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Lagrangian Measurements in a Coastal Upwelling Zone off Oregon

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ABSTRACT

During August 1972 drogued and hydrographic measurements were made in the coastal upwelling zone off the Oregon coast. The study was conducted as a component of the Coastal Upwelling Experiment (CUE-1). Both sub-surface parachute drogues and surface vane drogues were tracked for two periods. The one experiment began as the strong prevailing northerlies that drive the summer upwelling began after a cessation of 11 days. A new cycle of upwelling appeared to begin with progressive upwarping of the pycnocline inshore and the generation of strong surface equatorward motion. The other experiment coincided with the abrupt relaxation of strong northerlies and appeared to represent the onset of the decay phase of the upwelling circulation. The pycnocline broke the sea surface about 5 km from shore creating a highly convergent front which drew in the surface vane drogues. A strong sub-surface temperature inversion appeared to be related to intense sinking of surface water at the front. The onshore motion of drogues at 50 m depth gave evidence of persistent upwelling, despite the wind relaxation. A conceptual model of the two phases of upwelling circulation observed is presented.

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