Abstract Submitted
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Transition in energy spectrum for forced stratified turbulence YOSHI KIMURA, Nagoya Univ., JACKSON HERRING, NCAR — Energy spectrum for forced stably stratified turbulence is investigated numerically. The 3D momentum equation under the Boussinesq approximation is solved pseudo- spectrally with stochastic forcing applied to the largest velocity scales. Following Lesieur & Rogallo (1989) and Carnevale *et. al.*(2001), spectral eddy viscosity, $\nu_t(k) = (a_1 + a_2 \exp(-a_3 k_c/k))\sqrt{E(k_c)/k_c}$, is used for small scale dissipation. Using toroidal-poloidal decomposition (Craya-Herring decomposition), the velocity field is divided into the vortex mode (ϕ_1) and the wave mode (ϕ_2). With the initial kinetic energy being zero, the ϕ_1 spectra as a function of horizontal wave numbers, $k_\perp$, first develops a $k_\perp^{-3}$ spectra for the whole $k_\perp$ range, and then $k_\perp^{-5/3}$ part appears with rather a sharp transition wave number. Meanwhile the ϕ_2 spectra shows $k_\perp^{-2}$ first, and then $k_\perp^{-5/3}$ part appears with the same transition wave number. According to Carnevale *et. al.*, the transition wave number is understood as the Ozmidov scale with a correction by the coefficients of the buoyancy spectrum, $E(k) = \alpha N^2 k^{-3}$, and the Kolmogorov spectrum, $E(k) = C_K \epsilon^{2/3} k^{-5/3}$. By equating these spectra, we obtain $k_b \sim (\alpha/C_K)^{3/4}\sqrt{N^3/\epsilon}$. This assessment will be discussed.

Carnevale,G.F. *et. al*: 2001 J. Fluid Mech. **427** 205–239.
Lesieur, M. & Rogallo, R. 1989 Phys. Fluids A**1** 718–722.

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