

## **Case study of hail detection using S-band dual polarization radar in Korea**

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Hail can cause serious damaging to aircraft, cars, fruit tree, crops, livestock and people each year and it occurs unexpectedly on narrow range in short time. Analysis of hail (occurrence area, life time, moving track) is difficult because observation of hail depends on eye observation or information of citizen when Hail is occurred. So far most of hail research is using weather chart, sounding, instability index in Korea. So we need more research for accurate detection and verification of hail. It is possible that we can hail detection through hydrometeor classification used dual polarization.

For this research, the data from Mt. Bisul S-band dual polarization radar of Ministry of Land, Infrastructure and Transport (MOLIT) are applied to the NIMR hydrometeor classification algorithm of National Institute of Meteorological Research (NIMR). This algorithm was developed through a joint research program with the National Center for Atmospheric Research (NCAR). The NIMR hydrometeor classification algorithm was constructed based on NCAR algorithm using fuzzy logic technique for S-band radar. The fuzzy logic technique is well suited for hydrometeor classification due to its ability to identify hydrometeor types with overlapping and ambiguous measurements. NIMR hydrometeor classification algorithm can classify a total of 14 species of hydrometeor except for non-meteorological echoes.

In this research, we confirmed it is possible to detect occurrence and extinction of hail, predict its moving track, and whether or not hail occurred using dual polarization radar. The NIMR hydrometeor classification is currently being implemented in the product display in real time in the S-band dual polarization. The new result is expected to contribute to the high quality meteorological information and to enhance the forecast accuracy of the KMA operational system.