Geophysical Research Abstracts
Vol. 13, EGU2011-14182, 2011
EGU General Assembly 2011
© Author(s) 2011

Multi-year variations in the Northern Levantine Basin based on coupled hydrodynamic and ecosystem modeling

Emin Özsoy (1), Ali Aydoğdu (1), Adil Sözer (1), and Murat Gündüz (2)

(1) Institute of Marine Sciences, Middle East Technical University, Erdemli, Mersin, Turkey, (2) Istituto Nazionale di Geofisica e Vulcanologia, Bologna, Italy

The northern part of the Levantine Basin is a strongly variable system with wide continental shelves in the east (Cilician Basin - Gulf of Iskenderun) contrasting with the deep Antalya and Rhodes basins in the west, influenced by variable winds on the lee of the 'riviera' coast, river discharges from major rivers (Asi, Seyhan, Ceyhan, Göksu, and others), coherent jets and eddies of the 'Asia Minor Current' and the Rhodes Gyre circulation, creating a dispersive environment for tracers and biological-chemical components. It is the aim of this study to realistically account for these features based on model dynamics, supported by existing observations. Multi-year model runs are used to show seasonality and interannual variations of the system and its influence on the circulation, mixing and the ecosytem dynamics.

A coupled hydrodynamical / ecosystem model (ROMS) covering the region at 1.35km horizontal resolution and 30 vertical levels, using LMD turbulent closure parameterization and conservative advection schemes has been implemented for multi-year periods representing present and future atmospheric conditions. The system is forced by 6-hourly surface fluxes of heat, water and momentum, seasonal river fluxes of water and nutrients, and is one-way nested in coarser resolution model results, obtaining atmosphere and ocean physical boundary conditions from the simulations of the CMCC-NEMO model, and off-line ecosystem simulations of the OGS-BFM model, supplying initial and open boundary conditions at the western and southern boundaries of our model domain through collaboration developed in the Sesame project.

Extensive open boundaries and net flow through the region with important effects of rivers and geophysical turbulence have been successful in re-creating the observad features of the system in terms of both short-term and seasonal / interannual variability, showing dispersive influences of eddies and river plumes in the east and upwelling features of the Rhodes Gyre, as well as winter mixing in the shallow shelf region in the east.