Abstract View

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Two Cross-Equatorial Sections at 110°W

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ABSTRACT

A section along 110°W in the eastern Pacific from about 6°N to 6°S was occupied in March and June of 1981. Measurements consisted of absolute velocity profiles and CTD cuts. The large-scale structure of the subsurface zonal flow remained relatively invariant between these cruises. The Equatorial Undercurrent and North and South Equatorial Undercurrents appear as strong eastward flows, separated by westward currents. Away from the equator, comparison of currents estimated geostrophically with the direct observations indicate that the two techniques are in agreement within estimated errors except close to the surface. In the vicinity of the equator the geostrophic technique in general fails and the directly measured currents must be used. During March, within 3° of the equator from the surface to 700 m, the flow was more eastward by about 0.15 m s^{-1}; than in June. In March, the flow and temperature fields were relatively symmetric about the equator. By June, strong asymmetries had developed. In the top 100 m, eastward flow extended from the Undercurrent to about 3°S. A strong, shallow westward flow was situated over and to the north of the Undercurrent. A shallow southward flow developed from 4°N to 2°S. Order-of-magnitude estimates suggest that this can advect westward momentum onto the equator in the top 50 m and modify the Undercurrent. Asymmetry also developed in the near-surface thermal field. In June, upwelling was primarily located south of the equator. This resulted in a cold band lying south of the equator at the core of which the flow was predominantly eastward. A strong meridional temperature gradient at the equator separated the colder water from warmer water to the north. Thee asymmetries develop presumably in response to the seasonal increase from March to June of the winds. Computations of zonal transports in various σ_t-classes in the near-surface layers suggest that the bulk of the Undercurrent water does not return west on the same density surfaces, but does so in the surface layers.

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