Invited Talk: Session H35. Global Precipitation Measurement, Validation, and Applications

Integrated Hydrologic Validation to Improve Physical Precipitation Retrievals for GPM

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Land surface modeling and data assimilation can provide dynamic land surface state variables necessary to support physical precipitation retrieval algorithms over land. It is well-known that surface emission, particularly over the range of frequencies to be included in the Global Precipitation Measurement Mission (GPM), is sensitive to land surface states, including soil properties, vegetation type and greenness, soil moisture, surface temperature, and snow cover, density, and grain size. In order to investigate the robustness of both the land surface model states and the microwave emissivity and forward radiative transfer models, we have undertaken a multi-site investigation as part of the NASA Precipitation Measurement Missions (PMM) Land Surface Characterization Working Group. Specifically, we will demonstrate the performance of the Land Information System (LIS; http://lis.gsfc.nasa.gov; Peters-Lidard et al., 2007; Kumar et al., 2006) coupled to the Joint Center for Satellite Data Assimilation (JCSDA's) Community Radiative Transfer Model (CRTM; Weng, 2007; van Delst, 2009).

The land surface is characterized by complex physical/chemical constituents and creates temporally and spatially heterogeneous surfaceproperties in response to microwave radiation scattering. The uncertainties in surface microwave emission (both surface radiative temperature and emissivity) and very low polarization ratio arelinked to difficulties in rainfall detection using low-frequency passive microwave sensors (e.g.,Kummerow et al. 2001). Therefore, addressing these issues is of utmost importance for the GPM mission. There are many approaches to parameterizing land surface emission and radiative transfer, some of which have been customized for snow (e.g., the Helsinki University of Technology or HUT radiative transfer model;) and soil moisture (e.g., the Land Surface Microvave Emission Model or LSMEM).