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Finescale Velocity-Density Characteristics and Richardson Number Statistics of the Eastern Equatorial Pacific

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ABSTRACT

An analysis of finescale horizontal-velocity shear and density data collected along 110°W longitude in the equatorial Pacific is presented. The measurements were made with the free-fall velocity–density profiler, TOPS. Twenty-five deployments are used to investigate the variability in the depth interval 150–900 m. In this interval the shear and strain fields are dominated by finescale structures. The extra-equatorial latitude band 4–10°N exhibits shear and strain spectra as well as Richardson number (Ri) statistics that are consistent with midlatitude internal-wave model predictions. Approaching the equator, an enhancement of shear and strain variance is found along with an accompanying increase in the occurrence of Ri less than $\frac{1}{4}$. Consistent with previous studies, the present measurement suggest that the 13°C thermostad is turbulently mixed. A high occurrence of Ri less than $\frac{1}{4}$ is also found below the thermostad and in the latitude range 2–4°S. The implications of these observations are discussed along the representativeness of the present measurements.

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