Update on AMSR2

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GSICS MW subgroup
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AMSR2 Instrument

- ✓Successor of AMSR-E on Aqua and AMSR on ADEOS-II.
- ✓Deployable main reflector system with 2.0m diameter (1.6m for AMSR-E).
- ✓Frequency channel set is identical to that of AMSR-E except 7.3GHz channel for RFI mitigation.
- ✓Two-point external calibration with improved HTS (hot-load).
- ✓Add a redundant momentum wheel to increase reliability.

GCOM-W1/AMSR2 characteristics	
Scan and rate	Conical scan at 40 rpm
Antenna	Offset parabola with 2.0m dia.
Swath width	1450km (effective > 1600km)
Incidence angle	Nominal 55 degrees
Digitization	12bits
Dynamic range	2.7-340K
Polarization	Vertical and horizontal

AMSR2 Channel Set

Center Freq. [GHz]	Band width [MHz]	Pol.	Beam width [deg] (Ground res. [km])	Sampling interval [km]
6.925/ 7.3	350	V and H	1.8 (35 x 62)	10
10.65	100		1.2 (24 x 42)	
18.7	200		0.65 (14 x 22)	
23.8	400		0.75 (15 x 26)	
36.5	1000		0.35 (7 x 12)	
89.0	3000		0.15 (3 x 5)	5

MWR for Intercomparison

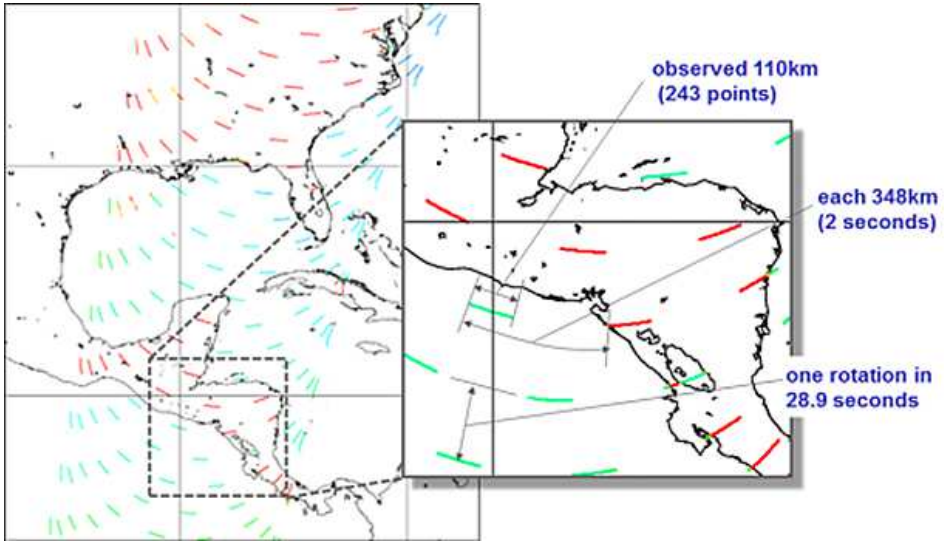
	TMI (TRMM)	AMSR-E (Aqua)	AMSR2 (GCOM-W)	GMI (GPM)
Launch Year	**1997**	**2002**	**2012**	**2014**
Sensor appearance				
Channels for Intercalibration	10.65 V/H 19.35 V/H 21.3 V 36.5 V/H 85.5 V/H	10.65 V/H 18.7 V/H 23.8 V 36.5 V/H 89.0 V/H	10.65 V/H 18.7 V/H 23.8 V 36.5 V/H 89.0 V/H	10.65 V/H 18.7 V/H 23.8 V 36.64 V/H 89.0 V/H
Approximate incidence angle [degree]	53.4 * (after boost)	55.0 54.5 for 89B	55.0 54.5 for 89B	52.8
IFOV at 36GHz [km]	16*9	14*8	12*7	16*9

* Recent information on TMI incidence angle through GPM X-CAL team: Incidence angles at 10V, 10H, and 37V are differ from the base value about 0.65, 0.22, and 0.12 degrees, respectively.

