GSICS Coordination Centre

Supported by JPSS Mission

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Introduction

GSICS Coordination Center(GCC)

- ✓ *GSICS Quarterly Newsletter*
- ✓ *(3 Special Issues + 2 General)*
- ✓ *Meeting Support*
- ✓ *(User Workshop Shanghai)*
- ✓ *GPPA and Product Acceptance (Timeliness, WGCV).*
- ✓ *Definition of GSICS Products and Deliverables.*
- ✓ *Awards and Outreach (Call issued for awards)*
- ✓ *How good are GSICS References*

GCC and JPSS Mission

- ✓*OMPS EDR SDR*
- ✓*CrIS as a reference*
- ✓*ATMS- Inter comparison with MSU/AMSU***
- ✓*Selection of In-orbit References.*
- ✓ *VIS Integrated method to improve calibration accuracy from multiple vicarious method*
- ✓*SSU recalibration for CDR development.*

GSICS Data Working Group

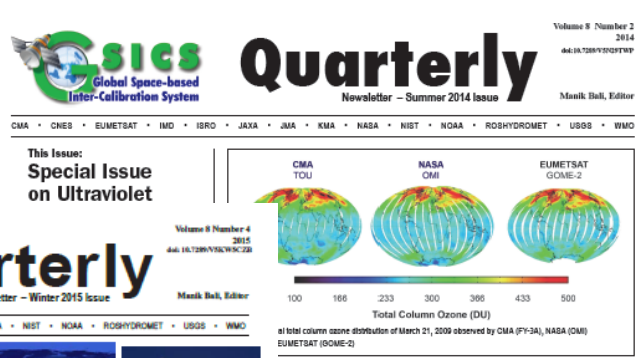
- ✓ Past-Chaired the GDWG
- ✓ Satellite 'Instrument Event Logging
- ✓ Archiving GSICS Products.
- ✓ Evaluation of doi for GSICS Products
- ✓ MW metadata and filenaming conventions
- ✓ Support Lunar Calibration WS in Darmstadt (code sharing).
- ✓ Proposed Document Management plan to GSICS.

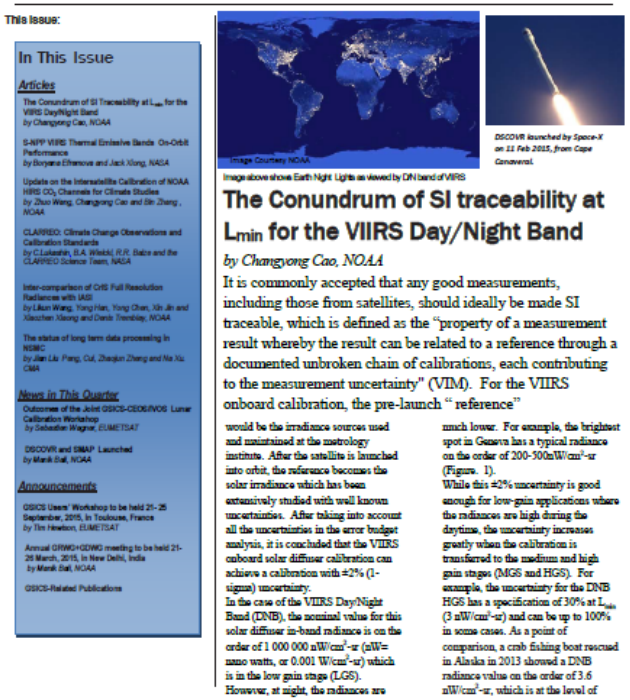
****Contributes to JPSS mission contributes towards JPSS goals and initiatives*****

OMPS CrIS ATMS

GSICS Global Space-based Inter-Calibration System

GCC – GSICS Quarterly Newsletter





GSICS Quarterly Newsletter Features

- Since Fall 2013, brand new format .
- Since Winter 2014, the Newsletter has a doi.
- Accepts articles on topics related to calibration (Pre and Post launch).
- New Landing page on the GCC website.
- Rate and Comment section: readers and authors can interact.
- Articles are reviewed by subject experts
- Help available to non native English speaking contributors.
- Since Fall 2014, new navigation features added to the Cover Letter.

