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On the dynamics of homogeneous turbulence near a surface OSCAR FLORES, Universidad Carlos III, JAMES J. RILEY, University of Washington — It is becoming increasing clear that stably-stratified flows can support a stratified turbulence $k^{-5/3}$ inertial range, different from Kolmogorov's. Stratification inhibits vertical motions, but the large-scale quasi-horizontal motions produce strong vertical shearing and small-scale instabilities. The result is a $k^{-5/3}$ horizontal spectrum for the horizontal velocities at scales larger than the Ozmidov scale, the largest scale that can overturn. For smaller scales, the classical Kolmogorov $k^{-5/3}$ applies. Inspired by data taken near the water surface in a tidal river,[1] we here explore to what extent the dynamics of the nonlinear spectral energy transfer of near-surface turbulence with no mean shear (i.e., horizontally isotropic turbulence bounded by free-slip and no-slip surfaces) is analogous to stably stratified turbulence. To that end, we perform DNS of decaying isotropic turbulence with $Re_\lambda \sim 100$, but bounded by a non-slip surface and a free slip surface. The behavior of the flow near the free-slip surface is similar to stratified turbulence, with a tentative $k^{-5/3}$ range, but the same is not true for the no-slip surface at the present Reynolds numbers. This research was supported by ARO and NSF.

[1]Chickadel et al. (2011) to appear in *IEEE Geosci. Remote Sens. Lett.*

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