Synthetic GPM Simulator Development using GV measurements: Current Status

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The next-generation Global Precipitation Measurement (GPM) mission core satellite will have a better capability of detecting light rain and falling snow in middle and high latitudes via a dual-frequency radar (i.e. the GPM dual-frequency precipitation radar or DPR) and a multi-frequency radiometer (i.e. the GPM Microwave Imager or GMI). This improvement requires more complex rainfall algorithms that can handle multi-sensor and multi-frequency signals of warm/cold/mixed rain over land/ocean in the Tropics as well as high latitudes. To facilitate such algorithm development, this project aims to develop a Synthetic GPM Simulator composed of a unified GPM instrument simulator (forward model) and CRM-simulation database.

The Synthetic GPM Simulator forward model will be built upon the existing multi-sensor satellite simulator, the Goddard Satellite Data Simulator Unit (G-SDSU). We will simulate and constrains numerical simulations of the Cloud-Resolving Model with Spectra-bin Microphysics (CRM-SBM) through evaluating micro and macrophysics against GPM Ground-Validation (GV) observations, including Canadian CloudSat/CALIPSO Validation Project (C3VP) in Canada, Light Precipitation Validation Experiment (LPVEx) in Finland, and upcoming Midlatitude Convective Clouds Experiment (MC3E) in US.