

Interactive comment on “Temporal variability of subsurface stormflow formation” by P. M. Kienzler and F. Naef

P. M. Kienzler and F. Naef

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Thank you very much for your constructive comments. We have revised our manuscript "Temporal variability of subsurface stormflow formation" according to your recommendations. The specific and detailed comments were helpful for revising and improving the manuscript, and we made a strong effort to deal satisfactorily with all points raised.

This is an interesting paper on the generation of SSF, on its variation in time and how it is influenced by antecedent precipitation intensity in individual rainfall events. I recommend acceptance for HESS after the authors have addressed the comments made below, as well as the minor comments inserted in the attached .pdf version of the m/s.

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We corrected all minor comments inserted in the .pdf - version.

How does the present paper relate to the material presented in Kienzler and Naef (2007) and Retter et al. (2006).

We clarified the relation of the present paper to Kienzler and Naef (2007) in the experimental slopes section. A related study analyses the substantial spatial variation of SSF formation by intercomparison of these sites (Kienzler and Naef 2007, Figure 2). The Retter et al. (2006) paper follows different objectives. The experimental part of the study took place at one of the experimental slopes of this study (Lutertal) and soil moisture content data was shared for both studies.

Throughout the m/s use of the term runoff should always be preceded by surface (OF) or subsurface (SSF) so that the reader is no doubt about which runoff we are dealing with. Is subsurface flow always fast? (see line 19, p. 2144)

We followed your recommendation and made clearer which kind of runoff we are dealing with. We changed the introduction in a way that SSF is defined more general and in a clearer way.

What is the precise distinction between matrix flow and macropore flow? (see also line 27 on p. 2150- line 1 on p.2151)

We added a definition of pipes, macropores and matrix flow to the introduction.

Re. soil drainage, in most hydrological situations there is a certain amount of deep

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drainage (or percolation). This term is not mentioned here at all, although the authors refer to (semi) permeable layers and bedrock.

We added the water balance for each experiment to tables 1 and 2, in which estimates of deep drainage / percolation are given.

Figure 3 (RHS) needs to be relabeled and the caption adjusted. Sure, the three curves are associated with drainage but they cannot be identified as drainage. Re. Figure 3. The impact of drainage after sprinkling. 100% represents values of soil suction, soil moisture content and piezometer head when sprinkling is completed. I dont understand "soil drainage" on the ordinate. The RHS of this figure should be fixed up as follows. Replace on the ordinates "soil drainage" by "relative value" The three curves relate to drainage but dont equate soil drainage.

We followed your recommendation and changed axis title and figure caption as suggested.

Re. soil pipes: they should be better defined/described if they play a major role. How important is their spatial distribution. How does one describe their presence (and location) in the different soils considered here? Do we have to be satisfied with qualitative descriptions like "They are present"? What are their dimensions? Where are they? Can their presence be quantified? Also please explain the difference between pipes and macropores. I assume that pipes are much larger and that they are predominantly horizontal, unlike macropores which are vertical? Do preferential flow paths involving macropores as well as pipes??

We added a definition of pipes to the introduction and detailed the description of lateral flow paths that were found in this study.

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How is the distinction between shallow and deep subsurface introduced in this paper. How are the two terms defined and measured?

We changed the terms shallow and deep SSF to topsoil SSF and subsoil SSF to make more clear the specific origin of the flow.

I find Figure 5 very difficult to interpret. What precisely is its meaning?

We extended the explanation of Figure 5 and provided more details in the discussion of these results.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 2143, 2007.

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