Dear Editor,

Thank you for your letter and for the reviewer's comments concerning our manuscript entitled "Controls on leaf water hydrogen and oxygen isotopes: A local investigation across seasons and altitude" (hess-2022-246R1). Those comments are all valuable and very helpful for improving our paper and for future studies. We have studied those comments carefully and have made corrections or explanations accordingly. Responses to the referee's comments are as follows:

Comments to the author:

The reviewers are generally satisfied with the revision. But both reviewers commented on specific areas that deserve further changes and in-depth analyses. Reviewers also pointed out that the language quality of this manuscript requires significant improvements. I concur with the reviewers' assessment and ask the authors to make a revision again with the reviewers' comments in mind. Thank you!

Thank you. We read the reviewers' comments and carefully considered them, and we have revised the paper accordingly and answered the questions carefully.

We also re-refresh and polish the language.

Reviewer #1:

Comment:

The results argued with the recent global meta-analysis that δ18Oleaf and δ2Hleaf values reflect climatic parameters (i.e., RH and temperature) differently（Line 313-315）. I suggest adding a detailed discussion and explaining the possible reasons.

Response:

Thank you. We have added more discussion and possible explanations for this (Lines 318-325). Our local investigation was consistent with the global meta-analysis of different responses of $\delta^{18}O_{leaf}$ and δ^2H_{leaf} to the isotopic composition of the source water and meteorological conditions. However, we observed the equivalent responses of $\delta^{18}O_{leaf}$ and δ^2H_{leaf} to climatic factors, which is likely due to the difference of study scales.

Comment:

The language of this paper needs to be further improved.

Response:

Thank you. We have polished the language.

Comment:

Reviewer#1 also asked for tracked changes in future revisions.

Response:

Thank you. We made the revision in the tracked change of the marked-up version.

Reviewer #2:

Comment:

♣ *The author has made revisions to the article, responding to the questions raised, and basically maintaining the general situation of the previous version. In generally. the explanation for the*

results was reasonable. However, there are still a few issues that need to be addressed before I would recommend it for publication by HESS.
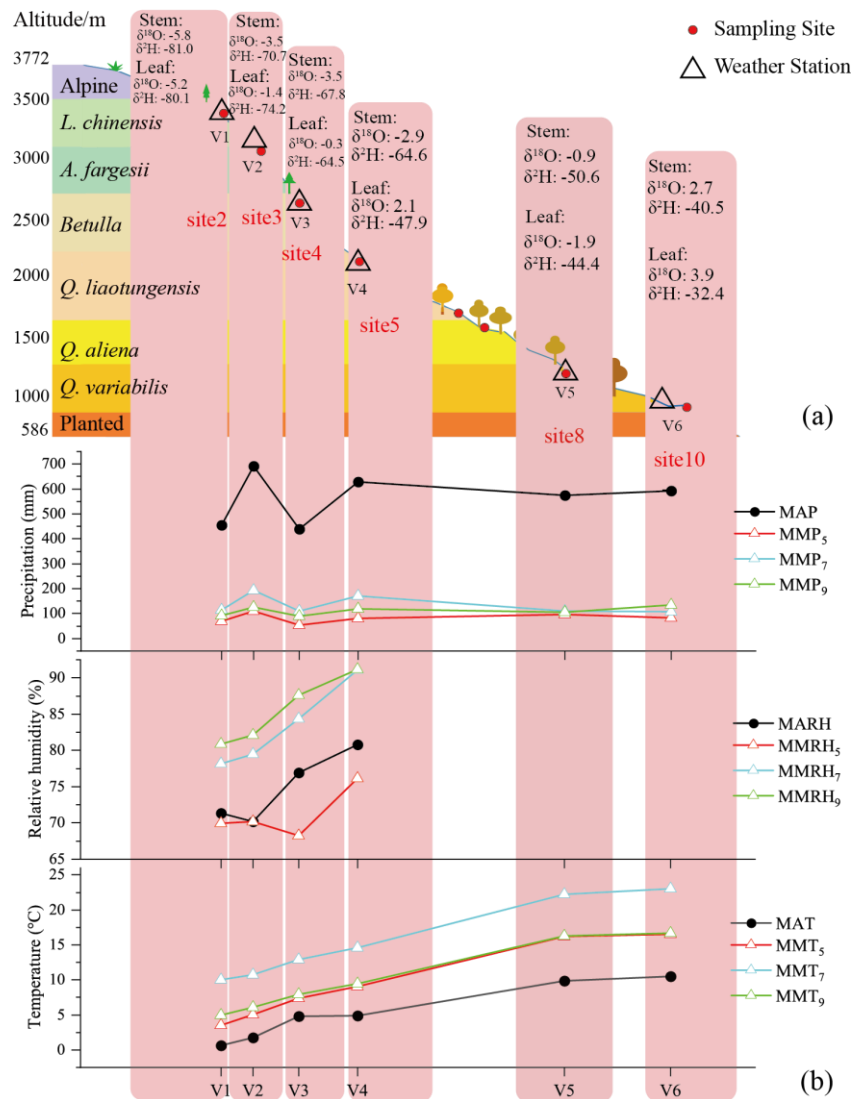
Response:

Thank you for your positive comments on this manuscript. We have addressed all comments according to two reviewers' constructive comments.

Comment:

♣ *There is a good one-to-one correspondence between the leaf water and the stem water isotope data set, but it is not possible to have a similar one-to-one correspondence between the thermometer humidity to calculate the correlation between them. Especially in mountainous areas, the heterogeneity of temperature and humidity is more intense. What is the impact of the results on this situation?*

Response:

Thank you. We agree with your valuable comments on the heterogeneous difference of temperature and humidity in the mountainous regions. Our results also showed the distinct difference of temperature, humidity, and stem and leaf water isotopes. The details were seen as below:

Comment:

♣ What is the time interval between each sample and the last rainfall? Could it be related to the fact that the isotopic signal of leaf water in September was extremely poor?

Response:

Thank you. We thank the Shaanxi Meteorological Bureau for supporting meteorological data (precipitation, temperature, and RH, etc.) along an elevation transect. The precipitation amount was measured after each precipitation event at the station sites.

In this study, we focused on the effects of mean annual precipitation (MAP) and mean monthly precipitation (MMP) on leaf water isotopes ($\delta^{18}O_{leaf}$ and δ^2H_{leaf} values), so we did not consider the time interval between three sampling and the last rainfall. The comment is good. Maybe we will conduct a detailed pinpoint measurement over a short period (several days) in the future.

In our study area, we guess that the relatively poor isotope signals of leaf water in September are because most of the species have been dried or died in September because of the mountainous climate (Zhao et al., 2018; Liu, 2021).

References

Zhao M., Wang Y., Xue F., Zuo W., Xing K., Wang G., Kang M., Jiang Y., 2018. Elevational patterns and ecological determinants of mean family age of angiosperm assemblages in temperate forests within Mount Taibai, China. *Journal of Plant Ecology*, 11, 919-927.

Liu, J. 2021. Seasonality of the altitude effect on leaf wax n-alkane distributions, hydrogen and carbon isotopes along an arid transect in the Qinling Mountains. *Science of the Total Environment*, 778, 146272.

Comment:

♣ How to consider the effects of biodiversity on leaf water sampling representation? Especially the alpine meadow ecosystem?

Response:

Thank you. A significantly vertical vegetation zones existed (Fig. 1), so we collected the dominant species for representatives at each zone across the elevation transect (Tang et al., 2006).

Actually at the alpine (> 3350 m asl), the species is monotonous (e.g., *Rhododendron sp.*) (Zhao et al., 2018; Tang et al., 2006).

References

Tang Z., Fang J., 2006. Temperature variation along the northern and southern slopes of Mt. Taibai, China. *Agricultural and Forest Meteorology*, 139, 200–207.

Zhao M., Wang Y., Xue F., Zuo W., Xing K., Wang G., Kang M., Jiang Y., 2018. Elevational patterns and ecological determinants of mean family age of angiosperm assemblages in temperate forests within Mount Taibai, China. *Journal of Plant Ecology*, 11, 919-927.

Comment:

♣ The current conclusions about the control of water isotope signals by source water on leaves have strong regional and atmospheric circulation characteristics and should be highlighted for the current conclusion.

Response:

Thank you. We have highlighted the regional characteristics in the text.