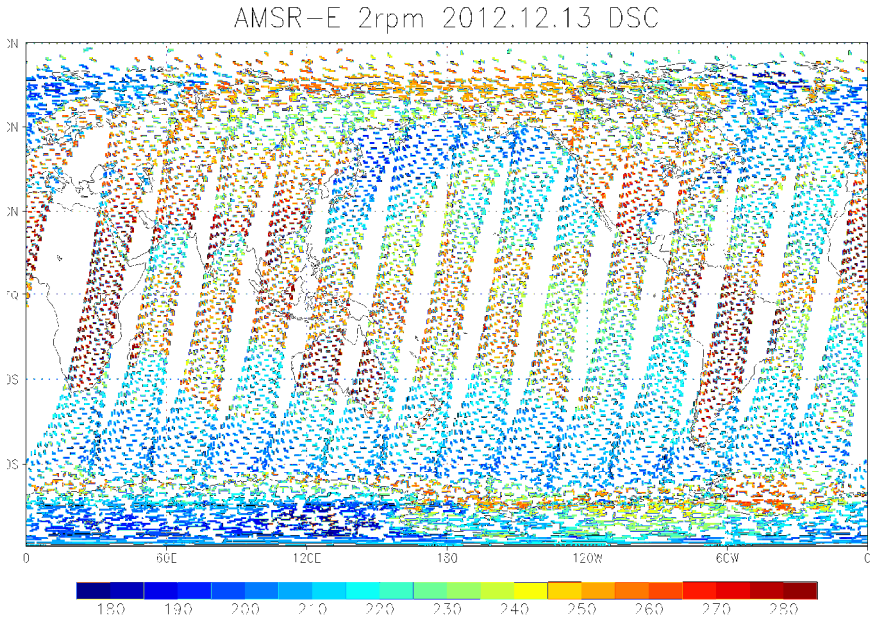
Photo of TMI and GMI by NASA

Direct comparison with AMSR-E

- Direct intercalibration between AMSR2 and AMSR-E:
  - Without significant corrections for center frequency, incidence angle, and observing local time.
  - Enables intercalibration in wide range of Tbs over land, ice, and ocean.
- AMSR-E slow rotation mode data (L1S) are available at:
  - http://sharaku.eorc.jaxa.jp/AMSR/products/amsre_slowdata.html

