

## ***Interactive comment on “Hess Opinions: An interdisciplinary research agenda to explore the unintended consequences of structural flood protection” by Giuliano Di Baldassarre et al.***

**Anonymous Referee #2**

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This is an interesting work based on deep insights and years of research on the topic by the authors. I think that the paper can be improved further by addressing the following points:

1) Page 2, Lines 7-8: “This study made the (common) assumption that future flood exposure depends on socioeconomic trends only, and not on the level of flood protection.” Can you elaborate more on the difference between these socioeconomic trends and the trend of more intense urbanization of flood-prone areas behind the levee? Isn't the latter a subset of the former? That is, aren't increased economic activities on floodplains part of greater socioeconomic trends that you're referring to? This is unclear to

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me.

2) Page 2, Lines 26-31: Here, you describe a case, talking about things such as how a flooding event in 1953 reduced population density of floodplain. However, it wasn't clear to me initially where this case is based on and what is the context of this 1953 flooding. I had to search other parts of the paper to find out that this is based on the Netherlands. It will be more reader-friendly if you can clearly mention that this flooding and social changes on floodplain are based on the Netherlands.

3) Page 3, Lines 1-10: Here, you contrast two cases: “urban growth behind the dikes is often factored into the risk analysis” and “urban growth in flood-prone areas goes beyond original plans, potentially leading to unforeseen increase in flood risk” (thus, leading to more levee development). This is interesting. But it wasn't clear to me how the two cases differ in terms of flood protection level. In the former case when risk analysis includes urban growth behind the levees, are the levees built much higher in the first place to reflect this expected growth? How will long-term flood protection level and flood risk be different between these two cases?

4) Page 3, Lines 19-21: This transference of risk to downstream due to hydraulic interactions stemming from heightening of upstream levees is interesting. Readers might benefit from little more discussion on this.

5) Pages 5: Comparative analysis is identified as a future challenge. I was surprised to see that the authors don't talk about how a framework can help with the task. In order to compare different cases in a consistent and structured way, a framework is needed. A framework defines a general set of variables and their potential relationships that an analyst should consider when examining cases.

6) Page 6: The authors talk about how new methods, concepts, and data can help advance sociohydrology research. It will be more helpful if the authors describe how such multiple methods work together and create synergies. Also, no methods of behavioral sciences are really described here. Modeling behavioral response using differential

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equation is not really a behavioral science method.

7) Page 6, Line 12: I think that Aerts (2018) is a review paper, not ABM paper.

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