Geophysical Research Abstracts
Vol. 14, EGU2012-13900, 2012
EGU General Assembly 2012

Modelling the baroclinic circulation with tidal components in the Adriatic Sea

A. Guarnieri (1), N. Pinardi (2), P. Oddo (1), G. Bortoluzzi (3), and M. Ravaioli (3)

(1) Istituto Nazionale di Geofisica e Vulcanologia, Bologna, Italy, (2) Università degli Studi di Bologna, Bologna, Italy, (3) Consiglio Nazionale delle Ricerche – Istituto di Scienze Marine - Sezione di Geologia Marina, Bologna, Italy

The impact of tides in the circulation of the Adriatic sea has been investigated by means of a nested baroclinic numerical ocean model. Tides have been introduced using a modified Flather boundary condition at the open side of the domain. The results show that tidal amplitudes and phases are reproduced correctly by the baroclinic model and the tidal harmonic constants errors are comparable with those resulting from the most consolidated barotropic models. Numerical experiments were conducted to estimate and assess the impact of (i) the modified Flather lateral boundary condition, (ii) the tides on temperature, salinity and stratification structures in the basin, and (iii) the tides on mixing and circulation in general.
Tides induce a different momentum advective component in the basin which in turn produces a different distribution of water masses in the basin. Tides impact on mixing and stratification in the Po river region (north-western Adriatic) and induce fluctuations of salinity and temperature on semidiurnal frequencies in all seasons for the first and only winter for the second.