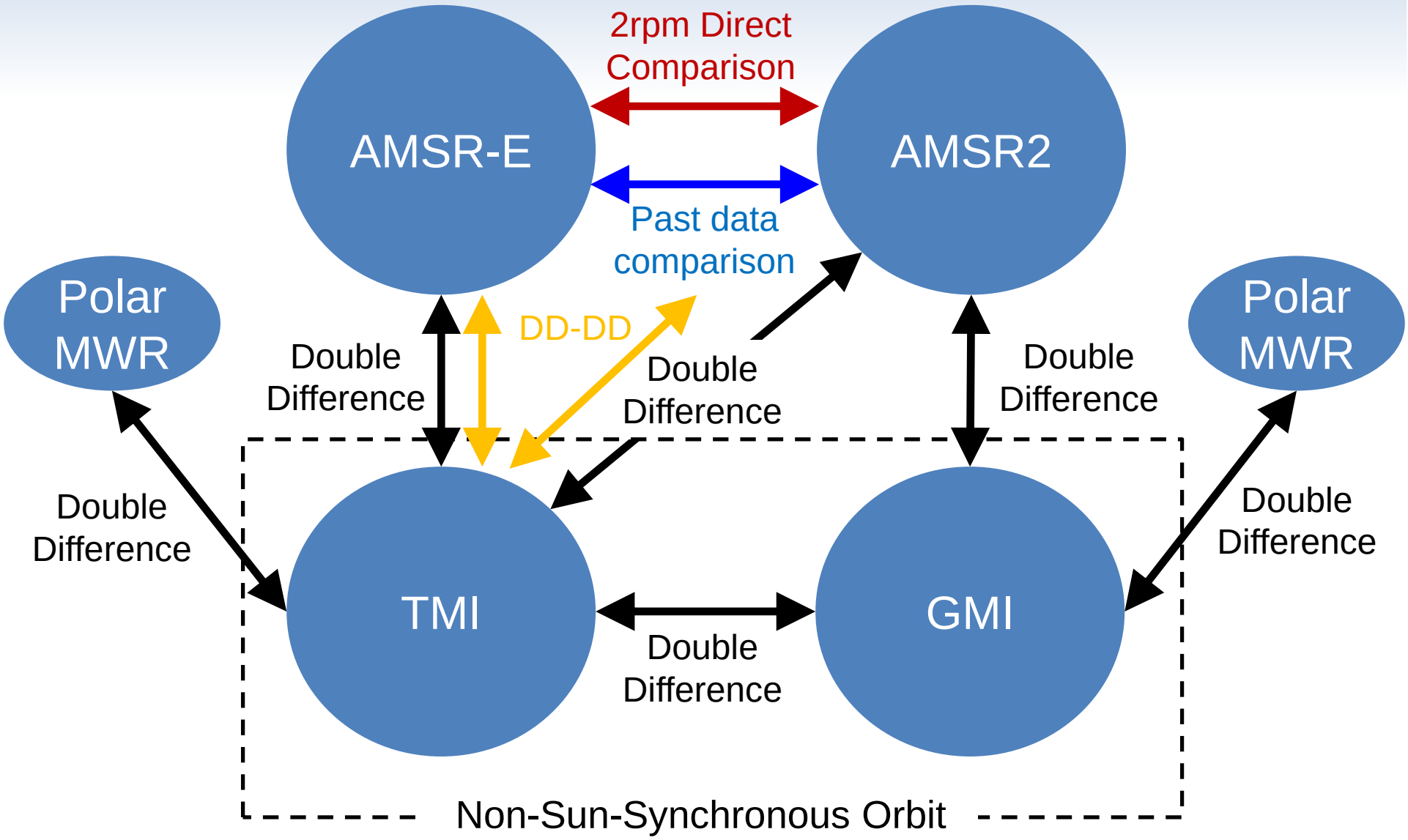


Observation geometry



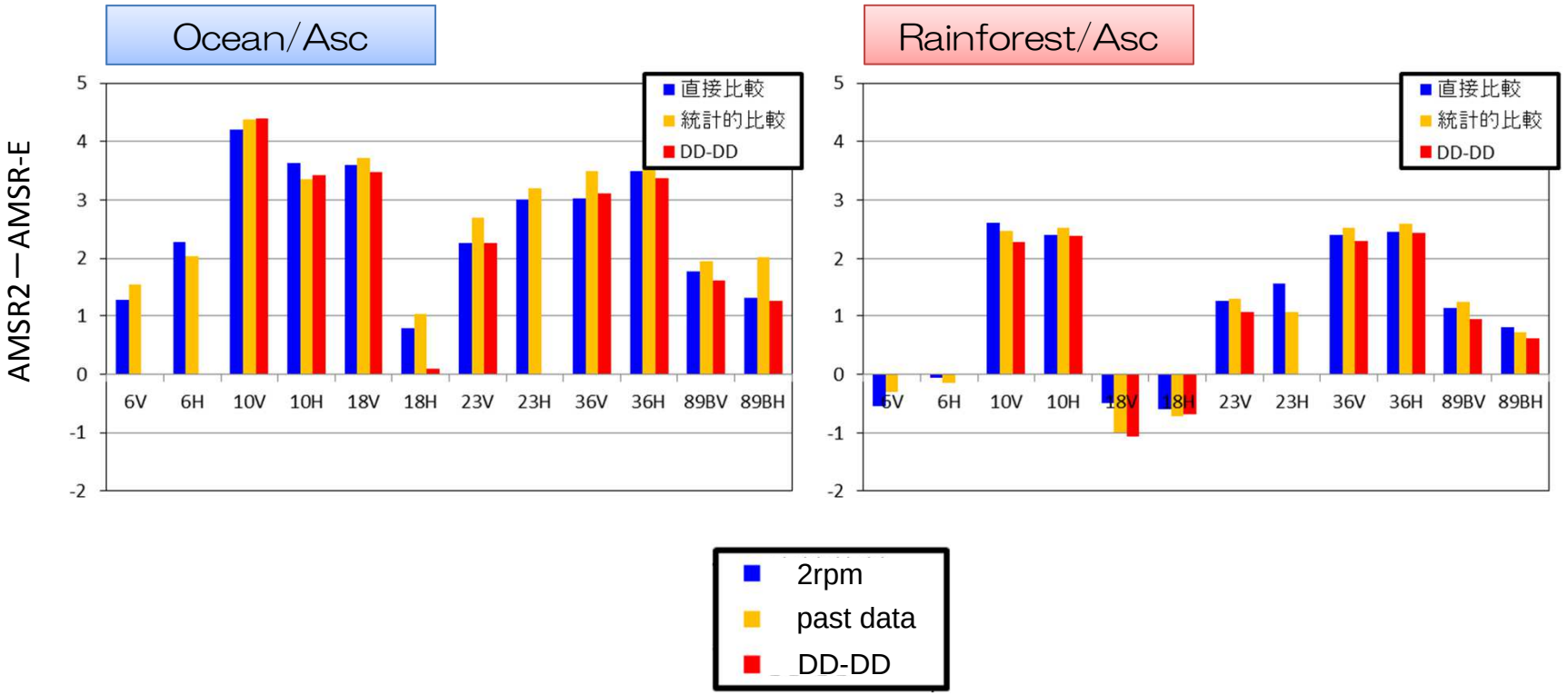
AMSR-E 2rpm 23V Descending

Overview of Intercomparison



Consistency among Methods

- Consistency among different intercalibration approaches
  - AMSR-E slow rotation mode (2rpm, L1S)
  - AMSR-E operational observation (past period, L1B)
  - Difference between DDs: DD(AMSR2-TMI) – DD(AMSRE-TMI)

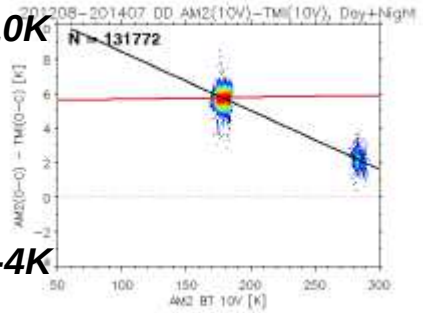


Data and Models

- Tb products for intercalibration
  - AMSR2: Level-1B (Version 1.1 and Version 2.0β2-ongoing)
  - AMSR-E: Level-1B (Version 3)
  - AMSR-E: Level-1S (slow rotation mode)
  - TMI: 1B11 (Version 7)
  - GMI: Level-1B (Version 03B)
- Radiative transfer model (RTM)
  - RTTOV 10.2 distributed by NWP SAF.
  - Used surface emissivity model/atlas built-in RTTOV 10.2: FASTEM 5 for ocean and TELSEM for land surface emissivity.
- Global analysis data
  - JMA's Global analysis and merged SST data called MGDSST are used as atmospheric profile and SST, respectively. ECMWF ERA-Interim analysis are also used for testing.

