

Interactive comment on “Exploring the interplay between state, structure and runoff behaviour of lower mesoscale catchments” by S. P. Seibert et al.

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I think the work is potentially interesting, and within the scope of the journal. However, the paper needs to improve in terms of the presentation of the material. In addition, the paper attempts to cover a lot of ground, which requires either a better synthesis, or a selection of topics, deferring other material to a separate work. I recommend the authors to address the reviewers criticisms, which implies a major revision of the paper. In addition to the reviewers comments, I have the following suggestions.

1. One of the purposes of the paper is to introduce dimensionless indices to characterize the catchment structure and function. However, the units of most of the quantities that goes into these indices are not reported. Using common sense for the units of

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the various quantities, these indices do not appear to be dimensionless. For example see Equation 1. AC and eFC are usually dimensionless (e.g. Reynolds et al., Geoderma, 2002), whereas P, E and Q are usually in mm/time, meaning that dS^* is not dimensionless.

2. Is there a clear advantage in using scaled quantities, such as the ones proposed, over using not scaled quantities? Would it be possible to show it? Do scaled quantities lead to better fits than not scaled quantities?
3. Clarify the difference between dimensionless and normalized
4. State and structure are terms that are usually applied in the context of models. Here the authors apply these terms in the context of catchments, i.e. of natural systems. The meaning of this terms needs to be clarified at the beginning of the paper.
5. The objectives are a key part of the paper. I think they are not very clear. What does “feasible” mean in objective 1? Please elaborate and clarify objective 2. Objective 3 would benefit from a clarification of the terminology, e.g. why catchment structure does not include ecology. Results and conclusions should demonstrate how the objectives are reached (i.e. not leave it to the reader to find out).
6. The paper talks about “model based estimates of evapotranspiration” without explaining how these estimates are obtained (some details are given, but much later in the paper). Restructure to clarify and motivate this choice.
7. The catchments are classified based on physiography, but the conclusions say nothing about insights on catchment behaviour. Which catchment characteristics control hydrologic response at that scale?
8. Can some of the tables be converted to figures?

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