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Observation of Z-R Relationship and Raindrop Size Distribution Using POSS and 2D-VD

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Abstract

The Z-R relationship has been used for estimating the rainfall rate (R) from an observed radar reflectivity (Z). This relation mainly depends upon the raindrop size distribution and fall velocity. To determine the relationship and investigate its variability, R and Z should be observed by different instruments individually and accurately at short time interval.

The POSS (Precipitation Occurrence Sensor System, Andrews) is a portable X band bi-static radar that detects precipitation occurring near the ground at 1 min interval. The 2D-VD (2D-Video distrometer, Joanneum Research) is an imaging system that records orthogonal image projections of raindrops using two line scan cameras and measures the fall velocity and equi-volume diameter of each raindrop falling through its sensing area. Both instruments were installed within 10 m of each other, so as to observe almost the same region of rainfall.

The comparison of these instruments enables us to investigate the time variation of Z-R relationship and the corresponding raindrop size distribution with high accuracy at 1 min interval.

Simultaneous observation of 2D-VD and POSS was conducted to observe Z-R relationship and the raindrop size distribution continuously from 15 to 26 July 2006. During this period, the heavy rainfalls occurred around Hokuriku area where our observation site (Kanazawa Univ.) is located.

The results from the observation will be presented and discussed in this paper.