

Equatorial and off-equatorial regime and Rossby solitons observed
by Topex altimeter

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Using nine years of Topex observations, a detailed statistical characterization of major components of equatorial Pacific dynamics on timescales a few months to a few years and spatial scales from about 600 km and longer is presented based on 2D spectral analysis of ungridded sea surface height (SSH) measurements. A wide variety of zonally propagating components of SSH variability, as well as non-propagating (steric-related) variations are clearly identified in the wavenumber-frequency plane. In addition to well-known types of oscillations (at semi-annual, annual, and biennial timescales), we find considerable energy in baroclinic modes with periods seven to nine months, at about 1.5 years, and at certain inter-annual timescales. Meridional variations of amplitudes, phase speeds and other properties of wave systems are analyzed, and contributions of individual vertical and lateral modes are estimated. The analysis confirms an earlier finding that some of these systems represent equatorial solitons or modons. To better understand relationships between equatorial and extratropical oscillations, a 3D analysis of SSH variations at higher lats is also provided, which reveals a substantial meridional component in the wave velocity vector.