Evaluations of NICAM using the Joint simulator and ground observation data

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It is important to evaluate and improve the cloud properties in global non-hydrostatic models like a Nonhydrostatic ICosahedral Atmospheric Model (NICAM, Satoh et al. 2014) using observation data. There are intensive observation stations over the Kanto region in Japan. The ULTIMATE (ULTra sIte for Measuring Atmosphere of Tokyo metropolitan Environment) is proposed to verify and improve high-resolution numerical simulations based on these observation data.

One of the challenging satellite projects is the Earth Clouds, Aerosol and Radiation Explorer (EarthCARE, Illingworth, et al. 2015) satellite, which is a joint mission by the European Space Agency (ESA) and Japanese Aerospace Exploration Agency (JAXA). The EarthCARE has multiple passive and active sensors in the same body to investigate clouds, aerosols, precipitation, and associated radiation budgets. It has a Cloud Profiling Radar (CPR), ATmospheric LIDar (ATLID), Multi-Spectral Imager (MSI), and Broad Band Radiometer (BBR). The CPR of EarthCARE has the Doppler capability to provide information on the terminal velocity of rain and ice and convective motions.

In this study, we introduced an evaluation method of microphysics schemes using Doppler velocity of the 94 GHz cloud profiling radar on the ground before the launch of the EarthCARE. We evaluated two microphysics schemes using this method. We investigated results with realistic simulations like those obtained by the EarthCARE CPR with random errors.