



Recommendations and Actions



GRWG-III, Feb 2008



Implementation and Operation

- ❖ EUMETSAT, JMA, and NESDIS reported their implementation activities.
- ❖ All members are invited to provide comments or suggestions regarding GSICS implementation and operation
- ❖ Several issues were discussed. Summary follows.



Issues – IASI Data at JMA



- ❖ JMA (Y. Tahara) reports difficulty in obtaining IASI data from NOAA CLASS
- ❖ EUMETSAT (P. Miu) offers to help
- ❖ This will be resolved between the two members



Issues – Design Principles

- ❖ GSICS goals require that **single pixel** collocations **anywhere** within the GEO field of regard be collected **continuously** over **long term** for **all bands**.
- ❖ GSICS should **collect all it can** to allow future selection and manipulation by users.
- ❖ **No comments**



Issues – Algorithm Compatibility



❖ Goal/Balance

- Encourage innovation
- Ensure compatibility

❖ Level of compatibility

- Common output (definition/format)
- Common principle
- Common logic
- Common threshold
- Common code



Less compatible

Completely compatible

❖ Questions

- Where we are and where we want to be?
- Shall we all implement a baseline algorithm?

❖ Conclusion

- Not ready for the goal of using a common algorithm
- Will share collocation data



Issues – Archiving Strategy

❖ Name of **SSS##.AIRS.yyyy.mm.dd.grn.lat.long.bbb**

sss Satellite ID (e.g., GOS, MET, FY_, MTS)

Satellite series number (e.g., 07)

yyyy Year (2007, 2008, ...)

mm Month (01, 02, ..., 11, 12)

dd Day (01, 02, ..., 30, 31)

grn AIRS granule number (001, 002, ..., 239, 240)

lat Latitude (e.g., N04)

long Longitude (e.g., W120)

bbb Band wavelength ($\mu\text{m} \times 10$, e.g., 039)

❖ Collocations (next page, ~30MB/day/GEO)

❖ **Premature before common algorithm and data**

- However, need to add AIRS version code
- Reasonable to save metadata only. Content, format, and nomenclature TBD.



Issues – Output Parameters

Real * 4	yyddd	year and day of year	ccyyddd
Real * 4	hhmmss	hour/minute/sec of GEO observation	
Real * 4	time_diff	LEO_time – GEO_time (sec)	
Real * 4	zeni_diff	$\cos(\theta_{\text{GEO}})/\cos(\theta_{\text{LEO}}) - 1$	delete
Real * 8	time	LEO time of observation (TAI second)	
Real * 4	pix_lat	collocation latitude (degree east positive)	
Real * 4	pix_lon	collocation longitude (degree north positive)	
Real * 4	geo_zen	GEO zenith angle (degree)	
Real * 4	leo_zen	LEO zenith angle (degree)	
Real * 4	sol_zen	SUN zenith angle (degree)	
Real * 4	geo_azi	GEO azimuth angle (degree)	
Real * 4	leo_azi	LEO azimuth angle (degree)	
Real * 4	sol_azi	SUN azimuth angle (degree)	
Real * 4	airs_cnv_shift	Ch6 shift SRF (irrelevant in general – to be deleted)	
Real * 4	airs_mmg_shift	Ch6 shift SRF (irrelevant in general – to be deleted)	
Real * 4	stat(6,4)	mean & stdv of collocation environment, mean & stdv of collocation target, convoluted AIRS radiance using modified Kato and Gunshor methods, for four channels	
Real * 4	leo_rad(2378)	AIRS spectral radiances at 2378 channels	
Real * 4	geo_rad(17,9,4)	GEO rad at 17 elements, 9 lines, and 4 channels	
Real * 4	leo_lat, leo_lon, geo_lat, geo_lon, sun_lat, sun_lon		

Premature before common data



Issues – Reporting



❖ Suggestion 1

- Output results
- Slope and intercept
- Start with something simple, e.g., daily mean bias
- Improve as we go

❖ Suggestion 2

- ?

❖ Not ready for routine reporting



Issues – Version Control

- ❖ Version 2 to incorporate JMA modular design
- ❖ Convention for versions
 - How big a change qualifies for Version 2.x instead of Version 1.x or Version 1.2.x?
 - How little a change qualifies for a new version at all?
 - What if ATBD didn't change, only the implementation?
 - Document what have been changed?
 - Procedure for community feedback and version release
- ❖ **Premature before common algorithm**



Issues – Input Data

- ❖ A complete set of GEO and LEO data within a common period of time (one day)
 - AIRS granules from NASA DAAC
 - Channel validity as of May 2007
 - Leap second as of May 2007
 - Update strategy TBD
 - Short-cut (e.g., from member of AIRS Science Team)
- ❖ Premature before common algorithm



Research

- ❖ Details of the implemented algorithms.
- ❖ Visible calibration
- ❖ Anomaly detection and reporting
- ❖ Inter-calibration between hyperspectral sensors (IASI, AIRS, aircraft).



