

Interactive comment on “A GIS-based multivariate approach to identify flood damage affecting factors” by Barbara Blumenthal et al.

Anonymous Referee #2

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The paper introduces a GIS-based multivariate approach 'to identify flood damage factors'. It uses two Swedish cities as case-study locations, concluding that the topographic wetness index (TWI) is the main variable explaining the number and amount of insurance damage for the specific case-study.

The study is essentially a very simple sensitivity analysis, on a specific case-study. In my opinion, the paper doesn't introduce any substantial contribution to the field to be published in a highly-regarded journal such as NHESS. There is some value in the particular damage dataset used. However, the analysis method is very simplistic (at undergraduate thesis level) and all the major literature on the topic of flood damage is ignored, for instance, the work by Heidi Kreibich's research group (many papers in the same journal).

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There is a substantial lack of critical discussion on the obtained results; it is also not clear what a reader should take away from the study and what is the usefulness of the study. The main conclusion is that 'Future studies on this topic should consider implementing TWI as a potential measure in urban flood risk analyses'. However, it is very well-known that the use of TWI has several limitations and that probabilistic flood risk models would require much more advanced proxies, methods and tools (hydrological + hydraulic models; exposure information, damage functions; etc.).

Some specific comments:

- 1) How do the authors discriminate rainfall-induced insurance damage from generic flood insurance damage? I am not convinced that insurance policy/claims have this level of detail.
- 2) 'The explicit flood risk of a home or estate does not matter for the price of an insurance policy': what do the authors mean here? This concept doesn't seem to make sense. If there is no link between insurance policy (and claims) and flood risk, why then this study is needed, considering that TWI could be seen as a very (very!) rough proxy for flood risk?
- 3) What is the number of insurance damage? Just the number of assets/claims? I am also not convinced by the specific normalization performed in the study. The common flood risk models simply consider loss ratios (repair vs replacement) as the main 'output' variable to be correlated with some local intensity proxy (water depth/velocity, etc).
- 4) Is TWI the same of the SWI? Why do the authors use two different definitions?
- 5) Rainfall intensity is not part of the PCA performed by the authors simply because 'no rain statistics are available at parish scale'. This is not a good justification as the physics of a given phenomenon should always come first, independently of the available data.

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6) It is very surprising that other variables than TWI play such a minor role in explaining flood damage. Some critical discussion on this aspect would have been beneficial.

7) Very poor-quality figures; lots of typos and unclear sentences throughout the manuscript.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2018-286>, 2018.