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Interactive comment on "Isotopic approaches to quantifying root water uptake and redistribution: a review and comparison of methods" *by* Youri Rothfuss and Mathieu Javaux

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Dear Youri and Mathieu,

Thanks for the answer and thus allowing for a discussion.

"when equilibrium for soil water is reached, one evaporation line is observed, i.e., d-excess is constant across the soil profile". Having all soil water isotope data on one evaporation line does not mean that there is a constant d-excess; actually the opposite would be the case. I guess you mean that one regression line can describe the evaporation line for the entire soil profile here.

I believe that your statement that soil water plots along the evaporation line (of constant

slope) is often limited to the upper soil. In your experiment (Rothfuss et al. 2015) the observations are limited to the upper 60 cm. However, I doubt that for thicker soil profiles, the slope of the soil water isotope samples will be constant across the profile. Soil water isotopes in the subsoil often plot along the LMWL. We have shown that for a study site in Luxembourg in Figure 2 and Figure 3b in Sprenger et al. (2016). That this trend towards higher d-excess (or lc-excess) (menaing less negative) with deeper depth occurs also for other study sites and climates is shown in Figure 5 in Sprenger et al. (2016). One can see there, that the lc-excess is not constant over depth, but approaches a more stable value with depth. Under such conditions, one could group the soil water isotope data into topsoil, plotting along an evaporation line, and subsoil, plotting along the LMWL (depending on the range of precipitation input). The simulations shown in Figure 9 in Sprenger et al. (2016) support that, since there is little variation in lc-excess below ca. 50 cm. Therefore, the soil water below 50 cm will plot along the LMWL, while the topsoil that experience evaporation will be plotting along an evaporation line. I hope I could clarify what I mean and that under the above described (natural occurring) conditions, a dual isotope approach would be beneficial.

References

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

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