Dear Dr. Yool,

Thank you for your thoughtful feedback and for the opportunity to clarify the points raised. We have carefully addressed each item and made the relevant changes to the manuscript and associated data archive as requested. A point-by-point response is provided below for your review.

I have now examined these and, while I am generally happy with your responses and manuscript improvements, I would like clarification on a small number of points ahead of making a decision about your manuscript.

Re: Referee #2's final comment on the connection between the shelf and the wetlands – I note that you have added some information from a new 1-year tracer-release experiment. However, I'm unclear on is whether these tracer simulations can be meaningfully validated – the information is informative on what's happening within the model, but is this realistic? My reading of the accompanying text in the manuscript is that this is unclear, so any clarification you can add would be valuable – even if it is just to note that validation is challenging.

Thank you for your thoughtful comment regarding the one-year tracer release experiment. We appreciate the opportunity to clarify its purpose and limitations. The primary intent of this simulation was to explore potential patterns of connectivity between tidal wetlands and the continental shelf by examining transport pathways under a controlled and idealized setup. As such, the passive tracer is not intended to represent a specific or realistic biogeochemical constituent, and we acknowledge that direct validation against observational data is inherently challenging due to the lack of long-term or spatially extensive in situ tracer measurements originating from coastal wetlands. However, the transport pathways and accumulation zones identified in the model are qualitatively consistent with known shelf circulation features and prior particle-tracking studies in the region. We have revised the paragraph in the manuscript to clarify this point and note the validation limitations while maintaining the value of the experiment in demonstrating the role of shelf-scale processes in shaping wetland-sourced material distribution at lines #376-381.

Re: Referee #3's comment "I am wondering why they are not showing the SST comparisons? It is important to demonstrate the representation of the Gulf Stream" – I am unclear whether any of your response here has resulted in changes to the text in the revised manuscript. Can you clarify please? The referee's question highlights an omission that addressing could help your readers with, even if you just note relevant literature this is better than leaving the reader in the dark. So, if you haven't included any of this, I would encourage you to reconsider. I'd additionally note that, because this is a new model run, it is of course arguable that prior validation studies may not be entirely relevant on this point.

Thank you for the follow-up and for emphasizing the need to clarify our response to Referee #3. We fully agree that the Gulf Stream is a key feature of shelf-scale dynamics and appreciate the referee's concern regarding its representation. We did evaluate the Gulf Stream in this specific model configuration. Although we opted not to include an additional SST figure in the main context to maintain clarity and focus, we have generated relative figures in the supplementary material (Fig. S5). Comparisons between modeled SST and the NOAA OI SST dataset show good agreement, with an overall MAE of 0.55 °C and a RMSD of 1.09 °C, and we have now added these metrics and discussions to the manuscript (lines #251-255). While we recognize that prior validation studies may not fully substitute for evaluation of a new model run, these results indicate that the Gulf Stream is realistically captured and that model performance is consistent with prior SCHISM applications.

Re: Figure 13 – I have several questions or comments about this new figure, and would appreciate it if you could address these.

#1 Is there a good reason for the rather sporadic labelling of hurricane events between the panels in this figure? Does this relate to whether or not these hurricanes affected the specific locales shown in the three panels? If this is the case, you might want to amend the final sentence of the caption to: "Notable hurricanes are indicated along the timelines of impacted locales" (or similar). But if all three regions are affected, make the position of the hurricanes easy to see across all of them.

Thank you for the suggestion. We have revised the original final sentence to read "Notable hurricanes are marked along the timeline at the affected locations, with names in bold indicating those that impacted multiple sites." This change clarifies that hurricanes affecting more than one region are shown in bold.

#2 There are strange interference patterns in (a) for both in- and out-flow that do not appear in the corresponding lines in (b) and (c). Can you clarify why this is? If it is not a plotting artifact – perhaps a data-frequency issue? – please make this clear.

The interference patterns indicate spring–neap tidal signals are more apparent at the Delaware Bay mouth (panel a) than at Chesapeake Bay (panel b) or Hatteras Inlet (panel c). The Delaware Bay has a substantially larger tidal range, resulting in tidal flux magnitudes approximately twice those of Chesapeake Bay and about 16 times greater than those of Hatteras Inlet. In addition, river discharge to the Delaware Bay is slightly smaller than to Hatteras Inlet and only ~20–25% of that to Chesapeake Bay. Consequently, variability from river discharge and wind-driven fluxes constitutes a much smaller proportion of the total flux in Delaware Bay, making the spring–neap signal more distinct. Here we attach a zoom-in on the time series over a year for your reference. We have incorporated this explanation into the manuscript at lines #324-327.

