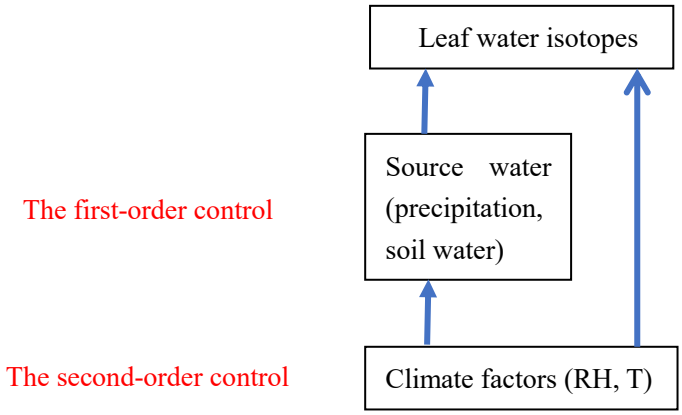
Comment:

Liu et al, based on field sampling of leaf water and measuring isotope composition (δ18O and δ2H) along an elevation transect on the Chinese Loess Plateau belt to illustrate controls on leaf water hydrogen and oxygen isotopes. The results point that the first-order control on δ18O and δ2H was the source water, and the second-order control was the enrichment associated with biochemical and environmental factors. Overall, this is an important and hard-working investigation for deepening the understanding of the control of leaf water isotopic composition in field conditions. However, the current analysis is mediocre, the scientific questions are poorly elaborated, and new discoveries are lacking. Secondly, the results show that source water is the main control of leaf water isotopes, which is contrary to the previous results which indicate that relative humidity is the main control of leaf water isotopes both under leaf and ecosystem scale. Therefore, there requires more evidence to support your conclusion. I recommend major revisions before considering publication in this journal.

Response:

Thanks a lot for your approvedness and suggestions. For the first question, we have two significant novel points: 1) the previous studies have always emphasized on the combined $\delta^{18}O$ and $\delta^{2}H$ values of leaf water ($\delta^{18}O_{leaf}$ and $\delta^{2}H_{leaf}$), few considering the respective responses or variations of $\delta^{18}O_{leaf}$ and $\delta^{2}H_{leaf}$. A recent global meta-analysis indicate that the respective $\delta^{18}O_{leaf}$ and $\delta^{2}H_{leaf}$ reflected differently, seen details in Cernusak et al. (2022; NP). However, our local-study supported that $\delta^{2}H_{leaf}$ responds more closely to xylem water than $\delta^{18}O_{leaf}$, but both $\delta^{18}O_{leaf}$ and $\delta^{2}H_{leaf}$ responds comparatively to climatic factors (RH, T), challenging the global meta-analysis (Cernusak et al., 2022); 2) We proposed a framework that control the leaf water isotope line by using multivariate statistical methods (Hierarchical clustering, Craig-Cordon model, Structural equation model, HYSPLIT, etc). The leaf water isotope line was generated by our analysis, which provides an important baseline for leaf-derived organic matter such as cellulose and leaf wax.

For the second question, our results were actually consistent with the previous conclusion. We proposed a hierarchical control on leaf water isotopes, as the following figure. The first-order control is source water, which is also affected by climate factors (e.g., T, RH). The climatic factors (e.g. RH) affect source water and directly affect leaf water isotopes. Without considering source water, the RH is the main control on leaf water isotopes.



Comment:

Minor revision:

Line 148-150, "For the plants, one or two deciduous and coniferous trees were chosen in each plot, and several large leaves and suberized twigs were collected for each species." Here should be describe in details.

Response:

Thanks. We have added more details.

Comment:

Line 214-215, How was the ð□□□ð□□ and ð□□□ð□□□ obtained? Here should be describe in details.

Response:

Thanks. We have added new citation, the kinetic fractionation equations for hydrogen and oxygen isotopes can be found in the reference.

Comment:

Line 264, predicted δ18O and δ2H values of leaf water were quiet simper, and need consider non stead state (NSS) under complex environment condition.

Response:

Thanks. It is a good question. We used the steady-state condition in this study because our sampling campaigns take place during the day when leaf water is generally near isotopic steady state because chloroplasts are mostly located near to the evaporative sites (Cernusak et al., 2016). The non-steady state effects on leaf water isotopes were expected at night because of low stomatal conductance (Cernusak et al., 2005; Cuntz et al., 2002; Cernusak et al., 2016).

Comment:

Line 456-459ï¼□there need more deep-seated analysis but not common knowledge in this area.

Response:

Thanks. We have depleted it. This needs to be further explored in the future.

Comment:

Line 466-469, The conclusion is too simple and needs to be further explored.

Response:

Thanks. We have strengthen the conclusion.