

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
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Comment on nhess-2022-33

Anonymous Referee #1

Referee comment on "Brief communication: Impact forecasting could substantially improve the emergency management of deadly floods: case study July 2021 floods in Germany" by Heiko Apel et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-33-RC1>, 2022

This incorporation of a hydraulic model into flood forecasting promises to be useful.

Since you don't have riverbed data, you assume that the mean river surface is the bed. You state that this is an acceptable assumption because the flooding river is much deeper than the river under normal conditions. Please conduct a sensitivity analysis to quantify this: under what situations can this approximation be made, and what is the error it introduces? You can run your simulation with a range of river bed depths assumed to quantify this as a sensitivity analysis.

You show results of your model run, but not a validation. Do you have the capability to conduct a validation of any sort for the RIM2D simulations? This validation can be from a historic event; it does not have to be for the event discussed in the paper. Nonetheless, some validation is required in order to show that the model is producing realistic results.

In addition to a validation, you should investigate what the sensitivity of the result is to grid size, or show that the results are independent of grid size.

It would also be good to carry out a sensitivity analysis to Mannings n values chosen. This is because the $n=0.05$ use for forests seems a bit small. Arcement & Schneider (1984) and Petryk & Bosmajian (1975) show n values between 0.1 and 0.2 for flooded forests.

You use a threshold value for human instability. There are many values published in the literature, also as a function of many different parameters (depth, depth-speed product, depth-speed² product). You should do a sensitivity analysis to this.

In addition to human instability, why not also look at vehicle instability? A good summary of the results in this field is given by Martinez-Gomariz et al. (2016). Another useful thing to assess would be building collapse. For example Jansen et al. (2020). As with human instability, the literature includes a wide range of results, so a sensitivity analysis would be needed, but it would strengthen the utility of this paper.