

Numerical model of the circulation and dispersion in the east Adriatic coastal waters

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The Regional Ocean Modeling System (ROMS) was implemented to reproduce physical properties of the area around submarine outlet Stobrec in the middle Adriatic coastal area. ROMS model run was forced with realistic atmospheric fields obtained from meteorological model Aladin, climatological river discharges, tides and dynamics of the surrounding area imposed at the open boundaries. Atmospheric forcing included momentum, heat and water fluxes calculated interactively from the Aladin surface fields during ROMS model simulations. Simulated fields from the Adriatic and shelf scale models were used to prescribe the initial and open boundary conditions for fine resolution coastal domain. Model results were compared with available CTD measurements and discussed in the light of the climatological circulation and thermohaline properties of the middle Adriatic coastal area. Variability in the circulation is related to the prevailing atmospheric conditions, changes in the hydrological conditions and water mass exchange at the open boundaries. Basic features of the coastal circulation are well reproduced by the ROMS model, as well as temperatures and salinities which are within corresponding seasonal intervals, although with lower stratification than measured ones. In order to reproduce dispersion of the passive tracer the ROMS model was coupled with Lagrangian dispersion model. Multiyear monitoring of the physical, chemical and biological parameters around the sewage outlet was used to assess the quality of the dispersion model results. Among measured parameters, redox potential of the surface sediment layer was selected to be compared with model results as its negative values are direct consequence of increased organic matter input that can be attributed to the sewage system inflow.