



Global Precipitation Measurement (GPM) Mission after Three Years

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The Global Precipitation Measurement (GPM) mission is a partnership between NASA and the Japan Aerospace Exploration Agency (JAXA) to advance scientific understanding and practical application of satellite-based global precipitation estimates. The GPM Core Observatory spacecraft, launched February 27, 2014, provides high-quality passive microwave (PMW) and radar observations. These data are subjects of study and application in their own right, and they are also used to unify and advance precipitation measurements from a constellation of research and operational satellite PMW sensors to provide “next-generation” precipitation products. Both uses are facilitated by the the GPM Core Observatory’s 65° non-Sun-synchronous orbit at an altitude of 407 km, which precesses across all times of day and covers the tropics and mid-latitudes, where a majority of the Earth’s population lives.

GPM provides products ranging from raw instrument data to Core and partner swath precipitation estimates, to gridded and accumulated products, and finally to multi-satellite merged products. The U.S. GPM Science Team is developing such a merged product, the Integrated Multi-satellitE Retrievals for GPM (IMERG), which is available with a 5-hour latency with temporal resolution of 30 minutes and spatial resolution of 0.1° x 0.1° (~10km x 10km). Some products have a 1-hour latency for societal applications, such as floods, landslides, hurricanes, blizzards, and typhoons, and all of these products have long-latency high-quality science products.

After three years in orbit, GPM has fulfilled its initial mission requirements, which are to measure rain rates from 0.2 to 110 mm/hr and to detect and estimate falling snow. The GPM mission is well on its way to providing essential data on precipitation (rain and snow) from micro to local to global scales, providing precipitation particle size distributions in the clouds, 5-15 km estimates of regional precipitation, and merged global precipitation. Once Tropical Rainfall Measuring Mission (TRMM) data are recalibrated to the high quality standards of GPM (and as GPM continues to operate), TRMM, GPM, and partner data will be retrospectively processed with the same algorithms to provide a record of global precipitation from 1998 to the present. The first such retrospective processing is slated to take place by Winter 2017-2018.