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Hydrology and Earth System Sciences Discussions



# *Interactive comment on* "Mapping model behaviour using Self-Organizing Maps" *by* M. Herbst et al.

**Anonymous Referee #4**

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Herbst et al. have submitted a very interesting and well-written paper on using self-organizing maps for model evaluation. This is a follow-up on a previous paper, where they showed that using self organizing maps to classify modeled streamflow time series can provide useful insights into model behaviour. In this present study they take their approach much further, and, instead of using a SOM to analyze modelled streamflow time series, they use a SOM to analyze diagnostic signatures of model behaviour. This new approach provides both a novel way to relate diagnostic signatures to model parameters, but also provides a way to identify model parameter sets that simultaneously meet several objectives (and is hence an advance in multi-criteria model calibration). I recommend that the paper should be published with minor revisions.

1. It may be interesting to add an extra figure that shows the relationship between different objective functions. It seems as if there is a trade-off between high flow and low flow objective functions, but it would be nice to see this relationship in more detail.

2. It would be interesting to include more information on the comparison with a standard objective function (e.g., RMSE). There is "room" in Figures 1, 2, and 6 to include an additional plot that shows the sum of squared errors.

3. It would be interesting to have more information on the comparison with SCE-UA. Can the authors include the SCE results in Figure 9?

4. I'd like the authors to make a "bigger deal" of the fact that they can provide "better" simulations of the %BiasFLV metric when they use a SOM to evaluate diagnosic signatures, than when they use a SOM to evaluate modeled discharge time series.

5. Include reference to the Reusser et al. SOM paper (HESS, 2009) as well as the Abromovich et al. SOM paper (J. Climate, 2008).

6. A trivial comment, but suggest re-wording the first sentence of the abstract to something like "...model evaluation and identification essentially involves extracting and processing information from model time series." (or something similar). The first sentence of the abstact is a tad on the weak side.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 3517, 2008.



**HESSD**

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Interactive Comment