Comment to the paper: ***Investigating compound flooding in an estuary using hydrodynamic modelling: A case study from the Shoalhaven River, Australia.***

The authors investigate compound flooding via hydrodynamic modelling for an event occurred in 2016 in southeast Australia. I have only a few comments I would like to add to the discussion of this very interesting paper.

About the first sentence:
(1) *Previous modelling studies have considered storm-tide and riverine flooding independently,* (2) *even though joint probability analysis highlighted significant dependence between extreme rainfall and extreme storm surges in estuarine environments.*

(1) I agree with the other referee comments, that this sentence is exaggerated. Moreover, to get a more complete picture of the studies (which is already quite satisfying), you may add some additional references (the last two tackle the compound flooding modelling differently, i.e. via statistical modelling):

- van den Hurk B, van Meijgaard E, de Valk P, van Heeringen KJ, Gooijer J. Analysis of a compounding surge and precipitation event in the Netherlands. Environmental Research Letters. 2015 Feb 26;10(3):035001.
- Bevacqua, E., Maraun, D., Hobæk Haff, I., Widmann, M., and Vrac, M.: Multivariate statistical modelling of compound events via pair-copula constructions: analysis of floods in Ravenna (Italy), Hydrol. Earth Syst. Sci., 21, 2701-2723, https://doi.org/10.5194/hess-21-2701-2017, 2017.
- Van den Brink HW, Können GP, Opsteegh JD, Van Oldenborgh GJ, Burgers G. Estimating return periods of extreme events from ECMWF seasonal forecast ensembles. International Journal of Climatology. 2005 Aug 1;25(10):1345-54.

(2) the first sentence of the abstract and P2 l1: *even though joint-probability analysis highlighted significant dependence between extreme rainfall and extreme storm surges*
I suggest to state explicitly that even in places where no statistical dependence exist between the compound flooding drivers, there can still be risk of compound flooding (for example co-occurrence of astronomical high tide and extreme river discharge). In general, even when the statistical significance of the dependence between sea and river levels is null, it may happen to have co-occurrence of sea and river water level extremes.

P23 l24 *This is particularly important for estuaries with large catchment areas (> 10000 km²), which are known to have a quick response time to extreme rainfall. Classification schemes (e.g. Roy et al. (2001)) and statistical analysis on the dependence of storm surges and extreme rainfall such as the one presented by Zheng et al. (2013) can guide which estuaries are subject to compound flooding*
I suggest to discuss the part about large catchments taking into account what was previously argued by Klerk et al. (2015) (page 8, second column) in a paper about the dependence between compound flooding drivers in the Rhine-Meuse Delta: "*This makes the dependence found hardly relevant for policy making, as peaks"* (of sea level and river discharge) *"do not tend to arrive in the area of interest at the same time. In smaller water systems, these time lags between high water levels and discharges may be much smaller"* (due to quick catchment response time to extreme rainfall) *"such as found for the recent events in the North of the Netherlands as described in another contribution to this issue…"*

Klerk, W. J., Winsemius, H. C., Verseveld, W. J. V., Bakker, A. M. R., and Diermanse, F. L. M.: The co-incidence of storm surges and extreme discharges within the Rhine-Meuse Delta, Environ. Res. Lett., 10, 035005, https://doi.org/10.1088/1748- 9326/10/3/035005, 2015.