

Interactive comment on “Residential flood loss estimated from Bayesian multilevel models” by Guilherme S. Mohor et al.

Anonymous Referee #2

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This paper describes the development of a Bayesian multilevel model for flood damage estimation. These two step models first group observations by event, flood type or region and then build separate models. The study showed that grouping by flood type is most useful for developing transferable flood damage models. The study seems to be carried out well and the writing is generally good. I therefore just have some minor suggestions for improvements:

• One of the main conclusions seems to be that when developing transferable flood damage models it works best to select models by flood type rather than by event or region. This observation is very interesting but this is based on a dataset of just German data. I can imagine that in a more international setting the regional difference might become more important than the flood type differences. I think this needs to be

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emphasized in the conclusions and I think the paper should therefore more promote the method than the finding (which I expect to be specific to this dataset of a relatively homogenous region).

• Can you maybe explain better why you go for a multilevel approach rather than just adding variables like flood type, region and event to the dataset? You can then use variable importance to see how much these variables add. In other words can you clarify the added value of this approach better compared to this obvious/simpler alternative approach?

• In the first sentence of the abstract you note that preparedness is typically ignored. I agree with this statement but its not really what this paper is about and by adding it to the first sentence of the abstract you confuse the reader. So I advice moving this statement.

• Maybe also mention synthetic models in the introduction.

• Line 26: The introduction frames that having a lot of detailed information automatically leads to overfitting and reasons that you therefore need multi-level models. This is not necessarily true, overfitting can be controlled in almost all data-driven methods so its possible to produce more general models with detailed data. Multi-level models are just another way of doing this not the only way.

• The explanation in 2.2.1 and 2.2.2 is a bit difficult to follow. Could you try improve the explanation, maybe using a figure.

• I think the title of 2.2.2 should be more like model tuning rather than model comparison, because you really use the same model but with different settings.

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