AMSR2 (2.0β2) -TMI

10V



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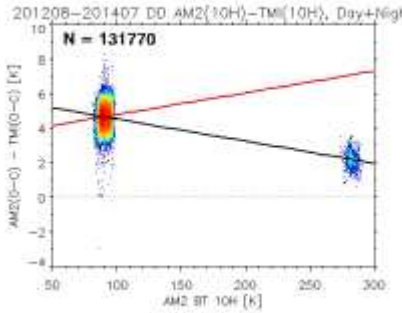

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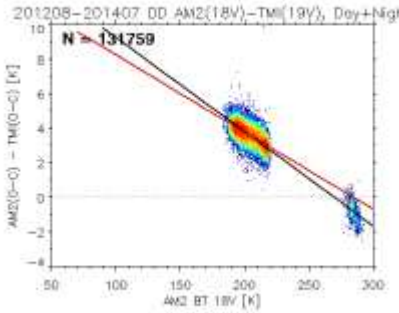

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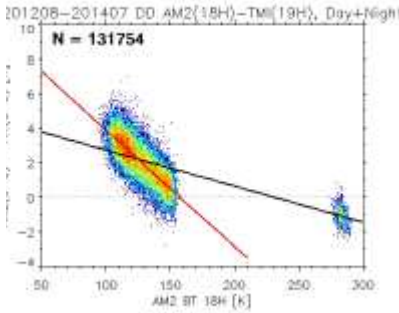

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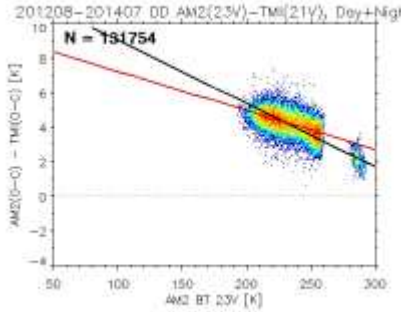
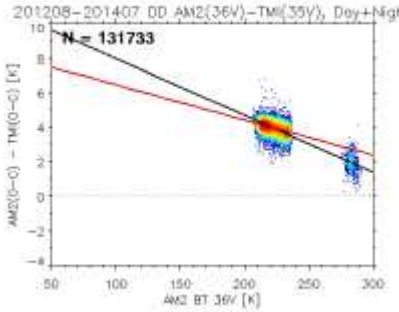


Day and Night

—: Ocean and Land

—: Ocean

36V



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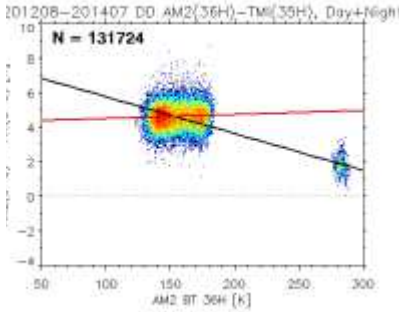

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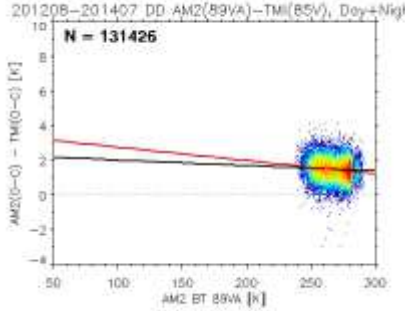

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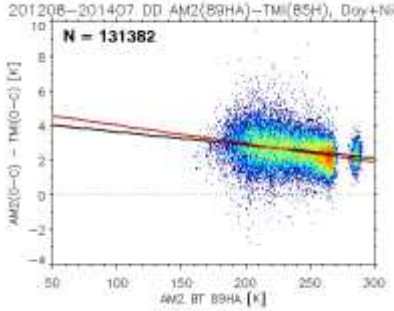
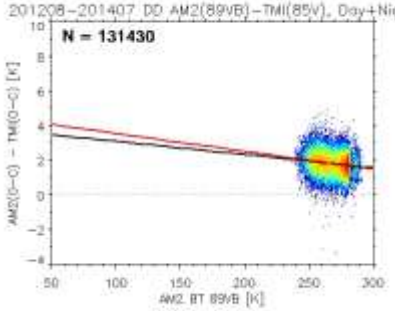
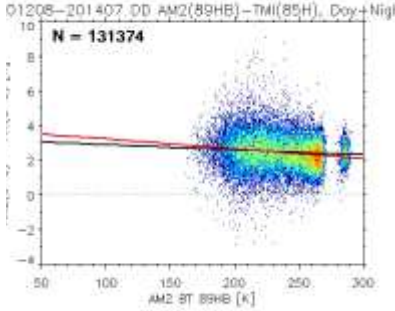
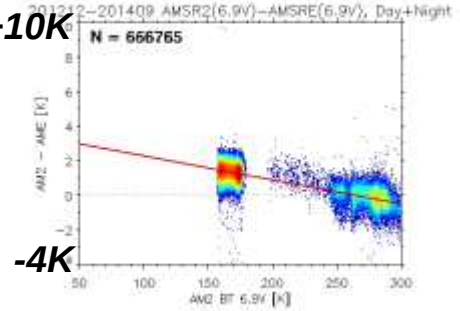






AMSR2 (2.0β2) -AMSR-E (2rpm)

06V



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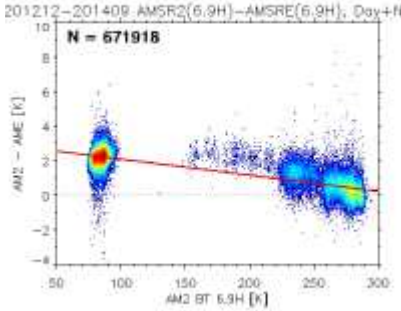

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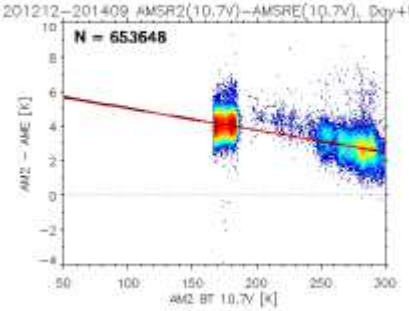

