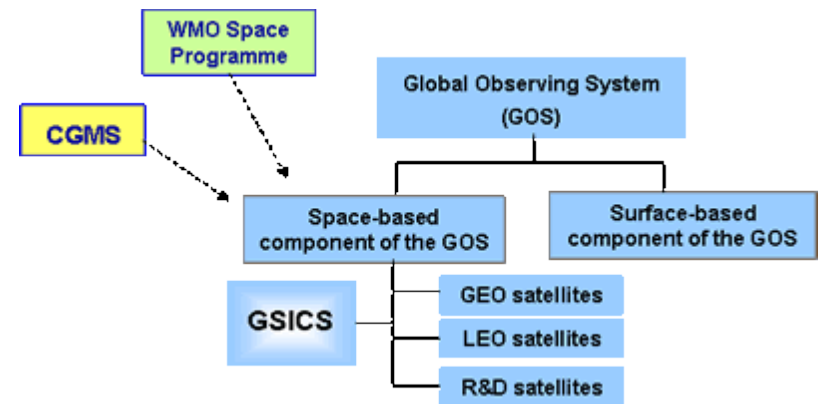


GSICS Update and WGCV Interaction

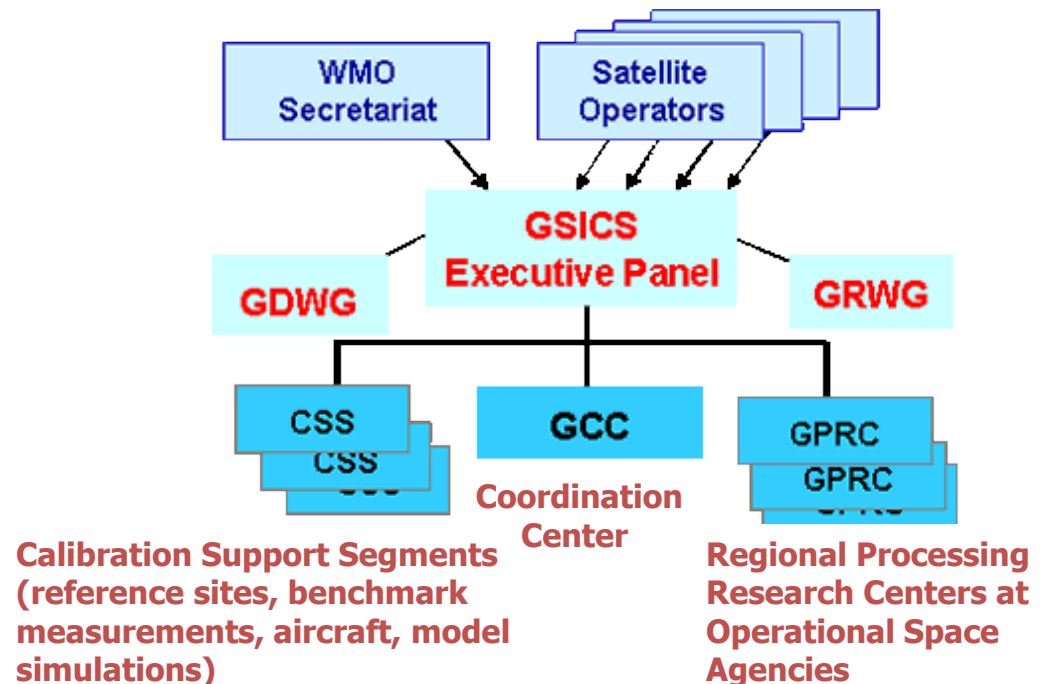
Presented by
Slawomir Blonski and Changyong Cao
NOAA/NESDIS/STAR
for
Mitch Goldberg, NOAA/NESDIS
GSICS Executive Panel chair
NOAA/NESDIS

GSICS organization

- Overseen by GSICS Executive Panel
 - Assisted by Research Working Group (GRWG) and Data management Working Group (GDWG)
- GSICS activities rely on:
 - GSICS Coordination Centre (GCC) operated by NOAA/NESDIS
- Processing & Research Centres (GPRC)
 - operated by each satellite operator
- Calibration Support Segments (CSS)
 - including field sites and laboratories



GSICS as an element of the space-based component of the Global Observing System



Current Focus of GSICS

- Interagency collaboration on algorithms (GRWG) and data exchange and formats (GDWG)
- Product acceptance and documentation requirements, metadata standards, data formats, website standards
- Routine intercalibration (monitor and correct) of all operational GEO infrared imagers using IASI and AIRS (and soon CrIS)
 - MODIS and Deep Convective Clouds for visible channels
- Intercalibration of LEO instruments
 - HIRS, SSMI, AMSU, MHS, AVHRR, AIRS, IASI, FY3,
 - GOME-2, OMI, SBUV
 - CrIS, ATMS, OMPS, VIIRS
- Traceability
 - Campaigns
 - Key collocation datasets
 - Requirements for pre-launch calibration
- Root causes and corrections

