# High Resolution Model Simulation for MC3E, IFloodS, and LPVEx: Comparison with Observations

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Recently, a multi-scale modeling system with unified physics was developed at NASA Goddard. It consists of (1) a cloud-resolving model (Goddard Cumulus Ensemble model, GCE model), (2) a regional scale model (a NASA unified weather research and forecast model, NU-WRF), (3) a coupled CRM and global model (Goddard Multi-scale Modeling Framework, MMF), and (4) a land modeling system. The same microphysical processes, long and short wave radiative transfer and land processes and the explicit cloud-radiation, and cloud-land surface interactive processes are applied in this multi-scale modeling system. This modeling system has been used for real time forecast as well as simulation for precipitation events during GPM GV campaigns [i.e. MC3E, a joint DOE/NASA field campaign; and two cold-season campaigns (Canadian CloudSAT/CALIPSO Validation Project (C3VP), GPM Cold-season Precipitation Experiment (GCPEx) and Light Precipitation Validation Experiment (LPVEx)].

This talk will identify the strengths and weaknesses of cloud and precipitation processes simulated by the model. In particular, the microphysics development and its applications for GPM will be presented.