Inter-comparison of precipitation retrievals from the Global Precipitation Measurement mission constellation.

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The Global Precipitation Measurement mission (GPM) is an international satellite mission that brings together a number of different component satellites and sensors, each contributing observations capable of providing information on precipitation. The joint US-Japan core observatory, launched on 27 February 2014, carries the GPM Microwave Imager (GMI) and the Dual-frequency Precipitation Radar (DPR). The core observatory serves as a standard against which other sensors in the constellation are calibrated, providing a consistent observational dataset to ensure the highest quality precipitation retrievals to be made. Precipitation retrievals from the constellation of partner satellites are generated through the common framework of the Goddard-PROFiling (GPROF) scheme, and is applied to both the conically-scanning sensors and the cross-track sensors; the provision of precipitation estimates from all the constellation sensors contributing to the better-than 3-hour average temporal sampling.

This study focuses upon the inter-comparison of the products from the different sensors during the first year of GPM operations; March 2014-February 2015. The two regions chosen for the inter-comparison, are the United States and Western Europe, and utilize the extensive radar networks of these regions. Statistical results were generated for instantaneous precipitation retrievals for each of the constellation sensors. Results show that overall the retrievals from the cross-track observations produce higher correlations with the surface radar data sets than the retrievals from the conically-scanning observations, although they tend to have higher root-mean squared errors. Some variation in performance between the individual types of sensors is also noted, which may be attributed to assumptions within the retrieval scheme (e.g. resolution, background fields, etc); other differences require further investigation.