**Introduction**

On-orbit calibration of spaceborne microwave radiometers is necessary to correct for:

- Solar intrusions
- Attitude offsets
- Calibration drifts
- Scan obstructions
- Intercalibration

Utilizing several unique methods for on-orbit calibration gives confidence to results. This presentation describes a new method for 150-183 GHz channels.

**Background**

Microwave frequencies from 10 to 183 GHz see very different Earth scenes

Current calibration methods for 150-183 GHz

### Cross-over points

- Surface
- Atmosphere

On-orbit calibration methods may vary for different microwave frequencies due to the relative sensitivity to the surface or atmosphere.

### Comparisons with RTM

- Natural Targets
- New method described here uses brightness temperature (TB) histograms

### ARM sites

- Utilizing several unique methods for on-orbit calibration gives confidence to results.

**Method**

GMI TB histograms for one month of observations

GMI observed (obs) and simulated (sim) histograms

Where do the warm TBs occur?

10-89 GHz: cold side of histogram has sharp edge

166-183 GHz: warm side of histogram has sharp edge

Warm TBs occur in tropical regions with minimal water vapor

**Results**

AMSU-B and MHS

Time Series

Scan Bias

GMI

Time Series

AMSU-B and MHS Time Series

GMI Time Series

GMI shows no evidence of a calibration drift.

RTM Uncertainty

Cross-track biases for METOP-A MHS. 157 GHz biases most likely due to RTM uncertainty.

N15 and N16 AMSU-B have significant calibration drifts and scan biases. N17 AMSU-B and N18 MHS are relatively stable.

**Summary**

New on-orbit calibration method is presented for microwave radiometer 150-183 GHz channels

- Utilizes the shape of brightness temperature histograms
- Can be used in combination with other methods to corroborate results
- Does not require cross-overs between satellites or observations of a specific region
- Application to cross-track sounders and conical imagers show promising results

**Future Work**

- Mitigate impact of RTM on sounder cross-track scan biases
- Improve intercalibration of similar but different channels (e.g. 150 with 166 GHz)

**References**


