

Interactive comment on “Investigating compound flooding in an estuary using hydrodynamic modelling: A case study from the Shoalhaven River, Australia” by Kristian Kumbier et al.

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We appreciate the comments of the anonymous reviewer. Below, we respond to each of the points raised (reviewer's comments are included in quotation marks).

“Abstract - a strong opening statement that is not entirely true, please consider starting "Many previous" Also, please consider modifying the line "we recommend to consider..." perhaps rephrase to "Therefore, joint probability analysis of storm-tide and riverine flooding is crucial in estuaries" Although true that quickly responding catchments are prone to compound hazard long-term duration events may also be an issue..”

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We agree with the reviewer's comments about our abstract and changed the opening statement to indicate and recognize that there are other studies which consider both flooding processes jointly. Furthermore, we have incorporated the suggested rephrasing of the abstract's recommendations. The importance of event duration is briefly addressed in the conclusion of the manuscript (p24 lines 3-5).

"p1 L27. Consider expanding the Zheng et al. 2013 reference to give some examples - such as Bangladesh (Lewis et al. 2013)"

The corresponding section was expanded by the suggested study of Lewis et al. (2013). The study demonstrated the enhancement of coastal extreme water levels by riverine discharge and therefore fits well in the context of our manuscript.

"p3 L5 Please consider also Maskell et al. 2013 who found non-linear interaction effects to be small and that simplified hydrodynamic modelling techniques suitable for river-storm tide interaction in an idealised estuary"

The suggested reference (Maskell et al., 2013) was incorporated into the manuscript. It indeed provides a good example of compound flooding in an estuarine environment. We found however that the discussion of non-linear interaction effects between surge and river are not directly relevant to the section, also because these effects were found to be insignificant in determining the flood extent (and would also need to be addressed in length, which would render this part too long).

"p9 l1 - the method is similar to the water-line method to determine inundation area (e.g. Lewis et al. 2013b, perhaps consider adding this for clarity for the reader"

We thank the reviewer for pointing out the similarity of our flood extent determination using SAR data to methods presented in Lewis et al. (2013b). We integrated the reference into our methods section to improve clarity and guide the reader to similar work.

References: Lewis, M., Bates, P., Horsburgh, K., Neal, J. and Schumann, G., 2013. A

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storm surge inundation model of the northern Bay of Bengal using publicly available data. Quarterly Journal of the Royal Meteorological Society, 139(671), pp.358-369. Maskell, J., Horsburgh, K., Lewis, M. and Bates, P., 2013. Investigating River–Surge Interaction in Idealised Estuaries. Journal of Coastal Research, 30(2), pp.248-259. Lewis, M., Schumann, G., Bates, P. and Horsburgh, K., 2013b. Understanding the variability of an extreme storm tide along a coastline. Estuarine, Coastal and Shelf Science, 123, pp.19-25.

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