

General Comments

The authors clearly present the details of a new regional ocean model configuration, for the coastal, shelf and slope waters of the Mid-Atlantic Bight and Gulf of Maine – of broad interest to biological and biogeochemical applications in particular. With this in mind, the authors could refer a little more to the importance of the physics and dynamics – painstakingly evaluated – for these applications. For example, water depth shoals to just a few metres across part of Georges Bank, and a large expanse of the outer shelf here (around 200 x 100 km) is no deeper than 60 m. These shallow waters remain tidally mixed all year around, while the deeper surrounding waters thermally stratify during summer. The consequence is enclosure of mixed waters by a tidal mixing front, which supports a clockwise residual gyre (Chen et al. 2003). I return to this in Specific Comments below.

- **Authors have noted this in the brief overview of regional dynamics in Section 1.**

Reference: Chen, C., Beardsley, R.C., Franks, P.J.S., and J. Van Keuren (2003). Influence of diurnal heating on stratification and residual circulation of Georges Bank, *J. Geophys. Res.*, 108, 8008, doi:10.1029/2001JC001245, C11.

The manuscript should nevertheless be suitable for publication in GMD, subject to minor and technical revisions in response to the following comments.

Specific Comments

1. p.3, lines 100-103: Relate the horizontal resolution (& km) to the 1st baroclinic Rossby radius in shallow stratified water at mid-latitudes, and discuss how much of the shallow dynamics is unresolved

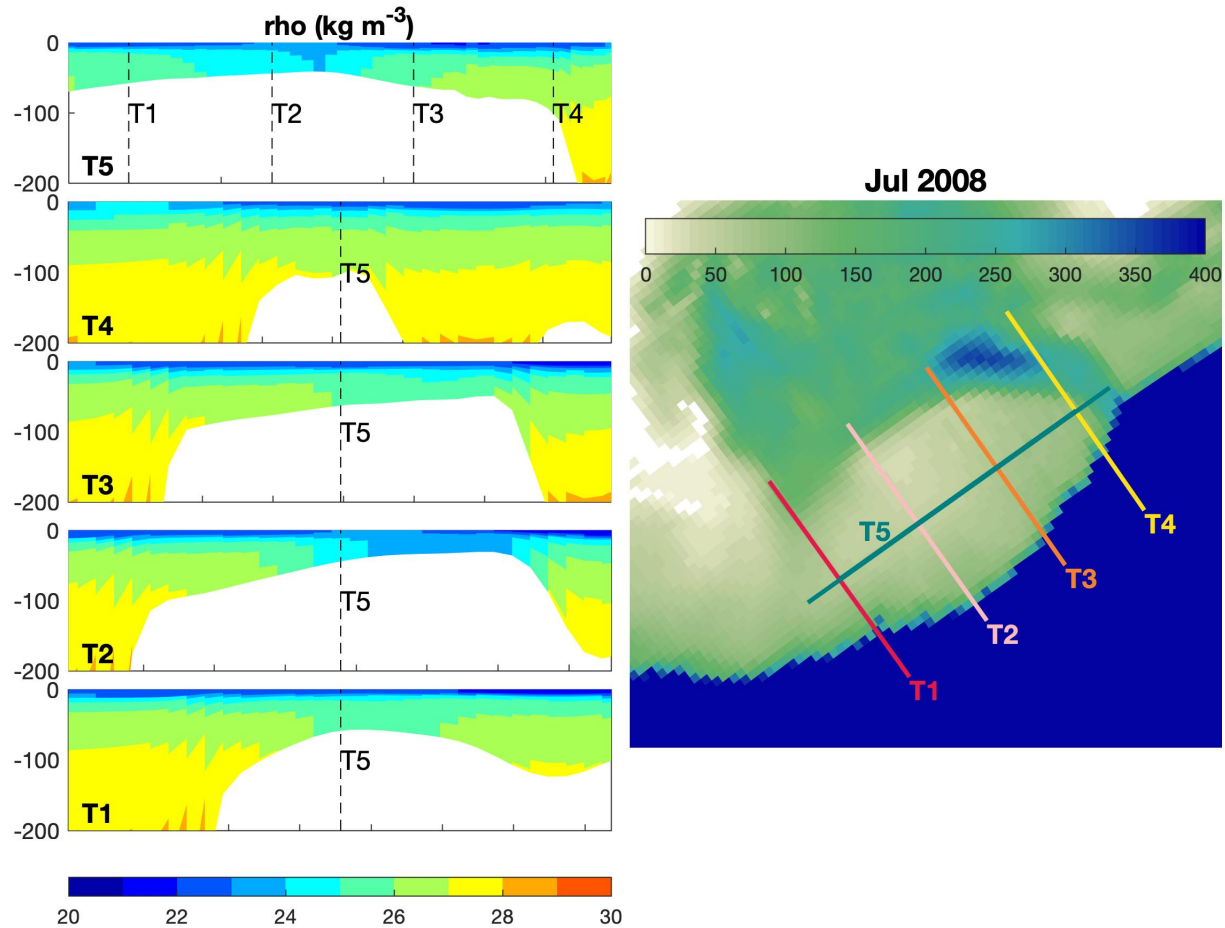
- **Authors now note relation to 1st baroclinic Rossby radius for shelf waters in text.**

