

Development of high resolution spatio-temporal precipitation data using a network of polarimetric X-band radars in Japan

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Localized convective precipitation develops rapidly in a very short time and is conducive to extreme local rainfall amount. The X-band polarimetric radar is useful to analyze the convective precipitation because it can provide us polarimetric radar parameters which are useful to understand microphysical process in the precipitation. However, the radar observation has some limitations in detecting initial stage of rapidly developing convective cell; the radar volume scan strategy adopted in operational radar is 5 minute interval which is not enough for measuring rapidly developing convective precipitation. To detect the early stage of convective cell, we developed the algorithm which is based on the interpolation method both in space and time. The algorithm reproduces higher resolution spatio-temporal volumetric data using the operational network of four X-band polarimetric radars. The mosaic of multiple radars could be benefit for increased sampling into a certain volume. In addition, different scan strategy at each radar also improve spatio-temporal resolution. The algorithm is applied to radar data of convective precipitations observed in Kanto area in 2012. The new volumetric data can recognize more detail about echo which developed rapidly and detect the first appearance of convective echo at upper layer. Early detection of convective precipitation at upper layer can be useful for nowcasting or very short-term forecasting.

Keywords: convective cell, X-band polarimetric radar, high resolution precipitation data