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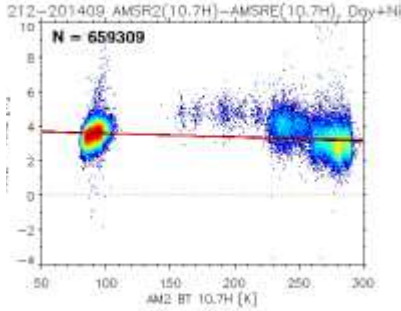

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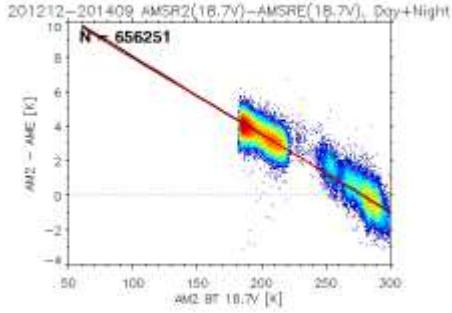

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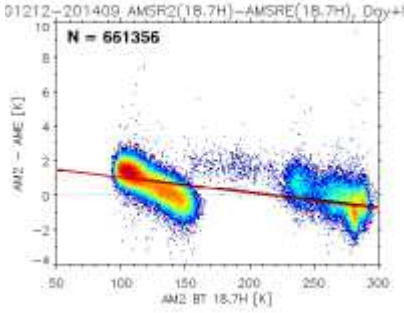

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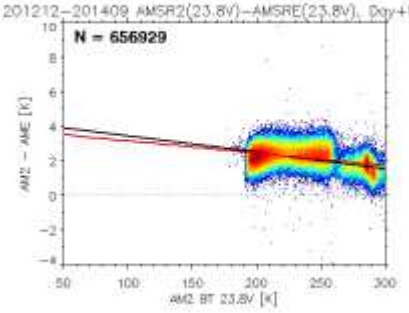

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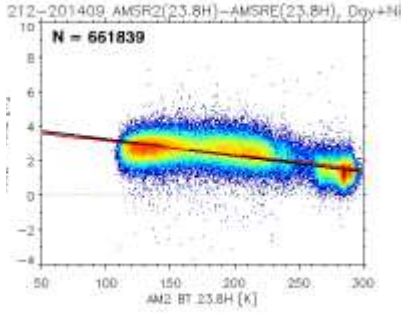

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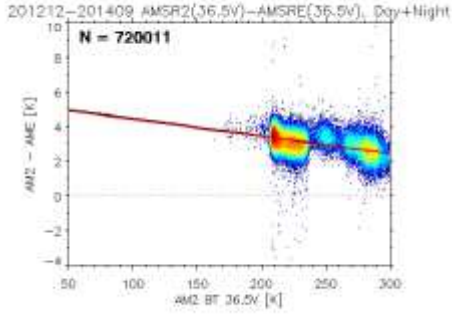

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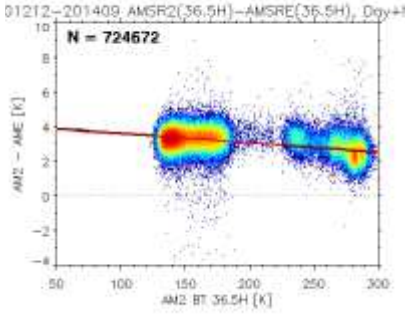

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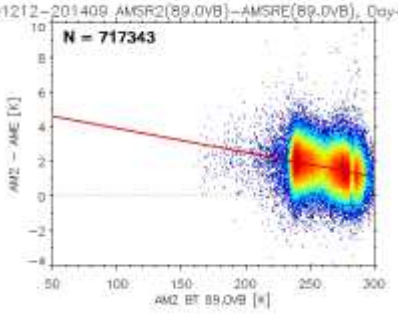

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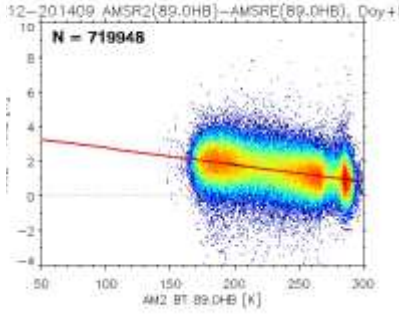
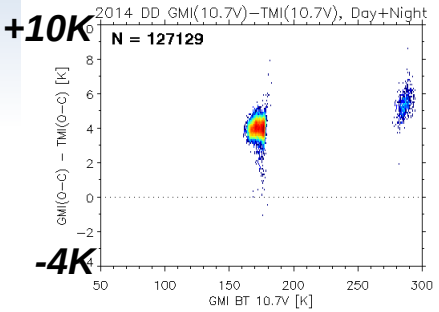


GMI-TMI Comparison

10V



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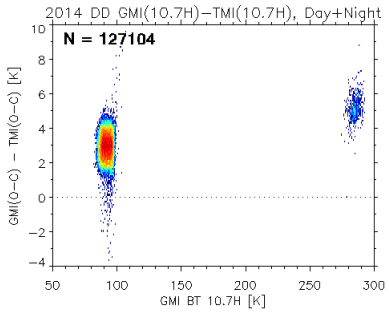

