



Present Status of AMSR3

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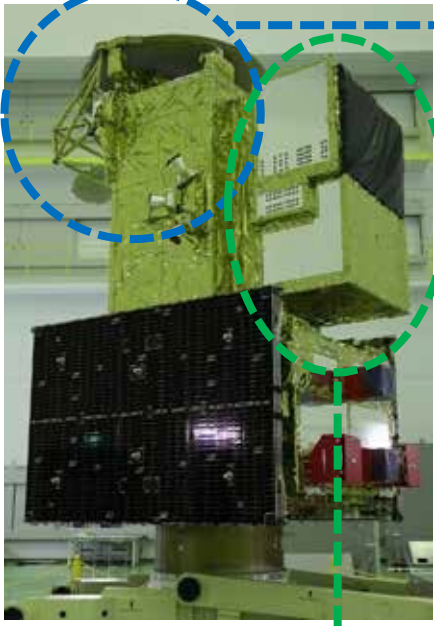
Kazuki Nakata, Kentaro Aida, Takumi Suzuki, Takeshi Miura, Kazuya Inaoka

Japan Aerospace Exploration Agency (JAXA)



GOSAT-GW: Global Observation SATellite for Greenhouse gases and Water cycle

AMSR3 (Advanced Microwave Scanning Radiometer)



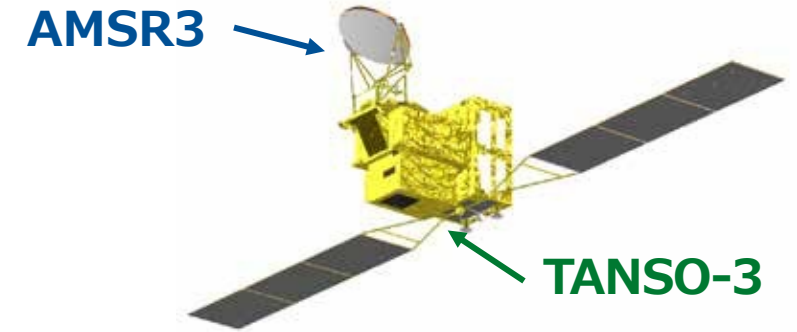
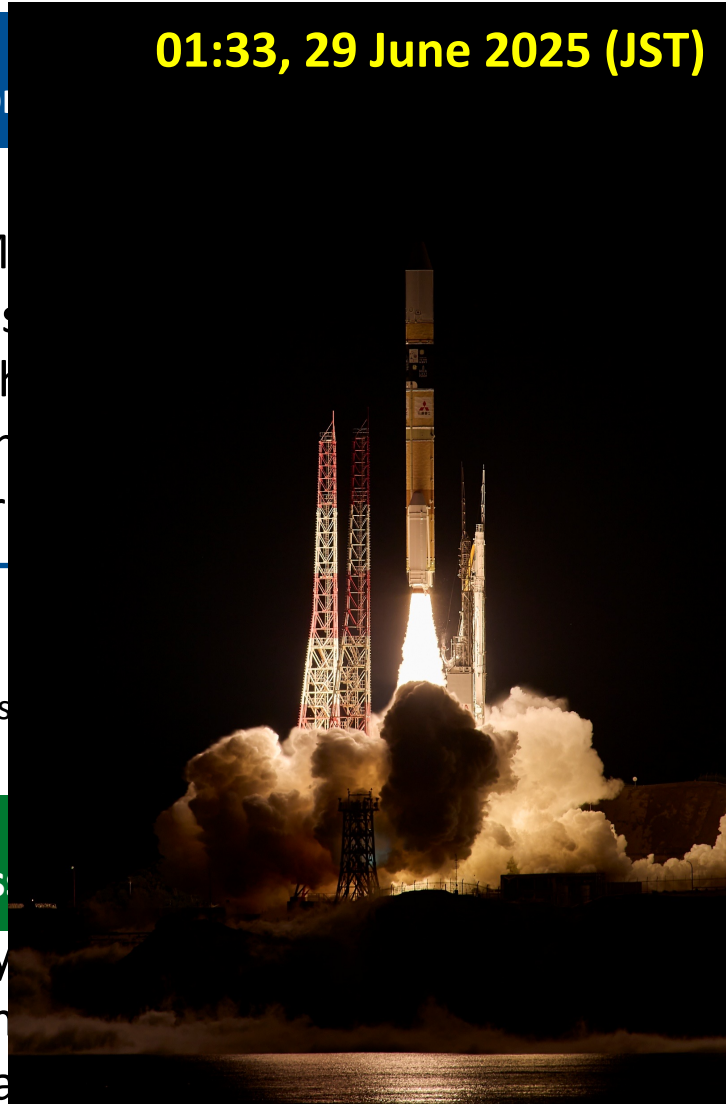
AMSR3, led by JAXA, will succeed AMSR2 observations and provide high-frequency observations of precipitation, water vapor, and sea surface temperature.

