

## ***Interactive comment on “HESS Opinions “Topography driven conceptual modelling (FLEX-Topo)”” by H. H. G. Savenije***

**Anonymous Referee #1**

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I like the ideas presented in this paper. I also like the enthusiastic style: I think that an Opinion Paper should bear a very personal mark from its author and be really "thought-provoking".

But I consider that, in the present paper, the answers to three fundamental questions are lacking. I don't want to suggest that they are missing in the author's mind... but it is something so important (and at the same time so unpleasant) that they really need to be publicly stated and answered:

1. How will you test your ideas?

Which datasets (hopefully as varied as possible) are you going to use to confront your

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hypotheses with measurement? Which (quantitative) criteria are you going to use? Which reference models are you going to use? All this must be defined beforehand.

2. How do you plan to organize your work in order to create as many possibilities of refutation (falsification) as possible?

I like to cite Konrad Lorenz (1973) who wrote that "most of us are in love with our hypotheses. It is a painful exercise (but one that keep you young and alert) to throw overboard every morning one of your favourite hypotheses". On this topic one could of course also cite Karl Popper (1985), who insists on the fact that it is often possible to escape refutation, but that it is essential to refine our theories so that it can be refuted.

3. Will you be able to revisit your hypotheses and simplify them if needed?

Even if they look relatively simple, your hypotheses may end up not being sustained by experiment. You may have at some point to simplify them, to reformulate them: this is an unpleasant process, one that many scientists are reluctant to engage in, because they consider it as a kind of "regression". On that topic, I like to cite two authors (who said things much better than I could do it myself): Bergström (1991) wrote that "going from complex to simpler model structures requires an open mind, because it is frustrating to have to abandon seemingly elegant concepts and theories. It is normally much more stimulating, from an academic point of view, to show significant improvement of the model performance by increasing complexity". Martin (1996) expressed the same opinion writing that "the prediction obtained with a complex model often points to a simpler model which could have been used in the first place. The challenge here is for the designer who has failed to keep his model simple to recognize the fact when confronted with it."

Your working programme is smart and ambitious: the real challenge is to define the "crash test" (Andréassian et al., 2009) that will be the best adapted to it, and also to keep the door open to reformulate and to simplify your hypotheses if testing does not bring the expected outcome.

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## References

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