

Expectations for the Global Precipitation Measurements for Precipitation Sciences

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Three dimensional precipitation data observed with Ku (13.8GHz) band Precipitation Radar (PR) on board the Tropical Rainfall Measurement Mission (TRMM) satellite have enabled us to discover various precipitation characteristics over the tropics and subtropics between 36N and 36S. Precipitation system regimes are estimated with precipitation characteristics. The multiple instrument observations of TRMM have also made us quantify the discrepancies between TRMM Microwave Imager (TMI) vs. PR estimated rainfall, and provided us with opportunities to investigate various approaches to improve the rainfall retrieval algorithms.

With the launch of the GPM/DPR, scheduled in February 2014, dual band measurements from space with Ku (13.6GHz) and Ka (35.5GHz) band frequencies will be started. Increasing information of the drop size distributions with DPR should improve the accuracy of precipitation profile structures, which are essential to study precipitation characteristics. GPM/DPR will provide excellent cross calibrations for constellation microwave observations to construct better mapping of precipitation from 65N to 65S, which covers 91% of the earth surface. Weak rainfall measurements will enable us better energy budget calculations after all, as well as more precise examinations of rainfall system lifecycles. We can also expect reexamination and further improvements of TRMM PR rainfall products by comparing Ku-band retrievals with DPR retrievals.

Three dimensional satellite measurement of precipitation at mid-to-high latitudes is a completely new scientific experiment. Since the precipitation systems there are very different from those in the tropics and subtropics, we can certainly expect further scientific discoveries to improve our knowledge of precipitation characteristics with thorough observations from the satellite. Using this outcomes, we also expect to provide useful knowledge to improve the numerical models for weather predictions and climate projections.

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