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Discussions

Interactive comment on "HESS Opinions: Functional units: a novel framework to explore the link between spatial organization and hydrological functioning of intermediate scale catchments" *by* E. Zehe et al.

Anonymous Referee #3

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The functional units concept is relatively new, and the manuscript is well-written. The authors propose three hypotheses and experimentally testable approaches to explore the link between spatial organization and hydrological function of intermediate scale catchments. The testable hypotheses and experimental part may be the highlight of this framework. But there are still several issues I would like to mention:

Firstly, the title could easily raise lots of questions. Both 'novel' and 'framework' are big words. And indeed there are several new things in this manuscript, but they maybe not

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deserve to be called ‘novel framework’. In the title, authors mention a ‘novel framework’, but in the text they mention ‘The idea about functional landscape entities... is not new...’ (P3256, L12-13). I am confused with these descriptions. Perhaps, the authors should make the statements consistent.

Secondly, the novel ideas should be highlighted, especially the differences from HRUs (Flügel, 1996), REW (Reggiani et al., 2000), landscape-based models (Winter, 2001), FLEX-Topo models (Savenije, 2010).

Thirdly, the authors mentioned that the CAOs model framework treats only the dominant processes. However, the authors also mentioned that the lateral exchange will be considered in the CAOs, which is an important advantage over HRUs. Let’s not focus on whether the HRUs neglect the lateral connection theoretically or only in the implementation. I would like to question why the authors are so sure that the lateral flow is the dominant process which has to be considered in the CAOs model framework.

Fourthly, there are already lots of approaches to do topology classification of real catchments. Which methodes do the authors intend to apply to classify the lead topology at hillslope scale?

Some suggestions:

Firstly, the manuscript is very long for an opinion paper, therefore the highlights are hidden in the detailed context. I suggest the authors shorten the manuscript and highlight the novel ideas to make the manuscript more concise and accessible.

Secondly, the lead topology is an interesting concept. Maybe highlight it in the functional units concept, since this is relative new to my knowledge, which is different from traditional concept of topography, at least not mentioned explicitly by other models. Thirdly, highlight the failure discussion, which could be interesting for hydrological modellers.

Minor comments:

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P3251, L12: explain the term ‘superordinate lead topologies’

P3287, L13-14: Zhang and Savenije (2005) and Westhoff et al. (2007) were cited, but not in the reference list.

Fig. 4 change Riperian into Riparian.

P3269, L12-13 remove ‘(burrow systems of ants, earthworms, moles and voles as well as root systems)’. It is a repetition.

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