

Interactive comment on “Mechanisms of consistently disconnected soil water pools over (pore)space and time” by Matthias Sprenger et al.

Anonymous Referee #2

Received and published: 27 May 2019

Content: The paper examines isotopic differences in water pools across depth and time to quantify the extent of mixing. They find that tightly bound water, defined as water not sampled via suction lysimeters, differed consistently from more tightly bound water.

Contextually, the paper is a comparison of two soil water extraction methodologies, it begs the question of whether the extraction technique equals the label applied here (and by many others!), i.e. if ‘mobile’ water and ‘immobile’ water (lysimeter and cryogenically sampled water, respectively) are truly so. The authors transform the isotopic signatures using a mass-balance approach but this is ultimately based on differences between extraction techniques. Others have reported similar observations of the differences between soil water, and attributed it to the same process where small pores retain water. This derives similar conclusions from a larger dataset and expands on

C1

dynamics in time. However, it does seem to re-hash, in greater detail, the observations and conclusions drawn by Brooks 2010 and leaves the reader questioning the novelty of the results (indeed, many papers have noted consistent differences between cryogenically-extracted water and soil lysimeters).

Overall, the paper is a nice contribution to our understanding of partitioning of water in the subsurface. They refer to this as ecohydrologic separation but it seems more a function of meteorology and geology, with potential impacts on cycling of water and uptake by plants. Moreover, e.g. p9, line 5 (and elsewhere referred to) How many mm of water does this ‘tightly bound’, ‘immobile’ portion represent? What portion of the annual water budget at this field site is ‘locked’ away as suggested? Ultimately, how important is this water that doesn’t mix? The various conclusions and potential impacts highlighted in the discussion section very much depend on an implicit assumption that this ‘portion’ is somehow significant.

Grammar: There were a fair number of mistakes in grammar and punctuation. Please revise professionally for verb tense agreement and use of imperfect tense, i.e. ‘we got it or we took it’ are informal and temporally less explicit than the perfect tenses.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-143>, 2019.

C2