## Abstract View

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# Estimates of the Local Rate of Vertical Diffusion from Dissipation Measurements

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ABSTRACT

Scaling of the turbulent energy equation suggests the balance of terms in the ocean is between turbulent production, dissipation and the loss to buoyancy. In this paper two models for the source of oceanic turbulence are considered; namely, production by the Reynolds stress working against a time variable mean shear, and the gravitational collapse of Kelvin-Helmholtz instabilities. Both of these shear instabilities are believed to be important in the ocean. Using values for the critical flux Richardson number and the measurements from studies of Kelvin-Helmholtz instabilities, the efficiency of turbulent mixing is shown to be comparable for the two models. Therefore, a general relationship between the dissipation rate and the buoyancy flux due to the small-scale turbulent velocity fluctuations is derived. The result is expressed as an upper bound on the value of the turbulent eddy coefficient for mass $K_\rho \leqslant 0.2\epsilon/N^2$. Values of $K_\rho$ are calculated from recent oceanic measurements of energy dissipation. Isopycnal advection and doubly diffusive phenomena are not included in the model.