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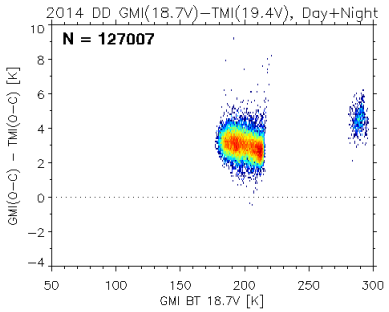

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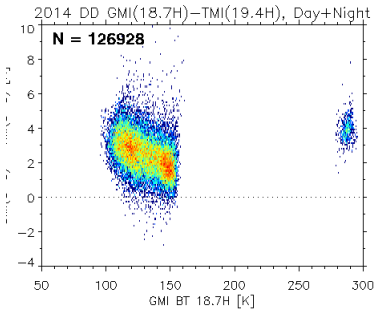

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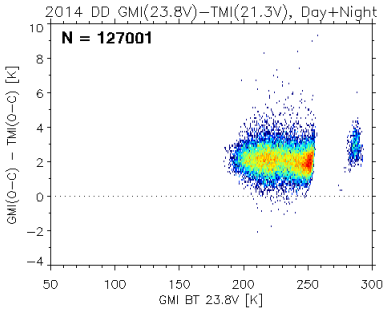
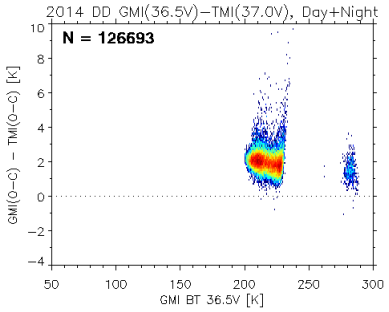


Day and Night

36V



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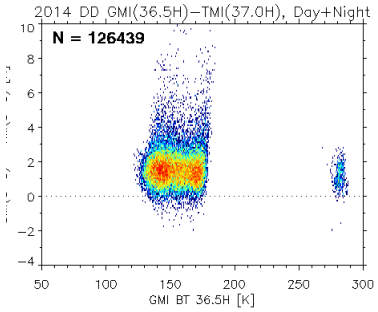

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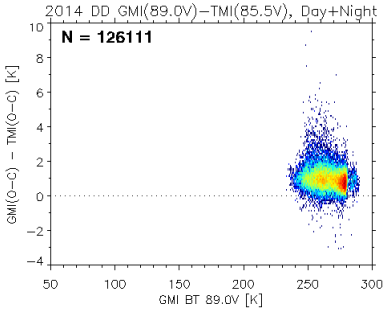

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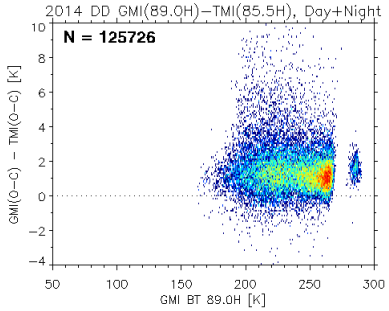
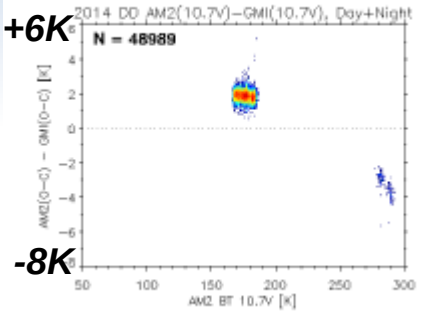


AMSR2 (2.0β2) -GMI

10V



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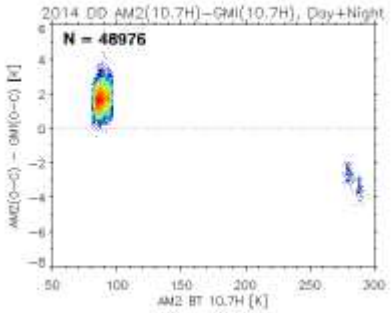

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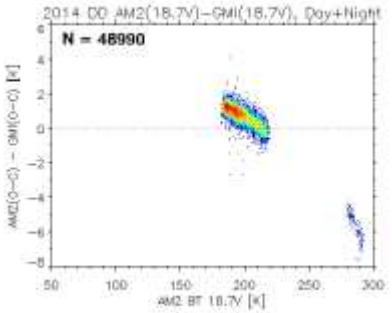

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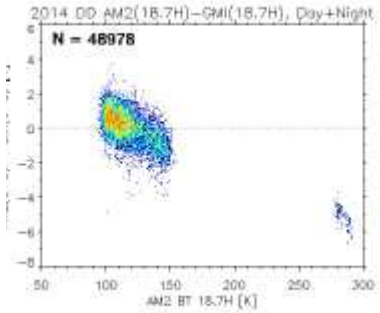

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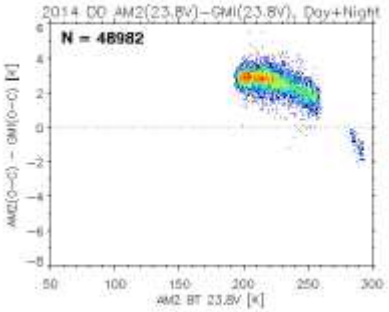
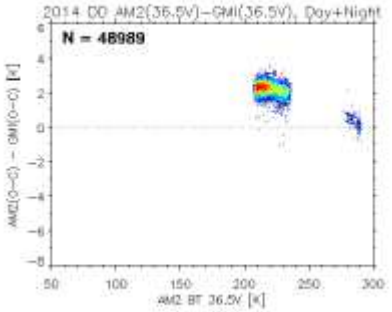


