An evaluation of WRF microphysics schemes in simulating the vertical structure of heavy rainfall over the Korean peninsula

Presenter: Hwan-Jin Song  
Address: 501-502A, Seoul National University, Gwanak-ro 1, Gwanak-gu, Seoul  
Country: South Korea  
Email: hwanjinsong@snu.ac.kr  
Authors: Hwan-Jin Song and Byung-Ju Sohn  
Affiliations: Seoul National University  
Preference: Poster presentation

It has been noted that the heavy rain system over the Korean peninsula is more associated with low-level clouds (i.e., warm-type heavy rainfall), in contrast to the traditional view that the deep convection with abundant ice water content produces heavy rainfall. This finding leads to a conjecture that the cloud microphysics parameterization developed for the conventional severe weather such as in the United States may not work for such warm-type heavy precipitation cases because of the different cloud–rain system. Thus, this study aims to evaluate the eight microphysics schemes in the Weather Research and Forecasting (WRF) model against the satellite measurements over the warm-type abundant Korean peninsula and surroundings. The evaluation results exhibit that Double Moment 6-class (WDM6) scheme simulates the most realistic vertical structure of heavy rainfall among eight WRF microphysics schemes by virtue of the smallest amount of snow and modified warm-rain physics (e.g., size distribution and accretion processes). However, excessive graupel in the WDM6 scheme is thought to be a problem.