GSICS current focus is on the intercalibration of operational satellites and on using key research instruments, such as AIRS/IASI and MODIS, as reference instruments for the operational instruments

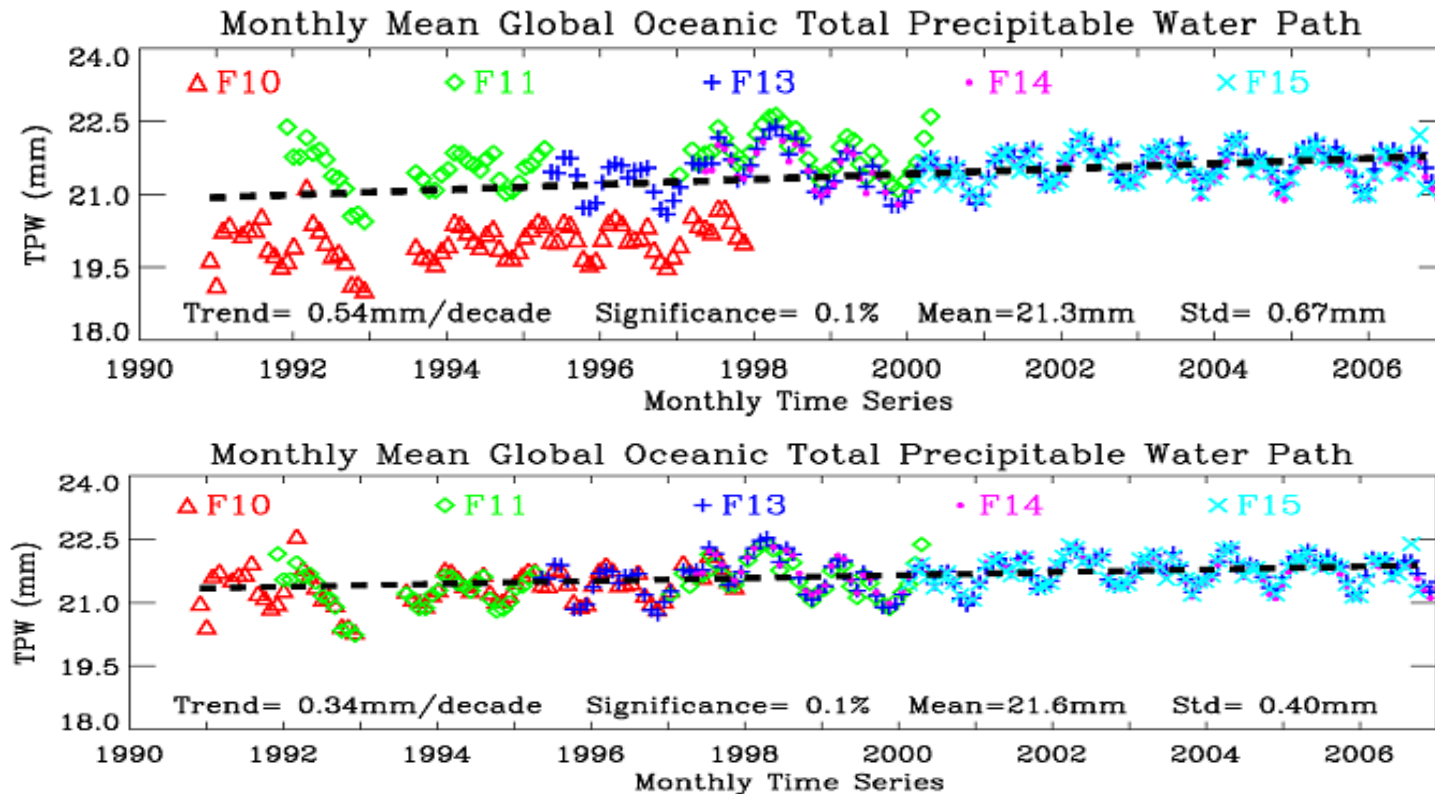
Building Blocks for Satellite Intercalibration

- **Co-location**
 - Determination and distribution of locations for simultaneous observations by different sensors (space-based and in-situ)
 - Co-location with benchmark measurements
- **Data collection**
 - Archive, metadata - easily accessible
- **Coordinated operational data analyses**
 - Processing centers for assembling co-located data
 - Expert teams
- **Assessments**
 - Communication including recommendations
 - Vicarious coefficient updates for “drifting” sensors

GSICS Outcome

- Coordinated international satellite intercalibration program
- Exchange of critical datasets for cal/val
- Best practices/requirements for monitoring observing system performance
- Best practices/requirements for prelaunch characterization (with CEOS WGCV)
- Establish requirements for cal/val (with CEOS WGCV)
- Advocate for benchmark systems
- Quarterly reports of observing system performance and recommended solutions
- Improved sensor characterization
- High quality radiances for NWP & Climate

Calibration is Critical for Climate Change Detection



Trend in global oceanic total precipitable water decreases from 0.54 mm/decade to 0.34 mm/decade after intercalibration!
Calibration uncertainties translate to uncertainties in climate change detection.

