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A Composite Spectrum of Vertical Shear in the Upper Ocean

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ABSTRACT

Results from three separate velocity profilers operated nearly simultaneously in the northwest Atlantic in 1975 are used to form a composite shear spectrum over vertical wavelengths from 100 m down to a few centimeters. This exercise constitutes an intercomparison of the three different measurement techniques and reveals a shear spectrum which is approximately fiat at a WKB-scaled level from $k = 0.01$ cpm through $k_0 \approx 0.1$ cpm, then falls as k^{-1} to a buoyancy wavenumber $k_0 = (N^3/\epsilon)^{1/2}$ determined by the local average Väisälä frequency N and the volume-averaged dissipation rate ϵ . Various consequences of the observed shear spectral shape are explored.

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