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Hydrology and Earth System Sciences Discussions

Interactive comment on "A framework to assess the realism of model structures using hydrological signatures" *by* T. Euser et al.

Anonymous Referee #1

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This paper proposes a graphical method for comparing different rainfall-runoff model structures in their capability of reproducing hydrograph signatures. The graphical method allows to compare the performance of the model (i.e., how well are the signatures simulated?) and its consistency (i.e., are all signatures comparably simulated?). The problem of selecting the right model structure, which represents the dominant processes occurring in the catchment, is a very relevant one in the hydrologic debate now. I really liked the idea of working with many hydrologic signatures together and of checking for both performance and consistency. For the moment, the authors propose a visual method rather than a quantitative, and therefore repeatable, one. This is a drawback of the methodology, even though it is acceptable. The main problem that I have is that the method is based on Principal Component Analysis (PCA) and is

not described in the paper. It is hard for the non-experienced reader to interpret, and reproduce, Figs. 8-12, which are the core of this paper, if the PCA method is not described. This could be done in section 2.2 where now only references to the literature are listed. For the rest, I really enjoyed reading this paper, which is well written and provides ideas (and this is what I search in scientific papers). Therefore I am supportive for its publication in HESS after the method is described clearly.

MINOR COMMENTS:

Page 12996, line 15: the assumption of normality of the inputs for PCA is discussed, but this is meaningless if PCA is not explained before.

Page 13006, line 18: if I remember well, Schaefli and Gupta (2007) suggest not to use Nash-Sutcliffe as is, when comparing different catchments.

Page 13008, line 19: because the catchment is small, homogeneous and the climate is very humid/wet.

Page 13012, line 6: please define "validity".

Page 13035, fig. 11: Which catchment is it?

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