GOSAT-GW at Tanegashima on 20 May 2025

TANSO-3 (Total Anthropogenic and Natural emissions)

TANSO-3, led by Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT), Ministry of Environment (MOE) and National Institute of Environmental Research and Development (NIES), will improve observation capability of greenhouse gases from GOSAT-2/TANSO-2.

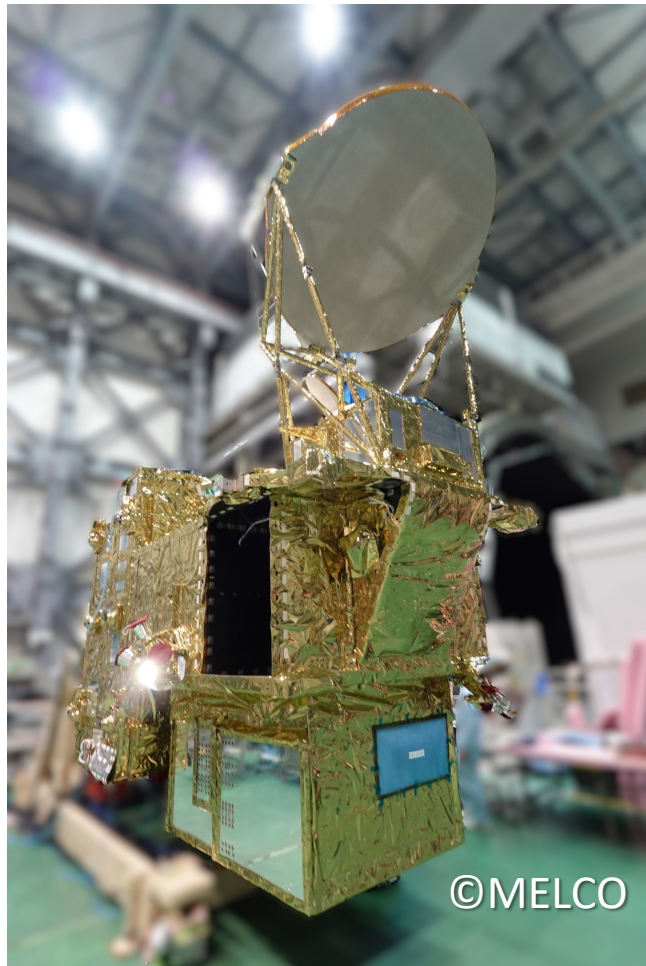
01:33, 29 June 2025 (JST)



GOSAT-GW Satellite Specifications

Mission Instruments		AMSR3 (JAXA) TANSO-3 (MOE/NIES)
Orbit	Type	Sun-synchronous, Sub-recurrent orbit
	Altitude	666km, recurrent cycle 3days (same as GOSAT)
	Local sun time at ascending	13:30+/-15min (same as GCOM-W)
	Revisit time	3 days
Satellite Mass		2.6 tons (including propellant)
Designed lifetime		> 7 years
Launch		29 June 2025 (JST) by H-IIA #50

AMSR3 Sensor Specification



©MELCO

Feature of the GOSAT-GW satellite with AMSR3 Main Reflector deployed

AMSR3 Channel Sets

Center frequency [GHz]	Polarization	Band width [MHz]	NEDT (1σ)	Beam width (spatial resolution)
6.925	H/V	350	< 0.34 K	1.8° (33km x 57km)
7.3			< 0.43 K	
10.25	H/V	500	< 0.33 K	1.2° (22km x 38km)
10.65	H/V	100	< 0.70 K	1.2° (22km x 38km)
18.7	H/V	200	< 0.70 K	0.65° (12km x 21km)
23.8	H/V	400	< 0.60 K	0.75° (14km x 24km)
36.42	H/V	840	< 0.70 K	0.35° (6km x 11km)
89.0 A/B	H/V	3000	< 1.20 K	0.15° (3km x 5km)
165.5	V	4000	< 1.50 K	AZ=0.23° / EL=0.30° (4km x 9km)
183.31±7	V	2000×2	< 1.50 K	AZ=0.23° / EL=0.27° (4km x 8km)
183.31±3	V	2000×2	< 1.50 K	AZ=0.23° / EL=0.27° (4km x 8km)

