Spaceborne Microwave Radiometry: Calibration and Science Applications

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3925 W. Braker Lane, Suite 200, Austin, Texas 78759

ABSTRACT: Spaceborne microwave radiometry is the backbone of weather and climate studies. Microwave radiometers can measure a variety of geophysical parameters through clouds and precipitation. When assimilated into weather forecast models, these observations account for a dominant 43% reduction in forecast error, compared to other satellite instruments. While an individual radiometer has a long revisit time of several days and a limited lifetime, a constellation of radiometers can reduce the revisit time to tens of minutes and provide decades of climatological data. Typically, science applications require around one-Kelvin accuracy (0.2% error). Calibration and intercalibration must be carefully conducted to correct various instrument issues and reconcile radiometer biases for subsequent science applications.

This talk presents methods and results of radiometer calibration, intercalibration, and science applications. These methods have been applied to the recent NASA/JAXA Global Precipitation Measurement (GPM) mission, which consists of a constellation of radiometers to measure global precipitation. The GPM constellation has produced an unprecedented precipitation dataset with high temporospatial resolution (half-hour and 0.1 degree). Examples of solutions for long-standing issues with calibration, coastal science applications, and preliminary results of hydrological studies conducted with GPM data will be given.

Coffee & cookies will be served
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