

This is the second time that I am reviewing Gaj et al. manuscript on “In-situ unsaturated zone stable water isotope (^2H and ^{18}O) measurements in semi-arid environments using tunable off-axis integrated cavity output spectroscopy”.

The authors have added new sections written as it seems in quite a hurry (please find below a sample of the typos / missing words that I could notice). The level of English is at some places surprisingly poor, e.g., the authors should avoid use of colloquial formulations, e.g., “basically”, “besides”, and seem to get “thus” and “though” mixed up. The uploaded version also does not contain all the modifications (i.e., parts that were removed) brought to the manuscript. But more importantly, the authors have only answered the first part of my specific comments (answers to pages C2689-C2693 are lacking).

Nevertheless I salute the effort to provide some quantitative numbers (mass balance section), even though – again – sloppily written.

GENERAL COMMENT

Again, I found myself struggling with Table 3. One cannot apply specific drift and span corrections before the repeatability of the measurements are assured. This is apparently not the case when looking at the abnormally high σ_{rep} (!) With these precisions, stable isotope compositions are invalid tools for e.g. disentangling environmental fluxes! As previously stated, this reviewer thinks that under the experimental conditions, the sampling sequence has an effect on the isotopic measurements (or the repetition has an effect).

SPECIFIC COMMENTS

TITLE

“water stable isotopes” and not “stable water isotopes”!

ABSTRACT

P2L2. Precise to what “directly” refers to here.

INTRODUCTION

In general, this should be substantially shortened. It reads like a mini-review while should go straight to the point after a short introductory §. Your study is a technical one. This is not reflected by the introduction until P4L21.

The “hypotheses” P6L4-8 should be stated as clear “objectives”. The bullet point list should incorporate the “mass balance” objective.

STUDY SITE AND METHODS

P8L2-7. This can be detailed and moved to some appendix but in the text a reference is enough (e.g., Altuhafi et al. 2013).

P9L18. “rate” is missing after “flow”. Also throughout the text “velocity” should be replaced with “rate”.

P9L31. “®” and not “©”.

Soil water balance

(should have its own section)

P10L11. Provide unit for “Recharge rate”.

To Equations 2 and 3:

1/ how were they empirically found? At a first glance, “22” and “3” do not look like empirical factors to me. Provide peer-review reference(s) associated with these equations;

2/ Provide clear definition of δ_{shift} .

To Equations 4 and 5:

- 1/ P10L20. You certainly mean “Thus” and not “Though”;
- 2/ they require steady state conditions. This hypothesis must be mentioned;
- 3/ Provide definitions and unit for all terms,
- 4/ justify value for tortuosity factor;
- 5/ which value do you take for δ_{EF} ?

To Equations 6 (and not 5):

- 1/ Is z_{EF} determined with Equation 6 or 5? The problem with Equation 5 is that in order to get z_{EF} , you need δ_{EF} ;
- 2/ give values for r^1 and r^2 .

P11L7: “with the surface tension of water (α) calculated at 24°C”.

RESULTS

Keep with paste tense!

Figure 5 is described before Figure 4. In this context I do not understand what informative value contains the deuterium excess that does not contain each isotope composition individually... From the text it is also not clear.

P12L24. δ values cannot be “enriched/depleted” but are “higher/lower than”

P13L7. Where can the reader find the mentioned values in Table 3?

Soil water balance

Please use abbreviations to match with the Equations and help the reader (e.g., R , z_{EF}).

How where T and ET determined?? This comes as a surprise at this point of the manuscript...

P15L1. “mm” instead of “mm/y”.

P15L5. Did you mean “67 - 79 mm/y and 161- 201 mm/y.”?

P16L6. Remove “be” from the sentence.

P16L8-9. This is not comprehensible...

Comparison with destructive sampling

P18L22-23. Water can move from high to low water potential. Since soil water potential is negative, the sentence becomes: “In this case water from deeper soil layers with *higher* water potential can move through the root system to soil layers with *lower* water potential (Dawson et al., 1993)”.

P18L31. “Those” should refer to more than one study (i.e., Sutanto et al. 2014).

P20L16-21. This is not comprehensible...

P20L23. “Soil respired CO₂...”.

Potential, limitations and future research

P20L27-28. Can be removed.

P21L5. “Thus, ..” instead of “Hence, ...”.

P21L7. “isotope compositions of unsaturated and saturated zone waters”.

P21L8. Do you mean “site”?

P21L8. “overnight”.

P21L12. What is meant here by “absolute humidity”?

P21L23. You certainly mean “Thus” and not “Though”.

CONCLUSION

P22L2. Avoid use of “summing up”.

P23L1. I don’t understand the mention of isotopic fractionation factors all of sudden... These should not be measured with such a setup (!)

P23L6. “Additionally, the direct determination of soil water *isotope compositions*”

TABLES AND FIGURES

In general, all information presented should be carefully defined in the captions.