



The development of an 1-D Cloud Microphysics Data Assimilation (CMDAS) to retrieve the cloud parameters over the ocean by integrating satellite data

C. R. Mirza; T. Koike; K. Yang and T. Graf

Dept. of Civil Engineering, School of Eng., University of Tokyo (craza@hydra.t.u-tokyo.ac.jp / Phone: +81-(0)3-5841-6106 / Fax: +81-(0)3-841-6130)

1D Variational (1DVar) Cloud Microphysics Data Assimilation System (CMDAS) is developed for retrieving reasonable cloud distribution and atmospheric geophysical parameter of integrated cloud liquid water content (ICLWC). The general framework of CMDAS includes the Kessler warm-rain cloud microphysics scheme as model operator, a 4-stream fast microwave radiative transfer model (RTM) in the atmosphere as observation operator, and a global minimization method so-called Shuffled Complex Evolution (SCE). The CMDAS assimilates the satellite microwave radiometer data set of Advanced Microwave Scanning Radiometer (AMSR-E) and retrieves ICLWC. The retrieved ICLWC values are then used to construct the cloud profile according to cloud base level and top level. The present assimilation method successfully introduces the heterogeneity into the initial state of the atmosphere. The modeled microwave brightness temperature and assimilated ICLWC by CMDAS is in good qualitative and quantitative agreement with the AMSR-E products.