Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

**Direct and Large Eddy Simulation of stably stratified turbulent Ekman layers** STIMIT SHAH, ELIE BOU-ZEID, Princeton University — Understanding and parameterizing turbulent fluxes in statically stable boundary layers, where buoyant forces destroy turbulent kinetic energy remains a challenging, yet very important problem, in geophysical fluid dynamics. Numerical simulations, with their ability to provide 3D, time-varying information on turbulent structures and dynamics are increasingly used to tackle the problem. However, some uncertainties remain about the limitation to low Reynolds number ($Re$) in Direct Numerical Simulation (DNS) and performance of subgrid-scale models in Large Eddy Simulation (LES) under stable conditions. To better understand these limitations and the effect of stability, we combine DNS of stably stratified Ekman layer at moderate $Re$ ($\sim 10^{3-4}$ based on $U_\infty$ and $\delta_t$) with wall-modeled LES using Lagrangian scale-dependent dynamic (LASD) subgrid model at large $Re$ ($\sim 10^{7-8}$). The analysis focuses on effect of stability on turbulent kinetic energy budget, turbulent structure, mean profiles of velocity, potential temperature, Reynolds stress, rms velocities and streamwise velocity and potential temperature spectra.

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Date submitted: 03 Aug 2011 Electronic form version 1.4