

Interactive comment on “Field survey of the 2017 Typhoon Hato and a comparison with storm surge modeling in Macau” by Linlin Li et al.

Anonymous Referee #1

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In this study, authors conducted immediate post-typhoon field survey in Macau right after Typhoon Hato in 2017, which significantly influenced Macau city. This is rather important for disaster prevention and mitigation efforts in the future since it can provide lots of first-hand information. Afterwards, authors developed a numerical model to simulate the event and validated the model using their own survey data. Then, some further numerical studies were carried out to investigate different scenarios. In general, the MS is well prepared and written. After minor revision, I recommend the immediate publication of the paper considering that another similar typhoon Mangkhut (No 1822) occurred in 2018, which again affected the Macau city. These two cases could be inter-compared to explore many interesting phenomena and physical insights to help the local government to do a better countermeasure against such typhoon disasters.

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Detailed comments include, 1. Lines 70-73. This is an interesting point. In general, the maximum storm surge occurs before the typhoon landfall. Hence, the worst scenario is the high tide occurs several hours before the typhoon landing. Ref.: Lai, F., Liu, H. (2017) Wave setup properties in the surge-wave coupled simulation: A case study of Typhoon Khanun. IUTAM symposium on storm surge modelling and forecasting, Procedia IUTAM, 25, 111-118. 2. Lines 104-112. Interesting to see that inundation mainly occurred in the west part of the Macau Peninsula. This, on one hand, is caused by the low-lying topography in the west as mentioned by authors. On the other hand, the southeast region is directly facing the Pacific Ocean and typhoon attack which, in my mind, may suffer more severe wave actions comparing to the west region of the peninsula (though its elevation may be higher than west region). According to Fig 3(a), there is a S-N directed breakwater located in the southeast, which may protect the southeast region to some extent. Could authors specify these more in detail? As for northeast region, it may be protected/shadowed by the islands located in the east. Any descriptions about Figs 3(c) and 3(d)? 3. Lines 124-125. Could authors add Takagi's survey data of Macau in Fig 3a, just for comparison? 4. Fig 4(c) is not mentioned in the context. 5. For section 4.3. Just a suggestion. According to IPCC, the intensity of typhoon will also increase, accompany with the SLR. Hence, authors may apply the scenario under which the typhoon intensity is enhanced together with different SRL. 6. Lines 269-270. This may be not suitable since according to IPCC, the frequency and intensity of future typhoon is increasing. Hence, the worst-case scenario of future typhoon should be more severe than typhoon Hato. 7. In conclusion, please point out clearly that the inner harbor area is the most fragile region which could be inundated even under the lowest tidal level. For this, immediate attentions/engineering actions should be took by the local government.

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