



## Abstract View

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## Equatorial Wave Vertical Modes Observed in a Western Pacific Island Array

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### ABSTRACT

A two-year array of sea-level and deep current and temperature measurements made in the Gilbert Group, Republic of Kiribati, is used to verify the hypothesis that equatorial gravity waves in baroclinic modes are responsible for sea-level spectral peaks at 2–7 day periods corresponding to vanishing zonal wavenumber or zonal energy flux. Sea level and deep temperature are significantly coherent at these special periods, both in the same and at differing geographical location, with phases which can be rationalized from linear theory. Zonal wavenumber-frequency spectral estimates indicate that, at least in the lowest baroclinic, second meridional mode, energy is concentrated at the wavenumber of vanishing zonal energy flux. At longer periods (7–40 days), observed wavenumbers are eastward and increase monotonically with frequency. These fluctuations are interpreted as lowest-baroclinic-mode Kelvin waves travelling 20–30% faster than linear theory predicts because of nonlinearities.

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