

On the Verge of IMERG Version 07

George Huffman¹, David Bolvin², Eric Nelkin², and Jackson Tan³

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²Science Systems and Applications, Inc.

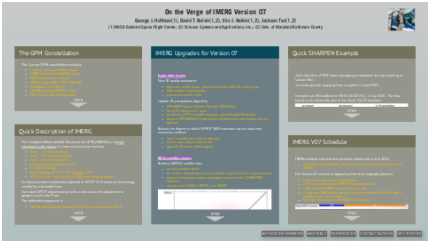
³Universities Space Research Association

November 24, 2022

Abstract

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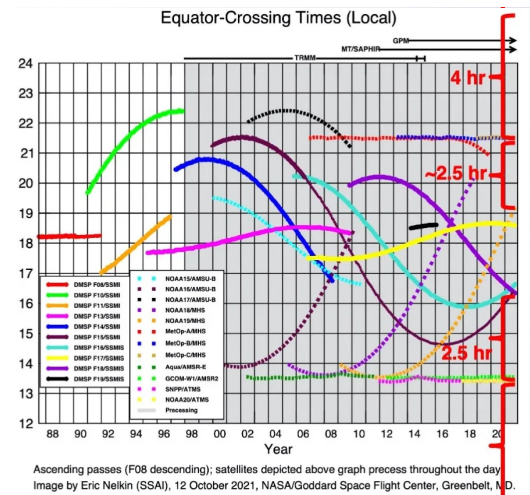
THE GPM CONSTELLATION

The Current GPM constellation includes

- 5 passive microwave (PMW) imagers
- 6 PMW sounders (but SAPHIR ending)
- PMW input as precip estimates
- GPROF (most PMW) + PREPS (SAPHIR)
- PERSIANN-CCS (GEO IR)
- CORRA (combined PMW-Ku radar)
- GPCP SG (monthly satellite-gauge)

Presently the interval between observations is < 3 hr >90% of the time, globally

- there are still significant gaps in coverage by the polar-orbit satellites
- the precessing satellites only occasionally fill these gaps
- the constellation is evolving
- the next challenge is coping with short-lived smallsats



QUICK DESCRIPTION OF IMERG

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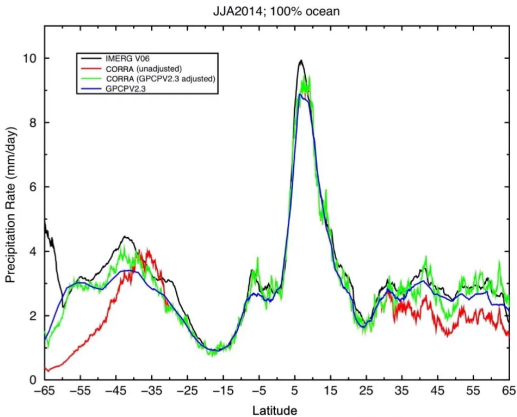
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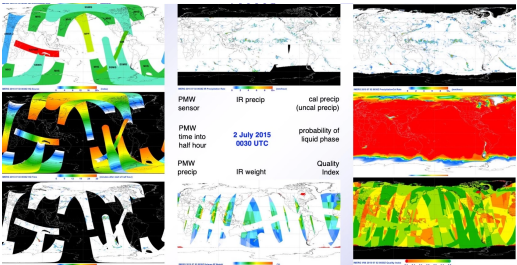
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D. Bolvin (SSAI, GSFC)

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- likely requires on-going tuning
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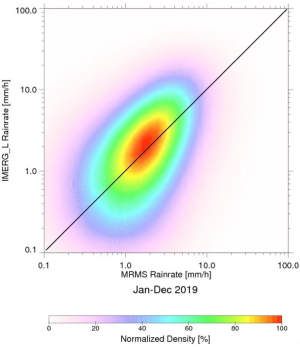
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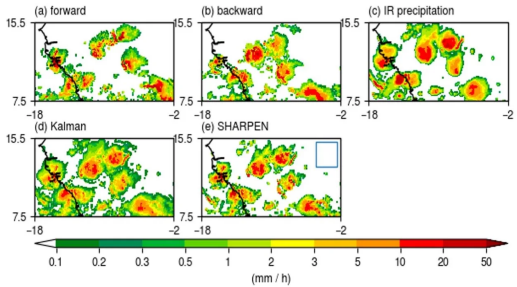
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Use local quantile mapping from morphed to input PDFs

Example over West Africa for 00:00-00:30 UTC, 1 July 2018. The blue square in (e) shows the size of the "local" 25x25 template.



