

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.

Anonymous Referee #2

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The manuscript presents a numerical model application to investigate the combined effect of river discharge and storm surge effects on flooding around the Shoalhaven river estuary (Australia). The manuscript is well presented (considering aspects below) and has the scientific merits for publication in NHESS. Although presenting a local study case, the model application is well conducted and results are interesting. However, prior to acceptance for publication, authors should address some aspects, listed below: - Abstract: First sentence of the abstract is exaggerated. Studies assessing estuarine processes and flooding certainly included both forcing conditions combined. - Clarify or change the term “entrance condition” (page 1, line 20; page 3, line 27). - Methods could be significantly shorter. In general, the manuscript is too long. Details

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such as statistical methods for assessing model quality could be only cited. There is no need to present all the equations (2 to 4). Details of the CFL equation is also not needed (Eq. 1). In general, several details in the method section could be left out. Citations to some of the detailed aspects would be enough and will reduce the length of the manuscript. Details of computer processor, for example, are not needed (page 12, line 17). - Has the model been calibrated and validated against measured current velocity data? This is an important aspect that limits the reliability of the application. It would be important to present the calibration of the model for current velocities, even if this is done for a different period, when data is available. If not possible, this limitation should be mentioned in the manuscript. Estuarine modelling applications require an assessment of their capabilities to reproduce the estuarine hydrodynamics, not only water levels. - Aspects such as those discussed in page 21 (Model performance), could be better verified through a comparison of modelled and measured current velocities.

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