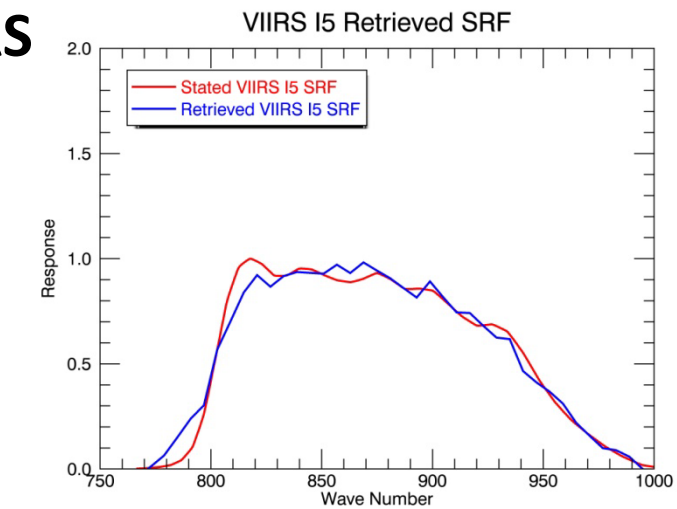
Journal of Physics and Chemistry of Earth invited Authors of GSICS Microwave issue to submit articles based on their submission to GSICS Newsletter .

Retrieval of Spectral Response Function using Hyper-Spectral Radiances

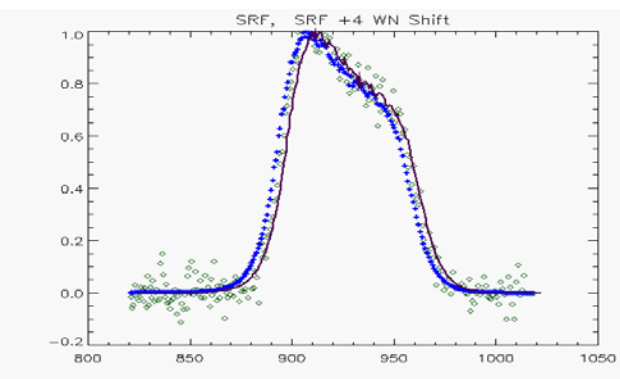
Developed a Method to retrieve spectral response functions using In-Orbit Inter- Comparison with CrIS/IASI/AIRS

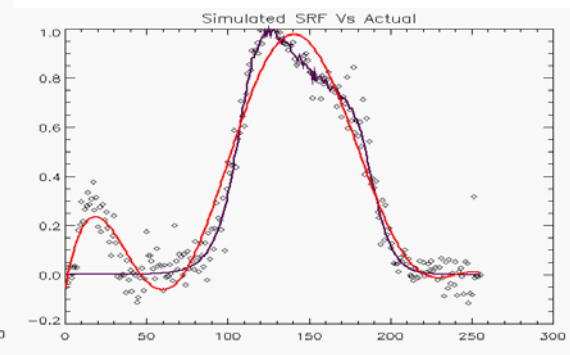
$$\begin{bmatrix} a_{1,1} & \cdots & a_{1,n} \\ \vdots & \ddots & \vdots \\ a_{n,1} & \cdots & a_{n,n} \end{bmatrix} \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} = \begin{bmatrix} b_1 \\ \vdots \\ b_n \end{bmatrix}$$

