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Numerical study of the turbulent characteristics of cyclonic and anticyclonic vortical structures in the Black Sea

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For typical conditions of wind regime over the Black Sea by using of the original 3D baroclinic numerical model of dynamics fields of current, temperature and salinity were computed. The currents have different character and the depth steepness structure, which undergoes some changes in time. The calculations show that during about one day, as a result of action of the January atmospheric cyclonic winds, in the sea some cyclonic and anticyclonic vortexes in different depths of the sea are formed. It is necessary to note that the central cyclonic vortex, having steady vertical cylindric configuration (with diameter $\sim$ 200 km and height $\sim$ 50 m) is streamlined by the main Black Sea current. In the same layers with depth of 36-86m in the western coastal zone of the Black Sea. The vortex characteristics for both cyclonic and anticyclonic vortexes are given in figures: the distribution of the velocity, temperature, salinity and horizontal turbulent viscosity in the vortex against the distance from the center of the vortex along the parallel and meridian, respectively; vertical distribution of the temperature gradient, salinity stratification, Brunt-Väisälä frequency, and Richardson number.