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Analysis of Mixing in Rotating Stratified Turbulence MATTHEW KLEMA, Colorado State University, ANNICK POUQUET, University of Colorado, DUANE ROSENBERG, 1401 Bradley Dr. Boulder, CO 80305, KARAN VENAYAGAMOORTHY, Colorado State University — This research introduces a parametric framework for the evaluation of rotating stratified turbulence (RST). Four dominant flow regimes in RST are delineated using the turbulent Froude number, $Fr_t = \epsilon/Nk$, and the turbulent Rossby number, $Ro_t = \epsilon/fk$ where k is the turbulent kinetic energy, ϵ is the dissipation rate of k, N is the buoyancy frequency and f is the Coriolis frequency. These four regimes reflect the relative contributions of buoyancy and rotation to the characteristics of the flow. Thirteen direct numerical simulations (DNS) are used for evaluation of the framework and analyzing the effects of forced rotation on turbulent mixing. The intensity of turbulent mixing is analyzed using the buoyancy Reynolds, $Re_B = \epsilon/\nu N^2$, and the ratio of turbulent to molecular diffusivities, $\hat{\kappa} = \kappa_{\rho t}/\kappa$. Results from the simulations show that forced rotation does not impact the behavior of the turbulence or impact scaling relationships with the turbulent Froude number when compared to non-rotating stratified DNS data. Ratios of the buoyancy frequency N and the Coriolis rotational frequency f is also shown to not be a useful ratio for the classification of stratified flow.

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