Natural Hazards and Earth System Sciences Discussions

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Comment on nhess-2022-84

Anonymous Referee #2

Referee comment on "Assessing flood hazard changes using climate model forcing" by David P. Callaghan and Michael G. Hughes, Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2022-84-RC2, 2022

The manuscript describes a procedure for assessing flood hazard changes using climate model forcing.

The proposed methodology is interesting and the topic is surely appropriate for NHESS.

I am glad to suggest to publish the manuscript after some comments and suggestions to share with the authors to improve the manuscript.

General Comments

- It could be useful to better explain in the introduction the novelty of the paper since in literature there already are some articles that assess future flood hazard under climate changes scenario by using hydrologic and hydraulic models. In the present form the original contribution could be not so evident because it is not fully clear how the proposed methodology differ or increase its effectiveness from other studies on this topic.
- I suggest in the introduction to add more recent bibliography on this topic and information about what was already proposed in other countries, i.e.: 1) Ryu, J.-H.; Kim, J.-E.; Lee, J.-Y.; Kwon, H.-H.; Kim, T.-W. Estimating Optimal Design Frequency and Future Hydrological Risk in Local River Basins According to RCP Scenarios. Water, 2022, 14, 945, https://doi.org/10.3390/w14060945. 2) Shrestha, S.; W. Lohpaisankrit W. Flood hazard assessment under climate change scenarios in the Yang River Basin, Thailand. International Journal of Sustainable Built Environment, 2017, 6, 285–298, https://doi.org/10.1016/j.ijsbe.2016.09.006. 3) Janizadeh, S.; Pal, S.C.; Saha, A.; Chowdhuri, I.; Ahmadi, K.; Mirzaei, S.; Mosavi, A.H.; Tiefenbacher, J.P. Mapping the spatial and temporal variability of flood hazard affected by climate and land-use changes in the future. Journal of Environmental Management, 2021, 298, 113551,

https://doi.org/10.1016/j.jenvman.2021.113551.

Specific Comments

- Lines 214-215: LISFLOOD was preferred to WCAD2D because it was found that the first model was faster than WCAD2D. Did you compare these model only for speed or also in terms of flood modelling results? In the latter case, did the test performed show significant differences?
- Lines 241-242: please explain how you derive a total physical time of 1470 years starting by the 18 projections included by NARCliM 1.5.
- Paragraph 2.6 (Lines 267-275): I don't understand the criterium for selecting the epochs for flood hazard classification. How did you select as historical epoch the period 1980/1999, and as projected epochs the periods 2020/2039, 2050/2069 and 2080/2099 in the entire range 1950-2100?

Technical corrections

- Line 13 pag. 1: historical period (1950-2006) should be the same of that one reported in line 99 (1950-2005).
- Line 489 pag. 15: in the reference you miss probably the comma before 2009.