

Weak Thermocline Mixing in the North Pacific Low-Latitude Western Boundary Current System

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Despite its potential importance in the global climate system, mixing properties of the North Pacific low-latitude western boundary current system (LLWBC) remained unsampled until very recently. We report here on the first measurements of turbulence microstructure associated with these currents, made in the western boundary region of the tropical North Pacific east of the Philippines. The results suggest that thermocline mixing in the North Pacific LLWBC is generally weak with the diapycnal diffusivity $\kappa_\rho \sim O(10^{-6}) \text{ m}^2 \text{ s}^{-1}$. This is consistent with predictions from internal wave-wave interaction theory that mixing due to internal wave breaking is significantly reduced at low latitudes. Enhanced mixing is found to be associated with a permanent cyclonic eddy, the Mindanao Eddy, but mainly at its south and north flanks. There, κ_ρ is elevated by an order of magnitude due to eddy-induced geostrophic shear. Mixing in the eddy core is at the background level with no indication of enhancement.

Keywords: diapycnal mixing, North Pacific, low-latitude western boundary current system, eddy, thermocline