

Interactive comment on “A Multi-Objective Ensemble Approach to Hydrological Modelling in the UK: An Application to Historic Drought Reconstruction” by K. A. Smith et al.

Anonymous Referee #1

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General Comments

This manuscript is a thorough evaluation and description of a new modeled dataset reconstructing historical flows in the UK. The authors do a good job outlining both the utility and limitations of the dataset they have created. This article makes very good use of graphics to convey complex information about a large number of data points; I especially like Figure 2. Overall, this is a high-quality paper, with just a few areas that require clarification (see "Specific Comments") or technical corrections (see below).

Specific Comments

Lines 358-360: The statement about selecting a “best” simulation rather than extracting

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a mean or median from the ensemble appears to be a very strong statement based only on some qualitative examples. The authors could just say that selecting a “best” simulation is SOMETIMES more accurate than using an ensemble mean. Otherwise, if the authors wish to back up their statement, I think they would need to do a more thorough analysis comparing both LHS1 and the ensemble means (or medians) to the observations.

Lines 477-479: I don’t quite follow the meaning of the sentence “They concluded that . . . eliminate the influence of different PET inputs on runoff simulation.” Does this mean that PET is not an important variable in predicting runoff? Does it mean that the hydrologic models have low sensitivity to small errors in PET? Please clarify.

Technical Corrections

Lines 70-73: These sentences are a little confusing, because it is unclear whether you mean the same thing by “hydrological models” and “rainfall-runoff models.” Are you saying that your methods are different from those used by Caillouet et al (2017) in France, or that Caillouet et al (2017) is a rare example of the type of analysis you have done for the UK?

Lines 75-6: “They can be used . . . prior to observational network” is an incomplete sentence. Please revise.

Line 125: It is not necessary to state that the catchments are shown in Figure 1, as this was already stated on line 123.

Line 193: Please also define “LHS500” in the methods section before using it here. At present, it is not defined until line 212.

Line 225: Please provide more information about what the Tweedie distribution is.

Line 323: Add an apostrophe at the end of “models.”

Line 518: Change “catchments” to “catchment’s”

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Line 523: Change “This contributions” to “The contributions”

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