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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Assessing and zoning of typhoon storm surge risk with GIS technique: A case study of the coastal area of Huizhou" *by* Si Wang et al.

Anonymous Referee #1

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The study conducted the assessment and zonation of typhoon storm surge hazard, vulnerability, and risk in a case study area with a high concentration of petroleum industries and population density, finding regions with different risk levels in the study area under five representative typhoon scenarios. These risk maps and analysis can aid in developing storm surge management strategies and evacuation plans, and the methodology (hydrological and wave models; GIS technique; exposure analysis) and the procedure can be applied in other locations. However, I found some issues about methodology and figure presentation that should be addressed in the discussion section to improve the quality of the article, which are summarized below.

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Discussion paper

Major concerns: (1) In the study, the performance of the coupled model for storm surge modeling has already been validated by comparing the simulated data and the water level records obtained from the Huizhou gauging station. However, the performance assessment of the coupled model was not done properly because the Huizhou gauging station was on the left of the study area. I encourage the authors to make another comparison between simulated data and recorded water levels that were obtained from one gauging station on the right of the study area. The validated results from these two gauging stations can make the performance of the coupled model more convincing over the study area.

(2) The storm surge modeling with the coupled model is an important step for this research and the modeling section requires more clarifying. For the ADCIRC model, I suggest authors give more description including what the discrete method was used and which coordinate system was chosen in the ADCIRC model, and how do you consider the bottom friction in the ADCIRC model because the different land types have various frictional values during the storm surge modeling.

(3) The data analysis of storm surge risks on different towns in the study area and the relation between hazard assessment and risk assessment can be added to the research paper, which is helpful to readers, especially to decision-makers, to better understand the impact from the storm surge.

(4). The authors conducted the risk assessment of storm surge for Huizhou city and we can identify the risk zones on different intensity scenarios from the results (analysis and maps). I encourage the authors to demonstrate how the results are useful for developing risk response plans and evacuation strategies for storm surge risk in Huizhou. It is a crucial aspect that can strengthen the study and the manuscript.

(5) I suggest the authors improve the presentation of figures 14, 15, 17, and 18: The terrain base map layer can be transparent to avoid blending with the colors on the assessment map layer. The font size of texts on the assessment map layers should

be increased. The legends in figures can be removed because they are repeated many times in figures 14 and 18 (b), (c), (d), and (e). The data analysis figure about vulnerability assessment can be added after figure 17 in the paper. The administrative boundaries might be displayed in the figures.

Minor comments on specific lines: 2.1 Study area 1) Figure 1: It is not clear to me where the Daya Bay Petrochemical Zone is located. It is important to add a visualization of the Daya Bay Petrochemical Zone in Figure 1 because the Petrochemical Zone with a high concentration of petroleum facilities is the reason to conduct the hazard and risk assessment of storm surge in the study.

2) L130- L145: Some information about the study area is not necessary and can be removed.

3) L160: The elevation map of the study area which is a crucial factor for the storm surge modeling in the paper should be displayed.

4) Figure 2: The more visualization about the barrier that is an important aspect might be given.

5) L178: Administrative boundaries at the township level should be displayed in the figure.

6) Figure 2 and Figure 3: North arrow in these Figures are not clear.

3.1 Model description and validation 1) L274: The unit of the radius of maximum wind (Rmax) on the Y-axis should be 'km' in Figure 7.

4 Results and discussion 1) Figure 13: The legends are not clear.

2) Figure 16: The colors of different bars can be set to the same value

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