

Nat. Hazards Earth Syst. Sci. Discuss., author comment AC1
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Reply on RC1

Sara Lindersson et al.

Author comment on "Global riverine flood risk – how do hydrogeomorphic floodplain maps compare to flood hazard maps?" by Sara Lindersson et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-136-AC1>, 2021

The author team is grateful to referee RC1 for writing a very helpful, concise and constructive review that addresses multiple points that indeed will improve the research article. We are also happy to read that the overall judgement is positive. Please find answers to the individual points of improvement below:

- **RC1:** *"In the abstract it is stated that flood mapping can be based on either (hydrologically-derived) flood hazard maps or (topography-based) hydrogeomorphic floodplain maps: what about satellite-derived?"*
Authors: Thanks for noting this. Indeed, satellite imagery is gaining importance for flood mapping and we will make sure to acknowledge this in the revised manuscript. Yet, our focus will remain on these two methods since satellite imagery can miss some areas that were not flooded in the observation period (or covered by clouds), but can still be *potentially* flooded in the future.
- **RC1:** *"In the introduction (L25-28) it is stated that global maps of flood-prone zones and human settlements are useful for detecting risk hotspots across the world, and may also be used for local studies in data-poor regions. The following papers are cited: UN SDSN, 2020; Ward et al., 2020. In fact the paper of Ward et al. 2020 does not seem so relevant here, but the community perspective paper on this issue from 2015 may be (<https://www.nature.com/articles/nclimate2742>)"*
Authors: We agree with RC1 on this point and will amend the references accordingly.
- **RC1:** *"L38-39: "Hydrogeomorphic methods for mapping floodplains, on the other hand, distinguish the characteristic shapes of floodplains based on topography". This feels like a non sequitur: in the previous sentence a lack of detailed topographic data was mentioned as a main limitations to model water extent – but here it appears that these same data are needed for the hydrogeomorphic method. Or is there a difference in the scale/type of data needed between the two methods?"*
Authors: We agree with RC1 that these two sections need to be rephrased to make the main point clearer: hydrogeomorphic methods having the advantage of not needing long-term hydrologic data. We will change the text to clarify this.
- **RC1:** *"L50-51: "What we know, however, is that the results of large-scale flood exposure analysis heavily depend upon the datasets used (Aerts et al., 2020; Dottori et al., 2016; Smith et al., 2019; Trigg et al., 2016; Ward et al., 2020)." The study of Bernhofen et al. should be included in this list."*
Authors: We agree with RC1 that Bernhofen et al should be included here, we will amend the references accordingly.
- **RC1:** *"L68: mention the names of the 2 flood hazards datasets here (before the*

references to Dottori and CIMA)“

Authors: Thanks for noting this, we will change this in the text.

- **RC1:** *"I do not understand the motivation for using 3 different population maps if the focus is on comparing hazard modelling, as implied by the title. For me the message can be obtained by selecting one of these datasets and the analysis would be more focused."*

Authors: Thanks for raising this important point, indeed, including only one population dataset would possibly make the analysis more focused. However, we think that including the three population datasets makes the exposure analysis more comprehensive and transparent. The individual population datasets have different limitations and benefits, and all three are frequently used within the academic community working on disaster analysis. We, therefore, decided that it would be relevant to include all three datasets, to show differences in exposure results. We agree with RC1 that the motivation for including the three population datasets needs to be clarified in the article, we will work on this.

- **RC1:** *"Section 3.1: Am I correct to assume that all maps were homogenized to 8.33 arcsecs? I could not find this explicitly in the text. Is this correct? And if so make this clear in section 3.1"*

Authors: Yes, this is correct. Thanks for pointing this out. We will clarify this in section 3.1.

- **RC1:** *"L161-163: "For instance, the individual flood maps have been post-processed to mask arid areas, to different degrees, since aridity poses a challenge for traditional flood model assumptions." I find this very vague. To "What degrees" exactly? How was this done and based on what assumptions? This is essential for reproducibility."*

Authors: Thanks for noting this. This statement referred to the original datasets, we meant that the creators of the flood hazard maps and the floodplain map have post-processed the maps to mask arid areas to different degrees (i.e. the original datasets vary in spatial coverage). For this reason, we calculated the model agreement index only for the river basins that are covered by all three models. We will rewrite the quoted sentence to avoid confusion.

- **RC1:** *"What was the reason for choosing the 26 countries shown in the analysis?"*

Authors: We based the country selection on four criteria, as specified in section 3.2 (lines 232-240). But indeed, the number of included countries could have been higher or lower. We decided on 26 countries since we thought that this was a large enough sample to provide variation across countries while still presenting the results clearly. We will add motivation for selecting 26 countries (and not more or less) in the text. We will also add a fifth selection criterion: that we aimed to get a representative country sample across the regions of the world.