Geophysical Research Abstracts
Vol. 14, EGU2012-12760-3, 2012
EGU General Assembly 2012

Diapycnal Nutrient Fluxes in the Cape Ghir upwelling region

M. Arcos-Pulido (1), A. Rodríguez-Santana (1), M. Emelianov (2), V. Paka (3), J. Arístegui (4), P. Sangrà (4), F. Machín (1), and L. García-Weil (1)

(1) Departamento de Física, Universidad de Las Palmas de Gran Canaria, Fisica, Las Palmas de Gran Canaria, Spain (mireya.arcos101@doctorandos.ulpgc.es), (2) Instituto de Ciencias del Mar, CSIC, Barcelona, Spain, (mikhail@icm.csic.es), (3) Shirshov Institute of Oceanology, Kaliningrad, Russia, (paka@ioran.baltnet.ru), (4) Instituto Universitario de Oceanografía y Cambio Global (IOCAG), Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain, (jaristegui@dbio.ulpgc.es)

An oceanographic survey was carried out from 18 to 29 October 2010 in the Canary Basin (PROMECA project). Near Cape Ghir, in the Northwest Africa coastal upwelling, 17 CTD casts were made to obtain continuous records of conductivity and temperature with depth, and to collect waters samples for nutrients analyses. Additionally, free-fall turbulence profiles were obtained at each station. 14 Expandable bathythermographs (XBTs) were deployed between stations to increase the grid resolution of the temperature field. Velocity data were acquired with a vessel-mounted Acoustic Doppler Current Profiler (ADCP) with a vertical bin size of 8 m. Water samples for nutrients: nitrate + nitrite (N+N), phosphates and silicates, were collected from 12 depths (down to 2000 m or the maximum depth), with 12-l Niskin bottles mounted on the rosettes sampler. The first results show low to moderate concentrations of nutrients offshore, with average values in the upper 150 m of 2.45 $\pm$ 1.98, 0.37 $\pm$ 0.18 and 1.47 $\pm$ 0.94 μM for N+N, phosphate and silicate, respectively. However, for stations near the Cape Ghir upwelling filament or influenced by this feature, a significant increase in the concentration of nutrients (up to 10 μM of N+N at 200 m) was observed.
We have estimated and compared the diapycnal nutrient flux in the region by using two different approaches. First, we used the dissipation rates of turbulent kinetic energy and thermal variance estimated from microstructure data acquired from turbulence profilers, and applied a model based on the dissipation ratio. This way we obtain net turbulence diffusivities in regions where there is an interaction of processes of double diffusion and turbulence induced by vertical shear of the flow. The second approach is based on obtaining diapycnal diffusivities with parameterizations of the gradient Richardson number and density ratio.