

Ocean Sci. Discuss., referee comment RC2
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Comment on os-2021-76

Anonymous Referee #2

Referee comment on "Responses of estuarine circulation to the morphological evolution in a convergent, microtidal estuary" by Rui Zhang et al., Ocean Sci. Discuss.,
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The paper describes alternation of hydrodynamics and numerous other properties of a microtidal estuary following anthropogenic interventions to the estuary over a period of time. The paper is well written however some small changes will improve quality. As the editor have already highlighted some places that need attention to improve language I would not comment on those. The paper is extremely long with a very large number of figures.

Specific comments/queries

Considering the shape of the estuary a curvilinear model grid system can be a more favourable option. Please explain the selection of a cartesian grid;

Please comment on the selected horizontal model resolution; Did you investigate the sensitivity of results to model resolution?

Please explain the source of water level variation and currents at the offshore boundary in MD1;

Same driving conditions have been used to simulate estuarine dynamics in 1977, 1994, 2003 and 2010. Please explain possible impacts of sea level change, potential changes to river flow and salinity on the simulated results. It is possible the estuary dynamics to under some natural changes during that 40+ years, for example river flow may have changed over the years.

In your model validation, it is said that surface layer dynamics are poorly resolved by the model because surface waves and wind were not considered in the model. However, it is stated in the Numerical model set up section (Line 243, page 7) that atmospheric forcing at water surface is given as inputs to the model. Please clarify.

Fig. 3 gives 'Patterns of the vertical-averaged horizontal circulation 380 during neap tide'. As this is just a snapshot in a tidal cycle please specify the time. It may be good to look at flood tide and ebb tide separately.

Fig. 5,6 – Once again since these are snapshots in time, please provide the time of the tidal cycle. Also, comment on the effect of the selected model resolution when calculating vorticity.

Fig. 8-9- Absolute values of each term is very small. Therefore, I am not sure if looking at them separately add any value. Also, please specify the time in the tidal cycle. Do flood and ebb tide show differences?

Page 36, Lines 816-822 – Do you have evidence to show that river sediment is trapped in the estuary?

It will be interesting to see what changes can be observed during spring tides as tidal circulation will be significantly larger than during neap tide. Please comment.