

STUDY OF THE INTERNAL WAVE FIELD
OFF KAHE POINT

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ABSTRACT

Current fluctuations collected from five depths off Kahe Point, Oahu, are analyzed systematically with special emphasis on the internal wave frequency band. Dominant currents are semidiurnal and diurnal tides. The average inertial wave is abnormally weak at the experiment site which is presumably due to the boundary inhibition by the island flank. A blue shift (about 0.005 cph) of the inertial wave is found during events of stronger energy. Beyond the semidiurnal tidal frequency, observed current fluctuations are consistent with free linear internal waves.

In all of the internal wave frequency band, the observed current is horizontally isotropic and the WKB normalized energy spectrum is vertically homogeneous, except at tidal frequencies and at the internal wave critical frequency (0.15 cph) near the bottom. An enhanced energy level and cross-isobath directivity at 0.15 cph near the bottom suggest the reflection of internal waves on the island flank.

Downward phase propagation of baroclinic semidiurnal tides is concluded from cross-spectral analysis. The semidiurnal tide is modulated with a period of 14 - 16 days. The cross-correlation analysis of the amplitude modulation of semidiurnal tides suggests an upward energy propagation of the baroclinic semidiurnal tide.