Natural Hazards and Earth System Sciences Discussions

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Comment on nhess-2021-27

Anonymous Referee #2

Referee comment on "Compound inland flood events: different pathways, different impacts and different coping options" by Annegret H. Thieken et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-27-RC2, 2021

This is a simple but useful article that is using historical flood loss data to compare flood types. It presents observations such as that dike breaches typically have longer flood durations or that flash floods typically have higher flow velocities. Many of the conclusions are obvious but its good to have data that confirms these intuitions. I'm not aware of another study doing the same and I think no other dataset would be more suitable for such a study. The article is very well written but I do have some minor comments.

- Are the samples independent enough to draw generalizable conclusions? Could some of the conclusions not be statistical significant because of a high spatial correlation between the samples? For example, you only have 128 flash flood samples but over how many different locations (e.g. villages) are they really collected? Some of the variables you look into could be highly spatial correlated (e.g. the same for the whole village or even the entire flood event). The most extreme example is table 5 which is somewhat correlated throughout the event (e.g. media coverage, quality weather forecast, etc.). So arguable the sample size for table 5 is just 1? I think this drawback of the study should be highlighted more throughout the results and discussion section so that the readers know which conclusions can be generalized to other areas/countries and which conclusions could be just a local coincidence.

- The definition of flash flood is a bit subjective in this paper and the conclusions will be very sensitive for this classification. It seems like some circular reasoning could be

occurring. That is you seemed to have used some flood intensity information from the household surveys to label observations a flash flood and then you seem to have concluded that flash floods are typically more intense in the same survey data. Is this observation correct or did you merely validate your flash flood classification with the household survey? Could you discuss the potential consequences of your labelling technique on conclusions of the paper? Furthermore, I wonder whether there isn't a more objective way of classifying flash floods. Maybe extreme rainfall in a terrain that isn't flat? Have you done some literature review on this?

- The use of the term "compound flood event" is causing confusion. From just reading the title most readers would assume this is about the coincidence of coastal and fluvial flooding. This makes the paper title somewhat misleading and also confusing because the link to the rest of the title is then no longer clear. The abstract adds to this confusion as the term compound flooding is introduced in an unexpected context. The start of section 2 clarifies everything very well and I understand why the term is appropriate but I still recommend either explaining the unconventional use of the term compound flood event early in the abstract or using different terminology (e.g. why not use the word flood type in the title).

- Section 3 doesn't explain the approach at a high level. This approach is quite simple so you can keep it short.