



EGUsphere, referee comment RC1
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Comment on egusphere-2022-922

Anonymous Referee #1

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-RC1>, 2022

General comment

Mesta et al. construct current and near-future urban development states (in total four exposure scenarios) for the Kathmandu Valley and assess the flood risk using flood inundation maps of the 100-year and 1000-year return level (pluvial and fluvial combined). In my opinion, the study has the potential to become a valuable contribution to risk research in the area. However, there are several points that need clarification and improvement before it can be considered for publication.

Major comments

Comment 1: Unspecific key result

The goal of the study (as far as I understood) is to provide decision makers with an adequate understanding of the risk consequences of particular actions. However, to me it was not clear what actually your key findings are. What is the new information that your study provides? What can decision-makers learn from your study? What is your key message to them? I imagine something like 5 bullet points summarizing the key findings of work.

Comment 2: Lack of discussion

In general, I miss a bit a critical discussion of the data and methods used. Some aspects need to be discussed in more detail. Justify better why usage of global and low resolution

data sets for regional risk assessment (Line 115). Discuss limitations of flood maps. You state yourself that resolutions of 10 m or finer are recommended. Also you state that 'urbanization effects on flood hazard' are neglected (Line 124). Please discuss influence on your results. Furthermore, I miss a discussion on the merging of fluvial and pluvial floods maps. Can you just do that and assume that the only thing that matters is the water level? What about velocity? I would find it very interesting to learn more about the importance of those two types that you merged. How much of the flooded area is from pluvial floods? Area there a lot of areas that are exposed to both? Please also discuss the usage of the flood vulnerability functions from JRC. E.g.: How is it possible that a one story building inundated by 6 m only suffers a loss of 60 %. Please provide more information on how you distinguish groups of low, middle and high income (Line 249-250), as this is important for one of your main findings. Subsequently discuss this result better. Why do people with high income live in the same types of houses than middle and low income groups? Why do high income people live in flood-prone areas? Wouldn't they choose to live in 'better' buildings outside dangerous areas? What is the reason for this? Or is that higher income people more live in urbanized areas prone to pluvial flooding? Please discuss better. One strategy you assess is to restrict future urban growth within the floodplain. This floodplain is defined by your maps (100/1000-year return level). Please discuss the uncertainty and flaws of this simple approach.

Comment 3: Abbreviations, acronyms and numbers,..

In my opinion, there is a very large amount of abbreviations, acronyms and numbers in the text that make it unnecessary difficult for the reader. For example, in section 2.2 there are new acronyms in almost every sentence. Particularly the acronyms for the building typologies are very hard to follow (e.g., Table 1) and also hard to find in the text. Please go through your text and think whether all those acronyms are required and maybe try to find more intuitive categories. If it is not possible to remove some acronyms, please provide at least an overview. Also an overview table with details in the supplementary might be a good idea. Please also update the legend in Fig. 3. It takes the reader a lot of effort and search in the text to find out what the different colors actually mean. Please consider to plot the numbers in table 2. Maybe you can try simple bar or pie charts. Please also explain why scenario C and D are together in this case. Also revise the paragraph between line 389-397. In general, you use a lot of numbers in the text. Please do not just list all the numbers, but select the numbers that you include into the text. These numbers need to underline your key findings and arguments. All the rest can go into the tables and figures, I think

Specific comments

Abstract: Make the abstract more clear. Focus on the key results, numbers and message. For me it was very difficult to get the key message of your work first time reading the abstract. Only after reading the entire article, I also understood the abstract. Clearly state the different exposure inventories and mitigation strategies you investigate. For me, your key message in very simple words is: 'Measures can reduce the risk/damage a lot. That is why we need to do it.' And you give the numbers for it. I like your first sentence in the conclusion Line 408-411. This sentence is clear to me and maybe you can use it also for the abstract.

Introduction: Needs to be more concise. There are a lot of general information. Please try to tailor it to the specific content of your article. There is lot about climate change, but in this study you do not assess climate change impacts. This is almost a bit misleading.

Page 1 Line 11: 'multi-hazard-prone area': There are multiple important hazard in the area, but you do not assess multi-hazards, as far as I understood.

Page 1 Line 14: Be careful with the word 'predict'. Maybe better use 'Our results hint/point at/suggest...'

Page 2 Line 56-57: Many readers are not familiar with these locations. Please explain where and what 'Terai regions'.

Line 110: Consider to include sub-section 'Study area'.

Line 105: Not necessary to put coordinates in the text here, in my opinion.

Figure 1: Include river network (and urban settlement layer?) into map. Also include larger overview map that at least shows location of Nepal within the Himalaya.

Line 130-133: I think you need to be careful here. You cannot say 'approximately reflects a situation in which flooding is exacerbated due to climate change' (Line 131). You compare 100-year and 1000-year flood. As you do not do any investigation and do not provide any information that could back this statement, you should not make it, I think. You do not do a climate change impact study.

Table 1: Please consider to include a scheme that illustrated the set-up of your study. This table seems to form a good basis for this scheme. It should capture the main steps of your study (return levels, exposure scenarios, distinction of building types, imcome level,..)

Figure 4: Wouldn't it be better to (also) show the absolute numbers? In my opinion, showing the percentage without information of building density can be a bit missleading. Like this, it does not provide good information on the the spatial distribution of flooded buildings, I think. Can you maybe plot the buildings on the map directly?

Figure 5: I am not sure the mean loss ratio on a municipality level is a very interesting thing to plot here. As you have the exact flood maps, why not plot damage using the inundation maps. In this way, hotspots of damage are visible. Please also try to calculate difference maps, e.g. between A and C to show the benefit of certain measures.

Line 450: Data availability: This is not sufficient, I think. Are there ownership issues and you cannot provide the data sets? Is it possible to put the data into a FAIR repository? At least the core data and an example data set?