

Clim. Past Discuss., referee comment RC3
<https://doi.org/10.5194/cp-2021-55-RC3>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on cp-2021-55

Anonymous Referee #2

Referee comment on "Different facets of dry-wet patterns in south-western China over the past 27□000 years" by Mengna Liao et al., Clim. Past Discuss.,
<https://doi.org/10.5194/cp-2021-55-RC3>, 2021

Review CP 2021-55

This is a nice paper that presents a set of new, well dated Holocene hydroclimate records. The overarching research question toward characterizing the relative contributions of temperature and rainfall to moisture balance is critical as we move into a warmer world.

CP review criteria:

Scientific Significance: (v. good, 1.5)

Scientific Quality: (good, 2)

Presentation Quality: (fair, 3) Please find an English editor.

1. The paper addresses relevant scientific questions within the scope of CP.

2. The importance of temperature to enhancing drought and reducing effective moisture is broadly understood. The new records presented however, are relevant and broadly useful as is understanding Holocene temperature/hydroclimate interactions.

3. The conclusions reached are relevant (temperature is important for controlling water balance).

4. The scientific methods and some assumptions are clearly outlined.

5. Assuming the records are interpreted correctly, the results are sufficient to support their interpretations and conclusions.

6. The description of the methods are generally sufficient to be reproducible.

7. Yes, the authors clearly credit related work and indicate their new contribution

8. Yes, the title clearly reflects the content of the paper.

9. Yes, the abstract is a concise summary of the paper.

10. The overall presentation is difficult to follow at times. I would recommend a native English speaking editor to clarify the manuscript.

11. The language is not particularly fluent or precise. This does not necessarily reflect the scientific quality, but should be addressed. It is difficult at times to gauge the scientific merit because of the writing.

12. Not applicable

13. The text can be clarified.

14. Yes, the number and quality of the references generally appear appropriate.

15. The supplement is thin, but sufficient I think.

General comments:

The age model looks good and well produced. There are a reasonable number of ages, and I appreciate the application of bacon for computing the age model.

I am generally happy with the methods and the records appear to be of high quality.

The multi-proxy approach increases the strength of the paper and the associated conclusions. The strong agreement between the grain size and d18O precipitation amount/intensity indicators is nice and increases my confidence in the records.

Have the authors considered how human activity and associated changes in vegetation impact their modern pollen calibration set?

Figure 5:

I get confused when labeling starts with (a) at the bottom of a figure. I read figures just like a page- from top to bottom and left to right. My preference would be to flip the x-axis so that time reads forward (from left to right). And start labels on the top with (a) to (j) on the bottom of the figure. The order of the plots then should be arranged roughly in accordance with the storyline as presented in the manuscript. If the story starts with the speleothem records, then put those on top of the stack etc.

-Arrows on the plot (up - down) to indicate if up is wet or dry would help readers interpret the figure.

-Arrows on panel (d) to more/less precipitation would be helpful.

-In panel (d), please correspond the axis color with the color of the dots. I'm assuming the red dots correspond to the brown d18O axis?

-Be consistent with labeling (or not labeling) the curves.

The above suggestions on Figure 5 however, should be aligned with CP figure criteria.

More comments

If reconstructing SWSI from pollen, why not also reconstruct precipitation amount and temperature? Reconstructing temperature and precipitation directly would provide an additional, although not independent, test on the paper's hypothesis. Would pollen based T and P reconstructions show warmer temperatures overcame simultaneous increases in precipitation during periods of low SWSI but high rainfall?

The lake is relatively shallow with a large surface area. Substantial or persistent increases in temperature, or decreases in effective precipitation would likely lower lake level, as seen since 1978. I'm concerned that changes in lake level would impact both the grain size record and the d₁₈O record. Lower lake levels would expose large areas of sediment prone to erosion. For example, Brian Shuman and others have developed lake level reconstructions using sand layers that extend into the lake during low stands. In these cases, increases in sand reflect less effective rainfall, not more as interpreted by this study. Lower lake levels would also have a strong impact on the d₁₈O concentrations. Do the authors have any indicators of Holocene lake level change at Yilong Lake? Can the authors help control for the possible influence of lake level change on their rainfall indicators? Given the correlation between the Yilong Lake records and speleothem records of Holocene Asian Monsoon, I'm hopeful that changes in lake level have not impacted these records. Nonetheless, controlling for lake level changes would be useful. Perhaps a pollen reconstruction of precipitation amount would corroborate with the d₁₈O and grain size records and not be directly impacted by lake level changes? I would be interested to hear if the authors have other ideas.