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Mesoscale and seasonal variability of the circulation in the NW Mediterranean from mixed-layer drifters trajectories

A. Rubio (1) , G. Andre (2), V. Taillandier (3) & P. Garreau (2)

(1) IFREMER, Centre de Méditerranée, B.P. 330, La Seyne sur Mer, France (anna.rubio@ifremer.fr), (2) IFREMER, Centre de Brest, Plouzané, France, (3) LOCEAN, Paris, France

As part of the project ECOLOPHY (IFREMER, LSEET, COM), 28 mixed-layer satellite-tracked drifters were deployed between June 2005 and June 2006 in front of the coast of Toulon to study the variability associated to the Northern Current in the Gulf of Lions (NW Mediterranean). In this work we analyse 26 trajectories obtained in two periods of different stratification conditions: June-September 2005 and December 2005- Mars 2006. The spatial and temporal autocorrelation functions of the related Lagrangian velocities reveal variability at different scales. In the HF band, the main signal is related to inertial oscillations, with the presence of small scale features. From low-pass filtered at the cut-off period of 36h, the 3h-interpolated position data reveal the well-known mean patterns of the along-slope circulation in the Gulf of Lions and the Catalan Sea and show up a mesoscale signal (with a time scale of 2.5 days). The joint analysis of drifter trajectories and SST satellite imagery allows to study the characteristics of some of the observed mesoscale structures. Moreover, each trajectory set covering these two deployment periods reveals different dynamical situations in the NW Mediterranean. While summertime drifters tend to leave the slope current to circulate in mesoscale structures over the shelf or towards the open sea following the Balearic front (located at the north of the Catalan Sea at this time of year), wintertime drifters tend to remain in the Northern Current along its path from the Gulf of Lions to the Balearic Channel.