

Revisiting the Characteristics of Mixing Efficiency in the Brazil Basin

*Takashi Ijichi¹, Louis St. Laurent¹, Kurt Polzin¹

1. Woods Hole Oceanographic Institution

It is still controversial whether or not the dissipation flux coefficient Γ , often referred to as the “mixing efficiency”, is a global constant of 0.2. A primary justification for continuing to use this conventional value comes from a number of dedicated tracer-release/microstructure surveys done over the past three decades. Most notably, studies in the Brazil Basin have been the basis for examining the characteristics of mixing in the abyssal interior of the global ocean. Here, using recent microstructure data also collected in the Brazil Basin, we revisit the characteristics of Γ in the abyssal interior. It is shown that Γ , estimated from averaged profiles of the TKE dissipation rate and the thermal variance dissipation rate, actually lies around 0.2 in the pycnocline, but on the other hand, it tends to increase up to 0.4-0.8 toward the bottom. Such near-bottom high efficiency appears to be associated with weak stratification in the bottom water. Furthermore, one microstructure profile appears to reach down to within the thin bottom boundary layer: Γ abruptly decreases to $O(10^{-2})$ within 50 m above the bottom, which is reasonable given the no buoyancy flux condition at the bottom. We will also examine these results using the earlier generation microstructure datasets collected in the Brazil Basin.