

Scientific Overview of the GCOM-W/AMSR2 Mission and Outlook for GOSAT-GW/AMSR3

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The Global Change Observation Mission-Water (GCOM-W) satellite was launched by the Japan Aerospace Exploration Agency (JAXA) in May 2012. It carries the Advanced Microwave Scanning Radiometer 2 (AMSR2), which is a 6-band multi-frequency, dual-polarization microwave radiometer with a 2-m aperture antenna. The JAXA's standard AMSR2 data product contains the vertically integrated water vapor, cloud liquid water, precipitation, sea surface temperature, sea surface wind speed, sea ice concentration, snow depths, and soil moisture. The GCOM-W/AMSR2 completed its 5-year designed mission life in May 2017 and has transferred to extended-mission phase. Besides the 10-month gaps between AMSR-E and AMSR2, the AMSR series provide long-term global observation data for studies of the global water cycle, air-sea interactions and polar environments. An overview of these studies is given in this paper.

JAXA planned a follow-on mission to GCOM-W/AMSR2, named AMSR3, which will be carried by the Global Observing SATellite for Greenhouse gases and Water cycle (GOSAT-GW). In December 2019, The GOSAT-GW/AMSR3 mission was officially approved and have moved into Phase-B. At present, it is expected to be launched in Japanese Fiscal Year of 2023 (from April 2023 to March 2024). AMSR3 succeeds all the frequency channels and polarization combinations of AMSR2. In addition, three high-frequency channels (166 GHz, 183 ± 3 GHz and 183 ± 7 GHz, V-pol) and 10-GHz channels (V- and H-pol) with improved Noise Equivalent Delta Temperature (NEDT) are added for observations of solid precipitation, humidity sounding, and high accuracy measurement of sea surface temperature. The targets of the AMSR3 mission are producing long-term continuous data record from AMSR, AMSR-E and AMSR2 and enhancing operational utilizations of near-real time data (e.g., weather forecast including typhoon and hurricane analysis, fishery near the coasts, navigational assistance on arctic shipping route).

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