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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Flood Vulnerability Assessment of Urban Traditional Buildings in Kuala Lumpur, Malaysia" *by* Dina D'Ayala et al.

Anonymous Referee #2

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I have now read the paper titled: "Flood Vulnerability Assessment of Urban Traditional Buildings in Kuala Lumpur, Malaysia". The paper focuses on the vulnerability of buildings to flooding in Malaysia by developing a vulnerability index for each building based on a number of parameters and by actually taking a step beyond and calculate also the economic loss under different flood scenarios. The paper presents an interesting approach to vulnerability assessment however it demonstrates also a number of significant weaknesses. In more detail:

Title: The title indicates that the main focus of the paper is the vulnerability assessment of buildings, however, the paper goes beyond that: a hazard map for different scenarios is produced and the possible economic loss under different scenarios is assessed. The title should probably change in order to include all that. Moreover, according to the title

the focus is on traditional buildings, whereas in the abstract the buildings are referred to as urban heritage buildings which indicates something else and elsewhere in the text as residential buildings (page 3, line 101). This should be also considered in rethinking the title of the paper.

Abstract: the abstract is rather long and gives too much detail (e.g. field surveys with Google street view) but also it does not refer to additional aspects that the paper covers such as the economic loss calculation.

Introduction: in the introduction but also elsewhere in the text the authors refer to non-structural measures but they never connect them to the results of their study or their aims. Also in the introduction, they refer to floods but they do not explain what kind of floods they are looking at. Later on in the manuscript, the authors shed light on that matter but it would be better if this would be done earlier on.

SMART: What is the relationship to the authors with the SMART project? Is SMART part of what they are doing or do they just use readymade results from this project? It is not very clear. More clarification is also needed in the description of the SMART defense scenario. What does this include? What kind f defense measures? Where?

Figure 4: The authors estimate the time of peak at all ungauged locations within the study area. Why is this information relevant to the vulnerability assessment of buildings?

Vulnerability index: Why do attributes vary between 3 and 5? Please clarify.

Vulnerability parameters: How do parameters 1 to 6 relate to the expected intensity? I guess 8and this also has to be clarified) that in e.g. parameter 4. With the height of stilts between 0 and 0,5m(?) there is 55 VR. But if the height of the flood is 2m this specific building will be highly vulnerable.

Weighting and classification: the authors do not refer to the weighting of the parameters or the classification of the final VRs. These are two important issues that should be

considered when working with indices. A reference to the following paper which deals with these issues is considered in my opinion necessary:

Papathoma-Köhle M., Schlögl, M., Fuchs, S. 2019. Vulnerability indicators for natural hazards: an innovative selection and weighting approach. Scientific reports.

Flood depth-damage ration function: page 14, lines 375-376: does the window height play a role?

Figure 6: The authors create a vulnerability curve based on the mean values of several damage functions in the literature. Why is it expected that the buildings in Malaysia correspond to an average value of the existing models? The depth damage ration functions used in the paper are from different countries (Japan, Ethiopia, and global generic functions). Clarifications are needed at this point. What are the points in the figure? The building used in the present study. Please clarify.

Figure 7 and 8: The authors present some descriptive statistics of the index. Why is this information relevant? How and by who can it be used?

Table 4: the classification of the vulnerability classes has to be justified.

Interpretation of results: The results are described but not interpreted or used to demonstrate the importance of the approach for specific end-users. For example, (page 17, lines 432-433) "the buildings in the eastern part of the area have higher vulnerability". Why is that (e.g. older part of town?) How can this information be used?

Page 18, lines 454-455: This needs to be discussed more There are two issues here: 1. Why is the number of floors a parameter of flood vulnerability anyway? Is a building with more floors more or less vulnerable to flooding and why? It can offer vertical evacuation to residents but apart from that does the number of floors contribute to the reduction or not of the physical vulnerability? And 2. The high number of floors means high building value which reduces the degree of loss. Some discussion on this kind of drawbacks of the approach is also needed.

Estimation of replacement cost due to different flood scenarios: In my opinion the scenarios should also be reflected in the VR 8see previous comment about vulnerability parameters.

Type of hazard addressed (page 20, line 485): this information comes too late. The authors focus on flash floods and river floods and they combine "the total flood risk". What is the difference between these two processes as far as their impact on the building is concerned? Why do the authors suddenly start talking about risk? Is this what they assess?

Discussion: Some vital information is missing. what were their assumptions and uncertainties? How can this study be improved and further developed in the future? How can the results (e.g. the vulnerability maps) be used by end-users?

Conclusions: the conclusions should be stronger and show what the authors have really achieved with the specific study. Instead there are some repetitions (e.g. lines 564-576) without having a strong message at the end.

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2020-96/nhess-2020-96-RC2-supplement.pdf

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