

Interactive comment on “Conditioning rainfall-runoff model parameters for ungauged catchments and land management impacts analysis” by N. Bulygina et al.

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This paper presents a great next step towards a fully Bayesian approach to PUB. It builds nicely on previous work that has been published and is cited here. Below are a few comments to further put the paper in context and to potentially strengthen some points made by the authors.

[1] One thing that you could be utilized a bit more are the experiences with regionalized or conditioned parameters of the model you are using from others: [1] Zhang et al. (2008, WRR) show to which constraints the model parameters are sensitive (their Figure 6). Your figure 5 shows exactly where BFIHost as a constrained fits in. Both

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together might provide insight into how many constraints are needed! Both papers use the same hydrological models and both have the UK as a study region which makes the comparison very straightforward. [2] Parameter k_f (or k_q in our case) is the one parameter next to α that often regionalizes well (see results of Lamb 1999, WRR and Wagener and Wheeler, 2006, JoH). Some further discussion on which parameters could be derived how would be good. [2] Why is b always the most difficult parameter? This is the one parameter in PDM type models that seems to be most tricky. How could we solve this issue? [3] What are the computational demands to derive a generic Bayesian framework and what are potential future bottlenecks that have to be overcome to extend this approach further? [4] The referencing needs checking!

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