

MMSE beamforming method for polarimetric phased array weather radar

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A polarimetric 2-D phased array radar, which consists of dual-polarized antenna with two-dimensional circular planar phase-array elements, capable of measuring the 3-D rainfall distribution in less than 20 seconds, is under development. We proposed minimum mean square error (MMSE) method for the under developing radar as digital beam forming (DBF) method, which is one of the important components to develop the phased array radar. In this presentation, precipitation radar signal simulations based on the developing radar concept are carried out. We discuss the estimation accuracy of polarimetric precipitation profiles (differential reflectivity, specific differential phase, and copolar correlation coefficient). From comparison of the performance of the conventional DBF methods, MMSE is superior because of the effect of adaptively suppressed side lobes.

Keywords: precipitation measurement, polarimetric radar, phased array radar, beamforming method