Visible Calibration Strategy

❖ Options

- Nine options are identified for GEO. Three for LEO.
- Advantages and limitations were discussed

❖ Strategy

- Try as many methods by as many members as possible
- No firm commitment. Report back at the next meeting

❖ Priority

- Pay attention to the three options that are suitable for comparison among GEOs
 - DCC – most promising
 - MODIS – demonstrated skills
 - Moon – feasible only for GOES

❖ Plan

- Summarized in the table (next slide)



Visible Calibration Strategy



	LaRC	JMA	EU	NOAA	CNES
MODIS	ALL GEO			GOES	
DCC	ALL GEO		MSG?	GOES	Parasol
Desert			MSG?	GOES, AVHRR	All
Lunar				GOES	
RT model		MTSAT			?
Sun glint				?	VGT, Parasol, MERIS
Star				GOES	
SNO – LEO				AVHRR & MODIS	
Snow				AVHRR & MODIS	VGT, Parasol
SNO – GEO					
Playa					



Evaluate Algorithm Accuracy



- ❖ Need to quantify the expected algorithm uncertainty
 - May result from
 - Spatial collocation
 - Temporal concurrence
 - Geometric alignment
 - Spectral convolution
 - Instrument noise
 - ???
 - Collaborate to quantify each of the above
- ❖ Encourage research in this area, but premature to have detailed plan at this time.



GRWG-II Actions

ACTION No.	ACTION	ACTIONEE	STATUS
GRWG-II 01	Provide test data, Version 1 of GSICS algorithm for GEO-AIRS co-location and spectral convolution (pseudo-code and one working code), and test results for all GEO's.	X. Wu July 2007	CLOSED
GRWG-II 02	Implement inter-calibration of FY-2C/D with AIRS.	P. Zhang June 2008	On track
GRWG-II 03	Implement inter-calibration of MTSAT with AIRS/IASI	Y. Tahara June 2008	Revised
GRWG-II 04	Implement inter-calibration of METEOSAT-9/8/7 with IASI.	M. König June 2008	Revised
GRWG-II 05	Implement inter-calibration of MTSAT with AIRS.	S. Chung Dec 2008	On track
GRWG-II 06	Implement inter-calibration of GOES with AIRS/IASI at GCC	X. Wu June 2008	Revised
GRWG-II 07	Provide subset of AIRS measurements to members for inter-calibration	X. Wu Sep 2007	CLOSED
GRWG-II 08	Provide subset of IASI measurements to members for inter-calibration	M. König June 2008	CLOSED
GRWG-II 09	Define the initial content of the output data to GDWG	X. Wu & Members Dec 2007	CLOSED
GRWG-II 10	Provide NetCDF4 template based on the content	V. Gärtner Dec 2007	CLOSED
GRWG-II 11	Provide and maintain the English website (with proper disclaimer) that contains instrument characteristics	X. Wu & Member Dec 2007	Revised



Review of GRWG-II Actions



- ❖ Actions 1, 7, 8, and 9 are closed
- ❖ Actions 2 and 5 are on track (or assumed so)
- ❖ Action 3 is revised – add IASI
- ❖ Action 4 is revised – replace AIRS with IASI
- ❖ Action 6 is revised – add IASI, replace “all satellites” with “GOES”
- ❖ Action 10 is expected to close soon
- ❖ Action 11 will be executed with new strategy
 - Members review WMO site and provide feedback
 - Members also serve (or delegate) as point-of-contact
 - Lafeuille maintains the web as corrections, additions, and updates continue indefinitely



Other recommendations

- ❖ Communicate suspected anomalies to relevant satellite operator
 - Through GSICS (GRWG, GDWG, and EP)
 - Document the event in ways of TBD
 - Assist further investigation if able
- ❖ Adopt reference temperature for radiance uncertainty
 - Typical values?
 - User-defined?
 - Table/curve/formula?
- ❖ Define bias as $\text{sat_in_question} - \text{ref_sat}$, e.g., $\text{bias} = \text{GEO-IASI}$
- ❖ Express bias in terms of slope and intercept, if applicable. With uncertainty, if available.
- ❖ Operation maneuvers
 - e. g., station keeping, patch change, decontamination
 - Operators need to document and archive the change
 - GSICS is recommended to assess and document the impact on calibration



Other recommendations

- ❖ CNES/LMD & NESDIS continue AIRS-IASI inter-calibration
 - Explore companion channel and box channel approach
 - Consider relaxing the time window to 80 seconds to eliminate alternating gaps between SP & NP
 - As inter-calibration standard, CNES is encouraged to brief the GSICS on IASI performance (monitoring results, special events, etc.)
- ❖ Evaluate DCC spectral characteristics with HYPERION
- ❖ Intensify inter-calibration between launch and operational
- ❖ CNES provide NESDIS/EUMETSAT water ice absorption spectrum from IASI data to assist investigation of the cause of 13.3 μm cold bias
- ❖ All AIRS users adopt single “flag file”.
- ❖ Routine production and distribution of bias by GPRCs when available