



Comment on hess-2021-289

Anonymous Referee #2

Referee comment on "Controls of seasonality and altitude on generation of leaf water isotopes" by Jinzhao Liu et al., Hydrol. Earth Syst. Sci. Discuss.,
<https://doi.org/10.5194/hess-2021-289-RC2>, 2021

Liu et al present a manuscript titled "controls of seasonality and altitude on generation of leaf water isotopes". Leaf water isotopes have wide application in the hydrology and ecology. It is quite interesting to know the effects of seasonality and altitude on isotope variations of leaf water. This manuscript reported the isotopic variations of leaf water, stem water, soil water and rain water with the season and elevation. They concluded seasonality and altitude exert the influence on leaf water isotopes through precipitation as source water by comparing the seasonal and altitude dynamic of isotope compositions of those four types of water. However, the precipitation in figures 2-4 did not show significant consistent seasonal or altitude dynamics of the $\delta^{18}\text{O}$ and $\delta^2\text{H}$ values with leaf water. These data are also not able to support the figure 7. In my opinion, compared to effects of seasonality and altitude on precipitation, they are more likely to influence the environmental factors such as humidity and temperature, and then affect the generation of leaf water isotopes. I don't understand why the authors ignored to discuss other factors but only source water.

Besides, some unexpectable data were not explained such as much enriched stem water relative to soil water. Moreover, some key information such as the sampling time, plant names, how many species totally are presented in the figures, each symbol represents one plant or one species?

Basically, this manuscript reported fairly important data and is addressing a topic which would interest large-scale ecosystem researchers. I suggest the authors reorganise this manuscript, confine their conclusions to their data. My detailed comments are

Line 1, change "Controls" to "effect"

Line 30-32, it will be clearer if change to "consistent seasonal dynamics of the $\delta^{18}\text{O}$ and $\delta^2\text{H}$ values in precipitation, soil water, stem water, and leaf water"

Line 35, change to "which result in"

Line 39, please rewrite the summary: first, it is difficult to understand those sentences; second, the linearity of dual-isotope plot is basically results of the equilibrium and kinetic fractionation factors

Line 40, rewrite, may be "Why can dual-isotope plot of spatiotemporal leaf water be linear"

Line 41-42, confused, the LMWL is also an isotopic water line

Line 44-45, change to "effects of seasonality and altitude on source water"

Line 73, add "More specifically" before "Soil water isotopes"

Line 143, what plants? trees or grasses?

Line 145-146, how many leaves for one plant? What time were those leaves collected? Diurnal variations of leaf water isotopes could be over those caused by the season or elevation.

Line 165-167, the laser isotope analyzer is quite sensitive to the organic matter in the soil. don't know whether you did the calibration or not?

Line 180-181, how the authors could convince us this online system can work in this study area. Here the spatiotemporal resolutions should be stated.

Line 237, why are O isotope values of stem water quite higher than the soil water and rain water? The authors should explain this in Fig 4.

Line 246, the fig 2 did not show the statistical significance. It seems the precipitation has no seasonal variation. Also, are those boxplots the summaries of whole-elevation samples?

Line 349-351, non-steady state model of leaf water isotope states the isotopes of source water, isotopes of ambient vapor, humidity and temperature, and transpiration and leaf traits determine isotope values of leaf water. Theoretically, source water is related to precipitation, but in this study either the seasonality or altitude of the precipitation isotopes are hardly related to leaf water or stem water (fig1&3). Also, the dual-isotope plot of did not show significant seasonal dynamics as that of leaf water (fig2). Therefore, those data could not support the claim (fig6). Compared to effects of seasonality and altitude on precipitation, they are more likely to influence the environmental factors such as humidity and temperature. I don't understand why the authors ignored to discuss other factors but only source water.

Lin 355-364 those are the general significance, not this paper's Insights and implications. Delete or put them in introduction.

Line 638-639, does each symbol represents one plant or one species?

Line 640-641, same as above.

Line 649, same question as above. What is the difference of this figure from the figure 3?

Line 650-652, I don't think those data of this study support this figure.