Abstract View

Volume 8, Issue 6 (November 1978)

Journal of Physical Oceanography
Article: pp. 1025–1041 | Abstract | PDF (1.09M)

A Study of Low-Frequency Fluctuations Near the Peru Coast

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(Manuscript received November 22, 1977, in final form May 15, 1978)

DOI: 10.1175/1520-0485(1978)008<1025:ASOLFF>2.0.CO;2

ABSTRACT

An analysis is presented of low-frequency (<0.4 cpd) fluctuations in currents, temperature and tide gage data collected during the March-September 1976 segment of the CUEA JOINT-II experiment off the coast of Peru. The observations were made near 15°S, a region of particularly strong and persistent coastal upwelling. Conclusions about the dynamics of motions over the continental shelf and slope are reached by means of correlations, empirical orthogonal functions and other indicators. It is found that flow over the shelf, where stratification was weak, was generally dominated by vertical turbulent frictional effects and was strongly coupled to the effectively inviscid, baroclinic flow over the slope. The momentum balance was three dimensional, with the alongshore pressure gradient playing an important role. In contrast to behavior in other coastal upwelling regions, the alongshore velocity field over the shelf and slope was evidently not strongly driven by the local alongshore component of the wind stress. The mean wind stress throughout the period was equatorward (upwelling favorable), whereas the mean alongshore currents over the shelf were poleward. The alongshore current fluctuations, which propagated poleward along the coast, were initially poorly correlated with the local wind stress, but during the course of the experiment, the wind stress increased in magnitude and gained in importance as a driving mechanism. The temperature and onshore-offshore current fluctuations over the shelf and, therefore, presumably the upwelling circulation were, however, correlated with the local wind stress throughout the experiment.