

Status of the Advanced Microwave Scanning Radiometer 3 (AMSR3) and its validation results

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The Advanced Microwave Scanning Radiometer 3 (AMSR3), which is a multi-frequency, total-power microwave radiometer system with dual polarization channels for all frequency bands from 6.9 to 89 GHz and V-polarization channels from 165.5 to 183.3 GHz with 2.0-m diameter antenna. AMSR3 is a successor and expansion mission of AMSR2 on board the Global Change Observation Mission - Water (GCOM-W) to continue observation of water-related parameters to contribute water cycle variation and climate change studies as well as operational applications. One of major improvements from AMSR2 is addition of new high-frequency channels (165.5, 183+-3, 183+-7 GHz) to enable snowfall retrievals that is not achieved by AMSR2. Also, additional 10.25 GHz channels, which have better temperature resolution compared to that of existing 10.65 GHz channels, contribute in producing robust sea surface temperature (SST) in higher spatial resolution of 30-km. While local observation time is the same as AMSR2 at 13:30 at Ascending orbit, satellite altitude is slightly lower (666 km) compared to AMSR2 and it resulted narrower observation swath.

AMSR3 is carried by the Global Observing SATellite for Greenhouse gases and Water cycle (GOSAT-GW), which was launched on June 29, 2025 (JST). It started scientific observation from August 11, 2025. During the initial calibration and validation operations phase starting from October 2025, JAXA has collaborated with partners to conduct calibration and validation activities to improve accuracy of AMSR3 products. In addition to on-board calibration, we are also conducting the satellite intercomparison of brightness temperature between AMSR3 and other microwave imagers, such as AMSR2 and GMI. Algorithm tuning of AMSR3 geophysical parameters, including precipitation, is underway toward public data release that is planned at the end of June 2026.

Precipitation algorithms of AMSR3 for both rainfall and snowfall are also used in the Global Satellite Mapping of Precipitation (GSMaP) products for microwave precipitation retrievals, and their improvements will be applied to the GSMaP microwave algorithm in its future updates scheduled in August 2026.