Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

ACG09-18 会場:301B 時間:5 月 28 日 10:15-10:30

地上観測による GPM/DPR のアルゴリズム/プロダクト検証
Ground Validation Activity for GPM/DPR Retrieval Algorithm and Products

金子 有紀 [1*] ; 中川 勝広 [2] ; 鈴木 賢士 [3] ; 沖 理子 [1] ; 中村 健治 [4]
KANEKO, Yuki[1*] ; NAKAGAWA, Katsuhiro[2] ; SUZUKI, Kenji[3] ; OKI, Riko[1] ; NAKAMURA, Kenji[4]

[1] 宇宙航空研究開発機構, [2] 情報通信研究機構, [3] 山口大学, [4] 獨協大学
[1]Japan Aerospace Exploration Agency, [2]National Institute of Information and Communications Technology, [3]Yamaguchi University, [4]Dokkyo University

The core satellite of Global Precipitation Measurement Mission (GPM) is equipped a microwave radiometer (GMI) and a dual-frequency radar (DPR) which is the first spaceborne K_u/K_a-band dual-wavelength radar(KuPR/KaPR) dedicated for precise precipitation measurement. In the DPR algorithm, measured radar reflectivity is converted to effective radar reflectivity by estimating the rain attenuation. Here, the scattering/attenuation characteristics of Ka-band radiowaves are crucial.

For the purpose of algorithm validation, JAXA and NICT have been conducted the ground observation since 2011 with cooperators, using the dual Ka-band radar system. It consists of two nearly identical K_a-band FM-CW radars, and the precipitation systems between two radars were observed in opposite directions. From this experiment, equivalent radar reflectivity (Z_e) and specific attenuation (k) were obtained. Dual Ka-radar observation campaigns had been done in Okinawa, Tsukuba, Mt.Fuji, Nagaoka, and Sapporo to obtain the attenuation characteristics of various type of precipitation. The final campaign had carried out during 2014 autumn to 2015 spring along the slope of Mt.Zao, in Yamagata prefecture, targeting melting layer. Though measurement was found to need precise setup of experiment, since the retrieved k is very sensitive to the fluctuation of data, the observation was successfully finished. As a result, Z_e-k relationships for rain, wet snow, and dry snow were obtained and compared with DPR products and algorithms. The Ze-k relationship in the DPR algorithm was found to be consistent.

For the better understanding of microphysics in the melting layer, newly-developed Ground-based Particle Image and Mass Measurement System (G-PIMMS) also worked during this campaign. It can capture two-dimensional particle images by two CCD cameras which mutually arranged perpendicularly, and measure particle weight by the electronic balance at the same time. Particles are classified into perfectly melted particles, melting particles, and solid ice particles by captured images. G-PIMMS was installed different altitude on the slope of Mt.Zao, so its data shows the particle differences in the position of melting layer. We are also trying to estimate Z_e-R relationship by Ka-radar result and G-PIMMS mass measurement.

Sometimes DPR overpassed the Ground-based Ka-radar experimental site, and vertical profiles of rain/snow were compared with ground Ka-radar profiles. The comparison also showed that the DPR Ka-radar profiles were consistent with ground observation. Other instruments such as disdrometer, Parsivel, MicroRainRadar, and X-band randar in several observation points was also take data when DPR overpasses. The result of DPR product validation by those observations will be reported.

キーワード: 地上観測, 検証, 融解層
Keywords: Ground Observation, Validation, GPM, DPR, Ka-band, melting layer