Responses to the reviewer's comments

Response to Reviewer #1

Thank you very much for your recognition of the revised manuscript. Your insights in both rounds of review have deepened our thinking on several key issues. Throughout the revision process, we learned to approach problems from different perspectives and endeavored to engage more comprehensively with your ideas, gaining many new insights. Your comments have been invaluable not only for improving this manuscript but also for enhancing our own way of thinking.

We will address each of your current comments in turn. Thank you again for acknowledging the scientific merits of the paper.

Responses to the major comments

Comment one:

-- I accept the authors' argument about local evaporation not influencing the isotopic ratio of downwind precipitation. As the cause, they quote other studies that state that evaporated moisture is ventilated out from the region without contributing to precipitation. As I understand, this could be due to the fact that evaporation is a slow process distributed in time, while precipitation events are more compact, so the amount of moisture evaporating during these short precipitation events should relatively small and may not impact the isotopic ratio significantly.

Response: This compelling perspective has greatly inspired me. **The fact that precipitation and evaporation occur at fundamentally different times is indeed the key reason why precipitation isotope ratios are not influenced by upwind evaporative moisture.**

Comment two:

-- I am still not very clear regarding the authors' explanations about the ultimate source of moisture for the forest if precipitation is consistently lower than evapotranspiration. The authors mention snowmelt, but snow is also part of precipitation. Do they mean that the forest is fed by the water streaming down the mountains? That is, that there is an inflow of liquid water into the area, which compensates for the mismatch between precipitation and evapotranspiration? Or maybe the authors' result is representative of the two years of measurements only, and there can be other years when precipitation exceeds evapotranspiration and soil moisture is replenished? Please consider adding a brief explanation on this point.

Note that in a steady state Runoff = Precipitation - Evapotranspiration, so if the latter sum is negative, this means that either soil moisture is declining or that there is an input of liquid water to the ecosystem (like irrigation or snowmelt streaming from the upper mountains).

Response: Thank you for your reminder—our previous explanation may indeed have been insufficiently clear. First, as you noted, precipitation can be divided into liquid and solid phases, and the samples we collected in the study area were entirely liquid. Second, we agree with your point on water balance:

when Precipitation minus Evapotranspiration (P – ET) is negative in the study area, liquid snowmelt from upstream flows in to restore the water budget. This influx is the key reason why the forest can survive here. We will add a brief clarification in Section 5.1.2, **as follows**:

"However, to support forest growth and maintain the regional water balance, upstream snowmelt compensates for the deficit between precipitation and evapotranspiration and flows into the forest ecosystem as a supplemental water source."

Responses to the minor comments

-- Please check through the text as there are many cases when words stick together with braces without spaces, like "liquid phase(Dansgaard et al., 1964)", "expression(Kool et al", "follow(Kong et al., 2013" (should be follows).

Response: We have reviewed the entire manuscript and corrected these errors.

-- Please mention in the text that Picea crassifolia is the Qinghai spruce (as indicated in the legend to Fig. 1b).

Response: After reviewing the relevant literature, we found that "Qinghai spruce" is not a standardized botanical name. Accordingly, we have replaced every instance of it in the manuscript with the scientific name "**Picea crassifolia**."