Day and Night

36V



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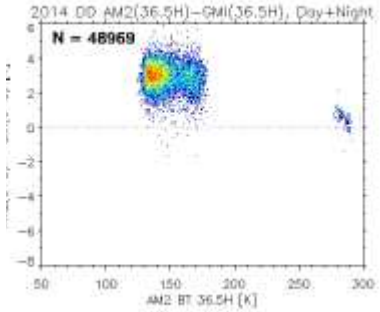

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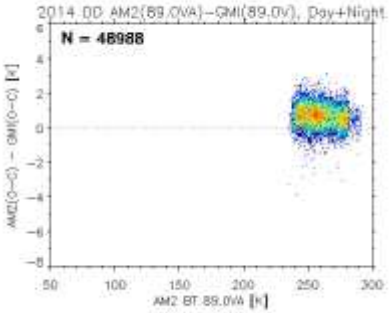

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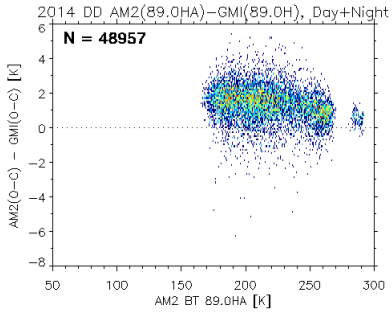

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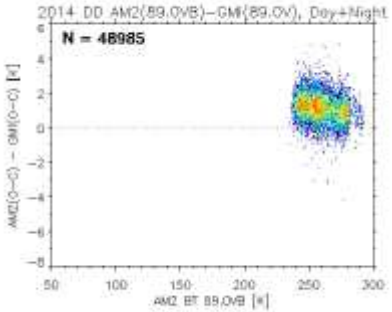

