

Interactive comment on “A hydrodynamic model for Galveston Bay and the shelf in the northwestern Gulf of Mexico” by Jiabi Du et al.

Anonymous Referee #1

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General Comments:

The manuscript "A hydrodynamic model for Galveston Bay and the shelf in the northwestern Gulf of Mexico" by Du et al. presents a detailed study on development, validation and implementation of an unstructured grid model in the Gulf of Mexico and adjacent estuarine bays. The impact of the remote river discharge from Mississippi and Atchafalaya on the hydrodynamics in the Galveston Bay is assessed. Overall, the model was well established, and carefully validated. The model results are quite reliable. A large-scale unstructured model is very helpful in identifying the effect of shelf processes on a specific estuary. The unstructured model provides great flexibility in covering the large GOM domain and resolving the complex shoreline and bathymetry in the estuaries. This study presents a good example of research on estuary-shelf in-

C1

teraction. The manuscript is well written and organized, and several new findings are provided, thus it merits a publication after some minor revision. My main suggestions are: 1) More focus could be paid on the physics, like how the buoyancy induced coastal current from the Atchafalaya and Mississippi Rivers affects the advective transport and mixing at the mouth of the Galveston Bay; 2) How about the advantage of this unstructured grid in resolving the narrow and deep channel? How important is this resolution in reproducing salt intrusion? Based on my previous experience, this model seems a little difficult to simulate salt intrusion in the Pearl River Estuary. The model results always seem overmixed than observations; 3) How Galveston and other estuaries affect the shelf processes, e.g., how they impact the coastal current, and water column stratification and mixing?

Detailed comments:

No

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C2