Interannual variability of the Adriatic Sea circulation

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The Regional Ocean Modeling System (ROMS) was implemented in order to reproduce interannual variability of the Adriatic Sea circulation. Simulations and model result analysis were performed for a three-year period from 1st January 2011 to 31st December 2013. ROMS model run was forced with realistic atmospheric fields obtained from meteorological model Aladin, climatological river discharges, tides and Mediterranean circulation imposed at the southern open boundary. Atmospheric forcing included momentum, heat and water fluxes calculated interactively from the Aladin surface fields during ROMS model simulations. Model results were compared with available CTD and ADCP measurements and discussed in the light of the climatological circulation and thermohaline properties of the Adriatic Sea and its coastal areas. Interannual variability in the Adriatic circulation is related to the prevailing atmospheric conditions, changes in the hydrological conditions and water mass exchange at the Otranto Strait. Basic features of the Adriatic circulation - basin-wide cyclonic circulation with several embedded smaller cyclonic gyres around main pits - are well reproduced by ROMS model. Modelled temperatures and salinities are within corresponding seasonal intervals, although measured profiles generally indicate stronger stratification than modelled ones. Summer circulation in 2011 with current reversal obtained along the eastern Adriatic coast was related to the sampling results of the early fish stages as well as to ARGO drifter movements. Simulated fields from the Adriatic scale model were used to prescribe the initial and open boundary conditions for the interannual simulation in the middle Adriatic coastal domain.