Evaluations and improvements of global cloud resolving models using high-resolution satellite data using simulators

Masaki Satoh (1), Woosub Roh (1), and Tempei Hashino (2)

(1) The University of Tokyo, Atmosphere and Ocean Research Institute, Kashiwa, Japan, (2) Kyushu University, The Research Institute for Applied Mechanics

The recent trend of the increase of computational power leads us to the new phase of atmospheric simulations using global cloud resolving models (GCRMs). Here we first overview our experiences in the past decade for evaluations and improvements of the non-hydrostatic icosahedral atmospheric model (NICAM) using satellite date with the Joint Simulator for Satellite Sensors, and then prospect future collaborative studies of GCRMs and satellite observations. We particularly introduce the EarthCARE satellite which will be launched in 2019 and the new initiative of GCRMs intercomparison called DYAMOND. The use of multiple sensors observation enables us to constrain cloud microphysics simulated in GCRMs. For example, we can evaluate ice/liquid water contents and effective radius of hydrometeors by using radar and lidar observations and their impact on radiative fields. The phase and particle shape are also inferred from depolarization by the lidar observation. The comprehensive use of satellite observations will improve cloud properties and circulations and reduce uncertainties due to clouds of GCRMs.