

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

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The author's interactive comment on Prof. Zeinivand's short comment:

I would like to thank Prof. Zeinivand for expressing his appreciation for the opinion. I agree with his valuable comment. In particular, his comment about distributed parameters and their calibration allows me to add a short discussion here in support of one of the main points of my paper. In the opinion paper, while talking about my experience with the WetSpa model, I have tried to say that after gaining some valuable understanding about the model processes and how parameters represent catchment characteristics and their relevance to the model behavior I could ease the calibration to such extent that I started to believe that the model needs no parameter calibration

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but parameter allocation. By saying so, I do not mean that hydrological models are free from calibration. I only mean such parameter calibration: is limited, is narrowed, and it is a logic-based specification.

As Prof. Zeinivand mentioned in his comment "usually physics and process based models are also distributed, therefore, we deal with some spatially distributed parameters". When we talk about calibration of such distributed parameters, it often means adjusting the entire parameter map by a correction value uniformly. So, we keep the spatial gradient of the parameter as it is, and we just adjust the magnitude of the parameter for all cells to some extent. This is also a kind of limited calibration, something similar to what the opinion paper has argued where mentioning about constraints and relational rules for parameter calibration. In my opinion, in fact, as for models, becoming "distributed" is already a very significant improvement in constraining their calibration procedure. So, the distributed modelling can also be interpreted a whitebox-like effort to limit calibration.

The author of this comment has also asked me to discuss the advantages of automatic optimization in the paper (as Prof. Montanari and Prof. Schaepli already suggested). I will surely do this in the final version in response to the reviewers corrections. Here, I should mention that so far I have received comments from three referees (Prof. Beven, Prof. Montanari and Prof. Schaepli), I agree with their very valuable comments and suggestions, and I am going to address them all in replies to the referees and in a formal letter to the editor at the end of the discussion period.

Again, I thank Prof. Zeinivand for appreciating the opinion and commenting on it.

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