2016? Is it better to choose the same period with the early 21th century (AD 2006-2015)?
11. Page 10, line 205. 'within'
12. Page 11, line 239. '2091-2100'?
13. Page 11, line 242. the period (AD 1901-2100) was not analyzed in this study.
14. Page 11, lines 244-254. If the period is extended to the entire 20th century and 21th century, this discussion may be related to the above mechanism about a centennial and longer variation of glacial-interglacial cycle.

Reference: Hu, Z., X. Chen, D. Chen, J. Li, S. Wang, Q. Zhou, G. Yin, and M. Guo (2019), "Dry gets drier, wet gets wetter": A case study over the arid regions of central Asia, *Int. J. Climatol.* , 39(2), 1072-1091.

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