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Hydrology and Earth System Sciences
Discussions

Interactive comment on "A sprinkling experiment to quantify celerity-velocity differences at the hillslope scale" *by* Willem J. van Verseveld et al.

Anonymous Referee #3

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I read the paper with interest. To me it is a well-structured and written case study giving a lot of experimental and modelling details. The experimental work is analysed based on data and a conceptual model and described in terms of celerity and velocity of water flow as response to a 24h sprinkling event. The experimental set up is impressive on the hillslope, but consists of only one isotopic (deuterium) tracer in the sprinkling water (constant for 24 hr). The topic fits very well in HESS and is, in my opinion, of interest to the audience of HESS.

I have only two suggestions and one minor point to take into consideration:

1) The discussion of the paper is entirely devoted to process understanding. However, I miss a section discussing the effects of the experimental set up (mainly the use of only one tracer in time and space). For example, what would the authors advice to improve

on the experimental set up and what would be the effect of applying multiple tracers (or spatially distributed or in time (think of also adding 18O, or others tracers like salts). It is not critics on the current work, but I think with so much emphasis on the experiment, it could be worthwhile to discuss that as well. This could maybe also be linked to the conclusion you draw that the "precise mechanism of disturbance transmittance remains unclear".

2) I would suggest the authors to rethink if parts of the paper cannot be transferred to appendix or supplement material. The paper is long and that distracts somewhat. Especially the field description (3.1-3.2) but even more the long model description including CRET and mixing model description, python etc info (3.7) and could be summarised in a few lines in the main article and all other details moved to the supplement material. To me that would be helpful.

3) There are quite some typo's and sloppiness, wrong references and inconsequent numbering of headings that should be rigorously checked by the authors before resubmitting

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