GSICS Product Portfolio

- For Operational Meteorological Satellites
 - Geostationary – IR & Solar
 - LEO – IR, Solar, UV, and Microwave – Conical & Cross-track Scanners
 - Current Operational & Historic Instruments
 - In near real-time and re-analysis modes
- GSICS Bias Monitoring
 - Routine comparisons of satellite radiances against reference
- GSICS Correction
 - Function to correct issued radiances
 - For consistent calibration with reference
- GSICS Diagnosis
 - Recommendations to modify practices
 - Design and Operation of future satellite instruments

GSICS Procedure for Product Acceptance

- Products progress from
 - Demonstration Mode
- Through
 - Pre-Operational Mode
- To
 - Operational Mode
- By a series of reviews
- Over a period of ~1.5 yr.
- Subject to meeting
 - acceptance criteria

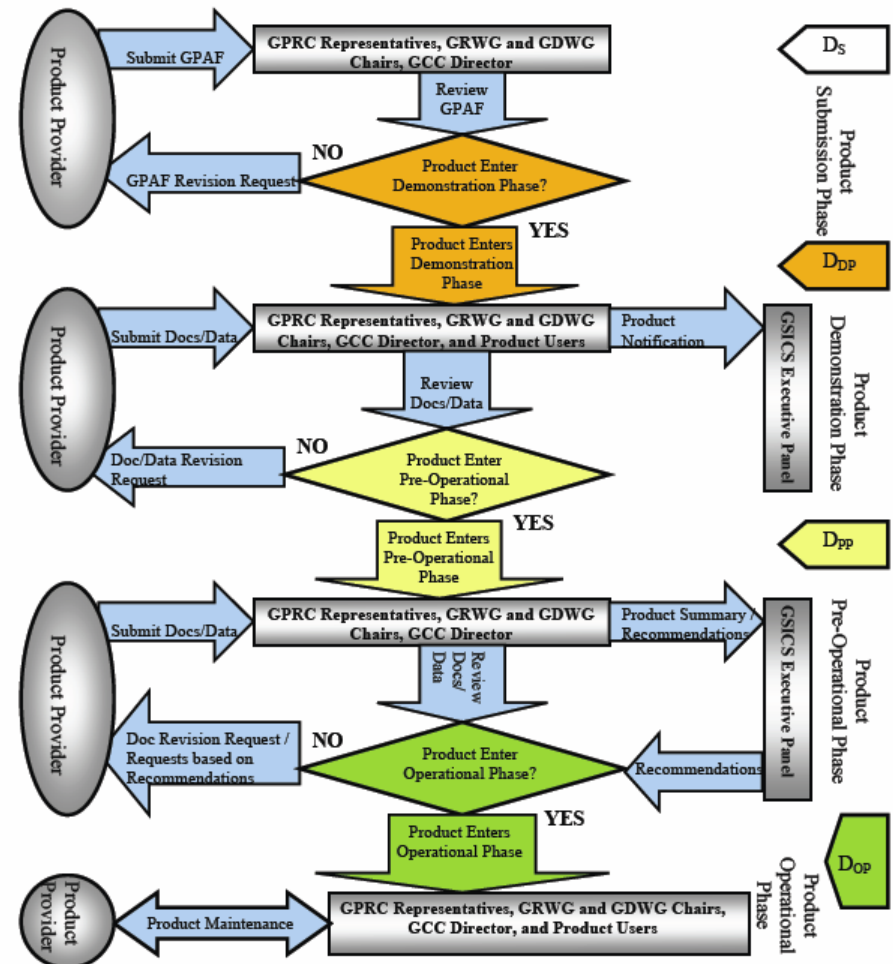
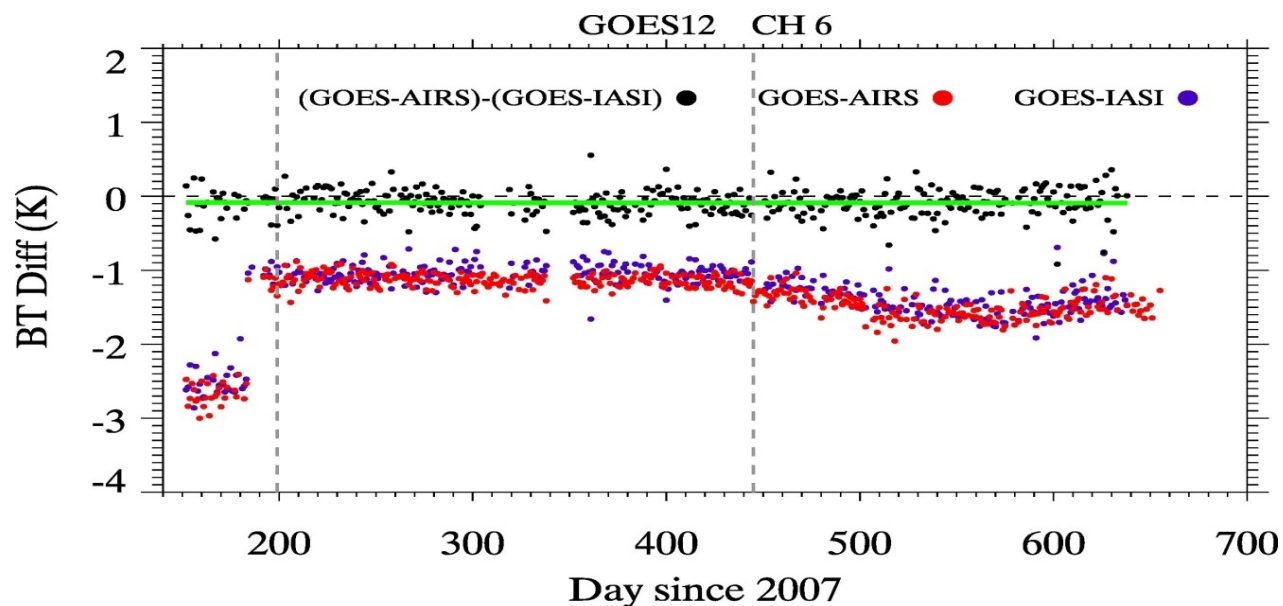
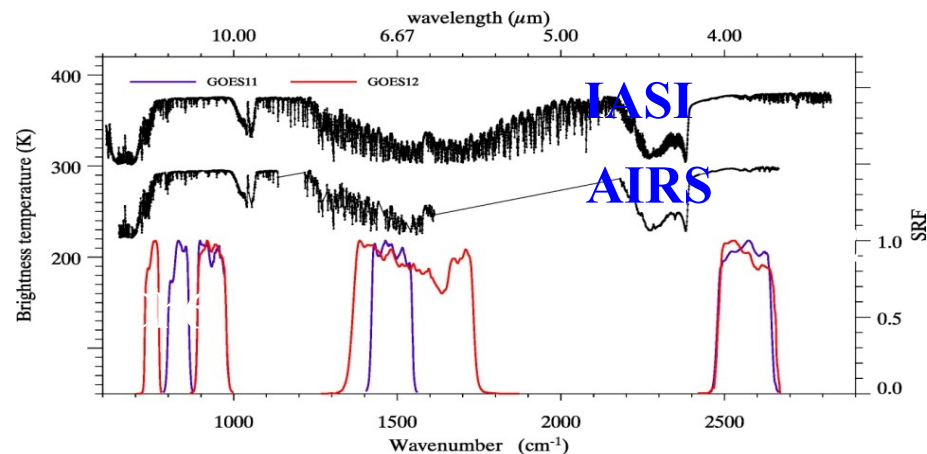
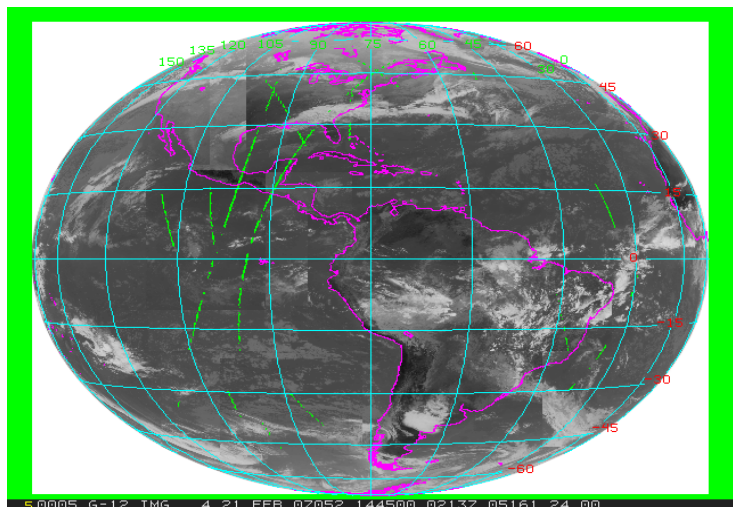
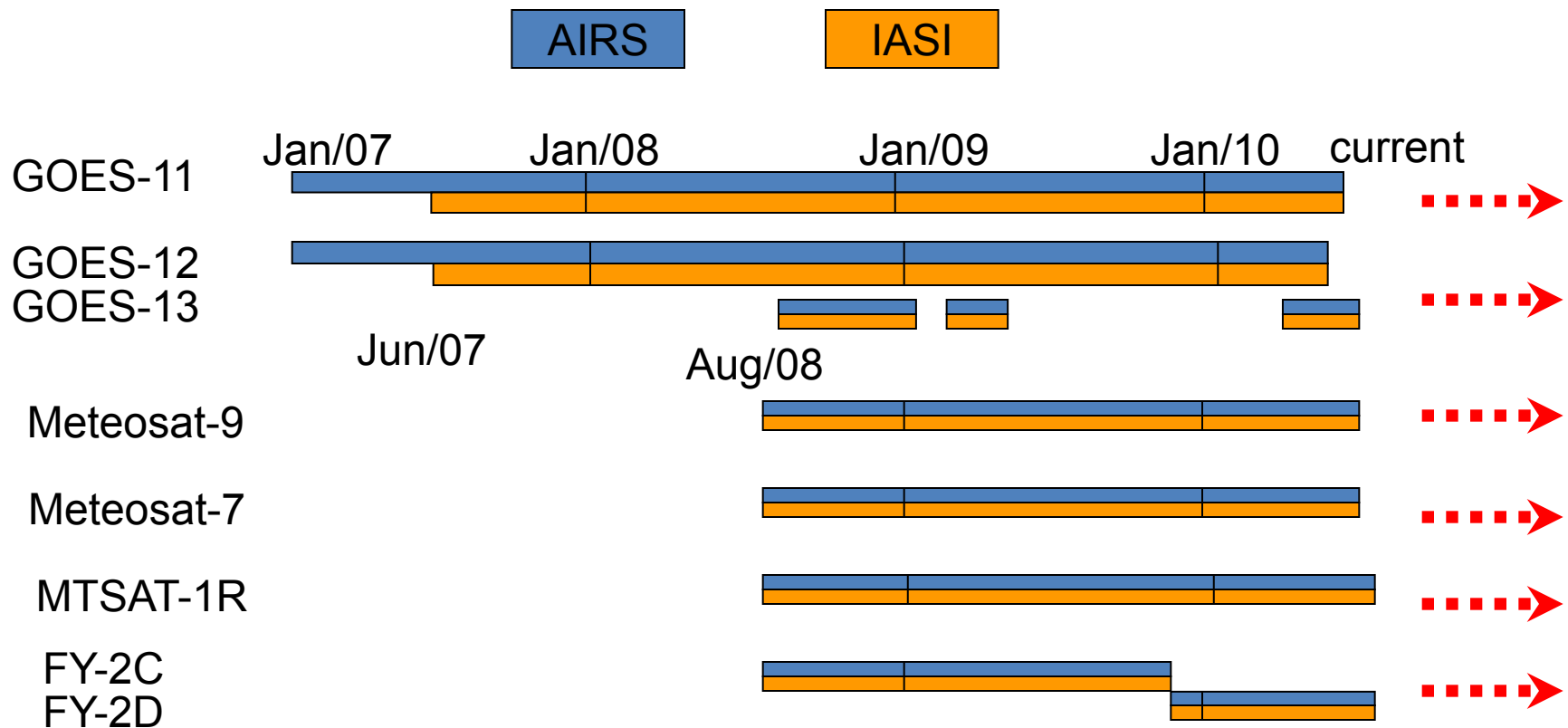


