Preliminary result of hail detection using an operational S-band polarimetric radar in Korea

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Hail detection algorithm using polarimetric radar is based on the assumption that differential reflectivity (ZDR) of hail is low due to the random orientation and the combination of low ZDR and high reflectivity (Z) is clue to the presence of hail (Bringi and Chandrasekar, 2001). Heinselman and Ryzhkov (2006) found that the ZDR and specific differential phase (KDP) in hail are significantly lower than in rain with the same reflectivity.

It was very difficult to monitor the hail event only using conventional radar before installation of polarimetric radar in Korea. Bislsan radar with polarimetric capability installed at the eastern part of Korea in 2009 by MOLIT (Ministry of Land, Infrastructure and Transport).

Hail was usually occurred in the spring and autumn and its size was almost less than 1.0 cm in Korea for the last 30 years. Hail occurred on 8th May in 2012 were analysed using Bisl polarimetric. Hail detection was tested by combination of Z and ZDR, namely, HDR (Hail differential reflectivity). And the correlation between S-band HDR values and observed hail characteristics was examined for rain event. Hydrometeor classification algorithm developed by collaboration with NCAR (National Center for Atmospheric Research) was applied to the Bislan radar.