Dear editor, dear authors,

The manuscript under consideration for publication addresses the capacity of salt marsh vegetation to reduce coastal flood damages to buildings at Chatham County, Georgia, USA. The study used an existing hydrodynamic model in combination with depth damage functions to estimate flood damages and corresponding reductions provided by current salt marsh cover. Finally, spatial distribution of these benefits are studied using a GIS overlay with socioeconomic data.

The novelty is in the expansion of the damage function based on National Flood Insurance Program (NFIP) starting from the work by Wing et al. (2020). Specifically, fitting a non-linear function and including residential homes up to three stories with and without basement. I found the research gap poorly described and making a too large claim, as combining hydrodynamic modelling with depth-damage function is to-date a standard procedure and is even applied at the global scale (e.g. Tiggeloven et al. (2022), and local scale (e.g. Philippines by Menendez et al. (2018)). In addition, the hydrodynamic model which is presented as state-of-the-art is omitting critical physical processes to accurately predict coastal inundation especially in vicinity of coastal wetlands. Finaly, the level of validation of the integrated framework is lacking and is in my opinion a critical component in the analysis. In this review I highlight a number of attention points that could be implemented as part of a *major revision*, but would require substantial alternation of the approach and/or structure of the manuscript.

Major comments:

Research gap

In lines 30-35 the authors start to define the research gap by stating that the physical effects (e.g. water level reductions) provided by coastal ecosystems are evident, but the translation into economic benefits is lacking. Next, the claim that this translation is performed at the global and regional level. In the following paragraph (starting at line 38), they stated that previous work focused mainly on wave attenuation. However, the cited studies in previous paragraph also include other flood components. Eventually, the final research claim is presented in line 40: “The monetary value.. poorly understood”. The built up towards this research gap can be much improved and benefit from a more extensive literature review. In addition, in my opinion, the research gap is too wide and does not match the activities in the study. I would target the research gap towards the novelty of the study; the improvement of depth damage estimates with the NFIP data compared to the USACE standard depth damage curves.

Hydrodynamic model

The authors used the existing ADCIRC – SWAN model. The authors acknowledged that this modelling system is widely used (line 104), thus cannot be presented as novel. The model resolution is up to 50 metres, which is to-date considered low resolution for local inundation models. State-of-the-art processed based inundation models at this scale have typically a resolutions up to 25 – 5 meters. But more importantly, SWAN is an oceanic wave model and unfit to accurately predict processes in the surf zone. For example, as SWAN averages over the wave phase it misses infragravity-wave physics which is critical for inundation levels. The authors should couple the ADCIRC-SWAN model with a dedicated model for the surf zone and increase the resolution to claim the model-setup to be state-of-the-art. Alternatively, and advisable, is to admit the caveats of the hydrodynamic model and focus fully on the depth-damage-estimates.

Engineered coastal protection

The authors do not mention if engineered coastal protection is present within the study area and how this infrastructure is represented in the model setup. I cannot imagine there are no coastal protection structures in the area and not accounting for those will greatly influence the results of the integrated results. Ideally, the structures are included in the hydrodynamic model, but at least their protection level should be accounted for in the economic analysis.

Validation of integrated framework

With the NFIP data the authors possess a very rich data set which provides the opportunity to validate the integrated framework. Firstly, by deriving the claim data corresponding to the selected storm 0157 the authors can visualize the flood depth and flood extent in the study area. This insight could be used to further validate the hydrodynamic model. Secondly, and more importantly, the data could be used to validate the damages that are estimated for the storm0157 and the other selected storm (1313). This would be a crucial step as currently, the accuracy of the presented data in Table 4 is unknown. Intuitively, the reader assumes that the NFIP derived estimates are more accurate compared to the USACE derived data, but this is not validated nor quantified. In other words, the regression depth-damage formula is based on all claim data and application of this formula to the selected storm and subsequent comparison of claim data of these events would provide valuable insight into the accuracy of the setup. I consider this a critical step which aligns with the novelty of this work.

Minor comments:

Title:
Suggestion to rephrase in line with the novel aspects of the work. At least remove infrastructure

Figures:
Varying font sizes and font types are used across the figures.

Line 21: What part of the 129 million people live in flood prone areas?

Line 23: Insert reference

Line 24: Is this global, or only US?

Line 29: change to: '*traditional gray infrastructure. Natural coastal ecosystems can reduce flood risk by attenuating storm surges and waves*'

Line 30: A barrier island is a morphological feature, I would not classify it as a separate coastal ecosystem. For example, mangroves or marshes can occupy barrier islands.

Line 40: "combination of coastal wetlands and levees" instead of marshes and levees.

Line 43: Remove 'high resolution'

Line 71-75: I would use past tense to refer to the Wing et al. study.

Line 80: I would not start a paragraph with a reference to a figure. Not reader friendly. For example start with: "An existing hydrodynamic model is used to provide tropical cyclone induced inundation depth and extent for scenario.."

Line 102: 50 meters is rather coarse for a local model. Could you include a figures showing what part of the computational grid has the 50 meters resolution and what part has a lower resolution.

Line 102: Is the wave model using the exact same grid and the flow model?

Line 109: The ADCIRC model is solving also the Shallow Water Equations, in addition to the wave continuity equation?

Line 113: Manning bottom friction coefficient?

Line 125: What is the total storm duration? A 20 min interval seems okay, but it depends on the total storm duration.

Figure 3: Please add some statistics, e.g. RMSE, MAE + R^2 scatter plot

Line 138: The marsh areas are not treated as open-water as the elevations remained the same. Thus rather implementing them as bare grounds, but with a roughness coefficient like open-water. Using this set-up bottom friction is limited, but depth-induced wave breaking still occurs.

Line 140: Please clarify what you mean with 'storm surge-driven waves'

Line 140: The effect of vegetation on wave propagation is not accounted for? In other words, the formulations by Suzuki et al. are not activated in SWAN?

Line 152: "A subset" reads like you rerun a substantial amount of simulations, but you selected two storms.

Line 182: What did you do with the ambiguous data without unit (either feet or inch?) You filtered them out I suppose? What percentage of the total data concerns this?

Line 233: Did you regrid the model results to a equidistant raster? If yes, what resolution and how?

Line 240: Maybe start with some context on the storm impact first, prior to stating effects of marshes

Line 243: 'up to' is vague. Use statistics to underpin the statements. What is the average reduction plus percentile spread in absolute values and percentual reduction.

Line 261: The whole point was that the regression formula account for non-linearity?

Figure 10: Consider including a difference map USCACE versus NFIP approach

Line 366: Weighted average seems to suggest something else.

Line 395: Be specific that this concerns storm 0157 (a single storm)

Line 408: Remove state-of-the-art

Line 434: Not surge?

Line 445: I would not state that this framework is applicable globally, as it requires detailed claim data such as provided by the NFIP, which is not widely available in other countries that do not have an insurance-culture.