

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Comment on nhess-2022-26

Anonymous Referee #2

Referee comment on "Compound flood impact of water level and rainfall during tropical cyclone periods in a coastal city: the case of Shanghai" by Hanqing Xu et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-26-RC2>, 2022

Review of "Compound flood impact of water level and rainfall during tropical cyclone period in a coastal city: The case of Shanghai" (nhess-2022-26)

This study presents a two-fold, i.e., physics-statistics based framework to understand compound flooding during tropical cyclone period in a coastal metropolis. The physics-based Delft3D-Flow Flexible Mesh was employed to simulate hydrodynamic processes over the coastal city and to simulated storm tides, astronomical tides, relative sea level rise in the adjacent ocean. The copula theory was employed to statistically quantify the interdependence among multiple drivers of compound flooding (here, rainfall and water level). The result of this study sheds light on ocean-land interactions particularly for metropolis, in this case Shanghai.

In my opinion, the framework and the work comprehensively presented here both have the potential for researches and are relevant for applications in a wider sense. From the perspective of climate change, ideally relatively longer investigation period of observations is required. However, this is normally not the case. On the other hand, this study applied the process-based Delft3D for over 50 years simulations, which offers the opportunity to overcome the difficulty in availability of long-term water levels records. Apart from that, such long-term dataset including typhon tracks could be useful in the community for further relevant studies and for saving computational efforts as well.

I would recommend that a minor revision is required to be accepted for publication in Natural Hazards and Earth System Sciences.

General Comments

The storyline of introduction can be improved for enhancing the readability. The significance of this work could be increased by discussing the results in a wider sense.

Specific Comments

L35-38: a relatively long sentence.

L43: what does GDP stand for?

L46-47: could the authors please provide a rough estimate of the damage due to each Typhoon in US dollars? (I saw such numbers in Section 2.1)

L48-49: Please double check the grammar of the sentence.

L106: greater -> higher

L125: costly -> severe

L230: I would expect one or two sentences for describing the results of Figure 5.

L239: What do the authors refer to with the traditional approach?

L254: account -> accounts