

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

Linlin Li et al.

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We thank reviewer 2 for the valuable suggestions. In this revised version, we have made changes according to the suggestions and comments and highlighted areas where those changes are made. The point-by-point replies to the comments are below.

Comment 1: line 17-23: The purpose of this paper and the conclusion are suggested to be included in the abstract.

Author's response: Thanks for the suggestion, we actually included the purpose and conclusion in our initial version, but the abstract for NHES has 100 word limits, so we shortened it to current version.

Author's change to manuscript: no change is made.

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Comment 2. line 39: “Macau (and Hong Kong) commonly experience about 5-6 typhoons per year. . .”, references are required.

Author's change to manuscript: we add the reference: Lee, E. K. S., L. Fok, and H. F. Lee (2012), An Evaluation of Hong Kong's Tropical Cyclone Warning System, *Asian Geographer*, 29(2), 131-144.

Comment 3. line 40: “. . .by storm surges during major typhoons..” The periods are doubled.

Author's change to manuscript: Extra “.” deleted.

Comment 4. line 49: “. . .Although, Macau has 2 tididal levele gauge”. Typo.

Author's change to manuscript: Corrected.

Comment 5. line57: “which will be discussed in this paper.” Redundant.

Author's change to manuscript: Redundant sentence is deleted.

Comment 6. line 66-67: “The sudden intensification occurred because of the low vertical 67 wind shear and the high sea surface temperature of around 31 Celsius degree in the Northern portion of the SCS”. References are required.

Author's change to manuscript: we add the reference: HKO: Super Typhoon Hato (1713), Hong Kong Observatory, <http://www.weather.gov.hk/informtc/hato17/report.htm>, 2017.

Comment 7. line 68: “It is well-known that the . . . during a typhoon landfall plays Eÿ . . .”. Missing words.

Author's change to manuscript: we added the missing word “tide”. Here is the corrected sentence: “It is well-known that the tide during a typhoon's landfall plays a significant role”

Comment 8. line 70: “OSU TPXO-atlas8”. References are required.

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Author's change to manuscript: we add the reference: Egbert, G. D., and S. Y. Erofeeva (2002), Efficient Inverse Modeling of Barotropic Ocean Tides, *Journal of Atmospheric and Oceanic Technology*, 19(2), 183-204.

Comment 9. line 79-80. . .: "SCHISM (Semi-implicit Cross-scale Hydroscience Integrated System Model). . ."

Author's change to manuscript: we add the reference: Zhang, Y. J., F. Ye, E. V. Stanev, and S. Grashorn (2016), Seamless cross-scale modeling with SCHISM, *Ocean Modelling*, 102, 64-81.

Comment 10. line 80: "Weather Research and Forecasting (WRF) model. . ."References are required.

Author's change to manuscript: We add the reference: Skamarock, W. C., Klemp, J. B., Dudhia, J., Gill, D. O., Barker, D., Duda, M. G., Huang, X.-y., Wang, W., and Powers, J. G.: A Description of the Advanced Research WRF Version 3, National Center for Atmospheric Research, Boulder, Colorado, USA, NCAR TECHNICAL NOTE, 2008.

Comment 11. Fig 2: Table S: The location of the photo shall be added in the figure.

Author's response: We added the longitude and latitude of each photo in the figure.

Author's change to manuscript: Please refer to Fig 2 for the changes.

Comment 12. Fig 3a: The red texts are not clear.

Author's change to manuscript: We changed the colour to yellow which we believe is clearer.

Comment 13. line 106-107: The locations, Ponte Pou Heng on Avenida de Demétrio Cinatti, Rua Visconde Paco de Arcos, Rua do Almirante Sergio, are missing on the figures.

Author's response: We realize it might be very difficult for readers who are not familiar

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with the roads' names to identify them on the figure. Therefore, instead of adding the names on the map, we chose to remove the names and use other features already on the maps to describe the area referred to.

Author's change to manuscript: The sentence with the listed names is change to ". . .was completely flooded to a depth of 3.1 m at Ponte Pou Heng (the purple dot). Along the coastal roads of the Inner Harbor, inundation depth reached 2.0 - 2.5m in many low-lying places."

Comment 14. Fig 3b: No 'Rua Do Camboa' on the figure.

Author's response: The street "Rua Do Camboa" is shown in Fig 3a and Fig 3d.

Comment 15. line 133-143: The information of time step, domain, vertical resolution used in WRF shall be explained.

Author's change to manuscript: We added more explanation in the manuscript: "There were 45 vertical levels with the lowest level approximately 50 m above the surface. The output time interval of wind and pressure fields is 10 minutes."

Comment 16. line 152-154: The way to determine the Manning coefficient shall be explained with related references.

Author's change to manuscript: We added the requested information in the manuscript: "The values of Manning coefficient are informed by previous studies (e.g. Martyr et al., 2013; Garzon and Ferreira, 2016). We choose relatively low Manning value for the estuary and open sea area as the sediment in the Pearl River Estuary is dominated by very fine sand (mainly silt clays) (Jiang et al., 2014)."