SRF (b_i) = A^{-1} B

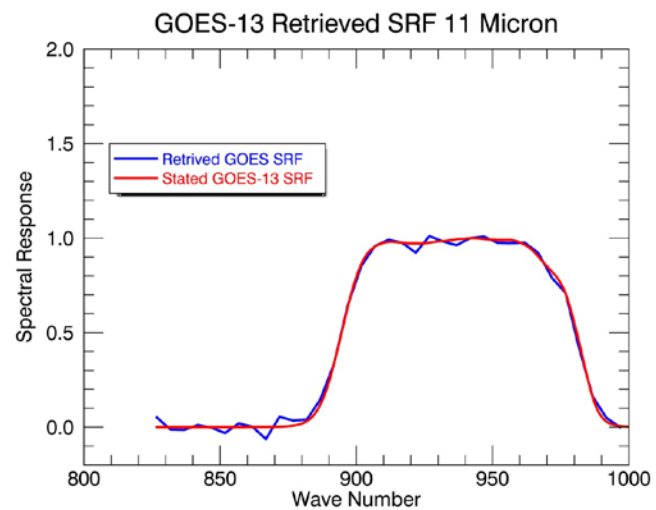


Validation





Method Detects shift and leaks in SRF

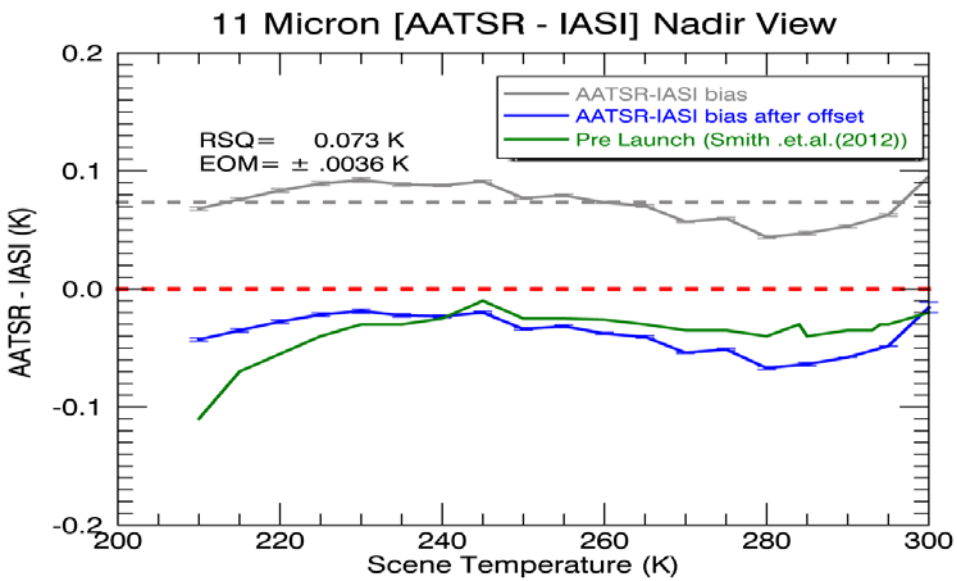


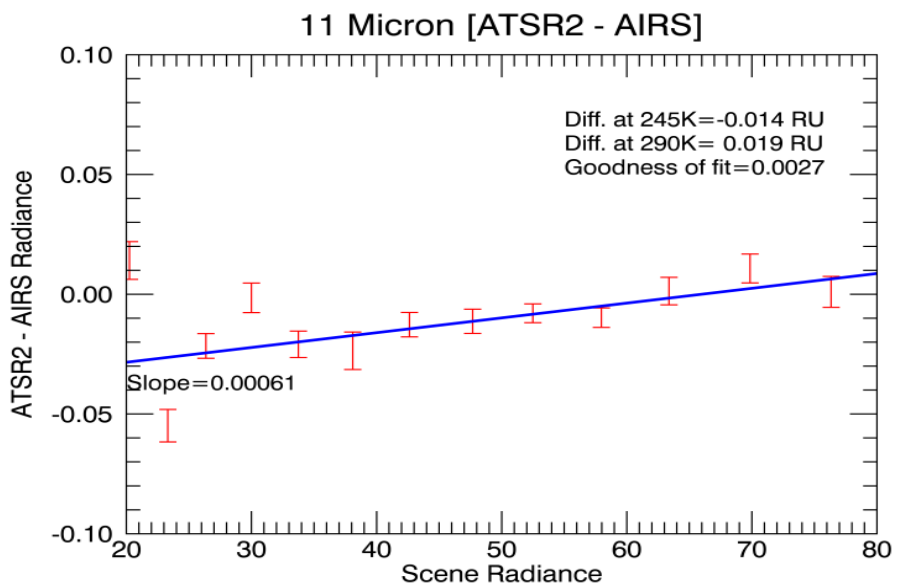
CrIS-VIIRS collocation data curtsey: Likun Wang

Global Space-based Inter-Calibration System

GCC- How good are GSICS References IASI and AIRS

Study was done at GCC/NOAA to investigate the reliability of GSICS references instruments by comparing with extremely accurate instrument (A/ATSR , Climate Satellite by design).





Top left image shows that IASI and AIRS (right) are nearly as good as pre-launch references.
While the IASI has an offset of nearly 0.073K the AIRS seems the have an offset of nearly 0.
Bali, Mittaz, Goldberg, 2015, Submitted to AMT

IASI and AIRS nearly as good as Pre-Launch reference

Growing need to use instruments that yield climate scale corrections

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Selection of Reference Instruments-Future Monitoring

GRWG

IR

AIRS
IASI A/B/C
Primary Ref*
CrIS*

Monitored instrument overlaps with spectrum of hyper-spectral instruments

MW

GP-X *
ATMS*
MSU AMSU
SSMI*

MW spectrum is large and not spanned by a single reference instrument. Multiple broad band instruments can be candidates.

