

GEWEX: Current Scientific Activities in Japan and a Vision for Future

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Global Energy and Water Exchanges (GEWEX) is one of core projects of the World Climate Research Programme (WCRP). Its mission is “to measure and predict global and regional energy and water variations, trends, and extremes, such as heat waves, floods, and droughts, through improved observations and modeling of land, atmosphere, and their interaction, thereby providing the scientific underpinnings of climate services” .

Scientific activities in Japan related to GEWEX span from 1) field observations; e.g. MAHASRI, AMY, YMC, NEPTUNE, to 2) model studies; e.g. GSWP3, LS3MIP, CORDEX, and 3) satellite observations; e.g. GPM, Himawari-8, GCOM-W, and EarthCARE.

Among them, the Monsoon Asian Hydro-Atmosphere Scientific Research and prediction Initiative (MAHASRI) completed its 10 years’ mission in March 2016 with a fruitful outcome. Post-MAHASRI is now in a planning phase. An intensive field campaign with R/V Mirai for the Year of Maritime Continent (YMC) has been just completed in January 2018. Asian Monsoon Year (AMY) experiment and North eastern Eurasia PMM Terrestrial UNited validation Experiment (NEPTUNE) are also ongoing activities.

The Global Soil Wetness Project Phase 3 (GSWP3), the Land Surface, soil moisture and snow model intercomparison project (LS3MIP) as a part of the CMIP6 experiment suite, and Coordinated Regional Climate Downscaling Experiment (CORDEX) Asia Empirical-Statistical downscaling group are led by Japanese activities.

On the other hand, satellite missions as the Global Precipitation Measurements (GPM), a high-end Geosynchronous Meteorological Satellite Himawari-8, and GCOM-W all started in a past few years, and we expect the EarthCARE satellite to be launched in a few years. These observations from space drastically increase the available data globally to improve our understanding of the global water and energy cycle.

Above three components are all indispensable for improving our understandings of the global water and energy cycles. Now we have to confront the increasing vulnerability of human society with the climate change, especially in the Asia-Pacific region. It is time to put an additional effort to accelerate the integration of these three components to further the GEWEX activity in Japan. These activities are linked to SDGs 13 and 11.

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