

Interactive comment on “Compound flood potential from storm surge and heavy precipitation in coastal China” by Jiayi Fang et al.

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Reviewer 2: This manuscript focuses on compound flood potential from storm surge and heavy precipitation in coastal China, the results of which may be a support for urban flood control and management. The idea, the data and the methods used are not new and innovative. The results are common and direct. Two main parts should be improved firstly for further reconsideration for potential publication in HESS. 1. Data are the basis for analysis. Tide data collected are mainly from 1975 to 1997 which are not in accord with that of precipitation. Does the tide data in the last 23 years potentially changed under climate change affect the results? If it does, how to improve it?

Response: Thanks for the comment. As mentioned in Line 106-108 in the original

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manuscript the time series of precipitation observations are usually longer and more complete than tide gauge observations (where data after 1997 is often not publicly available). We are using the longest possible overlapping periods for both datasets in this study. Climate change may have had an impact on compound events over the last two decades. We cannot assess it in detail due to data restrictions, but we make sure to account for the effects of sea level rise in our analysis (by removing its influence through a year-by-year tidal analysis) and further discuss the effects of climate change and variability in the revised version, which includes a new discussion section in response to other reviewer comments (see our comments to them above).

2. It has been widely accepted that storm surge and heavy precipitation are the first main influence factors of urban flood or waterlogging disasters. Please do not just list the data and their difference, discussions and conclusions must go deeper, the mechanism of the results and potential application in design of flood defenses should be clarified.

Response: Thanks for the suggestion. In the revised version, we would like to add a discussion part to have a deeper discussion about impacts by compound events (in parts based on historical damage records) and threats by climate change (particularly sea level rise), and also touch on potential ramifications for the design of flood defenses. However, we also would like to emphasize that no comprehensive analysis of the relationships between the different drivers of compound flooding, and the spatial and temporal variability, has been performed to date for coastal China. Hence, we believe that our results provide a baseline and can guide future research, including more detailed local assessments of the mechanisms through which these compound flooding drivers actually modulate urban flood risk. The latter requires more complex and computationally expensive modelling, which is beyond the scope of our analysis (and likely not possible to perform at the large spatial scales we include in our assessment).

