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Interactive comment on “Hortonian overland flow closure relations in the Representative Elementary Watershed Framework evaluated with observations” by E. Vannametee et al.

Anonymous Referee #4

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This paper is a follow-on from Vannametee et al (2012). In reality it is no more than an application of the ideas presented in the earlier paper. It simply applies the ideas presented there to a specific watershed. In that sense, it provides no conceptual advance, but merely purports to tell us if the methodology proposed in the earlier paper works. The main problem with the paper is that the answer to the question "Does the methodology work?" has to be yes, since it is constrained to be so. If you calibrate a model against a dataset for the same catchment you would be quite unlucky if it did not work reasonably well (that said the Nash-Sutcliffe statistics are not that impressive!). Any model that is calibrated is no longer a physically based one, since by calibrating you have, in effect, thrown the physics out of the window. So, philosophically, the paper

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is unsound. However, these authors are not alone in this practice, and it may be unfair to castigate them for a widespread philosophical failing.

More specifically, however, I think the paper skips over very important issues that need to be addressed, even if the philosophical weaknesses are overlooked. Fundamentally, the paper is about Hortonian runoff, yet there are no data from the watershed to back up the assertion that Hortonian runoff actually occurs. K_s values, which are critical to the modelling, are obtained from Rawls et al but there is no attempt to validate these values for the particular watershed. At the very least a table of the calibrated K_s values that are used in the modelling to compare with the ones taken from Rawls et al must be provided, so that the reader can judge just how physically reasonable the values that yield acceptable model output are. Sensitivity analysis of the model output is missing.

Overall, the paper asks the reader to take too much on trust. Maybe the model does do as well as the authors claim, but I would like to be able to judge this for myself rather than rely simply on the output statistics.

Interactive comment on *Hydrol. Earth Syst. Sci. Discuss.*, 10, 1769, 2013.

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