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High Reynolds number simulations of a stratified bottom Ekman layer JOHN TAYLOR, SUTANU SARKAR, University of California San Diego — Large eddy simulations of a stratified benthic Ekman layer over a non-sloping, rough seafloor have been carried out at a realistic Reynolds number ($Re_* = 10^6$) and Richardson numbers ($Ri_* = N^2/f^2 = 0 - 5625$). In order to achieve high Reynolds number simulations, a near-wall model has been used with a novel adaptive stochastic forcing component added to compensate for known deficiencies of the sub-grid scale model. The primary influence of the outer layer stratification is to limit the thickness of the bottom mixed layer and increase Ekman veering, while the drag coefficient only increases slightly. When the outer layer is stratified the mean velocity profile deviates from the unstratified log law, even in the well-mixed layer near the wall; the consequences for how bottom stress and dissipation rates are inferred from field data will be discussed. Above the pycnocline, a region with local shear instabilities and enhanced mixing is observed. Turbulence-generated internal waves radiate away from the boundary layer and their properties will be examined.

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