Geophysical Research Abstracts
Vol. 13, EGU2011-5113, 2011
EGU General Assembly 2011

Hidrographyc conditions and vertical velocities at a front detected at the Soller area during an IDEADOS Project survey

Rosa Balbín (1), Maria del Mar Flexas (2), Jose Luis López-Jurado (1), Angel Amores (2), Sebastian Montserrat (2), Marta Marcos (2), Ideados Team (1,2,3)

(1) Instituto Español de Oceanografía, Centro Oceanográfico de Baleares, Palma de Mallorca, Spain (rosa.balbin@ba.ieo.es), (2) Instituto Mediterraneo de Estudios Avanzados, CSIC, Esporles, Spain, (3) Instituto de Ciencias del Mar, CSIC, Barcelona, Spain

The Balearic Islands are the natural limit between two subbasins of the Western Mediterranean (WMED), the Algerian and the Balearic basins. In the southern part, the Algerian subbasin receives fresh surface water from the Atlantic (AW), and its dynamics is mainly driven by density gradients. To the north, the Balearic subbasin contains colder and more saline surface AW that has remained longer in the Mediterranean, and its dynamics is affected by notable atmospheric forcing, mainly wind. The Mallorca and Ibiza channels play an important role in the regional circulation of this area and their topography condition the exchanges between these two subbasins. As a consequence, there are significant differences between the general hydrodynamic conditions that affect the north and the south of the islands.

The overall objective of the IDEADOS project consists of determining the relationships between environmental conditions and the nektobenthic slope communities in oligotrophic areas of the western Mediterranean. With this aim, two areas with different geomorphologic and hydrodynamic characteristics were selected at the Mallorca channel zone, one to the south (Cabrera) and the other to the north (Soller). Two hydrographic surveys were carried out, on winter 2009 and summer 2010, which were complemented by two moorings of one year in those areas.
Hydrographic data were recorded, quasi simultaneously in a network of 36 stations (per area and survey) distributed in transects perpendicular to the coast, by using a SBE911 CTD. The CTD transects were placed with a 3x5 nm horizontal resolution. All seawater parameters (salinity, S, potential temperature, θ, and potential density anomaly, $\sigma\theta$) were computed every dbar using standard routines. Temperature and salinity can be considered accurate within 0.01 ºC and 0.008 psu respectively. Dissolved oxygen, turbidity, chlorophyll a and PAR were also recorded at each CTD station. During the surveys, water samples were taken with a carrousel of Niskin bottles for salinity and oxygen calibration. During the hydrographical sampling direct current measurements were performed by means of a vessel-mounted Acoustic Doppler Current Profiler system (RD Instruments 75 kHz Ocean Surveyor ADCP). This ADCP allowed bottom tracking down to 1000 m making it possible to know absolute water velocities. The dynamic anomalies were calculated from temperature and salinity distributions on isobaric surfaces taking 600 dbar as reference level. Satellite SSH and SST are also used to complement the data.

During the winter survey a clear density front was detected on the Soller area. This ground runs parallel to the coast between the Soller port and Dragonera Island. In this case the shelf is narrow and abrupt in the northern part becoming wider and progressively less steep towards the SW, while the slope is quite pronounced over its entire length.
The frontal zone appears perpendicular to the shelf with a density gradient parallel to it. This gradient, of 0.2 (kg m-3) in 30 km at 200 dbar, seems to give place to a current that partly crosses the Mallorca channel and a branch that turns aside to reinforce the Balearic current. Vertical velocities are calculated. Positive velocities up to 10 m/day are obtained. Clear differences in vertical velocities at NE and SW of the front are observed. A maximum of fluorescence is observed at the stations were positive vertical velocities are maximum. These results will be discussed.