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**Mixing efficiency of turbulent patches in stably stratified flows**[1]
AMRAPALLI GARANAIK[2], SUBHAS KARAN VENAYAGAMOORTHY[3], Colorado State University — A key quantity that is essential for estimating the turbulent diapycnal (irreversible) mixing in stably stratified flow is the mixing efficiency $R_f^*$, which is a measure of the amount of turbulent kinetic energy that is irreversibly converted into background potential energy. In particular, there is an ongoing debate in the oceanographic mixing community regarding the utility of the buoyancy Reynolds number ($Re_b$), particularly with regard to how mixing efficiency and diapycnal diffusivity vary with $Re_b$. Specifically, is there a universal relationship between the intensity of turbulence and the strength of the stratification that supports an unambiguous description of mixing efficiency based on $Re_b$? The focus of the present study is to investigate the variability of $R_f^*$ by considering oceanic turbulence data obtained from microstructure profiles in conjunction with data from laboratory experiments and DNS. Field data analysis has done by identifying turbulent patches using Thorpe sorting method for potential density. The analysis clearly shows that high mixing efficiencies can persist at high buoyancy Reynolds numbers. This is contradiction to previous studies which predict that mixing efficiency should decrease universally for $Re_b$ greater than $O(100)$.

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