Geophysical Research Abstracts
Vol. 18, EGU2016-12200, 2016
EGU General Assembly 2016

Validation of GPM Ka-Radar Algorithm Using a Ground-based Ka-Radar System

Kenji Nakamura (1), Yuki Kaneko (2), Katsuhiro Nakagawa (3), Kinji Furukawa (4), and Kenji Suzuki (5)

(1) Dokkyo University, Soka, Japan (knakamura@pat.hi-ho.ne.jp), (2) Japan Aerospace Exploration Agency, Tsukuba, Japan (yuki.kaneko@jaxa.jp), (3) National Institute of Information and Communications Technology, Koganei, Japan (nakagawa@nict.go.jp), (4) Japan Aerospace Exploration Agency, Tsukuba, Japan (furukawa.kinji@jaxa.jp), (5) Yamaguchi University, Yamaguchi, Japan (kenjis@yamaguchi-u.ac.jp)

GPM led by the Japan Aerospace Exploration Agency (JAXA) and the National Aeronautics and Space Administration of US (NASA) aims to observe global precipitation. The core satellite is equipped with a microwave radiometer (GMI) and a dual-frequency radar (DPR) which is the first spaceborne Ku/Ka-band dual-wavelength radar dedicated for 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, particularly for wet snow. A melting layer observation using a dual Ka-band radar system developed by JAXA was conducted along the slope of Mt. Zao in Yamagata Prefecture, Japan. The dual Ka-band radar system consists of two nearly identical Ka-band FM-CW radars, and the precipitation systems between two radars were observed in opposite directions. From this experiment, equivalent radar reflectivity (Ze) and specific attenuation (k) were obtained. The experiments were conducted for two winter seasons. During the data analyses, it was found that k estimate easily fluctuates because the estimate is based on double difference calculation. With much temporal and spatial averaging, k-Ze relationship was obtained for melting layers. One of the results is that the height of the peak of k seems slightly higher than that of Ze. The results are compared with in-situ precipitation particle measurements.