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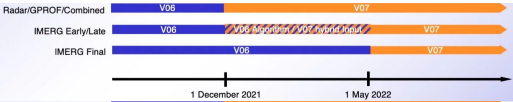
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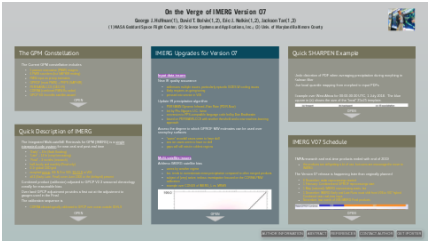
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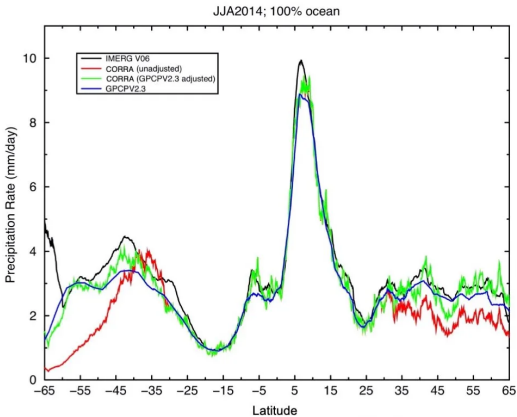
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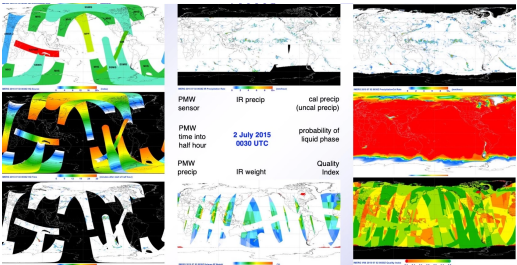
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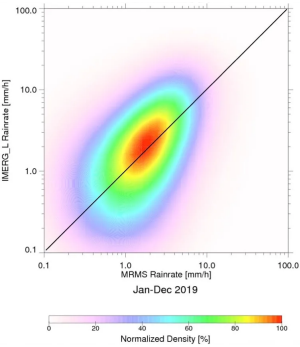
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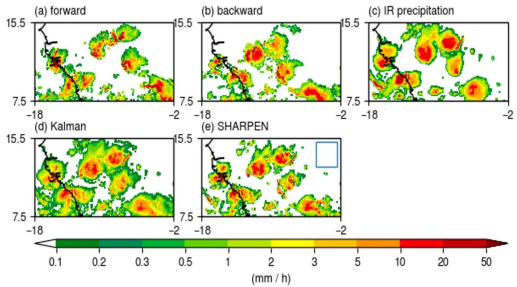
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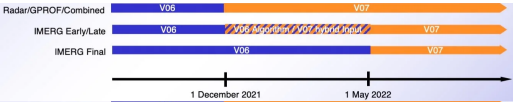
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After a B.S. in Physics at The Ohio State University (1976) and a Ph.D. in Meteorology at Massachusetts Institute of Technology (1982), Dr. Huffman was an Assistant Professor at University of Maryland, College Park, then moved to NASA Goddard Space Flight Center (GSFC) in 1988, where he consulted until entering government service in 2012, now as a Research Physical Scientist. Dr. Huffman focuses on combined (satellite-gauge) estimates of global precipitation. The resulting data sets include the Global Precipitation Climatology Project (GPCP) monthly and daily products (a contribution to the World Climate Research Program, WCRP); the NASA Tropical Rainfall Measuring Mission (TRMM) Multi-satellite Precipitation Analysis; and the NASA Global Precipitation Measurements (GPM) mission's Integrated Multi-satellite Retrievals for GPM. Allied work includes estimating errors and extreme precipitation event statistics. Dr. Huffman is the Deputy Project Scientist for GPM, and the GPM Multi-satellite Algorithm Team lead. He has 145 publications, 15 as first author, and numerous presentations. As well, he is the Chief for the Mesoscale Atmospheric Processes Lab at GSFC. Recent awards include NASA/GSFC Robert H. Goddard Group Honor Award for Science, 2019; Fellow of the American Meteorological Society, 2019; and NASA Exceptional Service Medal, 2018.

ABSTRACT

Development is well-advanced for the next version of the Integrated Multi-satellitE Retrievals for the Global Precipitation Measurement (GPM) mission (IMERG), labeled Version 07. IMERG is a key output of the U.S. GPM Science Team, and V07 will be the second generation in which data from both the Tropical Rainfall Measuring Mission (TRMM) and GPM projects are combined into a single, uniformly processed record, currently starting in June 2000. This presentation will show several examples of successes and challenges in V06, and use these to illuminate the upgrades that have been pursued for V07. For example, the V06 IMERG near-real-time products (Early and Late Runs) show regional biases because they do not have climatological calibration (despite the documentation), and this will be done in V07. As well, the time series of precipitation-rate histograms shows a seam in the transition from TRMM calibration to GPM Core Observatory calibration at the start of June 2014. V07 will benefit from better continuity in the input calibration datasets across that boundary. A third issue is that the Kalman filter used in IMERG a) introduces a variable amount of smoothing, and b) depends on relatively simple measures of input data quality. Both of these are revisited in V07.

We will report the status of IMERG Version 07 processing as of the conference time, and introduce some topics that are being considered for the future, including improved uncertainty estimates, addition of sub-monthly gauge information, and strategies for incorporating precipitation estimates from multiple, relatively short-lived small satellites.

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