Abstract View

Volume 18, Issue 3 (March 1988)

Journal of Physical Oceanography
Article: pp. 492–504 | Abstract | PDF (1.01M)

Near-Inertial Motion on the South Australian Shelf

Richard B. Schahinger

Flinders Institute for Atmospheric and Marine Sciences, School of Earth Sciences, Flinders University of South Australia, Bedford Park, South Australia

(Manuscript received April 3, 1987, in final form October 9, 1987)

DOI: 10.1175/1520-0485(1988)018<0492:NIMOTS>2.0.CO;2

ABSTRACT

Inertial oscillations in current and temperature records collected at two moorings on the South Australian continental shelf during February to May 1983 have been examined. A strong response to the eastward passage of cold fronts was observed at the well-stratified outer-shelf site, with much of the energy going into first baroclinic mode internal waves. Surface mixed-layer inertial currents attained speeds of 25–30 cm s^{-1} and were associated with vertical thermocline movements of 10–15 m. It is suggested that the inertial currents beneath the mixed-layer were the result of pumping of the thermocline due to divergence in the mixed-layer inertial motion. The phase relationships between the mixed-layer currents and thermocline movements were consistent with plane waves propagating in the same direction as the cold fronts, typically in the onshore direction. The inertial current signal midshelf was generally incoherent with that at the outer-shelf 22 km away due to the presence of strong horizontal density gradients. Both the energy level and presistence of the mixed-layer current oscillations during the three-month deployment period were comparable with observations from similar depths off Oregon and British Columbia, most events lasting for 2–5 inertial periods, while the observed mixed-layer inertial motion was in qualitative agreement with predictions from the simple wind-forced model of Pollard and Millard.