

3.20 KMA DUAL-POLARIZATION RADAR NETWORK AND OBSERVATION DATA QUALITY

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There were many issues related with weather radar operation in and outside of Korea Meteorological Administration (KMA) at the stage of establishment of Weather Radar Center (WRC). Outside of KMA, since the other different governmental agencies had been operating their own weather radars, it was needed to collaborate on radar operations among agencies and manage it more efficiently, and lead the entire weather radar operations to incorporate eventually as one in South Korea. Meanwhile inside of KMA, the organization had a self-modernization plan to improve service quality to satisfy in response to gradually increasing needs on public weather service. Eventually, in order to come up to their expectations, WRC was established April, 2010.

As a part of improvement plan on service quality, WRC/KMA determined to install 10 operational radars and 1 Radar Test Bed (RTB) for dual-polarization as one model from the same manufacturer. In the year of 2012, with the beginning of RTB installation at Yong-In, a total of 8 dual-polarization radars were replaced, and 2 radars are being replaced this year. The entire installation of the weather radars will be done in year of 2019 at Gangneung site.

The observation data quality has been evaluating by two methods during site acceptance test: Texture analysis and Point-mode analysis. In order to perform texture analysis, firstly it needs to smooth values of the gates in radial direction. If there are bad data, then those gates should be taken out when calculating. Secondly, calculate the subtraction between raw data and smoothed data, and then calculate standard deviation estimation. In addition, it is needed to extract values on a radar moment by using SNR, cross relation coefficient, and spectrum width. Lastly, calculate median from the standard deviation values. All steps for calculation can be done on every radar moments such as reflectivity, differential reflectivity, correlation coefficient, differential phase, radial velocity and spectrum width. However, texture analysis has cons such as overestimation of measurement errors from non-uniform rainfall, rainfall attenuation and boundary effect. Compared texture analysis, point-mode analysis can discriminate “system-induced error” from “sampling-induced error”. Therefore, KMA has been applying both texture mode and point mode analysis methods to evaluating radar observation data quality since 2017.

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