

Microstructure and mooring observations of enhanced mixing in the Kerama Gap

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Microstructure and mooring observations were conducted around the Kerama Gap, near the midpoint of the Ryukyu Island chain, in December 2016. We observed the enhanced mixing near the topography, with vertical diffusivities of $10^{-2} \sim 10^{-1} \text{ m}^2 \text{ s}^{-1}$ and found that tides are important to drive the enhanced mixing at the sill. To understand tidal processes, we conducted two-dimensional numerical simulations. The numerical simulation indicated that hydraulic jump or lee wave breaking are important for the enhanced mixing behind the sill. It also indicated that there are interferences between M2 internal tides radiated from entrance and exit of the Kerama Gap, which may correspond to observed enhanced vertical shear and mixing at a bottom of the North Pacific Intermediate Water in the Kerama Gap. These results suggest that enhanced mixing around Kerama Gap is important for ventilating deep water as well as renewal of the North Pacific Intermediate Water in the Okinawa Trough.