

## **5A.5 Multi-sensor radiance-based evaluation of aerosol-cloud-precipitation-land processes**

**Matsui, Toshi**, *National Aeronautics and Space Administration and Earth System Science Interdisciplinary Center*

The NASA Unified Weather Research and Forecasting (NU-WRF) modeling system is an observation-driven regional Earth System modeling and assimilation system at satellite-resolvable scale. One of the unique capabilities in the NU-WRF system is the multi-sensor satellite simulator, which enables evaluating model performance in the view of satellite radiance/backscatter data. This presentation encompasses a case study of the NU-WRF simulation over the West Africa during the AMMA field campaign. The NU-WRF simulation was conducted with three domains with the horizontal grid spacings of 18km, 6km, and 2km to resolve regional mesoscale features of mineral dust transportation, mesoscale convective systems (MCSs), and land-surface processes and interactions. Satellite multi-sensor radiance-based evaluation was conducted with the NASA A-train Constellation satellites (Aqua MODIS, Aqua AMSR-E, CloudSat CPR, CALIPSO CALIOP) and the MeteoSat observations. Various sensor signals and its statistical evaluation revealed the strength and weakness of the fully coupled NU-WRF simulation. The strength includes a realistic simulation of MCSs evolutions and mineral dust layer height, while the weakness includes low-cloud biases, overestimation of mineral dust concentrations, and land-surface skin temperature diurnal cycle.