

Japan's Field Experiment Plan for GPM DPR Algorithm Development Using a Dual Ka-Radar System

KENJI NAKAMURA¹, SHUJI SHIMIZU², KATSUHIRO NAKAGAWA³,
and HIROSHI HANADO³

¹*Hydrospheric Atmospheric Research Center, Nagoya University,
Furocho, Chikusa-ku, Nagoya 464-8601, Japan
nakamura@hyarc.nagoya-u.ac.jp*

²*Earth Observation Research Center, Japan Aerospace Exploration Agency,
Sengen, Tsukuba, 305-8505, Japan*

³*National Institute of Information and Communications Technology,
Koganei, Tokyo 184-8795, Japan*

Field experiments for the GPM dual-frequency radar (DPR) algorithm development using a dual Ka-radar system are described. The parameters which should be measured in the ground experiments depend on the DPR algorithm. For the liquid precipitation, raindrop size distribution is the primary parameter to be measured. For the dry snow region, another parameter of the snow particle density should be measured. For the wet snow or melting layer region, other parameters, such as the melting ratio should be measured. The dual Ka-band radar system which Japan Aerospace Exploration Agency (JAXA) is now developing will be a powerful tool to measure the parameters or the proxies of the parameters. The dual Ka-radar system can measure both the specific attenuation and the equivalent radar reflectivity at Ka-band. The basic idea is the retrieval of specific attenuation using the symmetrical appearance of the rain attenuation in the two rain signatures by radars on the same radio path but with the opposite (face to face) direction. Using the dual Ka-radar system along with other instruments, such as a polarimetric precipitation radar, a wind profiler radar, ground-based rain measurement systems, the uncertainties of the parameters in the DPR algorithm can be reduced. The verification of improvement of rain retrieval with the DPR algorithm is also included as an objective.

The planned field experiments include: (1) the polarimetric Doppler radar observation at the Okinawa Subtropical Environment Remote Sensing Center, the National Institute of Information and Communications Technology (NICT), and (2) snow observation with Snow and Ice Research Center, National Research Institute for Earth Science and Disaster Prevention, Kanazawa University and others in Kanazawa City, and Hokkaido University and others in Sapporo City. The experiments also include a melting layer measurement at the slope of Mt. Fuji.

Keywords: GPM, dual-wavelength radar, algorithm development, Ka-radar