

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Comment on nhess-2021-141

Anonymous Referee #2

Referee comment on "Modeling of a compound flood induced by the levee breach at Qianbujing Creek, Shanghai, during Typhoon Fitow" by Yuhan Yang et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-141-RC2>, 2021

This is a valuable study that creatively modeled a flood event induced by a levee breach in Shanghai. Apparently, the authors have made great efforts to quantitatively identify the evolutionary process and pattern of the flood event. However, several specific and key points were not sufficiently clarified in the current paper, see below my specific comments. Thus I suggest a major revision from the authors for further considering it for publish.

- In abstract, there shall be a statement on the effectiveness of the 2D Floodmap model. To what extent do the modeling results match with the real flood patterns? What are the advantages of the model? This is a key message that must be clearly stated in the abstract.
- Page 3, line 54-56, the "Himalaya glacier outburst flood in northern India" needs a reference.
- Figure 1, the sources of the image and picture shall be clarified.
- Figure 2, there needs more explanations of the three peaks of the water level curve. Especially why is there a "third peak", what caused it?
- As I understand, Compound flooding is an extreme impact event resulting from the interaction of multiple drivers (Zscheischler et al. 2018), mostly rainfall and tides (Bavacqua, et al 2020). But in this study, the flood was obviously mainly caused by heavy rainfall from Fitow, and there seems no tides or storm surges at the study site. Thus I suppose the authors shall not call it as a compound flood.
- The discussion and conclusion section is weak. The discussion shall be improved and extended with more on the possible strategies and measures to reduce such levee breach and associated risks. E.g. according to the flood pattern and process, which areas and which measures could be most effective in reducing the flood impacts? From engineering perspective, how could the levee be strengthened, to which level? In addition, it would be also valuable to compare the present study findings with otherSome flood adaptation studies and household responses measures may be referred and compared, for instance:

- Assessment of Flood Losses with Household Responses: Agent-Based Simulation in an Urban Catchment Area. *Environmental Modeling & Assessment* 23, 369-388.
<https://doi.org/10.1007/s10666-018-9597-3>
- Levee Failures and Social Vulnerability in the Sacramento-San Joaquin Delta Area, California. *Natural Hazards Review*. Vol. 9, Issue 3 (August 2008).
[https://doi.org/10.1061/\(ASCE\)1527-6988\(2008\)9:3\(136\)](https://doi.org/10.1061/(ASCE)1527-6988(2008)9:3(136))
- Climate-related flood risks and urban responses in the Pearl River Delta, China. *Regional Environmental Change* 15 (2), 379-391.
<https://doi.org/10.1007/s10113-014-0651-7>
- Urban flood risks and emerging challenges in a Chinese delta: The case of the Pearl River Delta. *Environmental Science & Policy* 122, 101-115.
<https://doi.org/10.1016/j.envsci.2021.04.009>
- Enhancing the resilience to flooding induced by levee breaches in lowland areas: a methodology based on numerical modelling. *Nat. Hazards Earth Syst. Sci.*, 20, 59–72, 2020. <https://doi.org/10.5194/nhess-20-59-2020>

- Meanwhile, there is no conclusion in the current section 4. I would suggest to add a paragraph to summarize the key findings in this study, with simple and clear sentences. This helps readers to quickly get the key points of the study.
- The English language is in general not sufficiently good for a scientific publication, which must be further modified.