



EGUsphere, referee comment RC3
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Comment on egusphere-2022-199

Anonymous Referee #3

Referee comment on "Numerical Modeling Investigation of Flushing Characteristics and Water Age in a Highly Stratified estuary: Mobile Bay, Alabama, U.S.A." by Gaurav Savant and Tate O. McAlpin, EGU Sphere, <https://doi.org/10.5194/egusphere-2022-199-RC3>, 2022

This manuscript describes a numerical model study of the water renewal in Mobile Bay, Alabama, USA. The model is validated against in situ measurements of water levels and salinity. The model performs very well. The authors use well-established methods to quantify water renewal processes in the bay. The problem is that the hydrodynamics of Mobile Bay is already well documented in the literature, including its water renewal processes (e.g., Du et al., 2018, JGR Oceans). It is unclear what this study brings to existing knowledge.

In particular, the authors use the concepts of flushing time and water age to analyze the water renewal in Mobile Bay under different river flow conditions and wind directions, which is exactly what is done by Du et al. (2018) and the conclusions are very similar. Only the impact of the Coriolis force is new in this study, but Figure 15 indicates that this impact is very low, unlike what the authors claim in the text.

As both the methodology and the scientific questions addressed in this manuscript are not novel, its scientific relevance is rather low. Besides, the broader relevance of the results to better understand other stratified estuaries globally is not discussed. Therefore, I would not recommend the publication of this manuscript in Ocean Sciences.