Red: Changes from AMSR2 including additional CHs

To improve temperature resolution (NEDT) for high-resolution SST

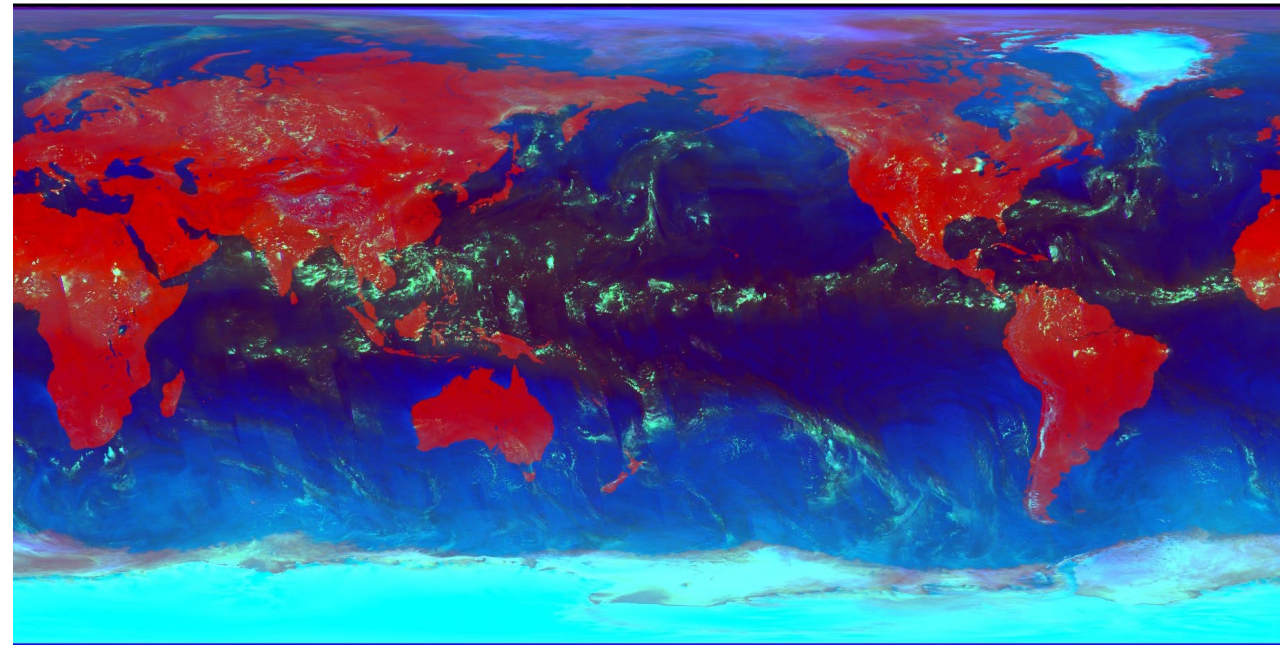
To reduce possible risks of RFI from the 5G communications

Add to get snowfall and water vapor sounding

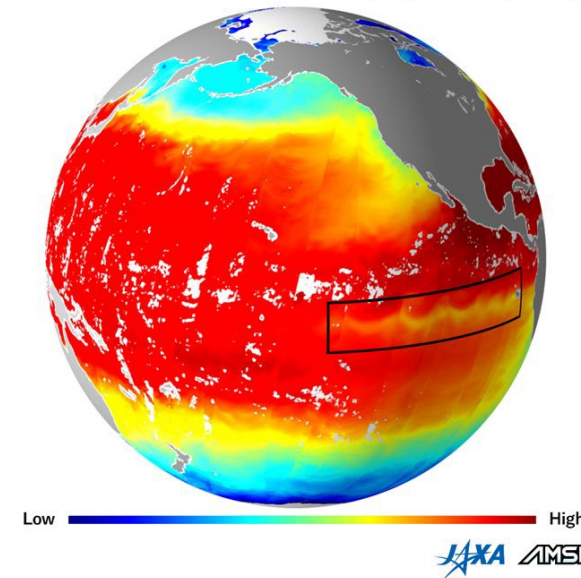
- ① Additional **166 & 183 GHz** channels to enable monitoring of global precipitation (rain & snow) and contribute to water vapor analysis in NWP
- ② Additional **10.25 GHz channels with improved NEDT** to enable robust SST retrievals in higher spatial resolution

