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An introduction to the ULTIMATE project in Japan

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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. One of the methods is a radiance-based evaluation using satellite data and a satellite simulator (here Joint simulator, Hashino et al. 2013), which avoids making different settings of the microphysics between retrieval algorithms and NICAM.

The satellite data with active sensors has a limitation to observe the specific case of cloud and precipitation systems. And it is needed to validate satellite observations using in-situ observation. There are intensive observation stations over the Tokyo area, whose domain size is 100 km×100 km. For examples, the High Spectral Resolution Lidar (HSRL, 355 nm), Doppler lidar, and the Cloud Profiling Radar (CPR, 94 GHz) are located in Tokyo. The WInd profiler Network and Data Acquisition System (WINDAS) data is available in Kawaguchiko, Mito, and Kumagaya. Several polarimetric radars cover this area like C-band, Ka band, and X-band phased array. 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. In this study, we introduce the preliminary evaluation results of NICAM and applications of the Joint simulator related to the ULTIMATE project.