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Comment on nhess-2021-368

Anonymous Referee #1

Referee comment on "The Emergency Accessibility Analysis based on Traffic Big Data and Flood Scenario Simulation in the context of Shanghai Hotel industry" by Qian Yao et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-368-RC1, 2022

This article proposes a methodological approach to assess how flooding can affect the accessibility of rescue services to hotels. The approach is then applied to the city centre of Shanghai, China. The topic of emergency accessibility analysis in urban areas following natural hazards is certainly a relevant one. However, I do not think that this article provides a meaningful scientific contribution to the field, as detailed below. My recommendation is that this article is not accepted for publication in NHESS.

In short, the proposed methodology is based on obtaining travel paths, and respective distances and durations, from each fire station to each hotel in a city, using a web service such as Google Maps (in this case, Gaode Map). The variables of interest are collected for different times of the day to reflect different traffic conditions. A 100-year flood extent map is then overlapped on the road network, and affected roads are marked as impassable. The web service is queried again to find alternative routes from the fire stations to the hotels, and the results between normal and flood conditions are compared. The article does not actually propose a new model or method, instead relying on results obtained from a web service whose underlying models and assumptions are not adequately described.

A core issue with the approach is that the post-event estimation of travel distances and durations for rescue services to reach hotels does not actually take into consideration the post-event traffic conditions in the city. This would require a traffic model to estimate how overall traffic would change during and/or after a flood event in a given city, which is a more complex problem - and arguably a more interesting one from a scientific viewpoint. Simply relying on real-time traffic and calculating routes that avoid certain roads assumed to be blocked by a flood is not a reliable approach, as overall traffic conditions in the flood situation - which will naturally influence the arrival time of rescue services - are not captured.

Adding to this, the case study itself is quite narrow in scope, and of very limited practical use. A large number of hotels exist in the city centre and are included in the analysis. Out of these, directly affected hotels are few, and they are considered inaccessible (note that this has nothing to do with traffic modelling, but simply results from spatially overlapping hotel locations and the flood map). Thus, the flood-related traffic results are mostly focused on the additional time that fire rescue services would take to reach hotels that are not affected by the event, due to road blockages caused by the event, but without considering overall traffic changes due to the event. The relevance of this analysis is questionable at best.

A number of other more minor issues are present throughout the article. For example, the authors state that they obtained their variables of interest from the web service "several times in January 2021". This is too vague: the reader understands that the data was collected in January 2021, but how? Were travel routes calculated only once for each hotel/fire station, or was this done multiple times in order to get a representative sample? If so, how were those numbers combined? More information is necessary.

Section 4.4 concerning "Disaster Management Strategy" is essentially a filler subsection without a specific connection with the rest of the article, and contains many with unreferenced generalities regarding flood, e.g. "the city's emergency response department should be equipped with some special vehicles and hovercraft with better water wading capabilities to ensure that emergency rescue missions are completed"; "tourism enterprises located in areas of high flood risk should improve their own capacity to prevent flooding and drainage. This can be done by building waterproof walls and drains, constructing steel gates, installing flood-proof glass and customising their own temporary defences"; and others.

The article, although understandable, is not particularly well-written, and the level of English is below-average, with many typos and sentences that are difficult to follow.

In view of this, I suggest that the authors critically rethink their methodological approach and case study application, as well as significantly improve the quality of the text, before considering a resubmission of this article.