AMSR3 First Images

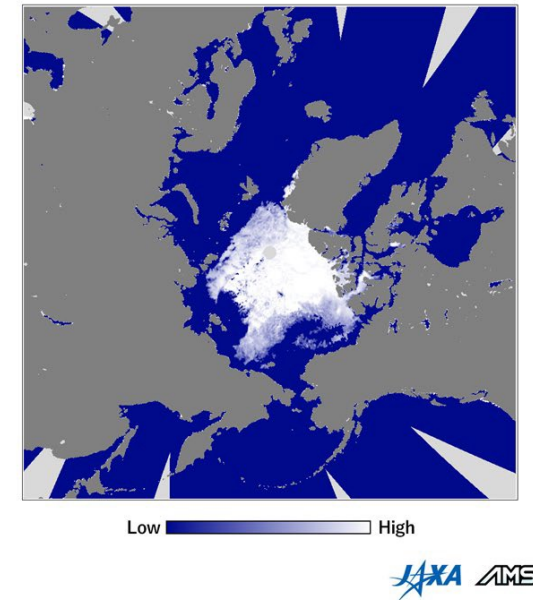
- AMSR3 scientific observation from 11 Aug. 2025
- First images on 5 Sep. 2025.
- Preliminary data has been provided to partner agencies and cal/val PIs since Nov. 2025.



AMSR3 Sea Surface Temperature (August 15-17, 2025)



