Abstract View

Volume 6, Issue 1 (January 1976)

Journal of Physical Oceanography
Article: pp. 45–56 | Abstract | PDF (839K)

Vertical Structure of Currents and Deep Temperatures in the Western Sargasso Seal

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(Manuscript received May 4, 1975, in final form August 12, 1975)

DOI: 10.1175/1520-0485(1976)006<0045:VSOCAD>2.0.CO;2

ABSTRACT

Currents and temperatures were measured as a function of depth at two locations during the Mid-Ocean Dynamics Experiments of 1972–73. Instrumented profiling floats were used and flows were determined by acoustic ranging. In some instances floats were trimmed to hover at definite depths in order to increase the resolution and measure local details. The barotropic flows were large, 4.6 cm a^{-1} at the 28°N, 69°40′W location and 7.8 cm s^{-1} at the 28° N, 68°40′W location. The energy density of the first baroclinic mode was larger than that of the barotropic flow at both locations. The shapes of the horizontal trajectories of the profiling floats changed only slowly from day to day. Superimposed on these profiles were velocity variations of the high vertical wavenumber modes associated with inertia and internal waves. They were within a band of ±1.5 cm s^{-1} below the thermocline and±13.5 cm s^{-1} in the thermocline. Current profiles as well as hodographs of the velocity an descent show a chaotic modal structure for those higher frequencies. There was a suggestion of a relationship between the velocity fluctuations profiled and profiles of the temperature or temperature gradient only in a high-resolution section of data near a depth of 2 km. The occurrence of Richardson numbers near unity was fairly common over depth intervals of ~ 100 m.