Natural Hazards and Earth System Sciences Discussions

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
https://doi.org/10.5194/nhess-2021-136-RC1, 2021

Comment on nhess-2021-136

Anonymous Referee #1

Referee 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-RC1, 2021

The authors compare the results of a global flooplain mapping based on a hydrogeomorphic approach (GFPLAIN) with two well-known flood hazard models (GAR and JRC). This is a useful addition to previous literature comparing several flood hazard modelling approaches, such as Trigg et al., Bernhofen et al., and Aerts et al. The paper builds on methods presented in those previous papers and applies them in a logical way. It also makes a nice contribution in using spatial agreement clusters and hydro-environmental attributes for its comparison. This is new for this field of research and provides some valuable new insights. The paper is well structured, clear, and well presented. Although it may not be groundbreaking, it certainly provides new insights for global flood assessment and has scientific rigour. Therefore, I would recommend publication if the following small points can be addressed.

- 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?
- 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)
- 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?

- 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.
- L68: mention the names of the 2 flood hazards datasets here (before the references to Dottori and CIMA)
- 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.
- 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
- 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.
- What was the reason for choosing the 26 countries shown in the analysis?