AMSR3 Sea Ice Concentration August 15, 2025 Ascending

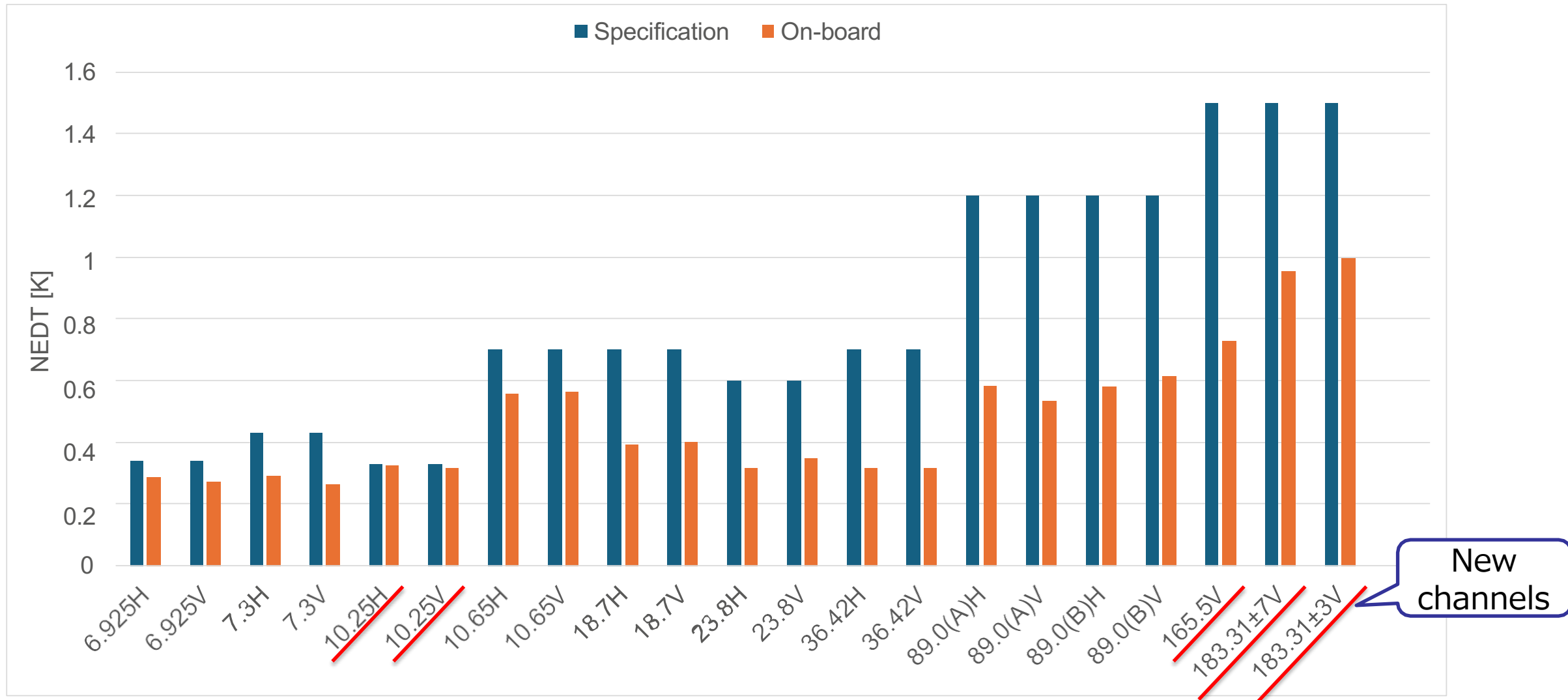


AMSR3 RGB composite image using 18.7, 89.0, and 165.5 GHz V-Pol. TB to highlight cloud/precipitation area in light green (15-17 Aug. 2025, Ascending)

https://global.jaxa.jp/press/2025/09/20250905-1_e.html

Initial cal/val phase until June 2026

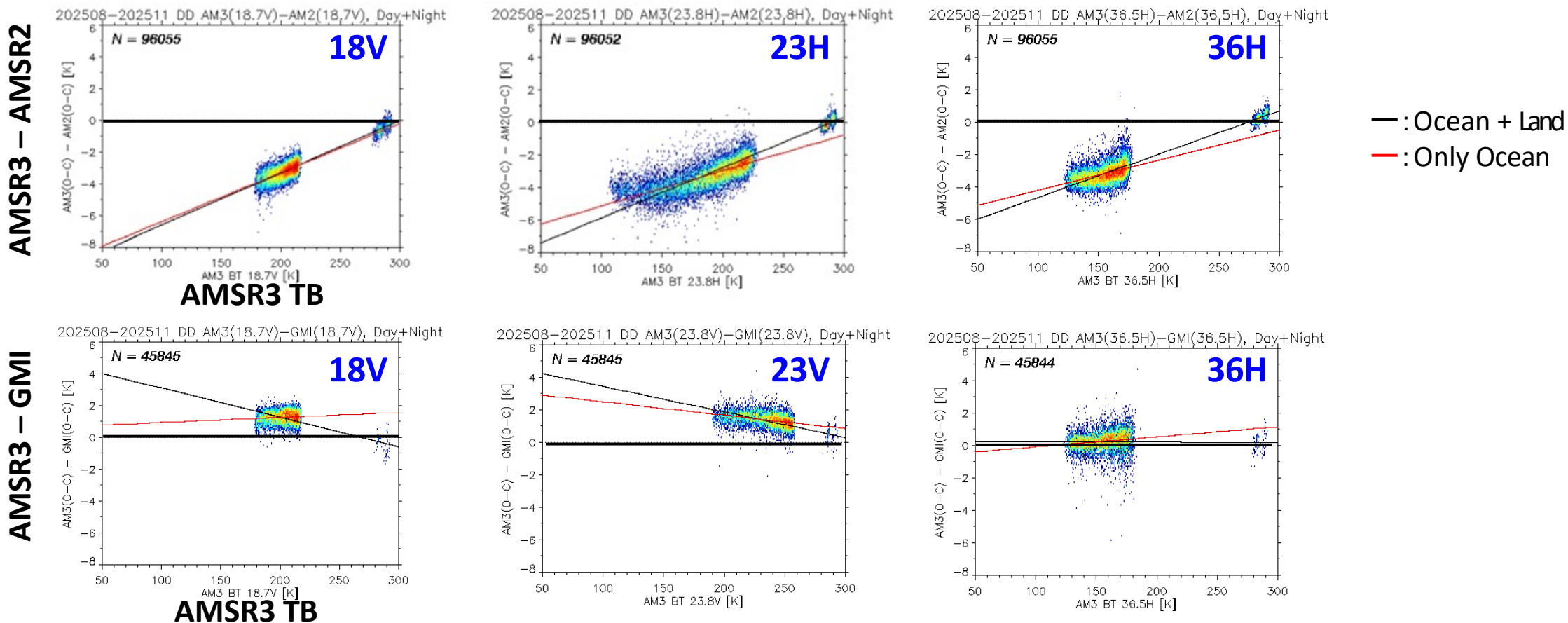
On-board Evaluation Results of AMSR3 NEDT



All channels satisfy the NEDT specifications.

