



EGUsphere, referee comment RC2  
<https://doi.org/10.5194/egusphere-2022-922-RC2>, 2022  
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## **Comment on egusphere-2022-922**

Anonymous Referee #2

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Referee comment on "Quantifying the potential benefits of risk-mitigation strategies on future flood losses in Kathmandu Valley, Nepal" by Carlos Mesta et al., EGU Sphere, <https://doi.org/10.5194/egusphere-2022-922-RC2>, 2022

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### **General comments**

The manuscript "Quantifying the potential benefits of risk-mitigation strategies on future flood losses in Kathmandu Valley, Nepal" addresses flood risk under four scenarios of urbanization and climate change (Scenarios A-D) with a focus on a multi-hazard prone area by computing the associated mean absolute financial losses and mean loss ratios.

I believe the manuscript could represent a substantial contribution to the understanding of flood events and especially their consequences and therefore fits perfectly the special issue "Estimating and predicting natural hazards and vulnerabilities in the Himalayan region". Nevertheless, before the manuscript is considered for publication, the authors need to address some concerns.

- The introduction provides valuable information about the relevance of flood events and risk assessment in the region of study. However, I believe the authors need to provide some additional details about the selected methodology (LL 96-98)). Why has this specific methodology been chosen? I recommend the authors to justify this selection. Is it based on previous works? Please add the associated references.
- I believe a figure showing the framework of the work with a step-by-step diagram will be very useful for the readers to better understand the methods implemented and highlight the scope of the work
- Regarding the information provided in Table 2, I recommend the authors to include a graph with the "expected number of buildings exposed to flooding" (Y axis) for the different scenarios (represented with colors for example) and the different flood depth (X axis), instead of the overwhelming Table 2. The authors could keep the information about the percentage in Table 2.
- It is unfortunate that in Figure 4 and Figure 5 the regions with 1% or 10% buildings in the floodplain are represented by a very small pie chart. This makes very difficult the interpretation. Is there any way that the authors could rescale these charts?

- Table 3 shows relevant information. However, the authors have a very detailed amount of data that could be used to have a more complete table. Could the authors include the absolute values for the different districts? And income levels per district for example?
- Section 3 is in my opinion much more oriented to describing the results rather than a discussion of the obtained results. I believe the authors could benefit from adding a specific discussion section to go one step further and try to find the reasoning behind the obtained results. Furthermore, the authors could answer critical questions such as: what is the impact or correlation of the flood depth on the losses? Are there any thresholds that could be established based on the present results in terms of flood depth leading to specific losses? why are high income levels suffering the highest losses? How are the flooding risk areas differing from other hazards such as earthquakes? Are there any solutions that would be beneficial to prevent simultaneously both hazards? Additionally, from figures 7 and 8 the authors could integrate an interesting discussion about measures planning, prioritizing high risk areas and highlight the benefits of taking action.
  
- I strongly recommend adding in the discussion a section about the limitations of the study. Along the manuscript many limitations and simplifications have been mentioned (e.g.: maps resolution, neglect of urbanization effects on flood hazards, basement consideration, random association of number of stories, component-level vulnerability information not available), please discuss the implications of all these aspects and the associated uncertainties for the findings of this study. What are the most impactful simplifications? The authors suggest addressing specific limitations in the future in the conclusions, but these statements need a previous proper discussion about the impact of these limitations on the accuracy and uncertainty of the results of the present work.

#### Minor comments

Figure 1. Please include the river network.

LL 123-124: I believe LL 120-123 (till "van de Lindt, 2021") are connected to the justification of the scope of the work (LL124-127 from "However, the primary purpose"). Thus, I would recommend the authors to move the sentence in between about urbanization effects on flood hazard to the end of this paragraph. Please also clarify the concept of "urbanization effects on flood hazard".

L130: Please add a reference for the sentence in brackets.

L133 Please specify what the neighbor method and add some references.

L135 I suggest to provide some information about the method of Tate et al. (2021).

Figure 2. Are these maps computed by the authors or were they directly obtained from any other sources? If they were obtained from Fathom-Global please add the url and references in the caption and clarify this information also in the manuscript (LL128-132).

LL255-257: The authors try to give some context to the selection of the 2 m threshold. Please clarify this in advance (in the introduction or methods) and give some references that justify this selection.

L264 Please remove the specific rows in brackets, this information is not needed since we do not have any numbering for the rows.

Page 15 and in general: Some abbreviations seem very repetitive (e.g.: VDC). I suggest the authors make an effort to merge ideas and avoid the use of overwhelming abbreviations.

Figures 2,4,5,7,8 could benefit from including a short title describing each of the plots. For example in Figure 2, a) 100-year mean return period, b) 1000-year mean return period.