Title: Evaluating the Intrinsic Uncertainty of Satellite Precipitation Estimates at their Native Resolution

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The amount of precipitation that falls on the Earth's surface over a given time interval and area is key for hydrological and weather science and applications. The critical importance of accurate water flux estimates explains the large body of verification analyses focusing on precipitation rate estimates in terms of occurrence, average and extremes. An abundance of validation has been carried out directly on Level-3 products using gauges and sometimes ground radar data from various over-land locations. Very few are implemented at the relevant scales to address the intrinsic uncertainty of precipitation products. Without relevant information on key uncertainty features only available at the intrinsic scale, applications making use of satellite Level-3 precipitation products are impacted both in terms of outcomes and physical realism. Gaps in error characterization still hinder the improvement of satellite precipitation estimates. For example, the homogeneity of satellite precipitation is often overlooked in the evaluations while it remains an endemic challenge in the generation of such products and their applications. In this presentation, the intrinsic uncertainty of the GPM IMERG precipitation product at 30-min and 0.01° is investigated using the Ground Validation Multi-Radar/Multi-Sensor. Aspects include the impact of precipitation characteristics on the intrinsic uncertainty, non-traditional regions, the impact of the GPM constellation sampling properties on retrieving precipitation variability, and integrated hydrologic validation.