

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2022-151

Anonymous Referee #1

Referee comment on "A nonhydrostatic oceanic regional model, ORCTM v1, for internal solitary wave simulation" by Hao Huang et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-151-RC1>, 2022

This paper presents a nonhydrostatic oceanic model for internal waves based on the framework of the Max-Planck-Institute ocean model. I suggest that the paper can be accepted after minor revision.

1. More details about the setup of the numerical test cases should be supplemented. For example, the bottom friction coefficients and the viscous coefficients are missing for test cases 3.2-3.5.
2. The boundary condition used to enforce the tidal flow in test case 3.5 should be added, because the internal waves are generated by the tidal flow in this test case.
3. Two internal wave models (Ai and Ding, 2016; Ai et al., 2021) similar to the proposed model should be mentioned in the introduction section. The model developed by Ai and Ding (2016) employed a novel grid arrangement based on a 3D grid system, which is built from horizontally unstructured triangular grids and a vertical boundary-fitted coordinate system. The resulting Poisson equation has a symmetric sparse matrix. The model developed by Ai et al. (2021) incorporates the immersed boundary method to deal with the uneven bottoms for internal wave generations and propagations, which avoids numerical errors in the calculation of the baroclinic pressure force.