Geoscientific
Model Development
Discussions

Interactive comment on "Model cascade from meteorological drivers to river flood hazard: flood-cascade v1.0" *by* Peter Uhe et al.

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Thank you for taking the time to go through our manuscript in detail and for your very positive review. We will respond to your specific comments below:

Specific comments

The justification of this approach is to improve on climate change assessments that use precipitation or river flow as a proxy to flood hazard. The authors should make it clear throughout the abstract and introduction that the model cascade they have designed could be used for this application (or indeed has been designed for this application) but this step isn't included in the current manuscript.

Thank you, we will make this clearer in the revised manuscript.

Line 19: I would argue the impact of floods is largely driven by the vulnerability of the population and infrastructure in the locations that they hit rather than the catchment characteristics (see the literature on "no natural disasters"). Climate change assessments (sometimes) take this into account by including projections of increased population etc. This model cascade does not go as far as to model impacts in this sense (ending at flood inundation/hazard) and I think this should be explicitly acknowledged in the text which does stray into discussing impacts in several places. You should check your terminology throughout the manuscript.

Yes, this sentence should be referring to flood hazard rather than impacts. We will correct this (here and elsewhere) and add expanded discussion regarding impacts being a consequence of combining hazards, exposure and vulnerability.

Also can you justify in the text why you haven't included impact modelling into the cascade?

Yes. Our idea with producing the schematic in Fig. 1 was to show that from the hazards that we calculate, there are many possible impacts – e.g., to infrastructure, transport, agriculture, peoples lives/health. Because of the different ways of quantifying these impacts, we would argue that presenting the hazards, and making them available for use in other impacts models can increase the applicability of the results from this approach, rather than quantifying a single type of impact in this framework.

Whilst I think the following suggestion would increase the impact of the manuscript, I do not consider it an essential pre-requisite to publication as the model cascade is already well described and documented. As a model description paper to enable others to set up a similar approach (and for general appreciation of the significant undertaking this type of model cascade is to set up) I would like to see as assessment/table (which could be descriptive) of how important each step is in the model chain; how much time does it take, is the required data easily available, what assumptions have been made to make the step possible, and does including it as an explicit modelled step in the

cascade notably improve the end result/reduce uncertainity. Although I note a future paper using climate projections is planned, perhaps you could consider a comparison of your results against just using the precipitation or river flow as a proxy within this future work to demonstrate the benefit of using a full model cascade.

Thank you for this suggestion. We will produce a summary table to go into the conclusions. As you suggest due to the complexities of the modelling, this table will need to describe a couple of key points about each step rather than being a comprehensive evaluation.

Technical corrections

Thank you for providing these corrections, which will help us polish this article and improve the final version. We will address these points in detail when we are revising the manuscript.

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2020-280, 2020.