

X-CAL Status

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The Entire X-CAL Team

Must acknowledge extraordinary level of support from PPS

X-CAL Meeting Planned for Feb.

Needed SAPHIR and AMSR2 Results

SAPHIR Data Began Flowing in December

AMSR 2 in January

(token amount available earlier in both cases)

PPS provided Base and 1C files in time to produce results.

Earth Incidence Angle

Sun Glint

AMSR 2

Met with Keiji Imaoka and personnel from JAXA and MELCO in Tokyo
(11/15/2012)

They showed their calibration results.

No tuning to models or other sensors

The TBs seemed high relative to TMI and Windsat

Asked if X-CAL could corroborate.

I suggested we could have some results by Feb X-CAL meeting if we had the data soon.

They sent 3 people to Feb meeting.

vs. TMI, double difference

- Cloud free ocean and rainforest area
- Jul. to Sep. 2012
- AMSR2 Tbs are 0 to 5 degrees higher than TMI Tbs
- Tb differences on ocean and on rainforest areas are different from each other.

AMSR2(O-C) – TMI(O-C)

Ocean			
Channel	Ascending	Descending	Asc+Dsc
10V	+4.3	+4.3	+4.3
10H	+4.9	+4.8	+4.8
18V	+3.9	+4.1	+4.0
18H	+2.7	+2.6	+2.6
23V	+4.6	+5.0	+4.8
23H	-	-	-
36V	+4.4	+4.5	+4.4
36H	+5.0	+4.9	+4.9
89AV	+2.7	+2.7	+2.7
89AH	+3.8	+3.7	+3.7
89BV	+3.0	+3.1	+3.0
89BH	+3.6	+3.7	+3.6

Rainforest			
Channel	Ascending	Descending	Asc+Dsc
10V	+2.2	+2.9	+2.5
10H	+2.9	+3.3	+3.1
18V	-0.3	+0.6	+0.1
18H	-0.2	+0.4	+0.1
23V	+2.5	+3.1	+2.8
23H	-	-	-
36V	+2.8	+3.3	+3.0
36H	+2.9	+3.0	+2.9
89AV	+2.9	+2.8	+2.8
89AH	+3.7	+3.6	+3.6
89BV	+3.1	+3.1	+3.1
89BH	+3.7	+3.7	+3.7

GCOM-WI "SHIZUKU"



Presented by A. Okuyama (JAXA/EORC) @ Feb 2012 X-CAL Meeting

AMSR2 and AMSR-E Intercalibration vs. TMI

CSU Results

Channel	AMSR2 Japan	AMSR2 CSU OptEst	AMSR2 CSU OptEst (cc1.1)	AMSR2 CSU ERA-I (cc1.1)	AMSR-E Japan	AMSR-E CSU OptEst
10v	4.3	4.1	4.3	4.2	-0.2	-0.1
10h	5.0	5.1	3.9	3.9	1.4	1.8
18v	3.5	4.0	3.6	3.2	-0.1	-0.1
18h	2.7	2.8	0.7	0.1	1.9	2.1
23v	5.5	4.6	2.7	1.8	1.5	1.4
23h	N/A	N/A	N/A	N/A	N/A	N/A
36v	3.9	4.4	2.0	1.9	0.4	0.3
36h	4.5	5.2	3.3	3.4	1.2	1.6
89va	1.9	2.7	-1.6	-1.8	-0.1	N/A
89ha	2.8	3.7	-0.9	-0.9	0.7	N/A
89vb	1.9	3.0	-1.3	-1.5	-0.1	0.2
89hb	2.3	3.5	-1.0	-1.0	0.7	1.0

AMSR 2

JAXA Results Corroborated

Otherwise, data are very high quality

Very few wild points

Calibration very stable

Bias can be absorbed by X-CAL procedures

Would prefer to find a cause

Delivery of constants by end of September seem straightforward.

Could become a moving target.

SAPHIR

6 Channels near 183 GHz Water Vapor Line (GMI has 3)

183.3 +/- 0.2 11 GHz

20° Orbital Inclination

Cross-Track Scanning

Simulator for GMI to Intercalibrate Polar Orbiting WV Sounders

Must Handle Large Earth Incidence Angle Issues

Two Approaches/ Several Teams Analogous to Imagers

Questions:

Data Quality?

Different Approaches—Same Answer?

Algorithms Adequate to Handle Earth Incidence Angles?

