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Turbulent Mixing in a Linearly Stratified Shear Layer SAM LEWIN, COLM-CILLE CAULFIELD, University of Cambridge — In order to develop a better understanding of the nature of ocean mixing, it is important to consider a variety of physical regimes that might represent different oceanic environments. Using high resolution direct numerical simulation at Reynolds number $Re = 6000$, we investigate the dynamics and mixing properties of a shear flow embedded within a deep ambient density stratification (modeled as a linear background density profile) and compare our results to a flow with the widely studied hyperbolic tangent density profile that produces characteristic Kelvin-Helmholtz (KH) mixing. We observe that linearly stratified flows exhibit turbulence whose intensity may be strongly temporally intermittent, depending on the mechanisms by which the growing KH billows are destroyed. Non-monotonic dependence of the irreversible mixing efficiency $\mathcal{E}$ (i.e. the ratio of the irreversible mixing rate to the sum of this rate and the kinetic energy dissipation rate) on the initial minimum Richardson number at the midpoint of the shear layer Ri_m is observed, which may be used to improve existing mixing parameterisation schemes for large-scale ocean models.

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