TMPA-IMERG Comparison

George J. Huffman

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algorithm	TRMM Multi-satellite Precipitation Analysis	Integrated Multi-satellitE Retrievals for GPM
basic acronym	TMPA	IMERG
data sets	• 3B42/3B43 production multisatellite-gauge combination • 3B40RT/3B41RT/3B42RT real-time merged microwave, microwave-calibrated IR, multisatellite	• 3IMERGHH/3IMERGM Final Run multisatellite-gauge combination • 3IMERGL Late Run near-real-time • 3IMERGE Early Run near-real-time
spatial grid; coverage	0.25°x0.25° lat/lon; 50°N-S	0.1°x0.1° lat/lon; 60°N-S
current version	7 (7a for parts, but this is a technicality)	3 (4 in development)
time interval; span	• 3 hr centered at 00, 03, …, 21 UTC; 1 Jan 1998-present (production), 15 Feb 2000-present (real-time) • monthly; Jan 1998-present (production) • other value-added products in data centers	• 30 min; 1 Apr 2014-29 Feb 2016 (Final); 10 Mar 2015-present (Late); 1 Apr 2015-present (Early) • monthly; Apr 2014-Feb 2016 (Final) • other value-added products in data centers
latency	• 3B42/3B43 2.5 mo after the month • 3B40RT/3B41RT/3B42RT 8 hr after obs. time	• Final 2.5 mo after the month • Late 15 hr after obs. time • Early 5 hr after obs. time
native format	• HDF4 (production) • binary (RT) • other value-added products in data centers	• HDF5 • other value-added products in data centers
algorithm summary	• calibrate microwave precip rates to TRMM Combined Instrument • merge microwave (HQ), giving preference to conical-scanners • compute VAR microwave-calibrated IR precip rates • fill holes in HQ merged microwave with IR estimates • include gauge data by - computing monthly satellite-gauge and then scaling 3 hr data to sum to the monthly in each grid box (production) - scaling 3 hr to 3B42 with climatological coefficients (RT)	• calibrate microwave precip rates to GPM Combined Instrument • merge microwave (HQ), giving preference to conical-scanners • compute PERSIANN-CCS microwave-calibrated IR precip rates • use CMORPH-style IR motion vectors to forward/backward propagate microwave maps, then use a Kalman filter to combine these and the IR estimates into a weighted estimate (Early is forward-only) • include gauge data by - computing monthly satellite-gauge and then scaling 30 min data to sum to the monthly in each grid box (Final) - scaling 30 min to Final with climatological coefficients (Late and Early)
Input microwave algorithms	• GPROF versions 2010v2 and 2004v for various conical scanners • NOAA MSPPS for cross-track scanners	• GPROF2014v2
plan	• continue running until IMERG is reprocessing back to 1998 (est. Q1 2018)	• release V04 back to April 2014 (est. Q3 2016) • release V05 back to April 2014 (est. Q2 2017) • extend V05 back to 1998 (est. Q1 2018); this is the TRMM V8 last processing

Data Fields in TMPA (top left), TMPA-RT (top right), and IMERG (bottom)

	3-hourly data file (3B42)
1	*Multi-satellite precipitation*
2	*Multi-satellite precipitation error*
3	Sat. obs. time
4	PMW precipitation
5	IR precipitation
6	Satellite source identifier
	Monthly data file (3B43)
1	*Satellite-Gauge precipitation*
2	*Satellite-Gauge precipitation error*
3	Gauge relative weighting

	Merged microwave data file (3B40RT)
1	*Merged PMW precipitation*
2	*Merged PMW precipitation error*
3	# pixels
4	# ambig. pixels
5	# rain pixels
6	PMW source identifier
	IR data file (3B41RT)
1	*PMW-cal. IR precipitation*
2	*PMW-cal. IR precipitation error*
3	# pixels
	Multi-satellite data file (3B42RT)
1	*Calibrated precipitation*
2	*Calibrated precipitation error*
3	Satellite source identifier
4	Uncalibrated precipitation

	Half-hourly data file (IMERG Early, Late, Final)
1	*Calibrated multi-satellite precipitation*
2	*Uncalibrated multi-satellite precipitation*
3	*Calibrated multi-satellite precipitation error*
4	PMW precipitation
5	PMW source identifier
6	PMW source time
7	IR precipitation
8	IR KF weight
9	*Probability of liquid-phase precipitation*

	Monthly data file (IMERG Final)
1	*Satellite-Gauge precipitation*
2	*Satellite-Gauge precipitation error*
3	Gauge relative weighting
4	*Probability of liquid-phase precipitation*