

Evaluation of mixed-phase clouds in NICAM over the Southern Ocean using CALIPSO and a satellite simulator

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It is important to evaluate and improve the cloud properties in non-hydrostatic models such as NICAM (Satoh et al. 2014) using observation data. One of the methods is a radiance-based evaluation using satellite data and a satellite simulator, which avoids making different settings of the microphysics between retrieval algorithms and NICAM.

One of the challenging issues is an evaluation of mixed-phase clouds, which consist of water vapor, ice particles, and supercooled water droplets. It is known one of the main reasons why climate models reveal large errors about the reflection of solar radiation over the Southern Ocean and Arctic.

The purpose of this study is an evaluation and improvement of mixed-phase clouds over the Southern Ocean in NICAM using a Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) and a satellite simulator.

We evaluate thermodynamics phase of mixed phases clouds over the Southern Ocean between 45°S to 65°S and 170°E to 170°W following Yoshida et al. (2010) method. We investigate impacts of microphysical processes on the characteristics of mixed-phase clouds.

Keywords: Mixed-phase clouds , microphysics , satellite simulator