

Initial Observations with X-band Dual Polarimetric Phased Array Weather Radar in Tokyo

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The weather radars using parabolic dish antenna generally require 5-10 minutes to mechanically rotate and to tilt upwards as they sample the atmosphere at several different elevation angles. The number of the observable elevation angles is about ten or so. The single polarization phased array weather radar (SP-PAWR), which has been developed in 2012, was designed to conduct precipitation measurement of a radar reflectivity factor, in less than 10 or 30 seconds in a range of 20 or 60 km in real-time, respectively. As a next radar development project, a dual polarimetric phased array weather radar (Multi-parameter phased array radar; MP-PAWR) is being developed. It can provide multi-parameter measurements that reveal detailed microphysics of storms in addition to accurate precipitation estimation, and can improve weather forecasts.

The first made MP-PAWR, which simultaneously transmits pulses of horizontal and vertical polarized radiation, has been developed and installed in December 2017, at Saitama University, Japan. The center of frequency is 9.4GHz (X-band). The MP-PAWR has a scanning scheme similar to the SP-PAWR, which uses the mechanical and electronic scanning in azimuth and elevation angles, respectively. The MP-PAWR provides the polarimetric precipitation measurements in three-dimensional volume scanning in less than 30 or 60 seconds in a range of 60 or 80 km in real-time, respectively.

In this presentation, we will show the initial observation results. To confirm reliability of the measurements and to evaluate the accuracy of the measurements by the MP-PAWR, the initial observation results of the MP-PAWR are compared with an optical disdrometer data.

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