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Moored Observations of Deep Low-Frequency Motions in the Central Pacific Ocean: Vertical Structure and Interpretation as Equatorial Waves

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ABSTRACT

Two-year time series of current and temperature collected in the deep equatorial central Pacific Ocean as part of the *Pacific Equatorial Ocean Dynamics* (PEQUOD) project indicate that motions with vertical scales comparable to those of low baroclinic modes dominate motions from annual to fortnightly frequencies. Properties of equatorial waves are consistent with many aspects of the observed spectra and coherences. In particular, the hypothesis of a spectrum of long Rossby and Kelvin waves at periods longer than about 40 days and Rossby, mixed Rossby-gravity, and Kelvin waves at periods between about 14 and 40 days is consistent with the observations. Neither vertically propagating rays nor randomly phased baroclinic modes can explain coherence phases uniformly, but forced phase-locked baroclinic modes provide a possible explanation. Sea level in the central Pacific is coherent with deep motions at periods of months or shorter. In particular, the quasi-annual sea level signal associated with the 1982–83 El Niño event is not coherent with deep current or temperature.

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