GCOMによる包括的な気候観測
Toward Comprehensive Climate Observations - Global Change Observation Mission (GCOM)

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The Global Change Observation Mission (GCOM) is planned as the comprehensive observation system of the Earth System's essential variables of atmosphere, ocean, land, cryosphere, and ecosystem (Imaoka *et al.*, 2010). The mission is designed to find out the traces of human-induced environmental changes, such as deforestations, forest fires, air and water quality changes to distinguish the human-induced changes and the natural cyclic changes, as well as to contribute to the climate studies and operational applications.

GCOM consists of two medium sized satellites to provide comprehensive information of the Essential Climate Variables (ECV) of atmosphere, ocean, land, cryosphere, and ecosystem. The GCOM-W (Water) or "SHIZUKU" satellite that is carrying the Advanced Microwave Scanning Radiometer 2 (AMSR2), which was launched from JAXA Tanegashima Space Center on May 18, 2012 (JST); and GCOM-C (Climate) satellite that will be carrying the Second Generation Global Imager (SGLI), which is scheduled to be launched in Japanese Fiscal Year of 2016.

AMSR2 on board the GCOM-W satellite is multi-frequency, total-power microwave radiometer system with dual polarization channels for all frequency bands. 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, and completed its operation in December 2015. Basic concept of AMSR2 is almost identical to that of AMSR-E. Because of various experiences and heritages from AMSR-E, AMSR2 standard products, including brightness temperature and eight geophysical parameters that related to water cycle, have been introduced to many operational and science applications quickly. AMSR2 standard products are available from the GCOM-W1 Data Providing Service (https://gcom-w1.jaxa.jp/). In addition to those standard products, eight research products are defined to expand possible utilization of AMSR2 data in new fields. Those are all-weather sea surface wind speed (ASW), high-resolution sea surface temperature (10-GHz SST), 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. AMSR2 ASW research product is distributed to public through the GCOM-W web site (http://suzaku.eorc.jaxa.jp/GCOM_W/) and 10-GHz SST research product is included in AMSR2 standard SST product from product version 2 to provide complimentary information. Other products except data assimilation product are being integrated and evaluated at JAXA for future release. JAXA also planning to produce consistent dataset of water-related parameters between AMSR-E and AMSR2 for global water cycle and climate change studies in 2016.

SGLI on board the GCOM-C satellite is a versatile, general purpose optical and infrared radiometer system covering the wavelength region from near ultraviolet to infrared. Two major new features are added to SGLI, they are 250 m spatial resolution for 11 channels and polarization/multidirectional observation capabilities. The 250m spatial resolution will provide enhanced observation capability

over land and coastal areas where the influences of human activity are most obvious. The polarization and multidirectional observations will enable us to retrieve aerosol information over land. Precise observation of global aerosols is a key for improving climate-prediction models. Further information of the GCOM-C and SGLI can be found at the GCOM-C web site (http://suzaku.eorc.jaxa.jp/GCOM_C/).

[1] K. Imaoka, M. Kachi, H. Fujii, H. Murakami, M. Hori, A. Ono, T. Igarashi, K. Nakagawa, T. Oki, Y. Honda, and H. Shimoda, “Global Change Observation Mission (GCOM) for monitoring carbon, water cycles, and climate change,” Proc. of the IEEE, vol. 98, pp.717-734, 2010.

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