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Evaluation of small scale anisotropy in stably stratified turbulence[1] AMRAPALLI GARANAIK, SUBHAS KARAN VENAYAGAMOORTHY, Colorado State University — Direct numerical simulations (DNS) of stably stratified turbulent flows are performed to evaluate Kolmogorov's hypothesis of small scale isotropy. True estimation of small scale turbulent quantities such as the rate of dissipation of turbulent kinetic energy (ϵ) and rate of dissipation of temperature variance (χ) requires nine mean square velocity gradients and three mean square scalar gradients respectively. It is common practice in oceanography to measure dissipation quantities from just one or two gradient components for both ϵ and χ by invoking Kolmogorovs small scale isotropy hypothesis. Though the use of the isotropic assumption at small scales in oceanic flows is both tempting and necessary, such an assumption is likely to result in an over- or under estimation of small scale turbulent quantities for two main reasons. First, the Reynolds number for oceanic flows is not always sufficiently high enough to justify isotropy at small scales. Second, oceanic flows are strongly influenced by stable vertical stratification resulting in large scale anisotropy. In this study we have revisited the small scale isotropy assumption in stably stratified flows and provide an estimation of departure from isotropy as a function of turbulent Froude number.

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