

~14 years of data

NASA Project Scientist:

Dr. Scott Braun

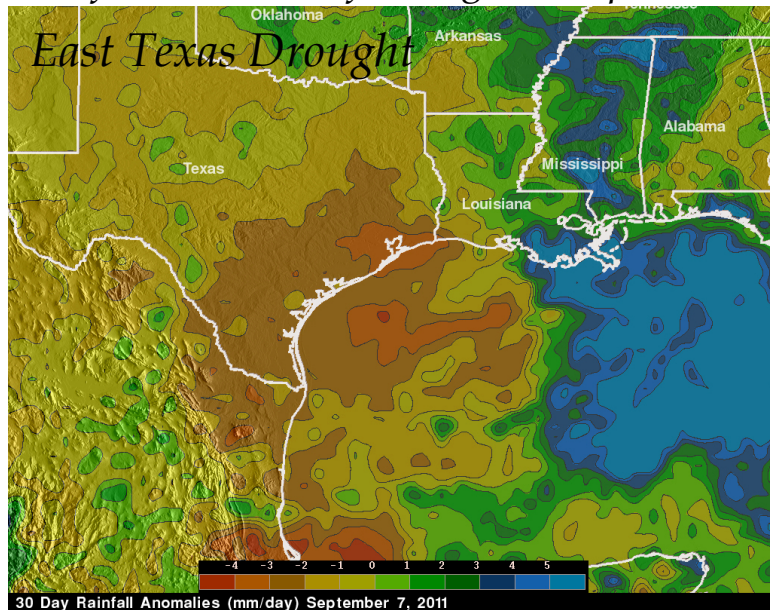
NASA Program Scientist:

Dr. Ramesh Kakar

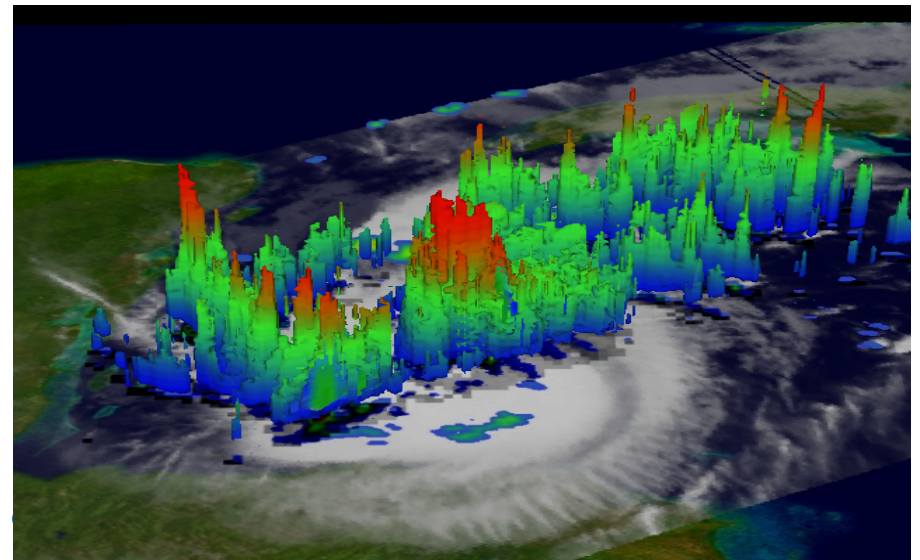
TRMM Achievements

- *Space standard for measuring precipitation*
- *Improved climatologies*
- *Multi-satellite (~3-hr) rainfall analyses*
- *Hurricane/typhoons*
- *Vertical hydrometeor/heating structure*
- *Diurnal signal*
- *Flood/drought and agricultural applications*

Rainfall Anomalies for Aug 7 to Sept 7, 2011



Hurricane Rina (October 26, 2011)

