



Global Precipitation Mission (GPM) and Dual-Wavelength Radar (DPR)

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Global precipitation measurement is essential not only for the research of the global change but also for the water resources management. Currently, satellite precipitation measurement is not sufficient for the detailed study of the precipitation and is far from enough for the water resources management which requires very high spatial and temporal resolution. To fill the gap at least partly, the Global Precipitation Measuring (GPM) was proposed jointly by US and Japan. The basic concept of the GPM is to provide three hourly global precipitation map using eight constellation satellites equipped with microwave radiometers and a core satellite equipped with a dual-wavelength radar (DPR) and a microwave radiometer. The DPR is now being developed in Japan, and radiowaves of 13 and 35 GHz will be applied. The DPR will observe 3D precipitation structure and will provide essential data for microwave rain retrieval. GPM is partly a follow-on mission of the Tropical Precipitation Mission (TRMM), but the GPM will extend the observation to cold regions where solid precipitation frequently exists.

The role of Japan for the space segment of GPM is development of DPR which is an essential sensor for GPM. As TRMM results show that the precipitation radar provides not only independent rain estimates but also three dimensional structure of rain systems. The three dimensional structure of precipitation system helps much for understanding the accuracy of rain retrieval algorithms for microwave radiometers. The core satellite which will be equipped with DPR and a microwave radiometer will give us a great opportunity to simultaneously observe precipitation systems with better accuracy. The non-sun synchronous orbit is required for crossing the orbits of constellation satellites as well as for resolving diurnal cycle of the precipitation.

Expectation to GPM is based on TRMM. The TRMM satellite was launched in November 1997. After that TRMM is providing invaluable data of not only the tropical and subtropical rainfall distribution but also global precipitation climatology which includes the three dimensional structures and diurnal variations.

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