@Reviewer 1: Thank you for the review and part pertaining to Reynolds. I have added in the conclusion section that, to tackle large-scale tidal simulations, the development of a global model should be the next step. Added "For comprehensiveness, the development of a global model may be a subsequent stage, a step that likewise provides boundary conditions for regional and local models".

I have increased in Figure 5 the mark density and increased the duration by 30 to 40% to balance coverage and readability of the plot. If a further increase is advised, then I can go up to twenty-x days as per the available data.

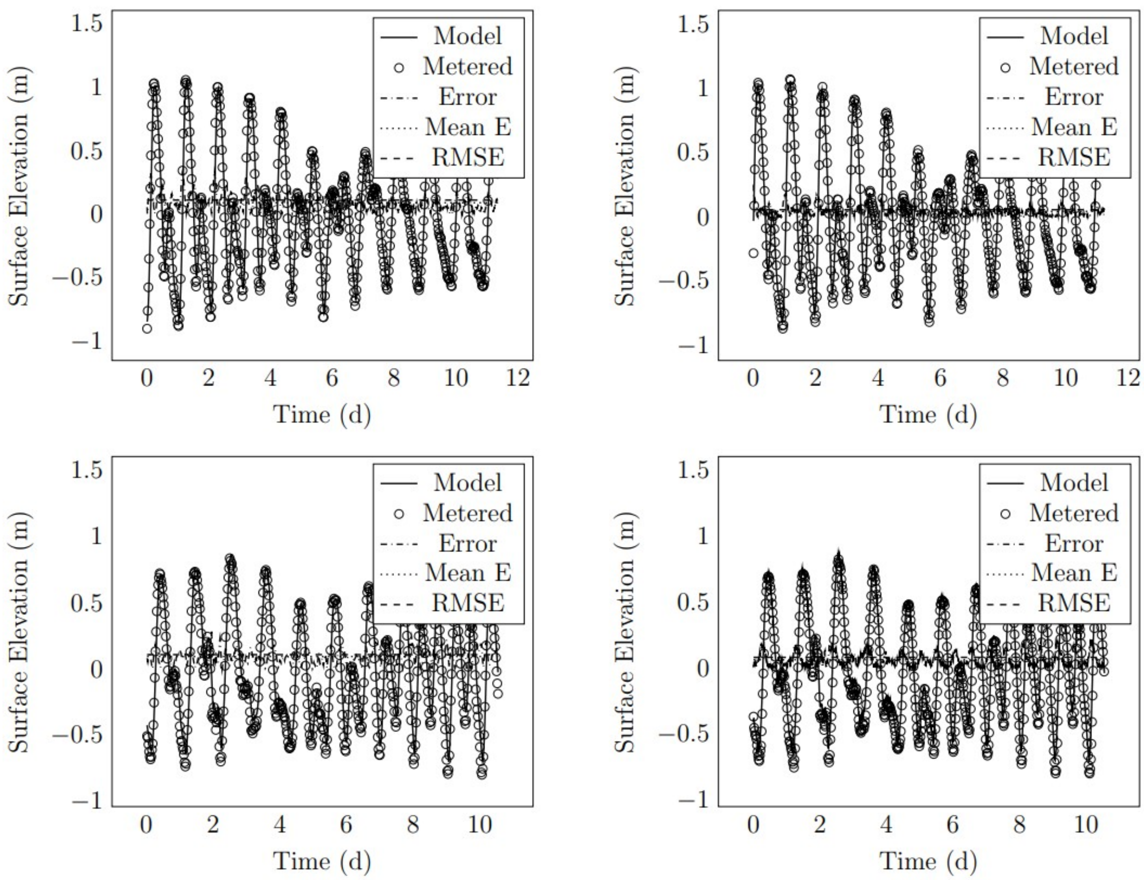

Figure 5: Correlation of simulated and surveyed surface elevation at the location of tidal meter 2 (left) and 3 (right) during August (top) and April (bottom) of 2023.

@ Reviewer 2: Thank you for the review questions. Manuscript got revised with changes as per points 1, 2, 3, 4 and 6, as detailed below.