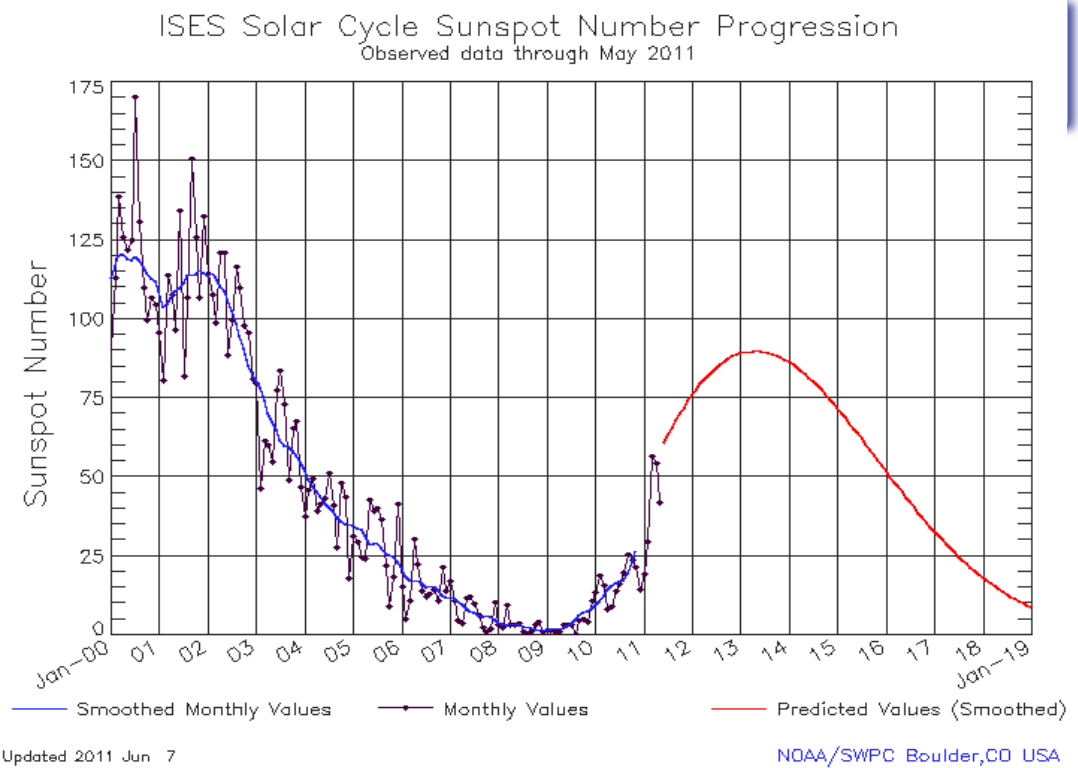
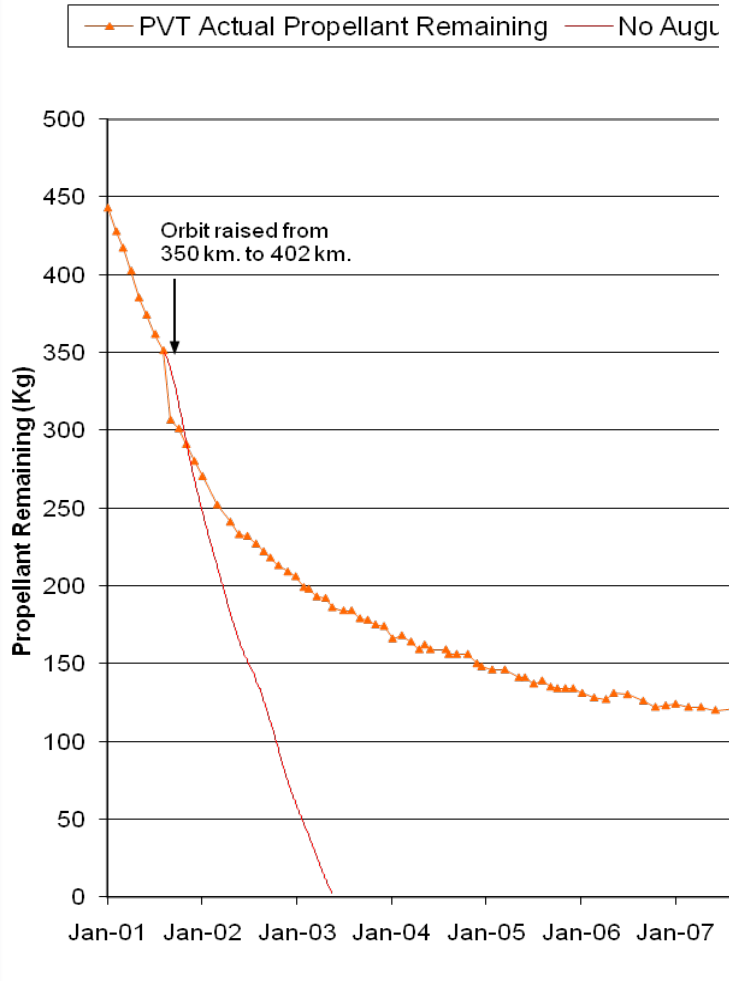