Figure 1: From top to bottom, the GSICS Procedure for Product Acceptance is described by four phases - Product Submission Phase, Demonstration Phase (DP), Pre-operational Phase (PP), and Operational Phase (OP) – and their review and revision cycles. The time markers at the far right, and their defined limits, are: date of submission (D_S); and the number of days from D_S to fulfill requirements to enter DP (D_{DP} ≤ D_S+90days), PP (D_{PP} ≤ D_{DP}+365days), and OP (D_{OP} ≤ D_{PP}+180days).

First International Coordinated GSICS Project: Intercalibration of Geostationary Infrared Channels with IASI and AIRS

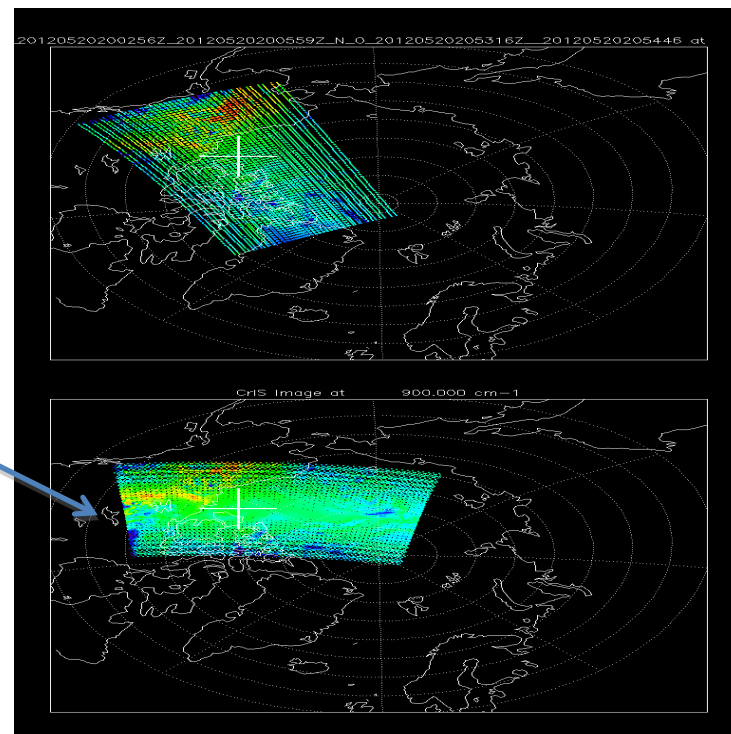
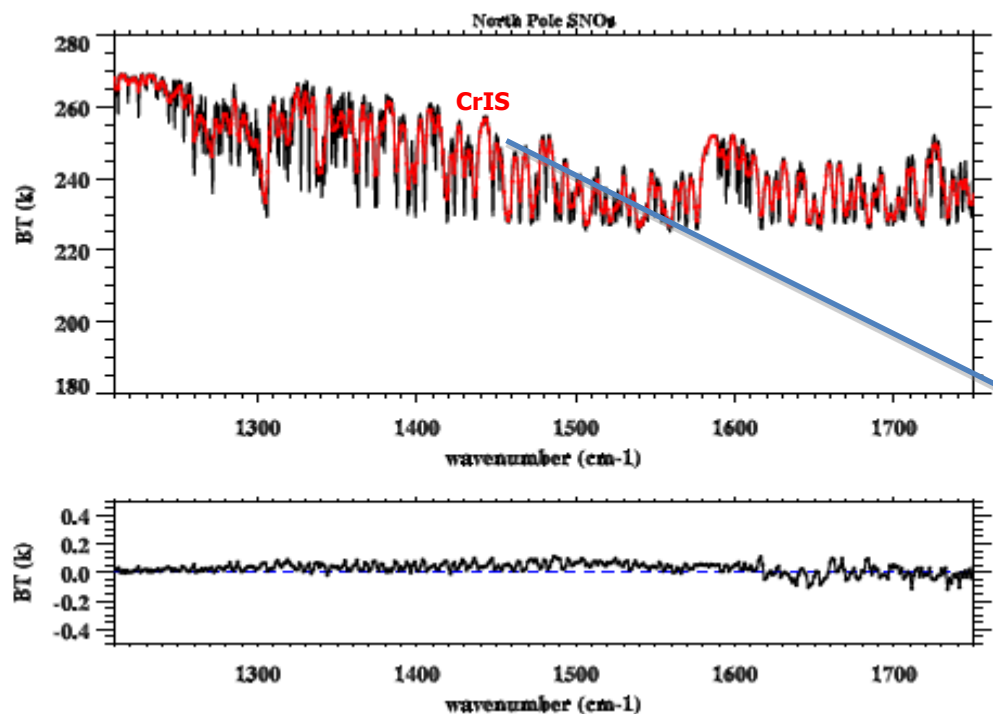


