

Surface Temperature and Pressure Distributions of Wind Gust 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 we installed high ground observation network (total 55 stations, 1.5~4km-mesh) in Gunma in FY2013. The following year, we further improved POTEKA to observe wind direction, wind speed and rainfall. Additionally, we added 93 locations, about 2km intervals, around the elementary school in order to achieve higher density than the existing observation network. Therefore, we can obtain real-time meteorological information per one minute in total 145 stations. This paper presents observation of wind gust on July and August 2014.

The wind gust occurred by cold front in Isesaki city around 12:30JST. The wind gust was estimated to gust front by Japan Meteorological Agency. Surface temperature dropped from 11:50JST, $-0.25\text{ }^{\circ}\text{C}$ per one minute on average and it drop captured in POTEKA network. The Maximum instantaneous wind speed has a peak after about 20 minutes from the temperature drop, was observed gust of about 19meter per second.

Downburst, accompanied with well-developed cumulonimbus, occurred and passed from Takasaki city to Maebashi city around 18:10 on 22 August 2014. A significant drop in temperature is noticed around 17:45, ($-0.47\text{ }^{\circ}\text{C}$ per one minute on average). The distributions and occurrence time of cold air captured by POTEKA network well coincide with field survey results of the Japan Meteorological Agency. In addition, the first temperature drop was confirmed about 25 minutes before damage occurrence time of the downburst.

In these cases, tendency of temperature and wind is in good agreement with the observed value of Maebashi local weather station, in order to capture wind gusts.

Keywords: compact weather sensor, high ground observation network, gust front, downburst, wind direction and wind speed, summer 2014