

***Interactive comment on* “Ensemble Projection of the Sea Level Rise Impact on Storm Surge and Inundation in the Coastal Bangladesh” by Mansur Ali Jisan et al.**

Anonymous Referee #2

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The paper addresses the potential influence of SLR on the flooding exposure during tropical cyclones in Bangladesh. The hydrodynamic model Delft-FLOW is used to simulate two historical storms and some future scenarios reflecting SLR of different magnitudes and uncertainties due to TC intensity and timing with respect to the tidal phase. Model results are validated against tide gauge measurements during the TC events. Further the authors investigate how inundated area and storm surge height would be changed if SLR would be present, assuming the properties of TCs remain unchanged. They conclude that even considering uncertainties of present-day TC properties the amount of flooded land would increase dramatically.

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The paper is well composed and clearly written. The objectives, methodology and results are sufficiently described. The discussed problematic is relevant and adds to the insight of the SLR consequences at regional scale. The approach of separating the sources of uncertainty and selecting a single trigger (here SLR) for the analysis contributes to better understanding of the potential changes in the local system. However, as the authors also pointed out, there are many unconsidered conditions like changes in TCs intensity, morphology, river discharge, etc. This undermines the value of particular resultant numbers if they are considered without more generalized conclusions. For example, what would happen if the SLR of 0.4 or 0.7m occurs? Some discussion going beyond the presented two SLR case studies would be appropriate. I propose to put the results described in the Section 3.4 in relation with the SLR values and not only with the present-day inundated area/storm surge height. It would be interesting to see the direct comparison (in % or absolute values) of changes in storm surge height with respect to SLR, e.g. for TC Sidr and Charchanda it would be 0.27m increase for 0.26m SLR, which is basically a linear addition of SLR magnitude on top of the present-day surge, and 0.62m change for 0.54m of SLR, which has a considerable non-linear contribution. This could give an insight into the (non)linearity of the storm surge and SLR interactions for particular area.

It would be very helpful to include the terrain map of the model region with land elevation and land/water mask for better understanding of the present day situation and possible impacts. It could be combined with Figure 1 or not. Some names on Figure 1 would be also helpful (like main rivers, measurement location names, etc).

Minor comments:

- p2. lines 55-56: "...causing deaths ... of lives". Please reformulate ('causing deaths of people' OR 'causing loss of lives')
- p3. line 83: please coordinate singular/plural forms "the impact ... are debatable"
- p4. lines 110-114: this passage looks like repetition of the previous one. Please

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remove or reformulate.

- p5. line 143: "... weas ..." typo?
- p5. lines 151-171: It is not quite clear from this description whether Delft3D has special module for generating wind and pressure fields from the TC track. If yes, and it "... slightly improves the original WES...", why the authors are still using WES and not Delft3D? If not, and wind and pressure are firstly generated by WES method and then fed to the Delft3d, then the description is misleading.
- p6. line 193: "... Storm surge..." -> "storm surge"
- p7. line 209: by tidal data the water elevation is meant? What type of instrument has been used, tide gauge?
- p7. line 212: "(-ve)infinity ..." typo?
- p8. lines 269-272: repeated passage, please remove
- p10. lines 310-313: please review or remove the passage, it does not describe Figure 7.
- p10. line 317: "... future TCs remain the same strength..." – either 'keep the same strength' or 'remain of the same strength'
- p10. line 322: "one of the methods we experimented in this study..." – either 'methods with which we experimented...' or 'methods that we tested'
- p10. line 327-328: "... the results looked much realistic..." -> ... the results looked much more realistic...
- p10. Lines 344-345: "...focus of the paper is to predict the future scenarios..." – please change 'predict' to assess/estimate/develop "... and comparison with..." -> 'and to compare with'
- p11. line 360: "... first floor is kept transparent..." – What does transparent mean in

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this context? Why is it relevant here?

- Figure 3b and 7a: for the case of TC Sidr in Charchanga the timeseries of measured and modelled water levels look somewhat different and out of phase. Do the authors have an explanation for this?

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