

Evaluation of EarthCARE/CPR simulation and preparation for data assimilation in the global NWP system of JMA

Kozo OKAMOTO, Eiji OIKAWA, Izumi OKABE (JMA/MRI), Riku SHIMIZU (Remote Sensing Technology Center of Japan), Toshiyuki TANAKA, Takuji KUBOTA (JAXA/EORC)

Kozo OKAMOTO, Eiji OIKAWA, Izumi OKABE, Riku SHIMIZU, Toshiyuki TANAKA, Takuji KUBOTA

The space-based cloud profiling radar (CPR) on CloudSat has been valuable in evaluating and improving cloud processes of numerical weather prediction (NWP) and climate models. Assimilating CPR will also be beneficial for improving accuracy in NWP analysis and forecasts. EarthCARE/CPR is expected to bring more benefits because it provides more accurate observations with higher sensitivity to clouds. Successful assimilation of CPR observations requires a deep understanding of the characteristics of CPR observation and its simulation from the NWP model used in the data assimilation system. This study aims to evaluate simulation by comparing CPR observation and simulation made by the global model at Japan Meteorological Agency for the data assimilation.

EarthCARE/CPR reflectivity observations are obtained from L2a CPR One-sensor Echo Product and averaged to match an assimilation horizontal scale (~55 km). RTTOV ver. 13.0 is used as a radar simulator to simulate assimilation variables of radar reflectivity. The comparison for three weeks in August 2024 shows that simulated reflectivity is smaller in its variability and weaker in mean echo than observed reflectivity at high altitudes, while stronger below the melting layer. The variability of the difference between observation and simulation is carefully examined and used to develop an observation error model in data assimilation. The cause of the systematic difference is also examined using CPR cloud products. Furthermore, we will present the latest development of EarthCARE/CPR assimilation at the meeting.