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NICT ドップラーライダーで観測された境界層内の風速擾乱について
Wind field disturbances in the boundary layer over Tokyo suburban area observed with NICT coherent Doppoler lidar

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Coherent Doppler lidar is capable of detecting radial wind velocity with error of 0.1-0.2 m/s which is comparable to wind profiler radar errors, by using aerosols in the boundary layer as scsatterer or laser beam's target. Laser beam scan enables us to monitor temporal evolution of disturbed wind fields in the height range from the ground surface to several kilometers. In this study we have analyzed radial wind velocity fluctuation components at the 0-2 km heights, extracted from the Doppler lidar observation on 2 February 2009. Beam scan was carried out in the vertical plane in the north-east direction.

Time series of the height-range cross-section of radial wind speed show that a structure with the 800-m depth standing up from the ground moved toward the lidar with the speed similar to the background wind of 2-3 m/s. The structure may be a thermal or plume flown by the back ground wind field. Associated wind velocity fluctuations are larger around the height of 0.8-1.2 km, where the background wind (radial component) has larger wind shear in the beam scan azimuth direction.

Further analysis is planned to clarify wind disturbance inhomogeneity and/or anisotropy, which may cause significant bias error in wind profiling or VAD technique and dual-beam method of momentum flux estimation used in wind profiler radar and Doppler lidar observations.

キーワード: 境界層, ドップラーライダー, サーマル, 乱流
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