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Hydrology and Earth System Sciences Discussions

Interactive comment on "Multi-criteria assessment of the Representative Elementary Watershed approach on the Donga catchment (Benin) using a downward approach of model complexity" *by* N. Varado et al.

Anonymous Referee #5

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We've all seen this situation where, on project launch, the project leader requests his/her collaborator to "model" hydrological response in the study catchment. This is not a straightforward task and after numerous iterations of correcting for data problems, adjusting modelling assumptions and much "learning on the job" there are - finally - simulation runs one is reasonably happy with. When it comes to writing up the material there is a dilemma. What was the science question? A paper needs a science question to be publishable. The crux is that there never was one as the idea was simply to check data consistency and to produce simulations. And making ends meet once the work is done seems impossible.

Reading this paper reminded me of this project situation. I can fully understand the author perspective. Simulating runoff is clearly a useful exercise, and proper split sample testing and evaluation of model efficiencies is the way this is usually done. Looking at internal data is even better. From a reader perspective, however, one wonders what can be learned from this paper. My main take away message in reading this manuscript was that the particular model should not be used in this type of hydrological setting because of its inability to represent perched aquifers. So?

I would recommend that the authors refocus the objectives of the paper. There are a number of possibilities and only one of them should be adopted.

- Focus on the hydrogeology of the catchment. In this case the idea would be to convey an understanding of the system. The introduction and discussion would have to deal with what other authors have found on this or similar systems and simulation efficiency measures could be left out as they do not contribute to an understanding of how the system works.

- Focus on the model. In this case one would have to illustrate how the model works as compared to other models and other systems. I suspect that dozens of other models would provide very similar fits so the added value could be to focus on the specifics of the model. What would be of interest are results of the dynamics of momentum (Eq 1) and in what they differ from mass flux dynamics.

- Focus on the multi-criteria approach. In this case the assessment strategy would have to be made more explicit. The introduction and discussion would have to relate the proposed strategy to existing ones. In each of the cases, title and structure of the paper would have to be adjusted to the changed focus.

There are also a number of minor problems in the presentation, e.g., use of "decadal" does not sound correct and the English should be streamlined.

My recommendation on this paper is to sharpen its focus on a single issue to bring

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across a message that is of value to the readership. This requires a re-write and the revised manuscript should be re-reviewed.

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