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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Reducing uncertainty bounds of two-dimensional hydrodynamic model output by constraining model roughness" *by* Punit Kumar Bhola et al.

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This paper describes a case study of constraining the model roughness parameter as a means to reduce the overall uncertainty in 2D inundation models.

In general, the paper is well written and, as so many papers around this topic that now start to become quite dated, is an interesting read and debates a very important topic: quite straightforward uncertainty reduction methods are available and should be used and applied much more in practice. Although, this argument was made a lot quite some years ago, I kind of welcome this paper, as it refreshes this important point.

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Discussion paper

Here are some points that I feel need to be addressed before publication:

In my mind Keith Beven and Florian Pappenberger wrote two of the best papers on this topic, both in 2006 so 13 (or more) years ago, namely: Beven: https://www.sciencedirect.com/science/article/pii/S002216940500332X Pappenberger: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2005WR004820

While the latter is cited by the authors, the former is not I believe and I think it should because I think it would be very useful in this presented study if the authors put their work in context of those two papers and build a justification around them to state why their presented case study is needed and what makes it different to existing literature, which, although now dated, is substantially large, especially the the 10 years 1998-2009.

Without such a "putting in context", this paper only really refreshes this very well known problem. It is my opinion, that with such a justification, the paper could be published subject to "minor/moderate" revisions but without it, I think it is unclear what new message is presented here.

Also, the authors need to clarify why they did not consider other sources of uncertainty in their model, such as discharge or downstream boundary condition or indeed topography? Why only roughness? Also, they should explain why they decided to do 1000 simulations and how this number was decided?

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