

Abstract Submitted
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On the Modification of Near-Wall Structures in Stably Stratified Turbulence JUNWOO LIM, Pittsburgh Supercomputing Center, Carnegie Mellon University, KYONGMIN YEO, CHANGHOON LEE, Yonsei University, Korea — We investigate the Eulerian and Lagrangian characteristics of turbulent channel flows under stable stratification with particular emphasis on the modification of the near-wall structures. From the direct numerical simulations in the range of $Re_\tau = 180 \sim 400$ and $Ri = 0 \sim 200$, we find that the near-wall turbulent structures become more energetic and intermittent under stable stratification, while the basic shapes still remain the same. We observe some evidences, however, that the stratification effect may eventually modify the shapes of near-wall structures as well at higher Richardson number. On the other hand, in the center region, the buoyancy already suppresses large scale turbulence significantly as the Richardson number increases. Due to the presence of internal gravity waves near the center region, the particles released from the one half of the channel are shown to be hindered from migrating to the other side. Other high- order statistics will be presented in the meeting in more detail.

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