



EGUsphere, referee comment RC2  
<https://doi.org/10.5194/egusphere-2022-1343-RC2>, 2023  
© Author(s) 2023. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## **Comment on egusphere-2022-1343**

Francesco Dottori (Referee)

---

Referee comment on "Methodology for constructing a flood-hazard map for a future climate" by Yuki Kimura et al., EGU Sphere,  
<https://doi.org/10.5194/egusphere-2022-1343-RC2>, 2023

---

This paper analyzes two methods for the generation of future flood hazard maps under climate change, along with a number of related issues. Even though the work focuses on a global-scale application of the CamaFlood model, the outcomes are relevant from a general point of view, given the importance of the topic. Overall the paper is well structured and generally well written, although some descriptions could be improved (see my comments). The analyses carried out are appropriate and well described. I think that the paper could be published after addressing a few minor issues that I am listing below.

L25: "...changes in flood risk..." I would correct in "changes in flood hazard"

L29 "we discuss future changes at global scale..."

L49-50: "To elucidate the potential impacts of flood disasters, a high-resolution map of potential disaster impacts must be developed, commonly named a hazard map." This is not fully correct. In flood risk literature, hazard is a component of risk but it is not a synonym of disaster impact (see for instance Ward et al, 2020). Perhaps you could replace with "To elucidate the potential impacts of flood disasters, high-resolution maps of disaster impacts must be developed".

L70-72 "Uses of large-domain flood-hazard maps include estimation of the affected population within an inundation area and determination of the impacts of flooding on GDP and urban areas in the current climate". This sentence should be reworded. In literature, the maps including impacts such as population and/or urban areas exposed are generally called flood risk maps

L72-74: Bernhofer et al (2018) compared six global flood models against satellite-derived flood maps, so adding a reference here would be appropriate in my view.

L80-81 this sentence should be modified, because several flood risk assessments have been carried out at scales from global to local

L147-154: I think that the description of the post-processing method needs more detailing. In particular I have some questions:

- My understanding is that the authors fitted a Gumbel distribution on each pixel of the Camaflood 6-arcmin grid, correct? Or do you use different areas for the fitting?

- In lines 155-162 you state that water surface elevation is uniform within each 6-min unit catchment, so I assume that water level in upstream catchment are increased to the same

water level of downstream catchment, right? If yes, please specify this in the text  
- Can you also explain why this approach was not needed in previous studies based on CamaFlood?

L218: Alfieri et al (2017) actually employed the lookup method, because they used historical flood hazard maps coupled with changes in frequency under future climate scenarios.

L405-406: Based on the results, the authors could maybe draw the conclusion that standard bias-correction techniques of GCM data are not suitable for use in flood hazard estimation (having been developed for different types of climate studies), and that different bias-correction techniques should be used (i.e. more focused on extreme values)

Figure 8: Can you specify the unit of measure of the x axis in (d) and (e)?

L488-503: I do not fully understand this analysis. Combining historical hazard maps with future flood frequency is basically the lookup method, right? (e.g. assuming that present-day 100-year RP will become 50-year RP in the future). Based on the outcome of the paper, I would rather conclude (here and in Conclusions) that historical hazard maps can be used as an indication of future hazard only if changes in flood frequency are properly accounted for.

#### References

Ward, P. J., Blauhut, V., Bloemendaal, N., Daniell, J. E., de Ruiter, M. C., Duncan, M. J., Emberson, R., Jenkins, S. F., Kirschbaum, D., Kunz, M., Mohr, S., Muis, S., Riddell, G. A., Schäfer, A., Stanley, T., Veldkamp, T. I. E., and Winsemius, H. C.: Review article: Natural hazard risk assessments at the global scale, *Nat. Hazards Earth Syst. Sci.*, 20, 1069–1096, <https://doi.org/10.5194/nhess-20-1069-2020>, 2020.