

Abstract Submitted
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Large Eddy Simulation of a Stratified Shear Layer KYLE BRUCKER, SUTANU SARKAR, University of California San Diego — Large Eddy Simulation (LES) of a stably stratified turbulent shear layer is performed with several sub-grid models: the simple Smagorinsky model, dynamic Smagorinsky model, and the mixed model. The ability of LES to predict the experimentally observed collapse at a critical value of bulk Richardson number is assessed. *A priori* and *a posteriori* tests are performed with a Direct Numerical Simulation (DNS) database serving as the benchmark. The budgets of turbulent kinetic energy, turbulent potential energy, Reynolds stress, and mixed budgets are utilized to elucidate the behavior of the sub-grid models. The simple Smagorinsky model, picks up some effects of stratification, but over-predicts the turbulent viscosity, and hence the bulk-behavior of the flow is quantitatively incorrect. The performance of the more advanced subgrid models are contrasted with the Smagorinsky model. The budgets of turbulent kinetic energy, turbulent potential energy, Reynolds stress, and buoyancy flux are utilized to elucidate the behavior of the more advanced sub-grid models.

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