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As part of the ONR ARI on Eastern Boundary Currents we: (1) Built, deployed and recovered a meteorological buoy, with downward-looking ADCP current meter and a thermistor string during the 1-year field season, then QC'ed the data and made it available; (2) collected satellite surface temperature data, along with satellite altimeter data, and made the data available to those in the project; (3) used the ADCP current data to evaluate the quality of the altimeter data; (4) used the altimeter data to characterize the seasonal evolution of the mesoscale circulation field.

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FINAL TECHNICAL REPORT

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Upper Ocean Heat and Momentum Budgets In an Eastern Boundary Current

As part of the ONR ARI on Eastern Boundary Currents (Mesoscale Interactions in Weakly Nonlinear Systems) we built, deployed and recovered a buoy with surface meteorological instruments, a downward-looking ADCP current meter and a thermistor string. The buoy was designed at OSU and built at Scripps under subcontract. It was deployed during the 1-year field season as two separate deployments of approximately 6 months. After recovery, we recalibrated the thermistors, QC'd the other data and made them available to others in the program. We also collected satellite surface temperature data from 1992 through the middle of 1996, through a subcontract to Ocean Imaging. We also made those data available to others in the project. The buoy was located under a crossing of tracks from the TOPEX/POSEIDON (T/P) altimeter. Under separate funding we received altimeter data from the T/P and ERS-1 altimeters.

The current meter data was used by Teri Chereskin to clearly demonstrate "Ekman-like" surface layer dynamics in the upper 40 m of the ocean. The ADCP current meter data was also used to verify the high quality of velocities calculated from the TOPEX altimeter. An inverse method of forming velocity fields from the cross-track velocities of multiple altimeters was developed. A method of using tide gauge sea level data along with altimeter data to form fields of sea surface height was also developed, allowing the altimeter height fields to better represent the region within 30 km of the coast, where the altimeter data are not valid.

Earlier Geosat data were used to characterize the large-scale jet and eddy system found in the California Current each summer. This system was compared to the Benguela and Peru-Chile Current Systems (other eastern boundary currents) using Geosat data to show the large difference in behavior of the systems. This comparison is presently being extended using TOPEX and ERS-1 data, combined with tide gauges and SST. The seasonal evolution of the circulation and SST patterns have been documented in the California Current System and the other systems are being analyzed.

In related work, several 1-D mixed layer models were evaluated using data from an equatorial turbulence experiment. We plan to apply the same models to simulate the mixed-layer dynamics at the EBC mooring. The satellite data analysis and upper ocean mooring data are presently being used in a follow-up ONR grant. In this project, the PI and others are evaluating the present NRL model of the California Current System, determining whether the circulation patterns and statistical characteristics of the model are similar to those from the real ocean. This project is a direct result of the analysis of data from the EBC ARI.

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