

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2  
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## Comment on nhess-2021-329

Anonymous Referee #2

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Referee comment on "Storm surge hazard over Bengal delta: a probabilistic–deterministic modelling approach" by Md Jamal Uddin Khan et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-329-RC2>, 2021

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I commend the authors on this mammoth work on a topic that is highly relevant and much needed for Bangladesh and this region. The work has been performed well and described thoroughly. I believe that the paper will be ready to publish after the authors clarify a few doubts and questions.

The issues that require clarification center on two points: 1) the embankments ; 2) the cyclone ensemble and return periods.

Re. the embankments:

1. The authors should explain exactly how the information on embankments has been integrated and should provide a map and/or more information showing embankment heights within their dataset (this can be smoothed out if there are copyright or other data concerns). As the authors state, these embankments are critical in controlling flooding. However I do not know if these embankments are wider than 250 m, and it is not clear if/how these can be captured by the bathy-topo datasets if the minimum resolution is 250 m.

2. The authors mention that the embankments appear to start overflowing at the 75-100 year RP water levels. Clarification on how the model "sees" these embankments will be useful. I assume that overtopping processes are not included in the model but this will be worth stating.

Re. the cyclone ensemble:

3. I understand and support the authors' decision to show water level variations based on RPs rather than events. While logical, this can however be confusing to interpret. The authors should add a few sentences explaining describing how the 100 year RP water level map (for example) is comprised of WLs from several cyclone events.

4. Figure 4 indicates a significant spatial variation in the number of cyclones affecting the coastline, with the western coastal segments seeing a lot more cyclones. This could mean that coastal segments in the east, with far fewer cyclones, also have a much smaller range of WLs within the 5-500 year RPs. Can the authors clarify if this is the case, and whether/how the spatial variation in cyclone tracks can influence the spread and uncertainty around the WL results at the shoreline and inland?