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Hydrology and Earth System Sciences Discussions

Interactive comment on "Robust multi-objective calibration strategies – chances for improving flood forecasting" *by* T. Krauße et al.

Anonymous Referee #1

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This paper presents a multiobjetive evolutionary algorithm for improved flood forecasting. This method combines the strenghts of evolutionary search and data depth measures to efficiently find a Pareto distribution set. This set is subsequently used to derive estimates of predictive uncertainty.

I enjoyed reading this paper. The manuscript is well written, and considers an imporant topic in hydrologic modeling. Despite this I have a few comments that I believe need to be addressed before publication is warranted.

1. The authors present another search algorithm to solve multiple objective problems. In the literature there is already many of such algorithms. Why would this algorithm be better than the existing state-of-the art? The authors do not show this in the paper.

This is crucial to warrant publication.

2. Multimethod seach has been done before, but not with data depths. For this paper to be acceptable the authors need to show that their approach is superior. If they cannot show this, then what is the purpose of the work. Yet, another algorithm that can do the job.

3. The synthetic case studies are very simple. Very low dimensionality of the parameter space. This does not inspire confidence that the method also works in the presence of 10 + parameters. I suggest to include a few case studies with at least 30 parameters. Many of them are available in the literature!! Thus, high-dimensionality needs to be confronted. The case studies are too simple.

4. The authors elude to the AMALGAM approach of Vrugt et al., and this methodology (published in 2007) has very similar ideas as adopted herein. The authors should much better reflect this.

5. It would be necessary to include the AMALGAM results for the same studies. My experience suggests that the results of the new code will not outperform existing methods such as AMALGAM. Thus, why develop all this stuff if the codes are already available and better?

6. The only novel element of this work is the data depth approach integrated into multiobjective algorithms. This is the main thrust of the paper. Not the algorithm.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 3693, 2011.