



Abstract View

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The Advection of Submesoscale Thermal Features in the Alboran Sea Gyre

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ABSTRACT

NOAA-7 infrared and Nimbus-7 multi-spectral visible imagery of the Alboran Sea collected as part of the “Donde Va?” experiment during the period 6–20 October, show the advection of submesoscale cold-water features about the Alboran Sea Gyre.

Continuous monitoring of these cold-water features using satellite imagery is possible because of the twice-daily (every 12 h) spacing of the NOAA-7 coverage of the area. After registration to a Mercator projection and atmospheric correction, analysis of the displacement of the cold-water features in successive images shows their apparent origin to be just east of Gibraltar, their movement at average speeds of 0.4 m s^{-1} around the Gyre and their apparent re-entrainment into the incoming Atlantic water east of Gibraltar. The Nimbus-7 CZCS imagery supplements the analysis by adding details of the movement and the theory on where the cold-water features originate.

During the 15-day period, nine cold-water features were thermally distinct enough to be tracked for several days. Aircraft and ship oceanographic data collected during the period show the cold surface features were associated with upwelled water from greater than 100 m depth and, based on temperature and salinity data, appear to be of Atlantic origin. Sonobuoy drift data indicate that the features were part of incoming Atlantic water. While the speed of the features varied from day to day, ranging from 0.2 to 0.6 m s^{-1} , comparison with meteorological data does not indicate that these differences were related to variations in direction or strength of the wind. It is hypothesized from the limited amount of data available at this time that the features are associated with the tidal movement through the Strait of Gibraltar.

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