

HESS-2022-142

Title: The natural abundance of stable water isotopes method may overestimate deep-layer soil water use by trees

Author(s): Shaofei Wang et al.

MS type: Research article

Iteration: Minor revision

Comments from handling editor:

Dear authors,

The Referee acknowledges the substantial improvement of the revised manuscript, but still quite a few minor issues and technical points need to be adjusted.

Best regards

Roberto Greco

Response: Thank you very much for providing the opportunity to revise our manuscript entitled “The natural abundance of stable water isotopes method may overestimate deep-layer soil water use by trees” (hess-2022-142). The reviewer’s comments are constructive and helpful. We have gone through the comments carefully and made revisions. Based on the instructions in your letter, we have uploaded the revised manuscript with revisions being marked. The point-by-point responses to the reviewer's comments are presented as follows.

Comments from anonymous referee #2

Thank you for considering my previous comments. I think you have significantly improved the manuscript. However, I still have some minor comments and technical corrections. Lines (L) refer to the revised manuscript with no track changes.

Response: Thanks a lot for encouraging and constructive comments on our

manuscript. We have carefully revised the manuscript according the comments. Please see the details as follows.

Minor comments and technical corrections

L86: Unclear b) objective. I suggest replacing ‘exploit’ with another verb.

Response: We agree. It has been edited in the text (L 87).

“(b) ascertain the water use strategy response of apple trees to variations in the growing season and stand age”

L87: Please specify what the ‘combined method’ is.

Response: We agree. It has been edited in the text (L 88-90).

“(c) elucidate the difference between the combined method (combining isotopic labeling in deep soils with natural stable isotope signatures) and the natural abundance of stable water isotopes method.

Title of section 2.2.3: Please change it to ‘Sampling of rain water’.

Response: We agree. It has been edited in the text (L 134).

“2.2.3 Sampling of rain water”

L135: Please replace ‘determination’ with ‘analysis’.

Response: We agree. It has been edited in the text (L 137).

“The collected rain water samples were immediately sealed into vials by parafilm and stored at 4°C for isotopic analysis.”

L148: I guess the authors meant that only samples with an extraction efficiency equal

or higher than 98% were considered for isotopic and data analysis. Please rephrase the sentence, by replacing 'should be' with another verb or tense.

Response: We agree. The sentence has been rewritten (L 150-151).

“Samples with an extraction efficiency less than 98% were discarded.”

L208-209: Please revise the sentence because xylem samples for FSW for 11-year-old apple trees, collected after 7 days, have $\delta^2\text{H}$ values that are much more negative than the background (Fig. 5).

Response: We agree. The text has been revised (L 210-212).

“The maximum concentration of D in xylem for both apple orchards occurred on day 3 after labeling, then decreased rapidly, and was lower than background values on day 7.”

Title of section 4.4: Please change it to 'Limitations due to the extraction method'.

Response: We agree. It has been edited in the text (L 368).

“4.4 Limitations due to the extraction method”

L370-371: It is unclear how spatial heterogeneity is related to the destructive sampling. Please rephrase the sentence.

Response: Agreed. We have rewritten this sentence (L 373-375).

“It should be noted that isotopic spatial heterogeneity of xylem water induced by sampling position and time (Nehemy et al., 2022) and soil water induced by uneven distribution of throughfall and preferential flow (Xiang et al., 2019; Yang and Fu, 2017) could lead to an isotopic offset.”

Reference

Nehemy, M. F., Benettin, P., Allen, S. T., Steppe, K., Rinaldo, A., Lehmann, M. M., McDonnell, J. J.: Phloem water isotopically different to xylem water: Potential causes and implications for ecohydrological tracing, *Ecohydrology*, 15(3), e2417, DOI:10.1002/eco.2417, 2022.

Xiang, W., Si, B. C., Biswas, A., and Li, Z.: Quantifying dual recharge mechanisms in deep unsaturated zone of Chinese Loess Plateau using stable isotopes, *Geoderma*, 337, 773-781, 10.1016/j.geoderma.2018.10.006, 2019.

Yang, Y. and Fu, B.: Soil water migration in the unsaturated zone of semiarid region in China from isotope evidence, *Hydrol. Earth Syst. Sci.*, 21(3), 1757-1767, DOI:10.5194/hess-21-1757-2017, 2017.