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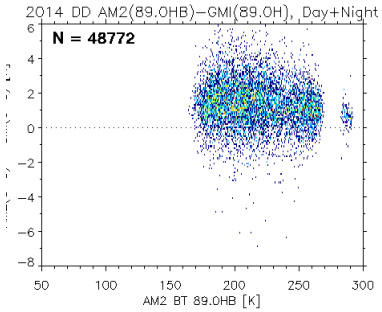
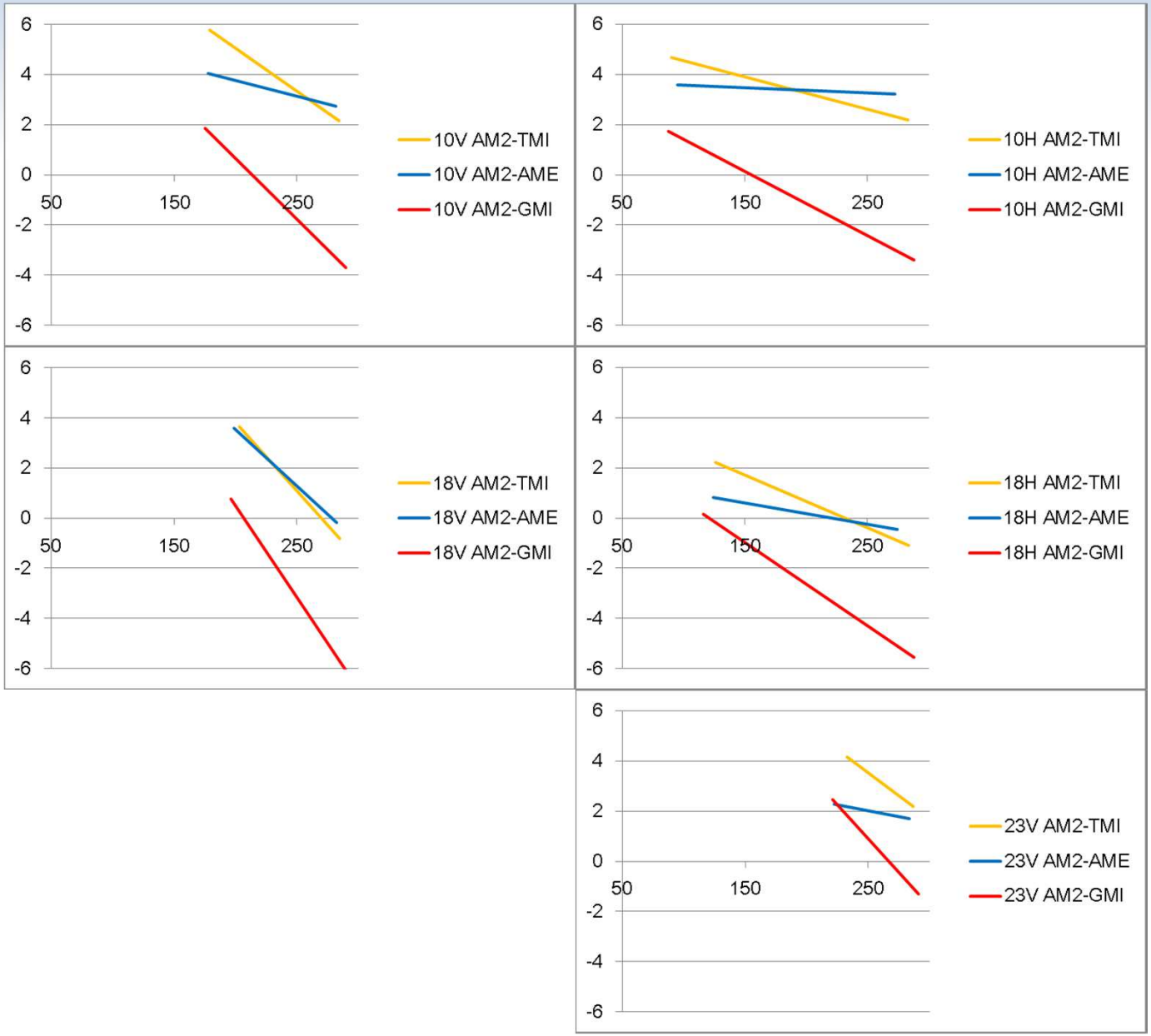
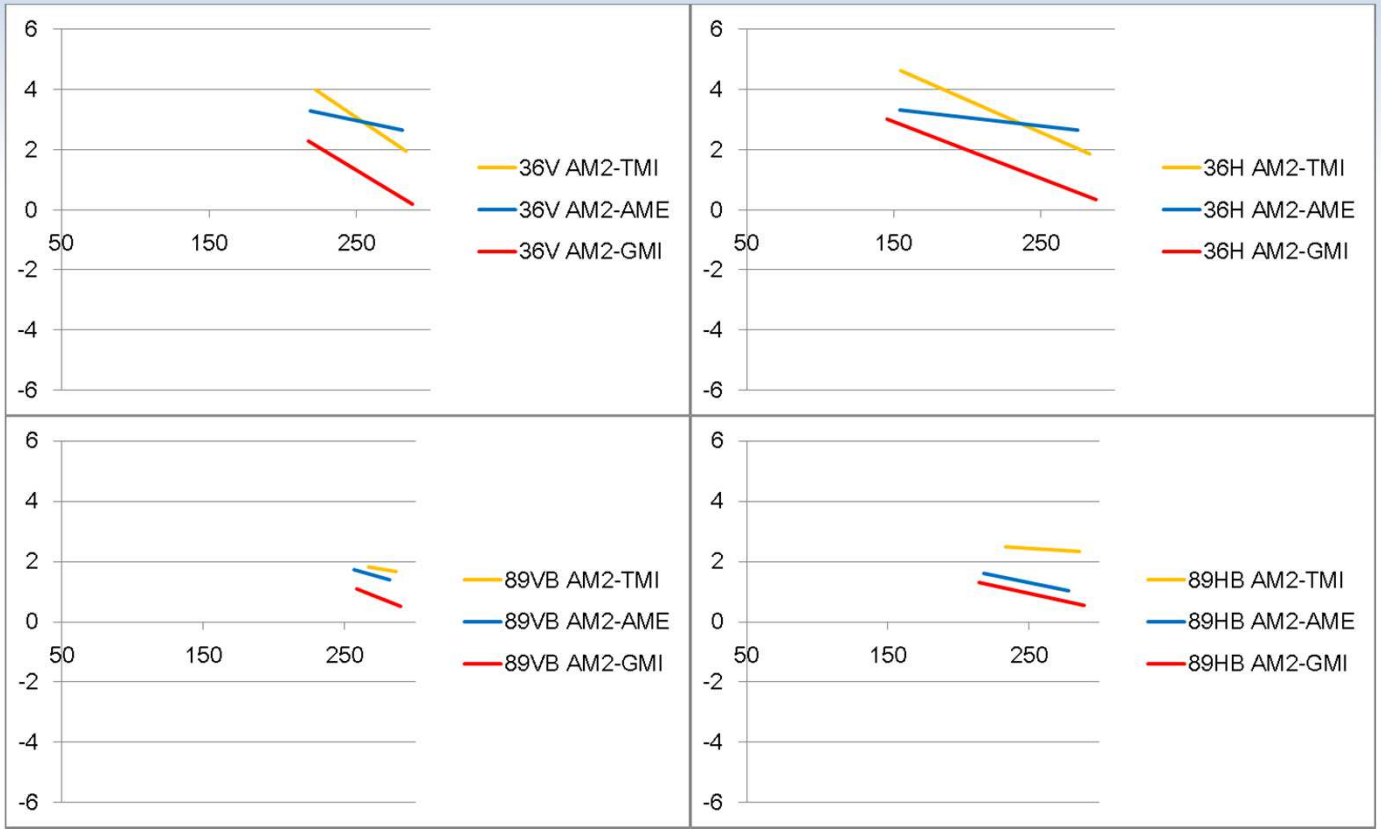


Intercomparison Summary



Intercomparison Summary



Summary

- AMSR2
  - AMSR2 is working fine. Next L1 product update is scheduled by the end of this Japanese fiscal year (i.e., by March 2015).
- Microwave Radiometer Intercomparison
  - Intercomparisons have been performed among AMSR2, AMSR-E, TMI, and GMI instruments. Derived calibration differences and coefficients are being uploaded on JAXA's website for users.
  - Differences were found between the calibration of AMSR2 and other radiometers. The differences seem to be Tb-dependent. Newly launched GMI instrument also has some differences particularly in lower frequency channels. Need to consider the causes of differences.