

Dear Editor and Reviewer:

Thank you very much for your supervision of the reviewing process of our manuscript. We highly appreciate your carefulness and broad knowledge on the relevant research fields. The article has been revised according to your constructive comments and valuable suggestions. The main responses to the comments are described as follows:

**1. The use of building height to adjust the existing depth-damage functions is good. However, there is only few sentences in Line 394-395 about why building height is an important factor in quantitative storm surge risk assessment. Throughout the introduction, there is some description about the application of building footprint, but no introduction to the influence of building height. Thus, I suggest to introduce building footprint in more concise language, and meantime concurrently add some description of why building height was chosen as an important factor.**

**[Reply]**

When the building is inundated, there are a variety of factors that may influence the amount of monetary loss. For example, building type, building structure, private precaution, maintenance status, and others (Marvi, 2020; Thielen et al., 2008). Taramelli et al. (2022) pointed out that building's height is one of the factors for determining the susceptibility due to flooding and evaluate the buildings' potential damage by flood hazards. Hasanzadeh Nafari et al. (2016) developed a new loss model, in which building with different story were divided into different categories in the modelling process. To conclude, height is an important factor that affecting the vulnerability of buildings when they serve as inundation-exposed elements. Therefore, in the process of quantitative storm surge risk assessment, it is necessary to adjust the depth-damage functions to make buildings of different heights correspond to different functions.

Besides, different from the field research and statistics required for other data acquisition, the data of buildings' height is more accessible from multiple sources. For example, public data DSM data has been utilized for building height estimation (Huang et al., 2022), some satellite companies also offer services to customize DSM data for selected regions. Nonetheless, they respectively suffer from a lack of precision and high costs. Building height can also be obtained via remote sensing technique, such as Synthetic Aperture Radar (SAR) (Li et al., 2020; Frantz et al., 2021), or take advantage of shadow in remote sensing images (Comber et al., 2011; Shao et al., 2011). However, in addition to the lack of precision, the absence of data necessary for modelling and the crowded character of rural buildings in China make the above methods difficult to be implemented. Compared to methods above, acquiring building height through UAV ensures high accuracy while being relatively efficient, and the method is quite simple, which also reduces the required costs.

These paragraphs have been added to the Introduction section of the revised manuscript.

**Specific modifications:**

**(1) In Line 52-53, several typhoons have caused disasters, this sentence may need a reference.**

**[Reply]**

Thanks for your comment. Two references have been added, and the sentence has been revised to reflect that "For example, Typhoon Hato in 2017, Typhoon Mangkhut in 2018, Typhoon Lekima in 2019 has caused significant damage to coastal cities in China, and resulted great losses of life and property (Zhou et al., 2021; Yang et al., 2019).".

(2) In Line 63, 'However' seems unnecessary, consider deleting it.

[Reply]

Thanks for your comment. The word has been removed in the manuscript.

(3) In Line 74-76, the sentence has some grammatical errors.

[Reply]

Thanks for your correction. The sentence has been removed in the manuscript due to content adjustments.

(4) In Line 81, 's' should be added to 'result'.

[Reply]

Thanks for your correction. The sentence has been revised based on your feedback.

(5) In Line 170-171, the use of 'such as' is suspiciously ambiguous, consider modifying the sentence.

