Abstract View

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Water-Mass and Transport Variability at 110°W in the Equatorial Pacific

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ABSTRACT

An analysis of nine hydrographic sections collected in 1979–81 along 110°W in the equatorial Pacific Ocean is presented. Sections typically sampled the upper 500 m of the water column from 10°N to 3°S. Analysis concentrated on the repeated sections north of the equator. Examination of the variability of eastward transport indicates that the North Equatorial Countercurrent (NECC) and the Northern Subsurface Countercurrent (NSCC) cannot be distinguished solely on the basis of water-mass structure. However, using a potential density surface (σ_θ = 25.0) as a current boundary we find that on average the NSCC transports 13.7×10^6 m^3 s^{-1} compared to only 8.3×10^6 m^3 s^{-1} for the NECC. The NSCC flow is sufficiently stable so that meridional surface dynamic-height gradient remains a good index of zonal transport fluctuations. Variations in surface dynamic height observed in our data and in the EASTROPAC data indicate a seasonal cycle to the surface topography with large values for the equatorial and countercurrent depressions in boreal autumn and small values in spring. Broad meridional correlation scales for surface dynamic height were found; equatorial fluctuations were significantly positively correlated with variability at latitudes out to 5°N and significantly negatively correlated with variability at 9–10°N. The meridional and vertical structures or vertical displacement were reduced to two empirical orthogonal function (EOF) modes which contained 78% of the variance. These modes did not suggest simple dynamical interpretation in terms of first-vertical-mode linear waves.