1. Summary

- A high-resolution 25-year simulation is performed in Gulf Stream (GS) region using a coupled physical-biological model.
- A large sample of mesoscale eddies are detected and tracked, and the eddy-centric composites are created.
- The long-term averaged contribution of cyclonic eddies (CEs) and anticyclonic eddies (ACEs) to the vertical NO3 flux into the euphotic zone \(Z_{eu}\) are both positive.
- The eddy-wind-interaction-induced Ekman pumping is likely the dominant mechanism for the enhanced NO3 flux at \(Z_{eu}\) in ACEs.

2. Numerical Model

- Physical model: ROMS over Northwest Atlantic (NWA) with 7km horizontal resolution and 40 vertical levels
- Biogeochemical model: NOAA/GFDL’s Carbon, Ocean, Biogeochemistry and Lower Trophics (COBALT) model

3. Eddy Detection and Tracking

4. Eddy Composites

5. Mechanism

6. Reference