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# Ecosystem Dynamics in the Black Sea: Numerical Modelling and Remote Sensing Observations

Rostislav Kandilarov (1), Emil Stanev (2), and Joanna Staneva (2)

(1) ICBM, University of Oldenburg, Oldenburg, Germany, (rkandilarov@gmail.com), (2) GKSS Research Center, Institute for Coastal Research, Geesthacht, Germany

In this study we address the ecosystem in the Black Sea based on analysis of remote sensing data from MERIS satellite and numerical simulations with NEMO. The hydrodynamical model NEMO was coupled with the biogeochemistry model LOBSTER (LODyC Ocean Biogeochemical System for Ecosystem Resources), which is a simple nitrogen based pelagic model with six compartments: nitrate (NO3), ammonium (NH4), phytoplankton (P), zooplankton (Z), detritus (D) and semi-labile dissolved organic matter (DOM). The LOBSTER model was adjusted to the Black Sea specific conditions and initialised with data from the observations. Boundary conditions consisted of realistic meteorological forcing and river fluxes from six major rivers of the Black. The impact of meteorological forcing, as well as the impact of vertical stratification on the functioning of biological system was addressed. The response to variability in the physical conditions and to the nutrient discharge from rivers was described in detail. Model results were validated against data from in situ observations and satellites. The comparison between numerical simulations and remote sensing data illustrated the credibility of simulations. Both satellite images and numerical model simulations demonstrated that the penetration of phytoplankton and other substances into the basin interior was shaped by the dynamics of coastal and open-ocean eddies.