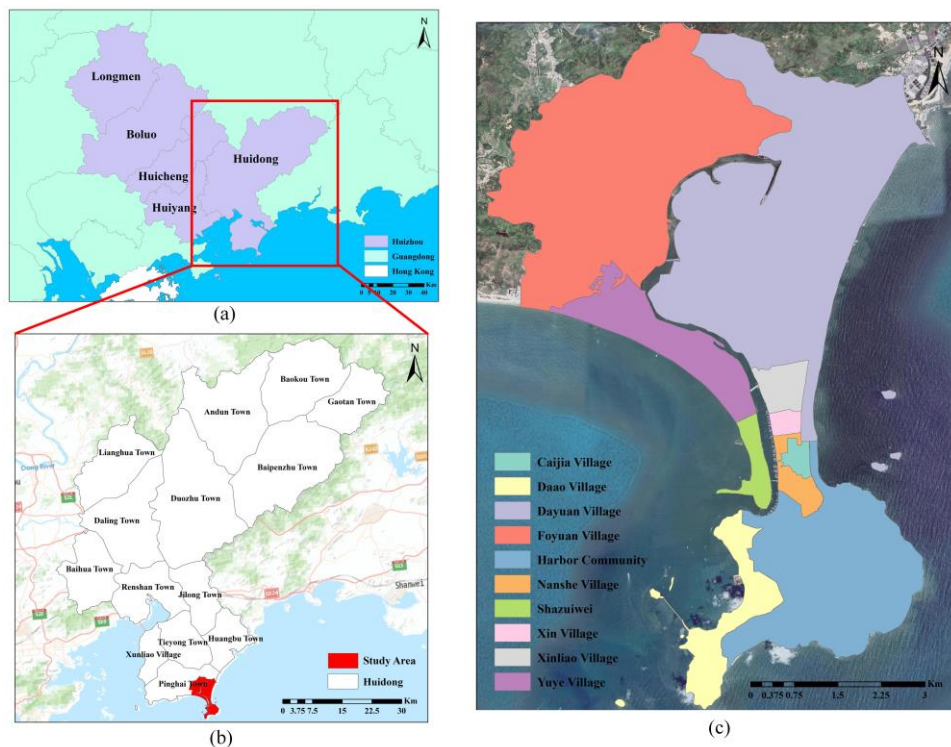
[Reply]

Thanks for your comment. The sentence has been revised to reflect that "However, just as mentioned above, Guangdong is relatively vulnerable to storm surges, such as Typhoon Hato and Typhoon Mangkhut, due to its geographical characteristics."

(6) In Fig.1, some of the color in Fig.1(c) are too similar, which might cause difficulty in reading, consider modifying it.

[Reply]

Thanks for your comment. Figure 1 has been replaced by followed image:



(7) In Line 218, according to what follows, it should be retitled wind field data, and the description of ‘Holland’ is needed.

[Reply]

Thanks for your comment. The paragraph has been reconstructed in the manuscript as follows:

(5) Hybrid wind field: ERA5 is the fifth generation of the European Reanalysis dataset produced by the European Centre for Medium-Range Weather Forecasts (ECMWF), and it provides the comprehensive and high-resolution atmospheric and climate data. Holland typhoon wind field model was proposed by Holland in 1980, which introduced Holland B parameter on the basis of the Schloemer exponential pressure distribution model (Holland, 1980). In this study, the two data are fused to generate hybrid wind field data, which is subsequently utilized for storm surge simulations.

(8) In Line 361, the sentence uses ‘more’, but there is no object of comparison, consider modifying it.

[Reply]

Thanks for your comment. The word has been removed in the sentence.

(9) In Line 529, ‘Fig.9’ should be ‘Fig.9(b,c)’.

[Reply]

Thanks for your correction. The sentence has been revised based on your feedback.

(10) In Line 545, ‘Fig.9’ should be ‘Fig.9(d,e)’.

[Reply]

Thanks for your correction. The sentence has been revised based on your feedback.

(11) In Line 555, while ‘risk matrix’ is introduced in this paragraph, there is no description of what exactly the ‘risk matrix’ is. It might be helpful to attach a table.

[Reply]

Thanks for your suggestion. The concrete representation of the risk matrix used for qualitative risk assessment is shown as follow:

Table 4. The concrete representation of the risk matrix

		Vulnerability			
		Low	Moderate	High	Very High
Hazard	Low	Low	Low	Moderate	Moderate
	Moderate	Low	Moderate	High	High
	High	Moderate	High	High	Very High
	Very High	Moderate	High	Very High	Very High

The table and necessary statements have been added into the section 4.3 of the revised manuscript.

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