Spacecraft and instrument status:

- *All spacecraft systems in excellent shape for continuation*
- *Precipitation Radar (PR) experienced anomaly in 2009, but since then has worked fine*
- *TRMM Microwave Imager (TMI)—has equaled/ surpassed the SSM/I heritage of 10+ yr median lifetime;*
- *Visible and IR Scanner (VIRS)—very minor response degradation;*
- *Lightning Imaging Sensor (LIS)—no moving parts, no component limiting life*

TRMM

Tropical Rainfall Measuring Mission



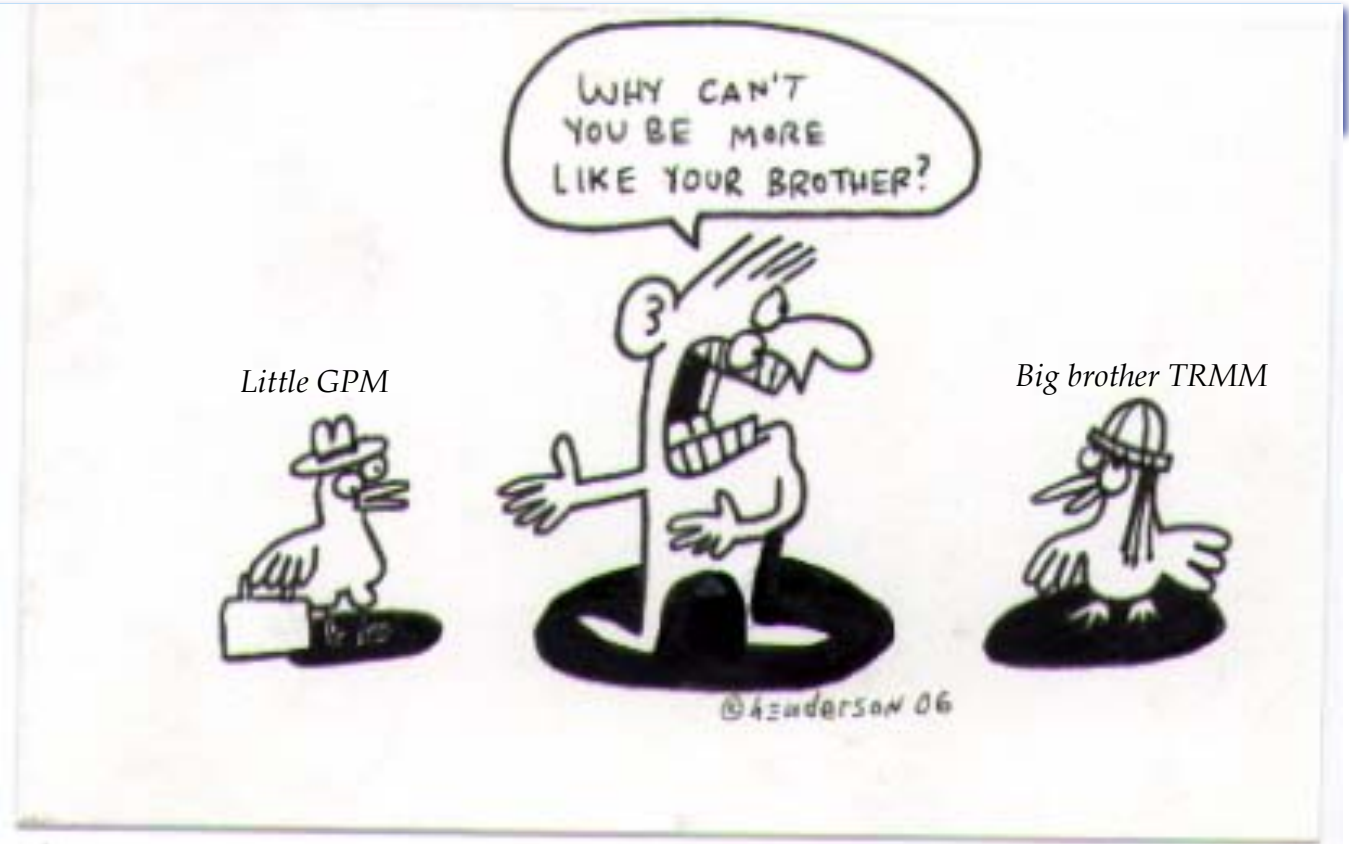
March 2011

Aug 2013 Feb 2015

High ratings for

Mission	Merit
Aqua	5.0
Aura	5.0
CALIPSO	4.1
CloudSat	5.0
EO-1	4.0
GRACE	5.0
Jason-1	5.0
OSTM	5.0
QuikSCAT	5.0
SORCE	5.0
Terra	5.0
TRMM	5.0

*Additional commentary or conditions



- *Weaknesses: Single satellite only, only samples the tropics, trouble with light rain*
- *Approved for baseline operations for 2012-13*
- *TRMM E/PO plan submitted Oct. 31*