1. The reference to Holleman et al. (2013) alongside Chan et al. (2018) is made to point out the

significance of numerical diffusion. The connection to Voronoi meshes is drawn by the second citation in the bracket, i.e. Chan et al. (2018). Voronoi meshes exhibit fewer acute polygon angles (spanned by cell vertices that are acutely remote from the cell centroid) which factor into numerical diffusion. Of course, flow aligned meshes are even better to tackle numerical diffusion but are here impeded by tidal dynamics bar the mesh itself becoming dynamic. Have changed "Furthermore, Voronoi approximations exhibit a reduction in numerical diffusion vs Delaunay meshes [4, 5]" to "In terms of numerical diffusion [4], Voronoi meshes exhibit a reduction compared to Delaunay meshes [5]." in the pending Arxiv revision.

2. Absent GPU acceleration, running this simulation along 5 other hydrodynamic simulations took one week on a Ryzen 9 7950X3D. That translates to about one day if all the CPU cores are dedicated to the simulation. Have added "The model exceeds real-time performance on a Ryzen 9 or comparable desktop CPU". Unboudedness over time is not a concern for numerical diffusion as it has a nivellating effect. In fact, its dampening effect can mitigate overshooting at the expense of accuracy. Have added "numerical diffusion does not threaten the stability but accuracy of a simulation".

3. The algorithm has been validated with a method of manufactured solutions, MMS, which has been submitted separately for publication. The MMS was realized by oscillating the seabed to match the flow field to an analytical solution. The method can be used to validate the algorithm and mesh. Have included points mentioned in 3. and 4. below in the pending Arxiv revision. Have added "Algorithm validation has been conducted with a method of manufactured solutions (MMS), which has been submitted separately for publication \cite{Lawen24}. The MMS was realized by oscillating the seabed to match the flow field to an analytical solution." in the manuscript.

4. Added "The method is first order in space and time to attain high resolution meshes (Figure 6) to resolve waves while remaining efficient in terms of Flops: to resolve waves, the cell size should be a log order below the part of the wave spectrum of interest, i.e. maximizing cell count and minimizing Flops per cell."

Timewise the LHS in equations such as #11 denotes forward Euler approximation. The ^{+\delta t} denotes a quantity at the subsequent time level. Past Delaunay versions of a species transport model (Lawen et al., 2013, Lawen et al., 2014 as cited in the paper), which worked in conjunction with other ocean models, offered for scalar quantities also semi-implicit matrix reordering algos. However, these attained only a tripling of time steps at the expense of flops for the reordering, rendering the net gain in terms of flops questionable. Added in the MS "Past Delaunay versions of the 3D SMART's species transport \cite{LAWEN2013330, Lawen2014} offered for scalar quantities also semi-implicit matrix reordering algorithms. However, these attained only a tripling of time steps at the expense of Flops for the reordering, rendering the net compute gain questionable."

Based on this experience, a split approach is pursued: fast explicit Voronoi algorithm (small timesteps but less flops per step) and slow implicit reference solver (published separately) for algo cross-validation in addition to validation with MMS and survey.

Yes, Voronoi schemes can be expanded to n dimensions. Interestingly, in this context, that might not improve results: for example, in the coastal case, the usual approach of resolving the vertical rather via multiple layers retains an alignment with the dominant horizontal current components and, thus, avoids numerical diffusion. That is, utilizing multiple layers achieves quasi flow alignment for the vertical. This example harkens back to question 1 above about numerical diffusion. But perhaps expanding the Voronoi tessellation to the vertical could be an enhancement to model wave breaking and moving coastal meshes (4D Voronoi). Added to the conclusion section "Voronoi schemes can be expanded to n dimensions. For coastal systems that might not improve results: the usual approach \cite{} of resolving the vertical rather via multiple layers retains an alignment with the dominant horizontal current components and, thus, avoids numerical diffusion. That is, retaining multiple layers achieves quasi flow alignment for the vertical. This caution might not hold for modeling wave breaking or moving coastal meshes (4D Voronoi)."

5. The model is capable of back-coupling modeled quantities onto hydrodynamic properties. There are two ways to account for bed evolution: A.) Bed thickness change fluxes are modeled for representative periods, such as a neap-spring cycle, and then extrapolated for an annual seabed update. B.) To really simulate multiple years. The latter would preferably be supported by GPU acceleration.

6. Yes, did change "Numerical diffusion for flow-aligned unstructured grids" to "Numerical diffusion for flow-aligned unstructured grids with applications to estuarine modeling". Thank you.