Composite rainfall map from C-band conventional and X-band dual-polarimetric radars for the whole of Japan

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X-band (3-cm) wavelength dual-polarimetric radar has several advantages compared to conventional C- and S-band radars, such as finer spatial and temporal resolution, higher sensitivity, less affected by variations in drop size distribution, easier to be set up and lower cost etc. In Japan, since National Research Institute for Earth Science and Disaster Prevention (NIED) deployed the first X-band polarimetric radar around the Tokyo metropolitan area in 2000, a widespread use of X-band polarimetric radar has gained significant momentum. Especially after the beginning of XRAIN project carried out by Ministry of Land, Infrastructure, Transport and Tourism (MLIT), 35 X-band polarimetric radars have been installed by the end of 2013, covering almost all major cities areas in Japan. And after years of efforts, the rainfall estimators using polarimetric parameters from X-band polarimetric radars have been proved to be in great harmony with rain gauge measurements without any corrections from surface observations. However, the maximum detection range of X-band radar is shorter than that of longer wavelength radars, and the signal extinction usually occurs behind heavy rainfall areas. To overcome these disadvantages of X-band radar and provide useful information for hydrological applications, the current research aims to produce a seamless rainfall map which covering the whole of Japan from X-band and C-band radars to provide high spatio-temporal rainfall information for early detection and prediction system, MPSEP (Monitoring and Prediction System of Extreme Weather). This composite system started running in real-time from the summer of 2013, and was found to substantially agree with ground observations.