Status of GEO-LEO Inter-Calibration



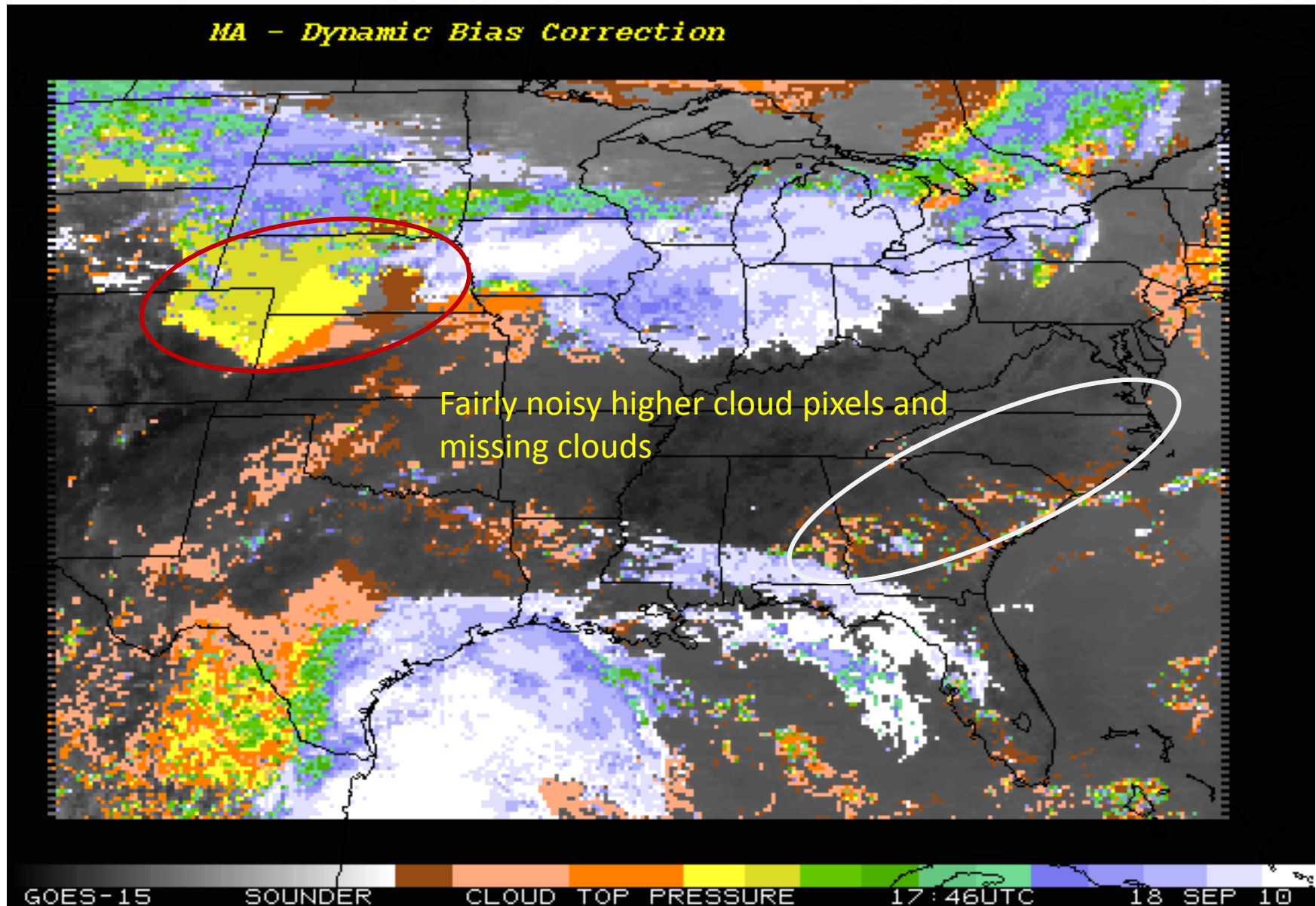
Near-real time monitoring and correction for six operational GEO with baseline algorithm

CrIS and IASI Band 2 Direct Intercomparisons



- For band 2 at water vapor absorption region, CrIS and IASI are consistent to each other and the difference is close to a zero line
- CrIS and IASI are nearly benchmark quality measurements and are critical for vicarious calibration of other infrared sounder and imager measurements

