Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Stratified turbulence: a possible interpretation of some geophysical turbulence measurements JAMES RILEY, University of Washington, ERIK LINDBORG, KTH Stockholm — For stably-stratified regions of both the atmosphere and the oceans, several existing sets of smaller-scale data, with horizontal length scales ranging from the Ozmidov scale $\ell_o = \sqrt{\epsilon/N^3}$ to several hundred times ℓ_o, appear to display Kolmogorov-Obukov-Corrsin inertial ranges in horizontal spectra. For both the atmospheric and oceanic data, this corresponds to horizontal length scales of roughly 1 to at least several hundred meters. Based upon results from numerical simulations[1,3] and theoretical arguments[1,2] it is argued that these data are inconsistent with the assumptions for these inertial range theories. Instead, it is hypothesized that the dynamics of stratified turbulence[4] explain these data. In stratified turbulence a strong downscale transfer of energy exists in the horizontal, and with this the development of a horizontal (but not vertical) spectral inertial range above ℓ_o. This downscale transfer of energy can then lead to smaller-scale instabilities and turbulence, providing new 'pathways' to turbulence in geophysical flows.
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Date submitted: 04 Aug 2007 Electronic form version 1.4