Cross-calibration of AMSR3 VS AMSR2 and GMI

- Double Difference (DD) method is applied to evaluate calibration error between AMSR3 and AMSR2 (6-89GHz), and GPM/GMI (10-183GHz).
- Small differences between Ascending & Descending orbits
- **AMSR3 TBs are lower than AMSR2 and closer to GMI (and AMSR-E)**



$$DD_{AMSR3 \text{ vs } AMSR2} = (TB_{AM3obs} - TB_{AM3sim}) - (TB_{AMSR2obs} - TB_{AMSR2sim})$$

$$DD_{AMSR3 \text{ vs } GMI} = (TB_{AM3obs} - TB_{AM3sim}) - (TB_{GMIobs} - TB_{GMIsim})$$

Early Validation Results: SST & Wind Speed

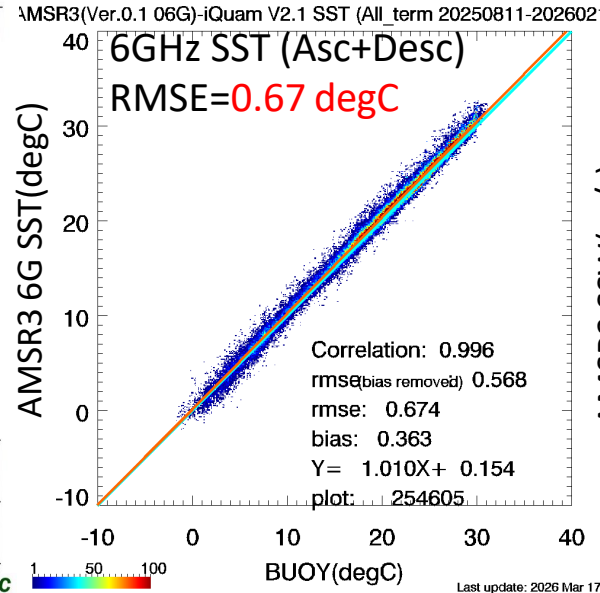
- SST & wind speed (standard SSW & all-weather ASW) algorithms for AMSR3 are identical to those for AMSR2.
- 10-GHz/multi-band SST & ASW products has been upgraded to standard products since AMSR3.

- Early validation results show good agreements to in-situ observations
 - SST vs floating buoys: Aug. 11, 2025 - Feb. 10, 2026
 - SSW vs mooring buoys: Aug. 11, 2025 – Apr. 12, 2026
 - ASW vs drop sondes: Aug. 11, 2025 - Dec. 31, 2025

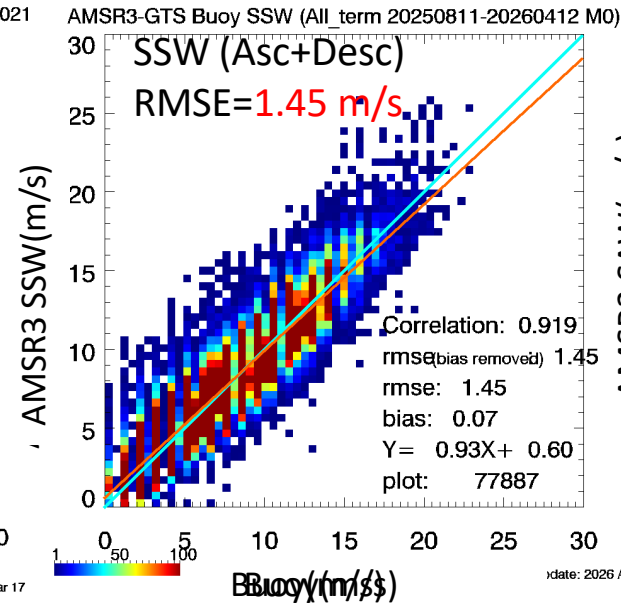
Descending orbit 6G SST on Dec. 31, 2025



