Effects of turbulence parameterization on the modeling of mesoscale vortices in the Ligurian sea

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We study numerically the dynamics of intense anticyclonic eddies in the Ligurian Sea (NW Mediterranean Sea). To this end, we use the Regional Ocean Modeling System (ROMS) configured at a resolution of 3 Km for a domain covering the Ligurian Sea. The model is forced with daily mean boundary conditions at the open lateral boundaries and by daily mean wind stresses at the surface. We analyze the effects of different sets of parameters of the K-Profile Parameterization (KPP) turbulence closure for the surface boundary layer and ocean interior on the spatio-temporal evolution of the eddies. Based on the intercomparison of modeling ouputs and against available observations, the results reveal a significant sensitivity to changes of the surface boundary layer diffusivity, while the effects of the double diffusion in the ocean interior are marginal. A subset of numerical experiments at 1 km is performed to explore the issue of the convergence of the predictions from a turbulence perspective.