

Interactive comment on “A strategy for “constraint-based” parameter specification for environmental models” by S. Gharari et al.

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The article presents a methodology to improve the identification of hydrological model parameters by introducing constraints on parameters and model state variables, based on physical reasoning and expert knowledge on processes on the catchment. The article is clear and well-written. It should be of interest for the readership of the journal. I have no corrections to suggest on its content (except two typo mistakes page 14864, lines 7 and 22).

However, I think the authors should find a way to gather this article with the other article they simultaneously submitted to HESS on the same topic, since this technical note lacks an application of the proposed methodology and the

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other article lacks a presentation of the general methodology. If merging the two articles into a single one yields a too long article, the authors could consider publishing them as companion papers. The first part, primarily based on this technical note, could present the general methodology and a case study illustration using one of the simple models applied in the other article. The second part could present a more general application of the approach to discuss the issue of model complexity, using the three $FLEX^A$, $FLEX^B$ and $FLEX^C$ models and a larger number of catchments, as suggested in my review of the other article. This could provide a more comprehensive presentation of the proposed approach. For this reason, I suggest publication after major revision.

We would like to thank the anonymous reviewer 2 for his/her valuable comments on this technical note. As we mentioned in our reply to Dr. Gong, we believe these two papers are worthy of being presented separately. We will enrich the technical note by adding more discussion on the value of expert knowledge and physical reasoning in hydrological modelling as well as the importance of formulating them with use of constraints. We will bring a synthetic case study as well as a simple hydrological application of imposing constraints on parameter value.

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