

Interactive comment on “HESS Opinions: Advocating process modeling and de-emphasizing parameter estimation” by A. Bahremand

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The abstract of this opinion paper is promising, stating that the paper comments and expands on some recent papers on the question of how to reduce the importance of parameter estimation in hydrologic prediction in favor of more physics-based modelling approaches.

While reading the paper I however got the feeling that it does not offer well-organized new insights or viewpoints. The paper strongly argues in favor of the use of expert knowledge and of parameter “allocation” instead of parameter calibration without explicitly stating neither where the term allocation comes from, nor what it actually means and how the uncertainty of resulting predictions could be assessed.

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I agree of course that hydrological modeling used to have, in the past, a very strong focus on parameter identification but the paper does not acknowledge that hydrological modelling has gone a very long way since then. As Alberto Montanari states it in his review, the paper does not seem to acknowledge that most current modeling studies adopt already an intermediate approach between the two extremes of no calibration and blind optimization.

What the author calls parameter allocation indeed plays a certain role in hydrological modeling; and it might well be something that experienced modellers do in any modeling study but that lacks some up-to-date discussion. Accordingly, in my view, the paper might become a valuable opinion paper if it is articulated around the question of what role might play expert-knowledge based parameter allocation, what makes it different from parameter calibration and how it completes it, why parameter allocation is useful for hydrologic prediction and for model coupling, what is the outcome of parameter allocation (a single model? transferable in space?), how would a typical parameter allocation procedure look like, what examples support it, what further work is needed to improve it. Such a paper could aim at giving guidance to beginners (see p. 12387), which would indeed be quite useful and draw on the numerous examples from the experience of the authors.

Detailed comments:

- Many recent papers are cited without mentioning what these papers actually propose or what the findings are (e.g. p. 12380, what is shown nicely by Gharari et al, 2014? What does the work of Bergstrom and the paper of Beven and Semenov (line 17) suggest? - The paper makes many statements without references (e.g. p. 12380 “It seems, in fact, that it may often be possible to arrive at parameter values through (...)”)
- P. 12388: what do you mean by “the equifinality should be dealt with from different angles to serve use to reach a better model”? - What do you mean by equimodellity? Why would a single fulfilling model be useful (conclusion section)? What do you mean by fulfilling here? - I fully agree with Alberto Montanari that automatic calibration is

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indeed very useful for model diagnostic and more importantly, that automatic calibration and uncertainty estimation is an essential ingredient for hydrologic prediction; I strongly recommend revising the wording with this respect

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