Geophysical Research Abstracts,
Vol. 11, EGU2009-11604-1, 2009
EGU General Assembly 2009

Wavelet analysis to detect circulation patterns in drifter trajectories deployed in the Canary Current.

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This paper presents the development of an approach, based on wavelet spectrum analysis, for the detection of speed patterns in the drifter trajectories caused by different frequency-scale phenomena. The wavelet analysis gives a time-frequency performance more accurate than traditional Fourier analysis. Discontinued occurrences are clearly observed by representing the temporal evolution of the signal spectrum.
A trajectory set of drifters dragged to 15 m deep has been used to investigate similar behaviour patterns caused by oceanographic phenomena with diverse frequency scales. This data set belongs to a collaboration program with NOAA, Surface Velocity Programme (SVP), where a drifter is launched each month at the ESTOC site (European Station for Time-Series in the Ocean, Canary Islands).This station is located 60 miles north of the Canary archipelago and the circulation regime in the area is dominated by the Canary Current. Nevertheless, the proximity of the upwelling area in the African coast and the obstacles that represent the islands in the mean circulation make a significant number of mesoscales structures crossing the survey area. Stationary cyclonic and anti-cyclonic eddies are visible to the south of the islands. Speed variabilities in the trajectories of the drifters are observed in different frequencies of the wavelet analysis. These changes frequently correspond to periods where the drifter is in a mesoscale structure or crossing a front region. Thus, we could establish different behaviour patterns in the trajectories related to the kind the prevailing oceanographic structure.