Report on the CEOS/WGCV-GSICS Microwave Subgroups Joint Meeting

Cheng-Zhi Zou

GSICS Microwave Subgroup Web Meeting, 07/26/2016

Meeting Information

- **Meeting Name**: CEOS/WGCV-GSICS Microwave Subgroups Joint Meeting
- **Place:** National Space Science Center, Chinese Academy of Sciences, Beijing, China
- **Time:** July 6-7, 2016
- **Participants:**

Cheng-Zhi Zou (Co-Chair)	NOAA
Fuzhong Weng	NOAA
Xiaolong Dong (Co-Chair)	NSSC (National Space Science Center, CAS)
Zhenzhan Wang	NSSC
Qifeng Lu	CMA
Shengli Wu	CMA
Yang Guo	CMA
Dawei An	CMA
Wenying He	IAP (Institute of Atmospheric Physics, CAS)
Yili Zhao	NOTC (National Oceanic Technology Center, SOA)
Xiaoqi Huang	NOTC
Gang Zheng	SIO (Second Institute of Oceanography, SOA)
Chunyue Cheng	BRIMM (Beijing Institute of Radio Metrology and Measurement)

Presentation

- **Overview**
  - Progress in CEOS/WGCV, Xiaolong Dong
  - Overview of intercalibration activities at GSICS Microwave Subgroup, Cheng-Zhi Zou
- **Instrument Performance**
  - Well-calibrated ATMS, Fuzhong Weng
  - FY-3 Evaluation in NWP by CMA, ECMWF, and UKMO, Qifeng Lu
- **Inter-Comparison**
  - Validation of FY-3 MWTS in lower-stratosphere using COSMIC RO data, Wenying He
  - Cross-Calibration of ESA SMOS and NASA Aquarie brightness temperature, Yili Zhao
  - Intercalibration of ATMS and SAPHIR, Isaac Moradi
  - Inter-calibration of Satellite Microwave Radiometer Brightness Temperatures from AMSU-B & SSM/T-2, Nazia Shah

Presentation

- **Pre-launch Calibration**
  - Vacuum test results of FY-3D/MWRI, Shengli Wu
  - Calibration and validation of FY-3 MHTS, Yang Guo
  - Progress of sea surface height calibration of HY2 Radar Altimeter, Xiaoqi Huang
  - New method of radiometric nonlinear calibration for FY-3C Microwave Thermometer, Dawei An
  - Retieving wet tropospheric path delay base on the HY-2A calibration of microwave radiometer, Gang Zheng

- **Standard development**
  - Microwave remote sensing radiometry at BIRMM, Chunyue Cheng

Point of Interest—focusing areas

- Challenges:

- Change and development of environmental observing satellites
  - The number of Earth-observing satellites has vastly increased
  - Onboard instruments are more complex and are capable of collecting new types of data in ever-growing volumes.
  - The user community has expanded and become more diverse as different data types become available and new applications for Earth observations are developed
  - Users have become more organized, forming several international bodies that coordinate and levy Earth observation requirements

Point of Interest– focusing area

- **Collaboration between CEOS and GSICS MW subgroups; not to overlap effort**

- **CEOS/WGCV microwave subgroups is focusing on**
  - Guidelines for prelaunch calibration of microwave radiometer
  - Guidelines for scatterometer calibration and data quality control

- **GSICS is focusing on defining reference instrument**

Point of Interest

- **Criteria for reference instrument**

- Fuzhong proposed criteria for selecting a reference microwave instrument (see next slide)

- Cheng-Zhi suggested that a reference instrument shall be channel dependent

  In CDR application, an instrument that has the longest availability and stability in both its orbits and radiances is often selected as a reference for developing diurnal drift algorithm. But this is channel dependent since, so far, not a single instrument was used as a reference for all channels. Once a channel failed for a reference instrument, another instrument (same type) will often be used as a replacement for the reference.

  In this sense, AMSU-A FCDR should be considered as a reference (see Manik's presentation)

- Tim sent an email providing ideas on choice of references; however, due to incapable of accessing gmail emails in China, these ideas were not discussed at the meeting

Proposed Criteria for a Reference Instrument (F. Weng)

- **The observations from the instrument are used in operations and research**
  - ✓ *ATMS data are used in both global and regional NWPs*
  - ✓ *ATMS data are used for hurricane monitoring and other applications (e.g. climate data record)*
- **The instrument calibration theory should be well established and documented**
  - ✓ *Peer reviewed publications*
  - ✓ *ATBD, OAD and user manual*
- **The instrument is well calibrated from the prelaunch tests and meets the specifications**
  - ✓ *Radiometric calibration (e.g. non-linearity)*
  - ✓ *Calibration accuracy from thermal vacuum data (TVAC)*
  - ✓ *Traceable methodology for instrument noise*
  - ✓ *Spectrum response function (SRF measurement)*
  - ✓ *Antenna gain (e.g. side-lobe)*
- **The instrument performance in orbit is well characterized and meets the specifications**
  - ✓ *Stable performance through trending noise*
  - ✓ *TDR to SDR conversion*
  - ✓ *Bias with respect to NWP and other standard (e.g. GPSRO/RAOB simulations, pitch maneuver)*
  - ✓ *Lunar intrusion correction*
  - ✓ *Inter-sensor bias through uses of resampling SDR*
  - ✓ *Geolocation accuracy*
  - ✓ *Error budget (e.g. antenna reflector emission)*