# Radiometry Calibration with High-Resolution Data of GPM: Application to ATMS 183 GHz Water Vapor Channels

**Analysis or reanalysis data produced by numerical weather prediction (NWP) models have been widely used in radiative transfer model (RTM) simulation for radiometer calibration. However, these NWP data are limited with coarse spatial (~100 km horizontally) and temporal resolution (~6 hour). In addition, there are known issues in NWP data due to limitations of NWP model mechanism, parametrization and assimilation skills. Therefore, a dataset based on observation with a high resolution can be a useful alternative, which can not only improve calibration but also assess NWP data. The Global Precipitation Measurement (GPM) core observatory provides an unprecedented data of atmospheric water signature retrieved from the combined onboard radar and radiometer. A GPM dataset including atmospheric water profiles of water vapor, cloud liquid water and precipitation has been produced with high spatiotemporal resolution of ~5 km horizontal, 250 m vertically resolution, and instantaneous observation. In the study, a scheme for ingesting the high-resolution GPM data, RTM simulation, and calibration has been developed and applied to ATMS water vapor channels and compared with different NWP data. It is found that the GPM data is distinct from NWP data. Whereas different NWP data show much similarity and model-tuned characterization, the GPM data exhibit different atmospheric profiles and weighting functions. Despite the difference, the simulated radiance from GPM data shows consistency with NWP data and outperforms some NWP data. It is a useful data for calibration and may find places in more applications where it is necessary to have high-resolution atmospheric water profiles.**