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Atmospheric Sciences: AS1.36: Precipitation: Measurement, Climatology, Remote Sensing, and Modeling

### IMERG Multi-Satellite Products Across Two Decades

George J. Huffman<sup>1</sup>, David T. Bolvin<sup>1,2</sup>, Dan Braithwaite<sup>3</sup>, Kuolin Hsu<sup>3</sup>, Robert Joyce<sup>4,5</sup>, Christopher Kidd<sup>1,6</sup>, Eric Nelkin<sup>1,2</sup>, Soroosh Sorooshian<sup>3</sup>, Jackson Tan<sup>1,7</sup>, Pingping Xie<sup>5</sup>

<sup>1</sup>NASA/GSFC, Greenbelt, MD, USA

<sup>2</sup>Science Systems and Applications, Inc., Lanham, MD, USA

<sup>3</sup>Univ. of California Irvine, Irvine, CA, USA

<sup>4</sup>Innovim, Greenbelt, MD, USA

<sup>5</sup>NOAA/NWS Climate Prediction Center, College Park, MD, USA

<sup>6</sup>Univ. of Maryland / ESSIC, College Park, MD, USA

<sup>7</sup>Universities Space Research Assoc., Columbia, MD, USA

The Version 06 Global Precipitation Measurement (GPM) mission products were completed over the last year, capping five years of development since the launch of the GPM Core Observatory, and covering the joint Tropical Rainfall Measuring Mission (TRMM) and GPM eras with consistently processed algorithms. The U.S. GPM team's Integrated Multi-satellite Retrievals for GPM (IMERG) merged precipitation product enforces a consistent intercalibration for all precipitation products computed from individual satellites with the TRMM and GPM Core Observatory sensors as the TRMM- and GPM-era calibrators, respectively, and incorporates monthly surface gauge data in the Final (research) product. Mid-latitude calibrations during the TRMM era necessarily are more approximate because TRMM only covered the latitude band 35°N-S, while GPM covers 65°N-S. Starting in V06, IMERG employs precipitation motion vectors (used to drive the quasi-Lagrangian interpolation, or "morphing") that are computed by tracking the vertically integrated vapor as analyzed in MERRA2 and GEOS FP. This approach covers the entire globe, expanding coverage beyond the 60°N-S latitude band provided by IR-based vectors in previous versions, although we choose to mask out microwave-based precipitation over snowy/icy surfaces as unreliable.

We will provide examples of performance for the V06 IMERG products, including comparison with the long-term record of GPCP and TMPA, showing higher values by about 8% in the latitude band 50°N-S over oceans; diurnal cycle, demonstrating improvement over previous versions; and daily precipitation PDFs for the entire record, showing a shift at the TRMM/GPM boundary, as well as interannual variations. These analyses have important implications for the utility of V06 IMERG data for long-record calculations. Finally, we will review the retirement of the predecessor TMPA multi-satellite dataset.