UV

OMI*
GOME-2*

VIS

Aqua Modi+ DCC

Complexity of in-orbit Inter - comparision enhanced as by surface reflectance Solar Zenith Angle. viewing geometry impact A-B .

Stability of Transfer targets such as DCC, Desert kicks in instrument monitoring algo.

Diverse requirements across (even within subgroups)

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Selecting Reference Instrument Process and a Scoring Scheme

Selection Process Reference for MW

A sub-group meeting is organized to identify instrument to be monitored

Group wishes to monitor GPM satellites spread over a range of roughly 25S to 25N (for eg

Group evaluates ATMS and SAPHIR.

Group considers that SAPHIR are the first radiometers in the 183 GhZ in low inclination orbit (Wilheit)

Instrument info on OSCAR and NRT monitoring on ICVS is considered

Despite not presenting global observations SAPHIR also scores higher because the intended goal is to inter-calibrate low inclination instruments. Input from scoring is considered.

On the other hand if goal would have been to monitor Polar instruments ATMS could have been a better choice.

OSCAR provides limited but critical information on instruments. (spectral, temporal and geographical coverage)

Detailed information is obtained via ATBD

Both SAPHIR and ATMS can score the same marks

More Stable and accurate references being explored For Eg. AMSU / MSU FCDR.

ene for GSICS Re-Analysis Correction for Meteosat Second Generation IR Channels

		reshold		Saturation			MetopA/IASI				
		Min	Max	Min	Max	Weight	Min	Max	Compliant	%Perfect	Score
		1	1	1	1	1	1	1	Pass		
		013	2013	2006	2030	100	2007	2020	Pass	63%	63.4
		-10	10	-90	90	2	-90	90	Pass	100%	2.0
		-10	10	-180	180	2	-180	180	Pass	100%	2.0
		270	300	180	330	5	180	310	Pass	67%	3.3
		746	2564	650	2800	10	645	2760	Pass	92%	9.2
		5	15	0	90	2	0.5	55	Pass	72%	1.4
						0			Pass		0.0
						0			Pass		0.0
						0			Pass		0.0
						0			Pass		0.0
		9	10	0	12	5	7.8	11.2	Pass	36%	1.8
			300		3	1		12	Pass	97%	1.0
						0			Pass		0.0
		1		10000		5	30000		Pass		0.0
			10		0.1	10		3.3	Pass	68%	6.8
									Pass		0.0
Radiometric Stability	K/yr		1		0.001	10		0.05	Pass	95%	9.5
Orbital Stability	hr/yr		12		0.1	0		0.001	Pass	100%	0.0
Radiometric Noise	K		10		0.1	1		0.15	Pass	99%	1.0
Spectral Resolution	cm-1		100		0.5	10		0.25	Pass	100%	10.0
Spectral Stability	cm-1/yr		2		0.01	10		0.000002	Pass	100%	10.0
SBAF Uncertainty	K		1		0.001	0		0.15	Pass	85%	0.0
Absolute Calibration Acc	K		1		0.001	10		0.05	Pass	95%	9.5
Inter-channel calibration	K								Pass		0.0
Traceability									Fail		
Documentation									Pass		
Community adoption									Pass		
Total						**184**			**96%**	**71%**	**130.9**

- *MW metadata and filenaming conventions*
- **NOAA GDWG in collaboration with MW former Chair Cheng-Zhi formulated the MW metadata and fileneming conventions for MW GSICS Products.**
- **The conventions were accepted by the GDWG members and would be put up on the wiki.**
- *Proposed Document Management plan to GSICS.*

  NOAA proposed to GSICS a Document Management Plan based on the DMS existing at NOAA library. Review of this plan underway

GSICS Global Space-based Inter-Calibration System

Summary

- GCC actively engaged in JPSS Instrument in-orbit calibration.
- GSICS Coordination Center leading efforts in In-Orbit Reference (radiance) Instrument Identification, Cross Calibration Product Maturity and Data Standardizations.
- Developed new technique to retrieve in-orbit SRF .

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