Reviewer 2:

This manuscript is about the implementation of a modelling system based on SCHISM covering the Gulf of Maine, the Mid-Atlantic Bight, and much of the South-Atlantic Bight (SAB) along the North American Atlantic Coast. In this study, the authors conducted a 20-year simulation from 2001 to 2020, focusing on tidal elevation, salinity, temperature, and velocity. The system was evaluated by model-observation comparisons over the studied regions. For the first time, they extended a regional continental-scale ocean model to the tidal wetlands to include the compound flooding process. They also conducted a single-year simulation with comprehensive tidal marsh coverage for sensitivity analysis. The model lays a foundation for future applications and is worthy of publication. I suggest a major revision before publication.

Thank you for your thoughtful comments and suggestions to help improve our manuscript. We have carefully considered your feedback and incorporated the suggested revisions into the updated manuscript, along with a detailed point-by-point response to facilitate your evaluation.

The labels in Figure 1 are confusing, with repetitive labels of (b), (c), (d), (e), (g). I understand that the orange boxes are defining the regions covered by (b), (c), (d), (e) subplots. However, the way to present is confusing. I suggest you change the orange labels to the name of the regions, for example, change orange (b) to Gulf of Maine, orange (c) to Long Island Sound.

Thank you for the suggestion. Due to limited space in panel (a) for labeling coastal names—particularly since panel (c) spans a larger area than just Long Island Sound and panel (d) focuses only on part of the Mid-Atlantic coast—we have incorporated the suggested revisions into the subplots (b), (c), (d), and (e). We also explicitly denote the orange boxes in the figure caption.

P125: was used to validate creek and wetland simulations -> were used to validate creek and wetland simulations

We have fixed this error at line #136.

P235: The authors stated that “The model effectively represents the Gulf Stream, as indicated by sea surface temperature (not shown)”. I am wondering why they are not showing the SST comparisons? It is important to demonstrate the representation of the Gulf Stream.

We agree that illustrating shelf-scale processes such as the Gulf Stream is important. Given that multiple SCHISM modeling papers have already shown the model’s capability in capturing shelf processes, including Ye et al. (2020 for SST, Cui et al. (2024) for shelf current dynamics, Huang et al. (2024) for shelf responses to hurricane events, and Park et al. (2024) for coastally trapped wave propagation along the U.S. Specifically for this study, our focus is the linkage to shallow

water systems and we now introduce a passive tracer experiment as a response to Riewer 2 to directly illustrate wetland-to-shelf transport pathways under the influence of the Gulf Stream and other shelf processes. Therefore, we streamlined some validation details in the manuscript to maintain clarity and conciseness.

For the currents comparison in Figure 10, a metric is needed for a quantitative comparison of both magnitude and direction.

We have added the RMSD values for velocity magnitude and directions across the region throughout the year at line #272-274.

P275: “by the salt front estimation data provided from DRBC (Fig. 10)”. It is referring to the wrong figure, since Figure 10 is not related to salt front.

We have fixed this error at line #321.

It is not clear how salt front distance is defined/calculated.

We now add this definition “distance from the bay mouth to the location where salinity drops below 0.5 PSU” at line # 240-241.

In section 4.1.2, the authors stated that “…modeled tidal flow fluxes at the gate or major inlets of the three significant waterbodies at mid-Atlantic – Delaware Bay, Chesapeake Bay, and the APES. While the net fluxes are always associated with the riverine discharge as denoted in Fig. 3, the flood and ebb tidal fluxes have distinct patterns among these three systems” However, this discussion lacks the detailed analysis one would expect from such a statement. The section provides no calculations, additional figures, or quantitative comparisons of these "distinct patterns." Without supporting data or deeper analysis, this discussion feels superficial and insufficient to warrant its own section.

We now add a new Fig. 13 to further support this part of discussion. This figure shows tidal fluxes at major coastal water bodies and illustrates the impact of hurricane events on local water exchange patterns.