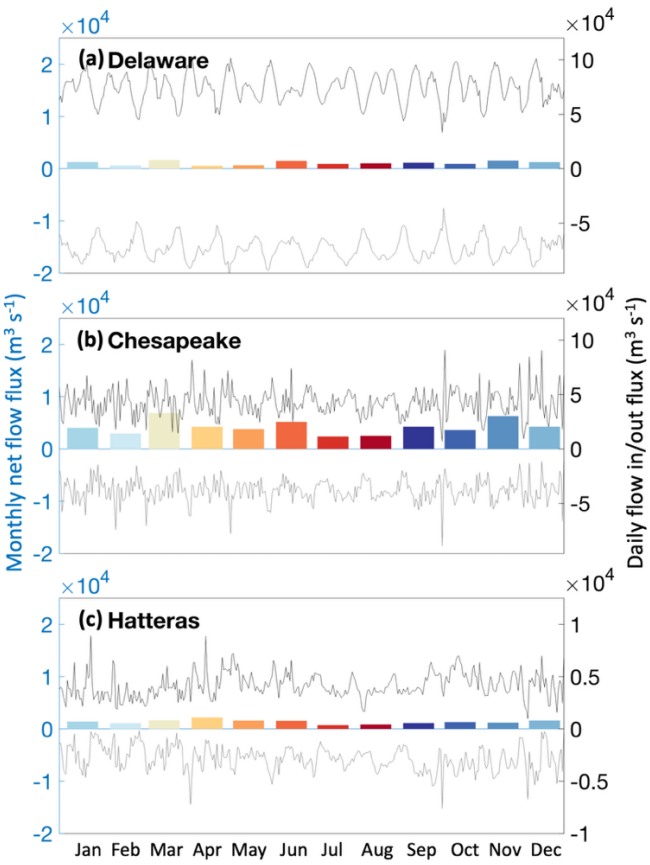

Fig 1. One-year (2003) zoom-in of tidal fluxes across the mouths of (a) Delaware Bay, (b) Chesapeake Bay, and (c) Hatteras Inlet at APES. Colored bars represent monthly net flow, while black and grey lines show daily inflow and outflow. Except for the right-hand vertical axis in panel (c), all left-hand vertical axes share the same scale. The right-hand vertical axes in panels (a) and (b) also share the same scale.

#3 The left-hand vertical axes here seem chosen so that the net flow data does not interfere with the separate in- and out-flow lines. This seems an odd choice since it essentially deprecates what seems to be the main point of these panels, and makes it difficult to compare the three regions since their vertical scales are very different from one another. Similarly, the vertical scales on the right-hand vertical axes are very different from one another, use different orders of magnitude for scaling, and even confusing don't align their zero value with that of the left-hand axes. Surely there are better ways to plot these?

We have revised the vertical axes so that all left-hand axes share the same scale, aligning the zero values on both sides at the same position. The right-hand vertical axes in panels (a) and (b) now also share the same scale. For panel (c), the magnitude of inflow and outflow is approximately an order of magnitude smaller than in the other two regions, making it difficult to visualize wind-

driven variability at the same scale. To preserve this variability, we retained a different scale for panel (c), as noted in the figure caption at lines #343-346.

Finally, in reviewing your Data Availability section, I visited the Zenodo archive that records the simulation output used in your manuscript and have a few comments. First, you appear to have uploaded unnecessary MacOS metadata alongside your *.mat data. As this is not necessary, and may even be confusing for Linux or Windows users, please remove this. Second, the uploaded dataset includes no README or other guidance about the uploaded files. You should at least include information to explain what the files are so that users do not have to work this out from first principles. Third, you have not included any of the scripts used to complete your analysis and plotting. In conjunction with an explanation for the data files, these document your analysis and would additionally assist users in making use of the files.

Thank you for your advice. The invisible macOS metadata files appearing in the Zenodo preview are automatically generated during the creation of the zip file and unfortunately cannot be removed. To avoid confusion, we have added a note about this in the newly uploaded README file. In addition, we also upload the scripts used for the analysis and plotting at the GitHub repository (https://doi.org/10.5281/zenodo.16787106).

I would appreciate it if you can clarify the above points for me, and make any relevant changes to your manuscript (and data archive). Please do not hesitate to get in contact with me if you require any clarification from my end.

Once these points are addressed, the manuscript can proceed to its next stage.

Please let us know if any further clarification is needed. We appreciate your time and consideration, and we look forward to the next steps in the review process.