

Editor

Dear Authors,

Thank you for your revision. But some comments from reviewers are still not well addressed. For example, the last question from Anonymous referee #4 is not included in the main text. One more thing I'm still not very satisfied is the use of "soil water availability" in the text. Many new studies found that vegetation uptakes water not only from soil, but from bedrock fissures and groundwater (see <https://www.nature.com/articles/s41586-021-03761-3>; <https://www.nature.com/articles/srep44110>). Using "root zone water availability" is likely a more proper term (see <https://hess.copernicus.org/articles/28/4477/2024/>). With these corrections, I think this manuscript will be well shaped up.

Thank you for your valuable feedback. We appreciate your attention to detail and the opportunity to further improve our manuscript. We have addressed both of your concerns.

Comment: On the use of “root zone water availability” instead of “soil water availability”:

Response: We fully agree that "root zone water availability" is a more accurate and comprehensive term. We have updated all instances of "soil water availability" to "root zone water availability" throughout the manuscript and added supporting text in the introduction:

Line 17 – 21: “Recent studies have shown that vegetation water uptake occurs not only from soil layers but also from bedrock fissures and groundwater systems (McCormick et al., 2021; Evaristo and McDonnell, 2017; Gao et al., 2024), suggesting that root zone water availability, rather than just soil wetness, determines the volume of water that plants can hydraulically lift ... ”

Line 39-41: “Additionally, a global meta-analysis has shown that groundwater use by vegetation is widespread, with a global prevalence of 37%, further emphasizing the importance of subsurface water sources for plant productivity (Evaristo and McDonnell, 2017).”

Line 48-51: “Recent research has emphasized the need for a more holistic understanding of the root zone in the Earth system, integrating its role across multiple spheres including the biosphere, hydrosphere, and atmosphere (Gao et al., 2024).”

Comment: Addressing the last question from Anonymous Referee #4:

Response: While our original manuscript included discussion of average time of occurrence in Section 2.2 under circularity statistics, we acknowledge this could be clearer. We have now added an explicit clarification (lines 195-196):

"The average time of occurrence represents the time of year when the flux (such as gross primary production, wetness, or vapor pressure deficit) typically reaches its peak, weighted by its intensity across all months."