Geophysical Research Abstracts
Vol. 13, EGU2011-3813-1, 2011
EGU General Assembly 2011

WRF simulations of snow storms: sensitivity tests of microphysics schemes and initial conditions, and the comparison to an array of different observations.

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One of the grand challenges of the Global Precipitation Measurement (GPM) mission is to improve precipitation measurements in mid- and high-latitudes during cold seasons through the use of high-frequency passive microwave radiometry. For this, the Weather Research Forecast (WRF) model with the Goddard microphysics schemes are coupled with the Satellite Data Simulation Unit (WRF-SDSU) that has been developed to facilitate the over-land snowfall retrieval algorithm by providing virtual cloud library and microwave brightness temperature (Tb) measurements consistent to the GPM Microwave Imager (GMI). This study tested the Goddard cloud microphysics schemes in WRF in snowstorm events (January 20-22, 2007) over the Canadian CloudSat/CALIPSO Validation Project (C3VP) site in Ontario, Canada. In this meeting, we will present the performance of the both Goddard 2ice (ice and snow) and 3ice (ice, snow and graupel) cloud microphysics schemes. In addition, we will present the results using coarse and high resolution of NCEP analysis. Results will be compared to an array of different observations, including snow observations derived from a ground-based Parsivel (Laser Optical) Disdrometer at the CARE site and King City radar. We will also use the WRF model outputs to drive the Goddard SDSU to calculate radiances and backscattering signals consistent to satellite direct observations. These simulated radiance are evaluated against the measurement from A-Train satellites. Note that the Goddard cloud microphysics scheme is now officially included in the WRF V3.