



Interactive comment on “Robust multi-objective calibration strategies – chances for improving flood forecasting” by T. Krauß et al.

Anonymous Referee #2

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This manuscript introduces the combination of multi-objective (MO) calibration with depth sampling in the parameter space. A newly introduced MO calibration method is presented and tested with two synthetic examples. The combined approach is tested with a case study applying WaSiM-ETH to the Riedholz catchment.

I agree in many points with the first reviewer. The manuscript is well written and clear. The idea to combine advantages from MO-calibration and depth sampling sounds interesting and should be further tested. However, there are a number of issues that need to be addressed before publication. My major concern is that the manuscript is a mixture of two topics that should be addressed separately and each one in more depth.

The first topic is the introduction of the new multi-objective calibration algorithm MO-

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PSO-GA. In agreement with the first reviewer, I suggest to test the new algorithm in more depth with other test cases (more parameters, rougher response surface) and to compare it to the performance of more recent MO-algorithms (e.g. AMALGAM).

The second topic is the combination of MO-calibration with depth sampling in the parameter space. This topic should be presented independent of MO-PSO-GA, since this combined approach can be used independent of the way the Pareto front is determined. Also, I recommend that the authors design synthetic test examples also for this topic where they demonstrate the clear advantage of the new approach for improved validation results in addition to the real-world case study. From the results presented I got the impression that the main effect of depth sampling is to exclude the outer margins of the Pareto front.

There is one point in the method that I am a bit puzzled and that should be thoroughly discussed by the authors: I do not understand why a large effort should be spent to sample the entire Pareto front (one of the problems to be addressed with MO-algorithms) and in the next step to reduce the set to the center part of the front.

Finally, the case study suffers from a problem, that unfortunately is very common in hydrology. The authors take an existing model, which they are aware of that it is not well suited (as presented in the discussion p. 3715, l. 1-5) and make a large effort (high performance computations required to produce the results) to find a valid parameter set. It is not clear, why not more effort goes into finding a better description/model for the catchment?

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