

On mathematical modeling of climate system the Black Sea-land-atmosphere

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The basic questions connected to construction of regional mathematical model of climate system the sea-land-atmosphere, developed at the Institute of Geophysics of Georgian Academy of Sciences, are considered and some results of realization of baroclinic model of sea dynamics for the Black Sea basin, which is one of main blocks of the regional coupled model, are presented.

The coupled model consists of interacting between themselves separate blocks, each of them has independent significance and represents mathematical model describing hydrothermodynamic processes in separate objects of the environment. The model is based on full systems of the hydrothermodynamic equations of the sea and atmosphere, the equations of molecular heat conductivity in the soil and of heat balance of the underlying surface (water, land). For solving of equation systems of the sea and atmosphere a two-cycle splitting method on physical processes, coordinate planes and lines is used.

At realization of the sea dynamics model separately as an independent block for the Black Sea basin, a calculated grid with horizontal step 5 kms and time step 1 hour were used. Results of modeling of inner annual variability of hydrological regime are presented in case, when variability of atmospheric wind forcing was reduced to continuous alternation of 24 wind types really having a place above the Black Sea basin within one year.

Analysis of results of numerical experiment have shown that under influence of atmospheric forcing, circulation in the upper layer of the Black Sea with thickness of 20-30 kms undergoes continuous qualitative and quantitative changes within one year.