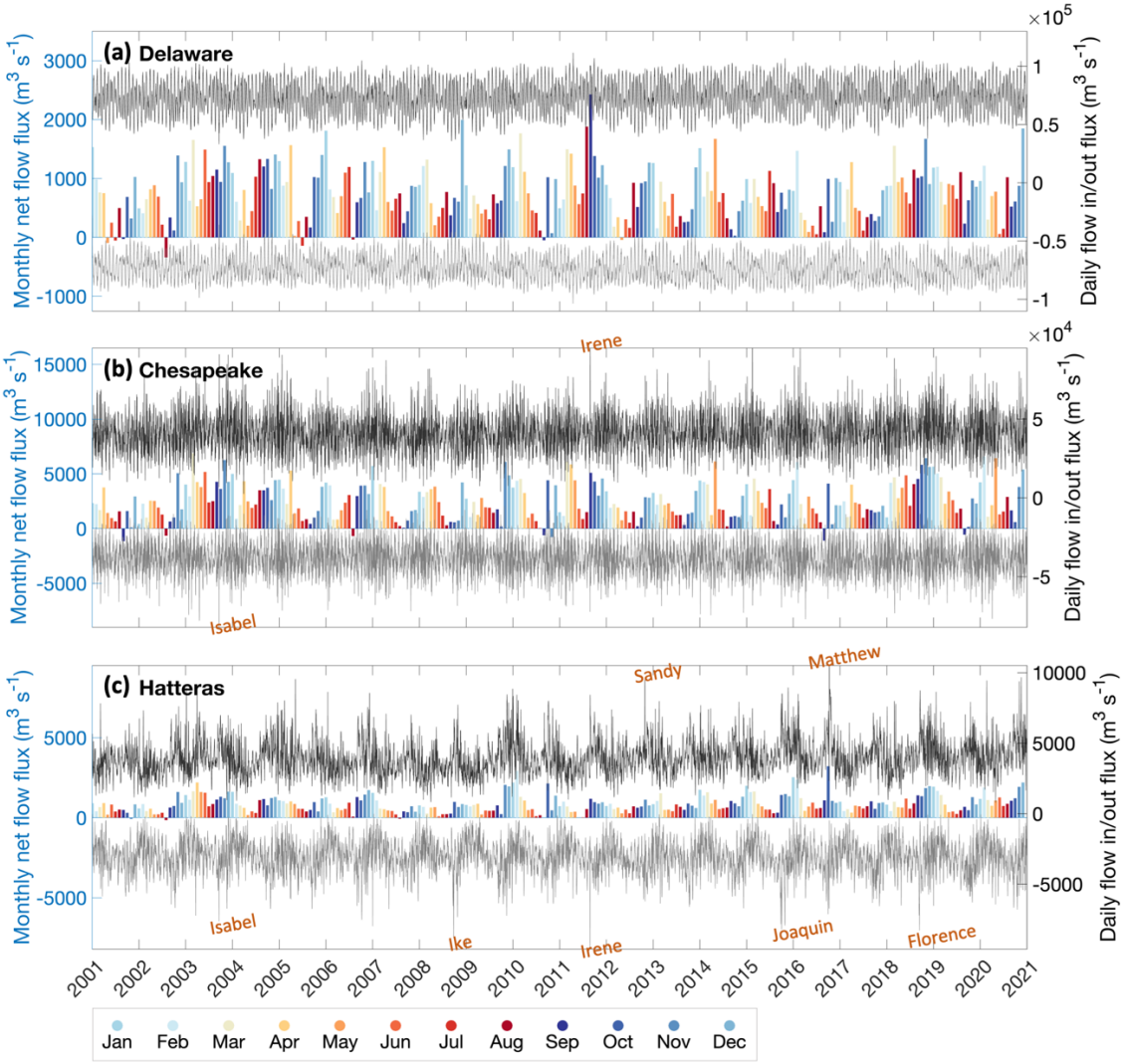

Figure 13: Tidal fluxes across the mouths of (a) Delaware Bay, (b) Chesapeake Bay, and (c) Hatteras Inlet at APES. Colored bars represent monthly net flow, while black and gray lines show daily inflow and outflow. Notable hurricanes are indicated along the timeline.

References

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