

## Hydrological Quantities Estimated By GCOM-W1/AMSR2

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The Advanced Microwave Scanning Radiometer 2 (AMSR2) on board the first generation satellite of Global Change Observation Mission - Water (GCOM-W1 or "SHIZUKU") satellite is multi-frequency, total-power microwave radiometer system with dual polarization channels for all frequency bands (Imaoka et al., 2010). AMSR2 is a successor of JAXA's Advanced Microwave Scanning Radiometer for EOS (AMSR-E) on the NASA's Aqua satellite, which was launched in May 2002. Basic concept of AMSR2 is almost identical to that of AMSR-E. The GCOM-W1 satellite was launched from JAXA Tanegashima Space Center on May 18, 2012 (JST), and has started scientific observation since July 3, 2012. We are planning to integrate the water-related parameters derived from AMSR2 with those from AMSR-E to produce long-term continuous datasets for climate change studies.

AMSR2 standard products (and their required accuracies at the end of the mission) are brightness temperature ( $\pm 1.0\text{K}$  (systematic),  $\pm 0.3\text{K}$  (random)), integrated water vapor ( $\pm 2.0\text{kg/m}^2$ ), integrated cloud liquid water ( $\pm 0.02\text{kg/m}^2$ ), precipitation (ocean  $\pm 20\%$ , land  $\pm 80\%$ ), sea surface temperature ( $\pm 0.2\text{ }^\circ\text{C}$ ), sea surface wind speed ( $\pm 1.0\text{m/s}$ ), sea ice concentration ( $\pm 5\%$ ), snow depth ( $\pm 10\text{cm}$ ), and soil moisture ( $\pm 5\%$ ).

Please note that the release accuracies are defined as a root mean square error (RMSE) except for precipitation, snow depth, and soil moisture products. The goal accuracy of SST is also defined as a RMSE of zonal means. The accuracy of the precipitation product is defined as a relative error (RMSE/Mean in percent), and that of the snow depth and soil moisture content products is defined as an absolute mean error (AME). All the AMSR2 products achieved required release accuracies and have been released to public since May 2013 (Kachi et al., 2013). Currently, algorithm updates and reprocessing of both Level-1 (brightness temperature) and Level-2 (geophysical parameter) are scheduled in spring of 2015.

In addition to those standard products, research products are defined to extend possible utilization of AMSR2 data. Those are all-weather sea surface wind speed, high-resolution sea surface temperature, land temperature, vegetation water content, high-resolution sea ice concentration, sea ice thickness, sea ice moving vector, and soil moisture and vegetation water content based on the data assimilation methodology. Those products will be processed and distributed from the web site of JAXA Earth Observation Research Center ([http://suzaku.eorc.jaxa.jp/GCOM\\_W/](http://suzaku.eorc.jaxa.jp/GCOM_W/)) when they are ready to release.

For global water cycle and climate change studies, continuous and homogeneous datasets are required. To fulfill those requirements, we are planning to produce consistent dataset of water-related parameters between AMSR-E and AMSR2. The latest Level-2 algorithm for AMSR2 will be applied to AMSR-E Level-1 product, and AMSR-E Level-2 products in the same format to that of AMSR2 will be processed and released to the public.

The AMSR2 standard products have been distributed through the GCOM-W1 Data Providing Service (<https://gcom-w1.jaxa.jp/>). The GCOM-W1 Data Providing Service System has been in operation since August 2011 in order to distribute AMSR2 standard products along with AMSR and AMSR-E standard products. Registered users can also use sftp protocol to download data automatically, as well as interactive mode. For quick look of the products, browse images of all AMSR2 brightness temperatures and geophysical parameters are available at the JAXA Satellite Monitoring for Environmental Studies (JASMES) for Water Cycle (<http://kuroshio.eorc.jaxa.jp/JASMES/WC.html>).

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