

Editor Decision: Publish subject to technical corrections (25 Jan 2016) by Christine Stumpp

Comments to the Author:

The authors went back to the editor and reviewer comments (first and second round) and improved the manuscript accordingly. Now, the storyline is more focused. Beside some technical corrections (see list below), the manuscript can be accepted for publication in HESS. I recommend additionally sending the manuscript to a native speaker for a general language check before the final upload. An additional check is provided by Copernicus too (English copy-editing service; http://publications.copernicus.org/services/copy_editing_for_english.html).

Grammar and punctuation was checked by a native English speaker.

I forwarded the request of the authors to the reviewers in providing their names for the Acknowledgments. The reviewers want to stay anonymous though. Nevertheless, I am convinced that they also appreciate being thanked „as anonymous reviewers“ for their good comments.

Technical Corrections:

General comment:

- write „in-situ“ in italic in entire manuscript

Reply: We changed as recommended.

- check tense!

Reply: The entire article was checked by a native speaker.

- there is no difference in “low water content” and “very low water content”. The word “very” is subjective and can be deleted in about 90% of the cases in your manuscript.

Reply: We removed “very” if inappropriate.

- one of the reviewers recommended to use “higher/lower” instead of “enriched/depleted”, which applies to entire paragraph and not only to the one sentence that was changed accordingly.

Reply: We changed as recommended

Specific comments:

- superscript in title (18O, 2H)

Reply: We changed as recommended

- delete the second part of the title “potentials and limitations”. It is a good idea and it sounds fancy; however, I would expect something like a review or an opinion paper

Reply: We changed as recommended

- no new paragraphs but running text in abstract

Reply: We changed as recommended

- p4, ln 19-21: I do not understand these two points from reading the abstract only; besides, they are speculative not justifying to be mentioned in the abstract. Add a more general sentence, e.g. something like “for future applications, uncertainty of the in-situ method is suggested to be reduced by improving the calibration procedure (i.e. reference standards) and further studying apparent fractionation effects influencing the isotope ratios in the soil water vapor. “

Reply: Uncertainty of the *in-situ* system is suggested to be reduced by improving the calibration procedure and further studying fractionation effects influencing the isotope ratios in the soil water, especially at low water contents. Furthermore, the influence of soil respired CO₂ to isotope values within the root zone could not be deduced from the data.

- p5, ln 2: Either „water stable isotopes have been...“ or „stable isotopes of water have been...“ but not „water stable isotopes of water...“

Reply: We changed as recommended

- p6, ln8: remove comma

Reply: We changed as recommended

- p7, ln22: give Ks in m/d (not cm/d)

Reply: We changed as recommended

- p7, ln 28: add space character (9,000 m²)

Reply: We changed as recommended

- p8, ln 20: remove comma

Reply: We changed as recommended

- p10, ln 7: add comma after „in addition,...“

Reply: We changed as recommended

- p10, ln 19: add comma after „therefore,...“

Reply: We changed as recommended

- p11: do not use superscripts in the equation; change Dv to Dv (also in text); same applies to equation 6

Reply: We changed as recommended

- p 11 ln 3-5: do not use units but dimensions in brackets (e.g. not „m“ but „L“ for lengths); be consistent and give dimensions for all variables (e.g. equation 6)

Reply: We changed as recommended

- p11, ln3: why was a tortuosity factor of 0.67 chosen?

Reply: According to Allison et al., 1984

- check order of Figures in the manuscript; e.g. Figure 7 (p12, ln 28) introduced before Figure 5 (p14, ln1); by the way, the reference to Figure 7 (p12, ln28) is wrong; it is Figure 6 - still the order is not according to appearance in the text

Reply: We changed as recommended

- p12, ln 10: explain the abbreviation RMSE

Reply: The agreement between *in-situ* and cryogenically obtained isotope measurements is expressed with the root mean square error (RMSE).

-p15, ln20-22 and p16 ln1 and Table 3: please check the calculated ratios: if you want to give the

contribution of transpiration to the total evapotranspiration (i.e. T/ET), it is $510\text{mm}/(510+120\text{mm})=0,809 \diamond 81\%$

Reply: We changed as recommended

- p16, ln15: English; “slowly increases and isotope values in the sampled vapor will get higher” instead of “might enrich itself....”

Reply: We changed as recommended

- p17, ln25: “Besides,...” not “Beside this”

Reply: We changed as recommended

- p18 ln 3: either might or can - not both

Reply: We changed as recommended

- p20, ln 11, 12, 28: add comma “Further,”; “Therefore, ...”, “In addition,...”

Reply: We changed as recommended

- p21, ln 25-30: add one sentence why CO₂ would be important for d18O analysis

Reply: We changed as recommended

- Table 3: theta:1% and theta:7% not explained; last two columns with one header only

Reply: We changed as recommended

We corrected each of the general and specific comments. In addition, we changed the term accuracy to measurement trueness, since accuracy includes the precision and the trueness. (according to Barwick et al. 2011) and explained in the text.

We further added some recent Publications where appropriate:

Barwick, V. and Prichard, E.: Terminology in Analytical Measurement: Introduction to VIM 3, Eurachem), 2011.

Beyer, M., Gaj, M., Hamutoko, J., Koeniger, P., Wanke, H., and Himmelsbach, T.: Estimation of groundwater recharge via deuterium labelling in the semi-arid Cuvelai-Etoshia Basin, Namibia, *Isotopes in Environmental and Health Studies*, 51 (4), 533–552, doi:10.1080/10256016.2015.1076407, 2015.

Koeniger, P., Gaj, M., Beyer, M., and Himmelsbach, T.: Review on soil water isotope based groundwater recharge estimations, *Hydrol. Process.* (accepted), doi:10.1002/hyp.10775, 2015.

Rothfuss, Y., Merz, S., Vanderborght, J., Hermes, N., Weuthen, A., Pohlmeier, A., Vereecken, H., and Brüggemann, N.: Long-term and high-frequency non-destructive monitoring of water stable isotope profiles in an evaporating soil column, *Hydrol. Earth Syst. Sci.*, 19 (10), 4067–4080, doi:10.5194/hess-19-4067-2015, 2015.