



A numerical model of internal tides with application to the Tunisian shelf and the strait of Sicily

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A fully three-dimensional nonlinear primitive equation model (ROMS) is applied to investigate the generation of internal tides in the Tunisian shelf and the Strait of Sicily. Model performance was evaluated with respect to tide-gauge data, satellite data, and currentmeter measurements of Gasparini et al. (2004). Strong tidal currents on the Adventure Bank and in the Messina Strait, which are characterised by a steep topography, generate a significant internal tides and could explain the observed strong diurnal internal waves in these areas. Vertical section in the Adventure Bank shows that the internal energy of the diurnal wave K_1 is confined near the sea bed where it is locally dissipated. This fact is coherent with the linear theory of Baines (1986) and with Artale et al. (1989) suggestions. Our results suggest that the internal waves in the Adventure Bank are essentially diurnal which is coherent with the observations of Artale et al. (1989). The opposite situation is found in the Messina Strait where the semi-diurnal signal dominates since the maximum value of the internal energy density of M_2 is three times of that of K_1 .