



Regional forecasting system of marine state and variability of dynamical processes in the easternmost part of the Black Sea

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The regional forecasting system for the easternmost part of the Black Sea developed at M. Nodia Institute of Geophysics of I. Javakhishvili Tbilisi State University under the EU framework projects ARENA and ECOOP is a part of the Black Sea basin-scale Nowcasting/Forecasting System. A core of the regional forecasting system is a baroclinic regional model of Black Sea dynamics with 1 km spacing based on hydrostatic primitive equations of ocean hydrothermodynamics, which are written in z-coordinates for deviations of thermodynamic values from their standard vertical distributions. To solve the problem the two-cycle method of splitting the model equation system with respect to both physical processes and coordinate planes and lines is used. The regional model of M. Nodia Institute of Geophysics is nested in the basin-scale model of Black Sea dynamics of Marine Hydrophysical Institute (Sevastopol/Ukraine). The regional forecasting system provides 3 days' forecasts of current, temperature and salinity for the easternmost part of the Black Sea, which is limited to the Caucasian and Turkish coastal lines and the western liquid boundary coinciding with the meridian 39.080E. Data needed on liquid and upper boundaries, also the 3-D initial hydrophysical fields for the easternmost regional area are provided in near operative mode from Marine hydrophysical Institute via Internet. These data on the liquid boundary are values of velocity components, temperature and salinity predicted by the basin-scale model of Black Sea dynamics of Marine Hydrophysical Institute and on the sea surface 2-D meteorological boundary fields – wind stress, heat fluxes, evaporation and precipitation rates predicted by the regional atmospheric model ALADIN are used. The analysis of the results of modeling and forecast of dynamic processes developed for 2010-2014 showed that the easternmost water area of the Black Sea is a dynamically very active zone, where continuously there are processes of generation, deformation and disappearance of the cyclonic and anticyclonic vortex formations of different sizes.

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