

Surface Temperature and Pressure Distributions of Downburst captured by High Dense Ground Observation Network "POTEKA"

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Meisei developed low-cost compact weather sensor (POTEKA Sta., hereinafter referred to as the POTEKA), which can measure temperature, relative humidity, pressure, sunlight, and rain detection per one minute and achieve higher density weather observation system economically. We installed economical and high dense ground observation network (total 55 stations, 1.5~4 km-mesh) in Gunma, Japan. This paper presents observation of wind gust phenomena around Takasaki city and Maebashi city on 11 August 2013.

The wind gust occurred from Takasaki thru Maebashi city around 18:00 JST and caused damages to private houses. Temperature changes obtained from POTEKA network show that surface temperature dropped by up to 13.9 deg. C in 12 minutes.

The following figure exhibits the change of sea surface pressure calculated from POTEKA around the gust pathway reported by JMA (Maebashi). Although pressure at Maebashi station increased gradually with 10 minutes resolution, pressure jumps of 1-2 hPa were recorded at POTEKA with one minute resolution, indicating that the temporal high pressure was caused by downburst downflow. Beside, two pressure jump can be found at some stations. The first and second jumps are coincided with gust fronts and down flow of downburst, respectively (Discrimination between downburst and gust-front by the surface dense observation network POTEKA).

Local weather observation network consisting of POTEKA succeeded in capturing the change of surface pressure caused by gust wind phenomena with unprecedented spatio-temporal resolution, which enables us not only to distinguish between gust fronts and downbursts but also to detect such wind phenomena earlier.

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