

Coherent Doppler lidar measurements of the sea breeze at Sendai Airport

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To study the sea breeze at Sendai Airport, the coherent Doppler lidar of the NICT performed measurements of the sea breeze, during the period from August 20 to August 24, 2006. The NICT's coherent Doppler lidar was stationed ~4 km east from the Pacific coast.

The vertical-slice scans were carried out parallel to the mean sea-breeze flow. These scans showed the vertical structure of the sea-breeze flow from the surface of the land and sea to several kilometers (usually 1-3 km) above the surface. These scans give radial wind velocities and backscattered intensities in the vertical cross sections. The low-elevation-angle (1 degree elevation) sector/conical scans were also carried out. These scans provided information about the horizontal variability of the sea-breeze flow.

On days without interference of morning fog, the development of the sea-breeze layer during morning was detected by the lidar. The lidar measurements showed early formation of the layer near the coast and its gradual horizontal and vertical expansion over land and sea. On August 24, the lidar detected the strong backscattered intensities near the sea-breeze front, which indicated the cloud development. We discuss the relationship between the sea-breeze front and the cloud development.