

***Interactive comment on* “Continual in-situ monitoring of pore water stable isotopes in the subsurface” by T. H. M. Volkmann and M. Weiler**

Anonymous Referee #2

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The manuscript HESSD 10, 13293–13331 “Continual in-situ monitoring of pore water stable isotopes in the subsurface” by T. Volkmann and M. Weiler presents a novel in-situ measurement setup for soil pore water isotope analysis based on laser spectroscopy. This system allows continuous, high-precision isotope analysis at very high temporal and also spatial resolutions and has potential to open up possibilities for significant new research into unsaturated/saturated soil water partitioning, fluxes and storage. The paper is well-structured and sound and I am pleased to recommend the manuscript for publication. Having said that I invite the authors to consider my following comments:

I fully appreciate the effort that goes into the experimental fieldwork and that outcome is produced based on subsets of a sampling campaign. However, this also comes at the expense that the results can not necessarily be generalized over longer time periods

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and or spatial scales. The authors do discuss limitations and further work but nevertheless state that the very short time period used for analysis shows the approach can be used to continuously (and unattended) measure pore water isotopes over different seasons and long time periods. The latter is slightly overstated and would require a demonstration of results obtained over several months with reference to a maintenance protocol (change of standards, cleaning of tubes, valves, etc.). My personal experience with laser spectrometers quite often showed temperature effects on the isotope analysis which can only be avoided in temperature-stable field laboratories. Also, it is encouraging that both in-situ and destructive sampling gave comparable results I am somehow unsure about what pore water was and can be sampled. It may well be that other methods such as cryogenic extraction and centrifuge experiments show different results due to the inclusion of potentially tighter bound pore water. Furthermore, the paper is very technical and could benefit from improving general readability by e.g. describing technical jargon to a wider audience and simply split long sentences. The authors could also consider shortening some parts (see examples below) or consider presenting this important piece of work as a technical note focussing on the analytical approach and technical development with an example application rather than the full paper.

Specific comments: Abstract: I think the abstract could be substantially shortened. Many of the technical aspects are not really needed at this point.

Abstract, Line 23: This is heavy jargon and a very long sentence. I suggest simplifying the expression “specific identical treatment onsite calibration approach” and split the sentence.

The sections 4.3 Assumptions and Limitations and 4.4 Outlook could be merged and shortened.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 13293, 2013.