Geophysical Research Abstracts, Vol. 7, 06828, 2005
SRef-ID: 1607-7962/gra/EGU05-A-06828

The pattern of the water circulation over the continental shelf of the Gulf of Cadiz, Atlantic Ocean

Jesús García-Lafuente(1), Javier Delgado(1), Francisco Criado-Aldeanueva(1), Miguel Bruno(2), Jorge Del Río(1), Juan Miguel Vargas(1), Antonio Sánchez(1)

(1) Departamento de Física Aplicada II, Universidad de Málaga, Málaga, Spain (2) Departamento de Física Aplicada, Universidad de Cádiz, Cádiz, Spain

Acoustic Doppler Current Profiler data collected during three successive surveys in the Gulf of Cádiz in May-June 2001 have been used to analyse the surface circulation on the continental shelves of the Gulf of Cádiz and the manner this circulation matches the circulation in the ocean side of the Gulf. The wider and larger eastern continental shelf (east of Cape Santa Maria) holds a cyclonic circulation bounded at the south by a shelf-break jet that is identified with the historically so-called Huelva front. The coastal current that closes the gyre at the north is the warm counterflow often mentioned in the oceanographic literature dealing with this region. Under westerly wind, this counter current re-circulates toward the south-east along the southern branch of the cyclonic eddy entraining cold water recently upwelled by this favourable wind nearby Cape Santa Maria. It is advected downstream by the shelf-break jet, leaving the cold signature at the surface that is usually identified with the Huelva front. Under easterlies, part of the coastal counterflow invades the western and narrower continental shelf (west of Cape Santa Maria) while the remaining flow continues re-circulating eastward to close the cyclonic cell. The western continental shelf and slope is occupied by a large-scale cyclonic eddy that extends further offshore into the deep ocean. Outside the continental shelf, the eddy has a vertical length scale of hundreds of meters and appears to be linked to the general wind forcing in the area. Both cyclonic structures are bounded at the south by a jet that enters in the Gulf of Cádiz moving around the second eddy. The jet bifurcates and one branch proceeds toward the Strait of Gibraltar to feede the Atlantic inflow and the other bends to the soutwest to merge with the Canary current further downstream.