17. line 160-161: How to setup the radiation stresses in SCHISM?

Author's change to manuscript: The WWMIII is dynamically coupled with SCHISM every 600 seconds. The radiation stress is estimated according to Roland (2008) based on the directional spectra itself. The radiation stresses computed in WWMIII are trans-

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ferred to SCHISM at each step to update water level and velocity, which are returned to WWWWIII as feedback.

18. Fig 5a: The text on the figure are not clear enough.

Author's change to manuscript: We have modified the figure by adjusting the colour of coastline and station name. The texts now stand out from the background colours.

19. Figure 6b : What are the reasons that the error at Chiwan is larger than other stations?

Author's response: The tidal gauge in Chiwan is located deep inside of the bay area (see the figure below) where the bathymetry and coastal geometry were subjected to significant changes in the past decade. The bathymetric data used in the simulation does not necessarily capture the most updated status in the bay.

20. line 195, Fig 6c, Fig 6d: The location name cannot be found on the figures.

Author's response: The two locations "Inner Harbor" and "Fai Chi Kei" are marked on Fig 3b. Readers can refer to Fig 3b for the locations.

Author's change to manuscript: We add the sentence "(see the locations in Figure 3b)" in the main text for readers' convenience.

References:

Garzon, J., and Ferreira, C.: Storm Surge Modeling in Large Estuaries: Sensitivity Analyses to Parameters and Physical Processes in the Chesapeake Bay, *Journal of Marine Science and Engineering*, 4, 45, 2016. Jiang, S., Xu, F., Li, Y., Liu, X., Zhao, Y., and Xu, W.: Distributional characteristics of grain sizes of surface sediments in the Zhujiang River Estuary, 30-36 pp., 2014. Martyr, R. C., Dietrich, J. C., Westerink, J. J., Kerr, P. C., Dawson, C., Smith, J. M., Pourtaheri, H., Powell, N., Ledden, M. V., Tanaka, S., Roberts, H. J., Westerink, H. J., and Westerink, L. G.: Simulating Hurricane Storm Surge in the Lower Mississippi River under Varying Flow Conditions, *Journal*

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of Hydraulic Engineering, 139, 492-501, doi:10.1061/(ASCE)HY.1943-7900.0000699, 2013. Roland, A.: Development of WWM II: Spectral wave modeling on unstructured meshes, 2008.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2018-222>, 2018.

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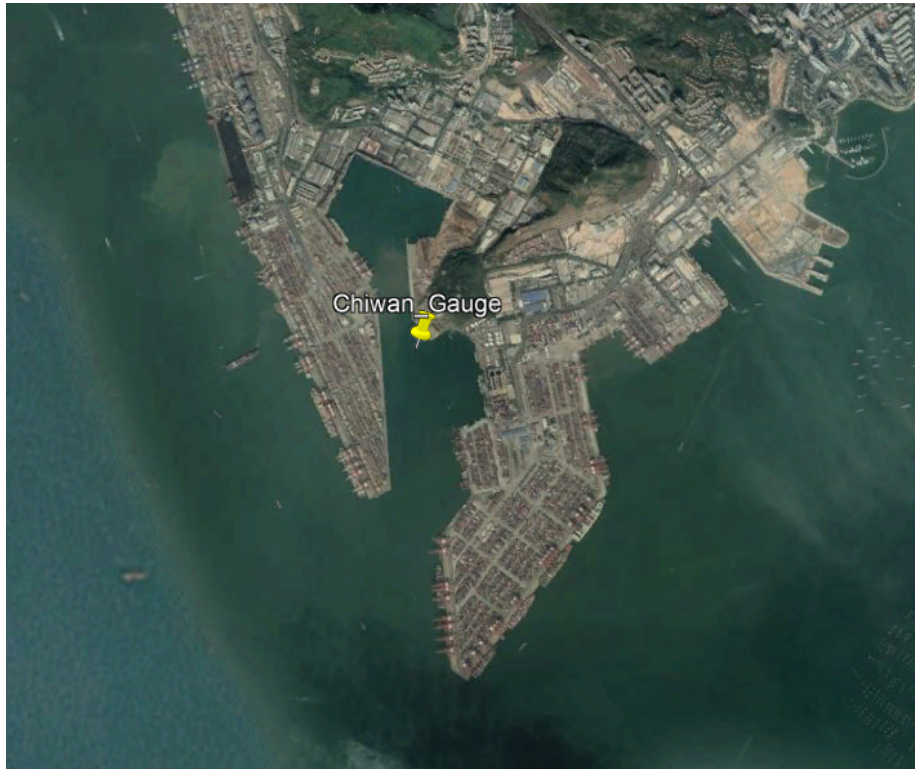


Fig. 1. The location of Chiwan gauge