



Internal gravity waves during the morning transition of the Atmospheric Boundary Layer: observations and laboratory experiments

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The Atmospheric Boundary Layer (ABL) structure has been documented by mean of a Backscatter Lidar, a Doppler Lidar and soundings. During the morning transition, observations revealed strong internal gravity wave activity in the weakly stratified residual layer. As opposed to the generally accepted concept, we find evidence of mixing at the capping inversion of the residual layer, induced by the convectively driven internal gravity waves. Using shadowgraph and PIV techniques, a series of water-tank experiments is carried out to examine the interaction between a multi-layer stratification and oscillating-grid-induced shear-free turbulence. Results reveal that turbulent eddy-scale waves propagate with a narrow range of frequencies and vertical wavenumbers. We present evidence of internal gravity waves tunnelling through a weakly stratified layer, which could account for certain wave-turbulence encounters during the transition.