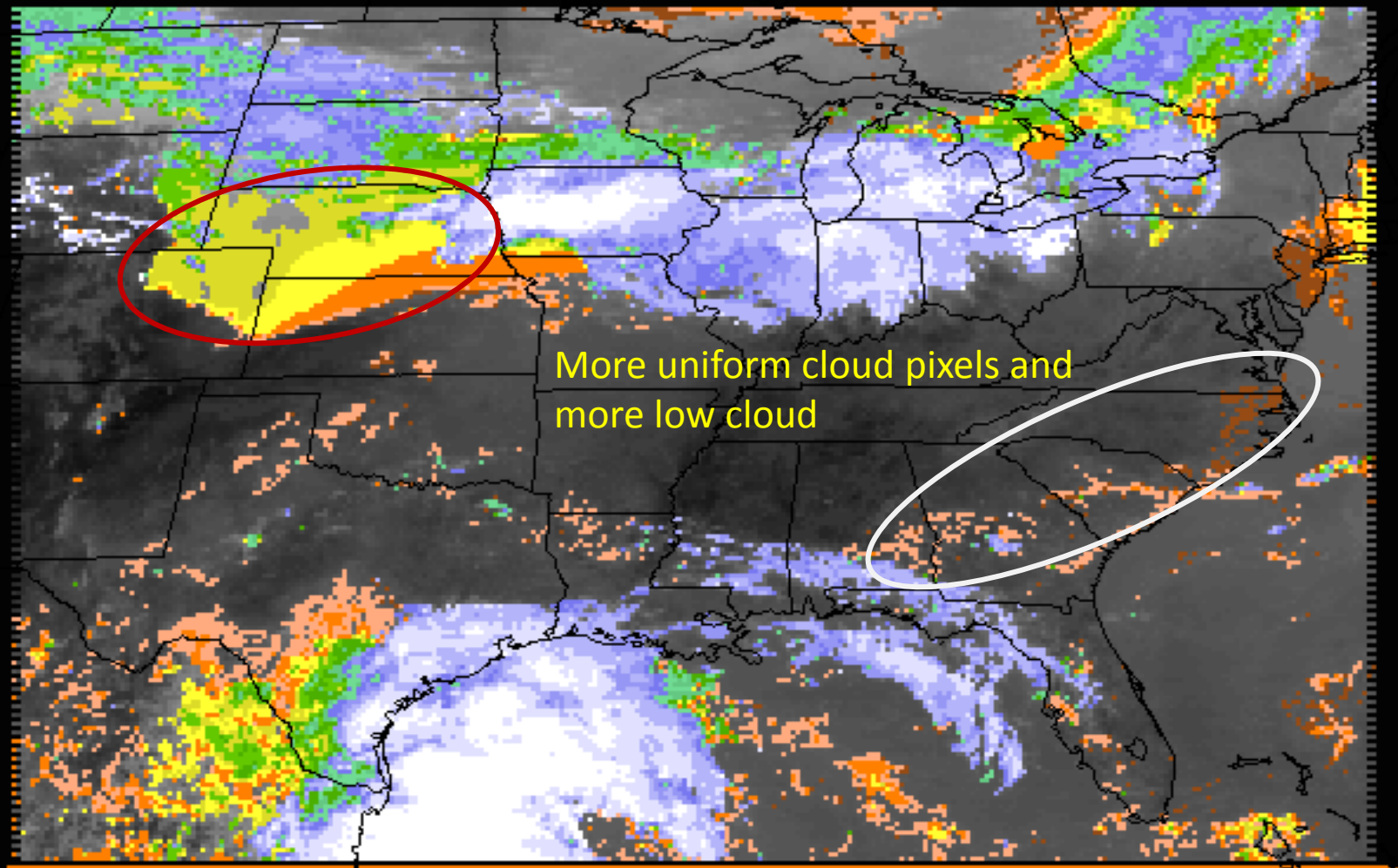
GOES Sounder Cloud-top pressure



GSICS seems to improve (less noise) upon the dynamic bias correction method for this case.

GOES Sounder Cloud-top pressure

Schreiner - GSICS Bias Correction



GOES-15

SOUNDER

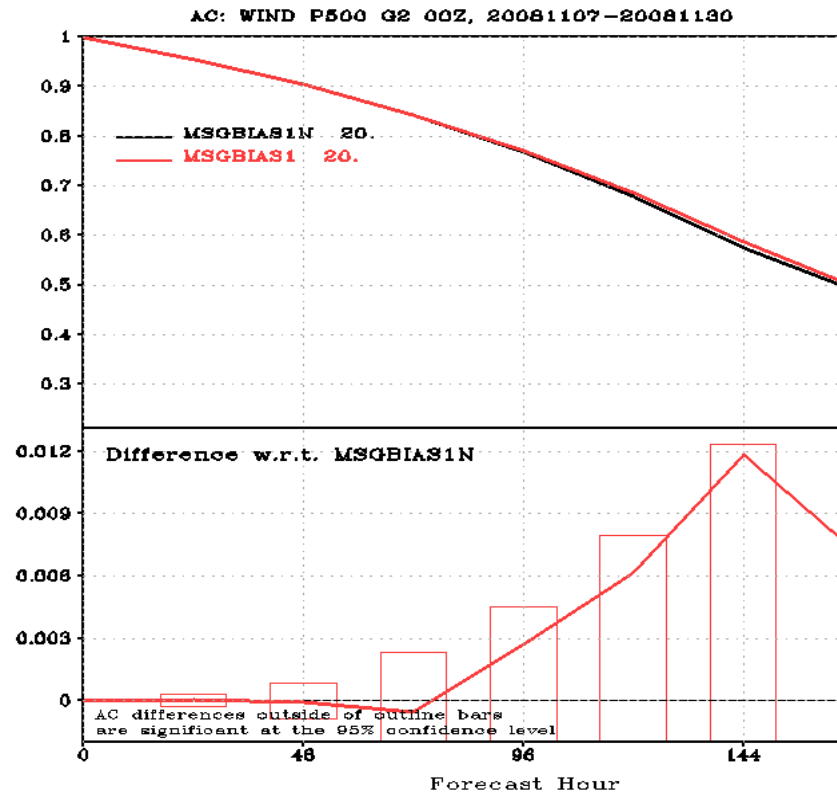
CLOUD TOP PRESSURE

17:46UTC

18 SEP 10

Impacts of GSICS Correction for SEVIRI on GFS Forecast

MSG SEVIRI CSR **with** and **without** GSICS bias correction
500 mbar Anomaly Correlation over NH



Summary

- GSICS is Global Space-based Inter-Calibration System!
 - Focuses on Level 1 data => FCDR
- GSICS does not (generally) re-calibrate archives of data
 - But provides products to correct calibration of real-time and archive data to be consistent with reference instruments
 - Also provides tools to monitor biases in near real-time
- To date, GSICS have concentrated on current GEO imagers
- Developed Procedure for Product Acceptance
 - Thorough documentation with traceability
 - May be applied to 3rd party products
- Need to ensure consistency between products
 - For different instruments – contemporary and historic