

Scan strategy concepts of Tier-1 radars of GPM ground validation

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The NASA/JAXA Global Precipitation Measurement (GPM) mission has launched its core satellite on the end of February 2014. Along the mission, International science collaboration in the GPM Ground Validation (GV) program is expected to play a vital role in refining remote sensing algorithms and in assessing both the quality and utility of satellite precipitation products in different climate and geographic regimes. The GPM GV program aims at using in an optimal way a set of ground-based instrumentation, such as research and operational weather radars and raingauge networks. The “Tier-1” identifies research radars that are operated by research institutions that have a full control of the system to define measurement strategy that can be optimized for direct validation in correspondence of GPM core satellite overpasses. Typically, these radars belong to different organizations and have been developed with different approaches and for different objectives. Some of them features unique and distinctive technical characteristics. To ensure consistency of comparisons with the single reference of the instruments of GPM core satellite, guidelines have been set both to ensure calibration and to use scanning strategies in correspondence of core satellite overpasses to allow intercomparison of data. In fact, these radars have to provide on a regular basis a reference for GPM core satellite overpasses and radar data they provide should be comparable each other and provide a consistent reference across the globe for satellite estimates. Weather radars typically use a narrow beam and achieve a description of precipitation volume by scanning it. From the point of view of scanning, radars differ for mechanical characteristics and/or mechanical limitations. This paper illustrates criteria used to define a set of scanning modes and protocols that can be followed so that all the radar observations of the diverse Tier-1 radars contributing to the global GPM GV effort, can meet a common acceptable standard to be comparable.