Basis for Intercalibrating MHS, AMSU-B, ATMS, SSMIS (wv part)

Also: interesting Precipitation Signal

Jim Wang NCEP Analysis-based Results

Date Month/Year	METOP_A - MT			NOAA18 - MT		
	183.3±1	183.3±3	190.3	183.3±1	193.3±3	190.3
07/2012	-0.09 ± 1.40	-0.13 ± 1.20	0.41 ± 1.06			
	± 0.02	± 0.02	± 0.02			
08/2012	-0.08 ± 1.33	-0.13 ± 1.19	0.41 ± 1.04	-0.04 ± 1.56	-0.05 ± 1.35	0.21 ± 1.12
	± 0.02	± 0.02	± 0.02	± 0.05	± 0.05	± 0.04
09/2012	-0.12 ± 1.35	-0.05 ± 1.24	0.46 ± 1.02	-0.24 ± 1.55	0.22 ± 1.35	0.29 ± 1.18
	± 0.02	± 0.02	± 0.02	± 0.08	± 0.07	± 0.06
10/2012	-0.09 ± 1.41	-0.09 ± 1.21	0.48 ± 1.02	0.00 ± 1.50	0.09 ± 1.31	0.23 ± 1.23
	± 0.02	± 0.02	± 0.02	± 0.02	± 0.02	± 0.01
11/2012	-0.07 ± 1.39	-0.13 ± 1.19	0.50 ± 1.08	0.00 ± 1.44	0.07 ± 1.28	0.10 ± 1.40
	± 0.03	± 0.02	± 0.02	± 0.02	± 0.02	± 0.02
12/2012	-0.03 ± 1.45	-0.13 ± 1.24	0.46 ± 1.07	0.02 ± 1.50	0.05 ± 1.29	0.38 ± 1.11
	± 0.02	± 0.02	± 0.02	± 0.01	± 0.01	± 0.01

Jim Wang Retrieval-based Results (fit ≤ 1 K)

Date Month/Year	METOP_A - MT			NOAA18 - MT		
	183.3 \pm 1	183.3 \pm 3	190.3	183.3 \pm 1	193.3 \pm 3	190.3
07/2012	-0.07 \pm 1.21 ⁺	-0.03 \pm 0.99	0.37 \pm 1.07			
	\pm 0.03 [§]	\pm 0.02	\pm 0.02			
08/2012	0.04 \pm 1.20	-0.03 \pm 0.99	0.33 \pm 1.10	-0.08 \pm 1.51	0.13 \pm 1.16	0.15 \pm 1.43
	\pm 0.02	\pm 0.02	\pm 0.02	\pm 0.06	\pm 0.05	\pm 0.06
09/2012	0.15 \pm 1.23	-0.03 \pm 1.01	0.24 \pm 0.97	-0.08 \pm 1.45	0.09 \pm 1.33	0.08 \pm 1.35
	\pm 0.02	\pm 0.02	\pm 0.02	\pm 0.12	\pm 0.11	\pm 0.11
10/2012	0.12 \pm 1.28	0.01 \pm 1.01	0.36 \pm 1.09	0.17 \pm 1.37	0.19 \pm 1.13	0.05 \pm 1.26
	\pm 0.03	\pm 0.02	\pm 0.02	\pm 0.02	\pm 0.02	\pm 0.02
11/2012	0.08 \pm 1.24	-0.01 \pm 1.00	0.42 \pm 1.12	0.28 \pm 1.29	0.15 \pm 1.07	-0.10 \pm 1.35
	\pm 0.03	\pm 0.02	\pm 0.02	\pm 0.02	\pm 0.02	\pm 0.02
12/2012	0.11 \pm 1.33	-0.05 \pm 1.09	0.28 \pm 1.08	0.15 \pm 1.34	0.17 \pm 1.11	0.32 \pm 1.31
	\pm 0.03	\pm 0.02	\pm 0.02	\pm 0.01	\pm 0.01	\pm 0.01

+ Standard Deviation

§ Uncertainty of the Mean

SAPHIR

(supporting information in several talks and posters)

Data Quality quite good

Different approaches give very similar answers

Algorithms can handle EIA differences

Have begun detailed algorithm comparisons

We (will) have enough results to support May 23,24 2013 meeting in Toulouse.

Will Discuss SAPHIR, MADRAS and other X-CAL topics

More than 15 years since launch of TRMM
>11 Years Since boost
Likely more to come

Very long self-consistent data set to
investigate climate changes

Subsets have already been used to look at
oceanic rain trends

How "self-consistent" is it?

Windsat

Can serve as an additional benchmark

Windsat is an experimental satellite for measurement of oceanic wind **Direction**

Very Subtle, Demanding Measurement

Good Instrument Calibration Essential

Conical Scanner

6.8, 10.65, 18.7, 23.8, 37 GHz

H&V Polarizations (+ others)

Range of Incidence Angles $> 5^\circ$

TMI orbit-wise calibration problem was detected using Windsat.

We have Windsat Data Spanning more than 5 years

Upper Limit of TMI drift *ca.* 0.01K/year

We are working to reduce the error bars.

End of Life Calibration Maneuver Critical

OTHER ISSUES

TMI Prelaunch Calibration Standard

METOP A for WV sounders

Radar Enhanced and Combined Team Leaders Agree

Consensus Calibration Still Important for GMI Evaluation

PPS needs pre-launch constants by end of September

Mostly not a problem

SSMIS FCDR (CSU) not quite finalized

Wes Berg says a month or so
if so, then OK