

## Turbulent mixing within the Kuroshio in Tokara Strait

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Strong turbulent mixing within the Kuroshio are observed using a microstructure profiler in Tokara Strait. The Kuroshio current is greatly modified at shallow seamounts. The vertical diffusivity in the Kuroshio at the lee of the seamount is enhanced nearly 100 times from the upstream site to  $K_{\text{rho}} \sim O(10^{-3})\text{--}O(10^{-2}) \text{ m}^2 \text{ s}^{-1}$ . In the 70-m thick shear enhanced turbulence layer, the flow is in favor of shear instability. A one-dimensional diffusion model using the observed eddy diffusivity reproduces the observed water mass transformation. However, the estimated diffusion time scale is at least 10 times longer than the advection time scale and suggests much stronger turbulence mixing in the vicinity of the seamount. Our study suggests that a better prediction of current and water mass properties of the Kuroshio requires an accurate parameterization of interactions of the Kuroshio with topography and the associated turbulent mixing.