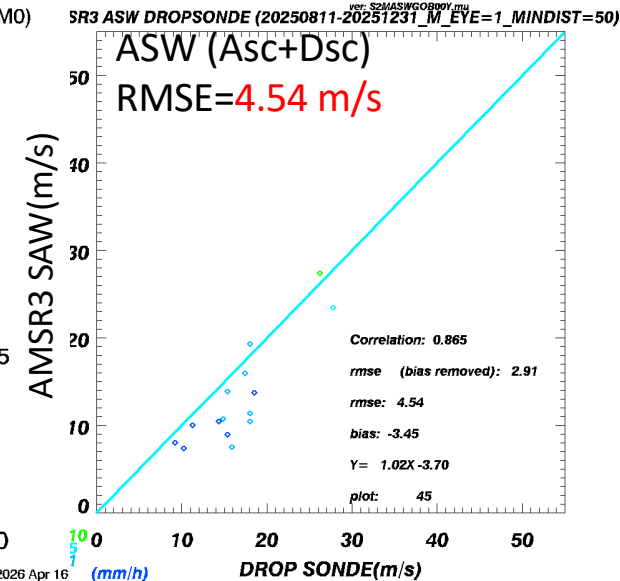
AMSR3 SST VS NOAA iQuam2 buoy



AMSR3 wind speed VS mooring buoy



AMSR3 all-weather wind speed VS NOAA dropsonde



AMSR3 Standard Products and Validation

Product		Area	Release Accuracy	Standard Accuracy	Current Evaluation Status
Brightness Temperature (L1B)		Global	± 1.5 K	± 0.3 K	Under evaluation
Resampled Brightness Temperature (L1R)		Global	± 1.5 K	± 1.0 K	Under evaluation
Integrated Water Vapor Content	Ocean	Global Ocean	3.5 kg/m ²	3.0 kg/m ²	< 3.30 kg/m ²
	Land (except vegetation & ice area)	Global Land	6.5 kg/m ²	3.5 kg/m ²	< 3.37 kg/m ²
Integrated Cloud Liquid Water Content		Global Ocean	0.10 kg/m ²	0.05 kg/m ²	0.0441 kg/m ²
Precipitation	Liquid	Global	50 % (ocean) 120 % (land)	50 % (ocean) 120 % (land)	45.5 % (ocean) 70.0 % (land)
	Solid		130 % (ocean) 200 % (land)	130 % (ocean) 200 % (land)	Under evaluation
Sea Surface Temperature	6 GHz	Global Ocean	0.8 ° C	0.5 ° C	0.65 ° C
	10 GHz			0.6 ° C	0.68 ° C
	Multi-band				0.7 ° C
Sea Surface Wind Speed		Global Ocean	1.5 m/s	1.0 m/s	1.45 m/s
All-weather Sea Surface Wind Speed		Global Ocean	7 m/s	5 m/s	4.54 m/s
Sea Ice Concentration		High-lat. Ocean	10 %	10 %	Under evaluation
High-resolution Sea Ice Concentration		High-lat. Ocean	15 %	15 %	Under evaluation
Snow Depth		Global Land	20 cm	10 cm	< 10cm
Soil Moisture Content		Global Land	10 %	5 %	< 5%



Concluding Remarks

- AMSR3 was successfully launched on June 29, 2025 (JST).
- It is currently in the initial Cal/Val phase. The v1.0 data will be released to general scientific users in **early July 2026**.
- Cross-calibration of AMSR3 with AMSR2 and GPM/GMI is being conducted. Early results showed that **AMSR3 TBs are closer to GMI TBs and lower than AMSR2 TBs**, that is consistent with previous reports. Further analysis extending data period is now underway.
- Tuning of AMSR3 standard algorithms and their validation are also underway. At present, early results showed that the **most products already satisfied required release accuracies**.
- **AMSR2 NRT data** distribution will be terminated at the **end of Aug. 2026**, while the delayed mode (2 – 12 hrs delay) processing and distribution of science data will be kept for the cross-calibration between AMSR3 and AMSR2.
- More information about AMSR3, including data format specification and sample data files, are available at the **AMSR website** (<https://www.eorc.jaxa.jp/AMSR>)