



Observations of Deep Flow along the Central California Coast

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A number of programs have collected observations of deep currents and water properties over the continental shelf off Central California during the past three decades. Here we summarize the results of these measurements. The oldest data set included bimonthly observations off Point Sur (33°20'N) from April 1988 to April 1991 using an acoustically tracked dropsonde and a NBIS Mk III CTD. The poleward flow observed above 1000 m was weaker at depth but generally dominated the flow pattern.

Deep (~1000 m) currents were also observed off California from August 1994 to September 2009 using current meters and RAFOS floats. Current meter data were collected at nine locations for time periods ranging from two months to 76 months. A total of 144 months of float data were collected. Analysis of current meter data included histograms, progressive vector diagrams, stick plots, kinetic energy and rotary spectra, stick plots, means and standard deviations. Float data were analyzed using trajectories and calculating means, standard deviations, and diffusivities.

For current meter data, semidiurnal tidal energy dominated the kinetic energy spectrum, anticyclonic rotary motion exceeded cyclonic motion, kinetic energy was typically an order of magnitude greater than for diurnal frequencies, and kinetic energy decreased about an order of magnitude as depth increased by 1000 m. Mean speed for current meter (float) data was 6.1 (4.0) cm s^{-1} and alongshore variability exceeded across shore variability. Two floats were entrained in mesoscale eddies, one cyclonic and the other anticyclonic; the eddies moved westward at a speed of about one cm s^{-1} . Seasonal variability along the continental slope was marked by late summer or early fall warming; eddy kinetic energy was minimum in February, $3 \text{ cm}^2 \text{ s}^{-2}$.