2. p.9, lines 320-321: The water column must be stabilized in winter by salinity stratification, as noted below (p.10, lines 338-339) – this should be introduced here to avoid an impression of static instability.

- **We have noted the role of salinity in maintaining stability.**

3. p.10, line 352: As outlined above, water columns on Georges Bank remain fully mixed during summer. Surrounded by stratified water, horizontal density gradients across the front between mixed and stratified water support a baroclinic jet (Chen et al. 2003), presumably of consequence for pelagic and benthic fauna. How well is this simulated in Doppio?

- **Shown below are 5 transections for the mean of July '08, which depict a mixed water column within the shallower portion Georges Bank. The dotted line(s) on the vertical transects represent the intersection with the other transect(s). Model shows vertically well-mixed water column at shallower locations on Georges Bank for the sample month of July '08. Surface velocity is shown below in response to Specific Comment #5.**

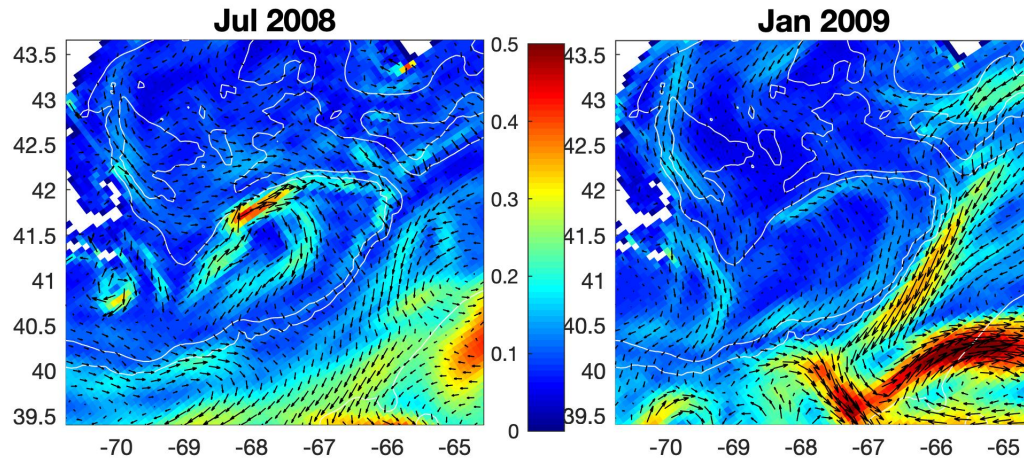


4. Fig. 10: the indication is of seasonal stratification across Georges Bank, presumably due to area-averaging? In general, averaging across the large areas in Fig. 6 (left) will “hide” considerable spatial structure in seasonal stratification – can you justify this averaging?

- **The model subregions described in Fig. 6 were chosen to have enough observations in each region to have meaningful model-data comparison statistics, while also being relatively consistent dynamical regimes.**

5. Figs. 15, 16: Seasonal jets will not be clearly seen in long-term averages – can you contrast winter and summer circulation, zooming in on Georges Bank? (an additional figure)

- **Seasonal jets are visible in the plot of monthly mean surface current velocity (m s^{-1}), shown below, for July 2008 and January 2009. Bathymetry contours of 100, 200, and 4000 m are shown in white. The model domain encompasses many different dynamical regions of interest to researchers, but we do not feel we have the space in this overview paper to add numerous figures depicting regions of particular interest. We have, however, made all model output openly accessible to the community from whom we invite further analysis.**



Technical Corrections

1. p.7, line 223: "reference datum"
 - **The typo has been corrected.**
2. p.13, line 441: "in the face of"
 - **Authors have reworted the line.**
3. Figure 6: explain the dashed contours (labelled 0.5, 1.0)
 - **Additional explanation has been added.**