



## Abstract View

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# Observations of 20-Day Period Meridional Current Oscillations in the Upper Ocean along the Pacific Equator

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### ABSTRACT

Prominent oscillations of the meridional current, with a mean period of approximately 20 days, have been observed in the upper ocean over several years from May 1979 to October 1985 using moored current measurements along the Pacific equator at 95°, 110°, 124°, 140°W and 152°W, as well as off (but near) the equator at 110° and 140°W. The fluctuations are relatively narrowband ( $\pm 0.005$  cpd) in frequency. A 95% statistically significant peak in power spectra of meridional current occurred at 110°, 124° and 140°W, but not at 95° and 152°W where the spectral peaks were smaller. The dominant wave period decreased by about 4% from 110° to 140°W. Maximum amplitude was measured at 124°W; the amplitude above 80 m was maximum at the equator and decreased poleward from the equator. At 15 m the annual averaged root-mean-square amplitude was about  $20.5 \text{ cm s}^{-1}$ , and individual peak-to-trough values reached  $150 \text{ cm s}^{-1}$ . The wave amplitude decreased with depth and the wave was essentially confined to the upper 80 m. The penetration depth of the oscillation was greatest at 110° and least at 140°W. At the equator the motion was essentially rectilinear, and at the off-equatorial sites the current vector

rotated anticyclonically. Estimates of westward phase speeds were 81 and  $93 \text{ cm s}^{-1}$ , the longitudinal wavelengths along the equator were about 1320 and 1600 km. The amplitude was seasonally and El Niño modulated, with the waves absent during March to May and during the onset of the 1982–83 El Niño when on both occasions the westward flowing South Equatorial Current at the equator was substantially reduced. Even during intervals of intense wave activity, the mean Richardson number was lowered by only about 15%, but remained above  $\frac{1}{4}$ . There was no evidence that the 0.05 cpd waves were directly generated by the local surface wind.

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