Response to Reviewers

Title: Investigating coastal backwater effects and flooding in the coastal zone using a global river transport model on an unstructured mesh

Author Response 1st revision

Reviewer 2
Reviewer Comments:

This paper presents a method to address the interactive phenomenon of river flooding and storm surge, using an unstructured mesh and focusing on two US coasts with different characteristics. The study underscores the role of backwater effects in representing the impact. Overall the study is well written and the results are clearly demonstrated. I have one minor comment.

Author Response:

We would like to sincerely thank the reviewer for the valuable comments and recommendations. We have carefully addressed the reviewer's suggestions as follows. The excerpts of the revised manuscript are provided as HESS does not allow us to share our revised revision at this stage of the review process.

R2C1:

P 5 L 135 Here the river widths are estimated using an empirical equation. This can be the source of uncertainty in simulations, so it should be relied only when other available and reliable data cannot be obtained. The target area is US, so there should be more reliable data. At least, global river width dataset has also been developed such as GWD-LR (Yamazaki et al. 2014). I would not ask the authors to re-calculate all the results, but just add some discussion on this point and consider using other data in future work.

Author Response:

We appreciate the reviewer comment and add the discussion of using more reliable river geometry dataset in future work:

"The river channel width and bankfull depth estimated from empirical formulations may introduce uncertainties. Even though such estimation achieves reasonable accuracy at local basins, more reliable river geometry data should be considered at least for regions wherever the data is available. While global river width datasets have been developed for river width >90 m (Allen & Pavelsky, 2018; Yamazaki et al., 2014), the river bankfull depth may also be derived from high-resolution remote sensing data. However, it remains challenging to upscale the observed river geometry to model resolution given the river is resolution free (Liao et al., 2022)."

Allen, G. H. and T. M. Pavelsky (2018). Global extent of rivers and streams. Science 361(6402): 585-588.

Liao, C., T. Zhou, D. Xu, R. Barnes, G. Bisht, H.-Y. Li, Z. Tan, T. Tesfa, Z. Duan and D. Engwirda (2022). Advances in hexagon mesh-based flow direction modeling. Advances in Water Resources 160: 104099.

Yamazaki, D., F. O'Loughlin, M. A. Trigg, Z. F. Miller, T. M. Pavelsky and P. D. Bates (2014). Development of the global width database for large rivers. Water Resources Research 50(4): 3467-3480.