

CONVERGENCE AND SUBDUCTION AT THE NORTH
EQUATORIAL FRONT

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ABSTRACT

Satellite thermal data from the equatorial Pacific show strong, seasonally dependent upwelling along the equator, characterized by a sharp front between the cold upwelling water and the warmer surrounding water to the north and south. Strong wave-like perturbations have been observed on this front, caused by meridional oscillations in response to the passage of Tropical Instability Waves, moving westward at 20 to 50 km/day with wavelength of 500 to 1000 km. This study, conducted in the framework of the Tropical Instability Wave Experiment, will focus on the small-scale dynamics of the front itself. Strong convergence is found in leading- and trailing-edge crossings of the front, resulting in subduction of the equatorial upwelling water below surrounding warmer waters, having potential significant impact on local biological processes. As the layer is subducted, a strong along-front jet is formed, moving to the east following the curvature of the front. Based on Temperature-Salinity properties of this jet, it serves to transport high-salinity water toward the north away from the equator, gradually mixing with surrounding water.