V7 Reprocessing Completed

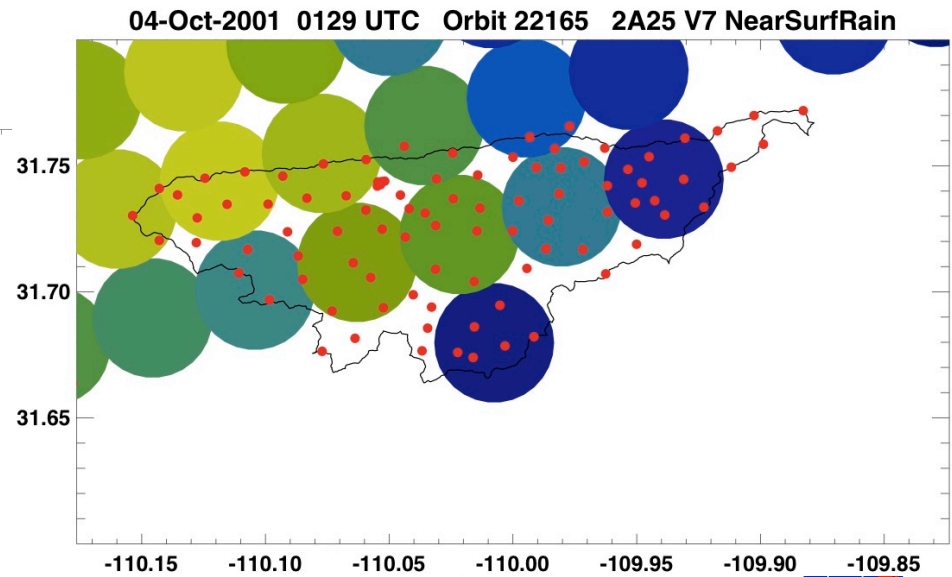
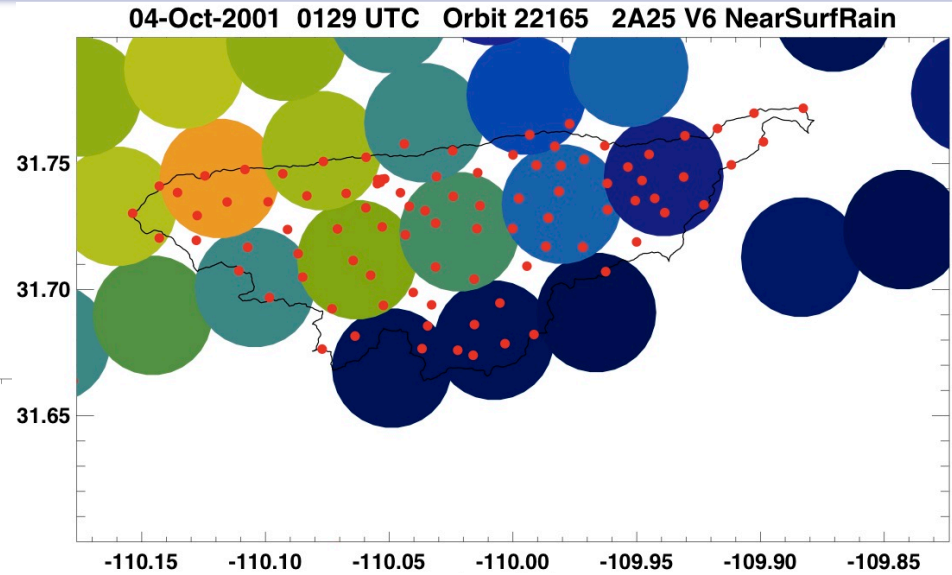
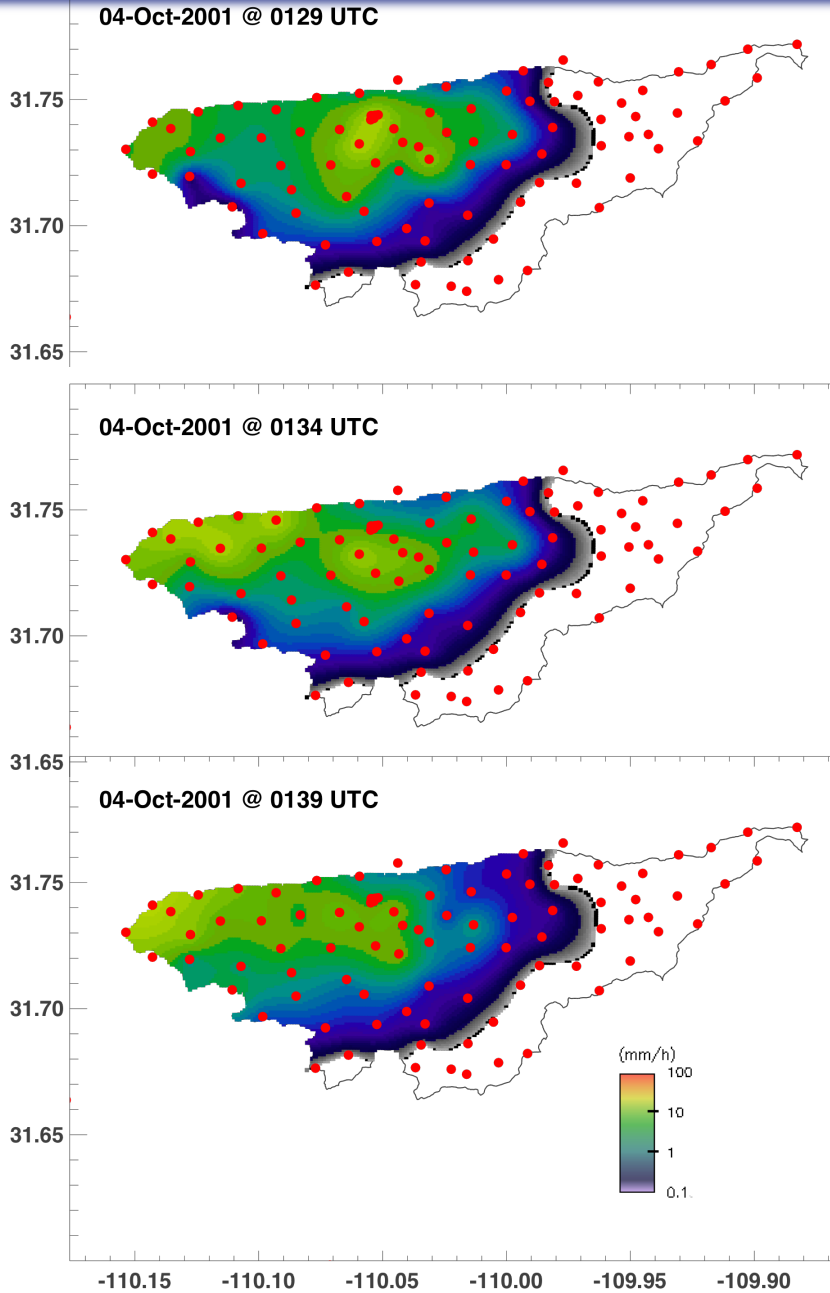
- Reprocessing of 13+ years of TRMM data completed ~AUG 17
 - Does not include latent heating and multi-satellite products

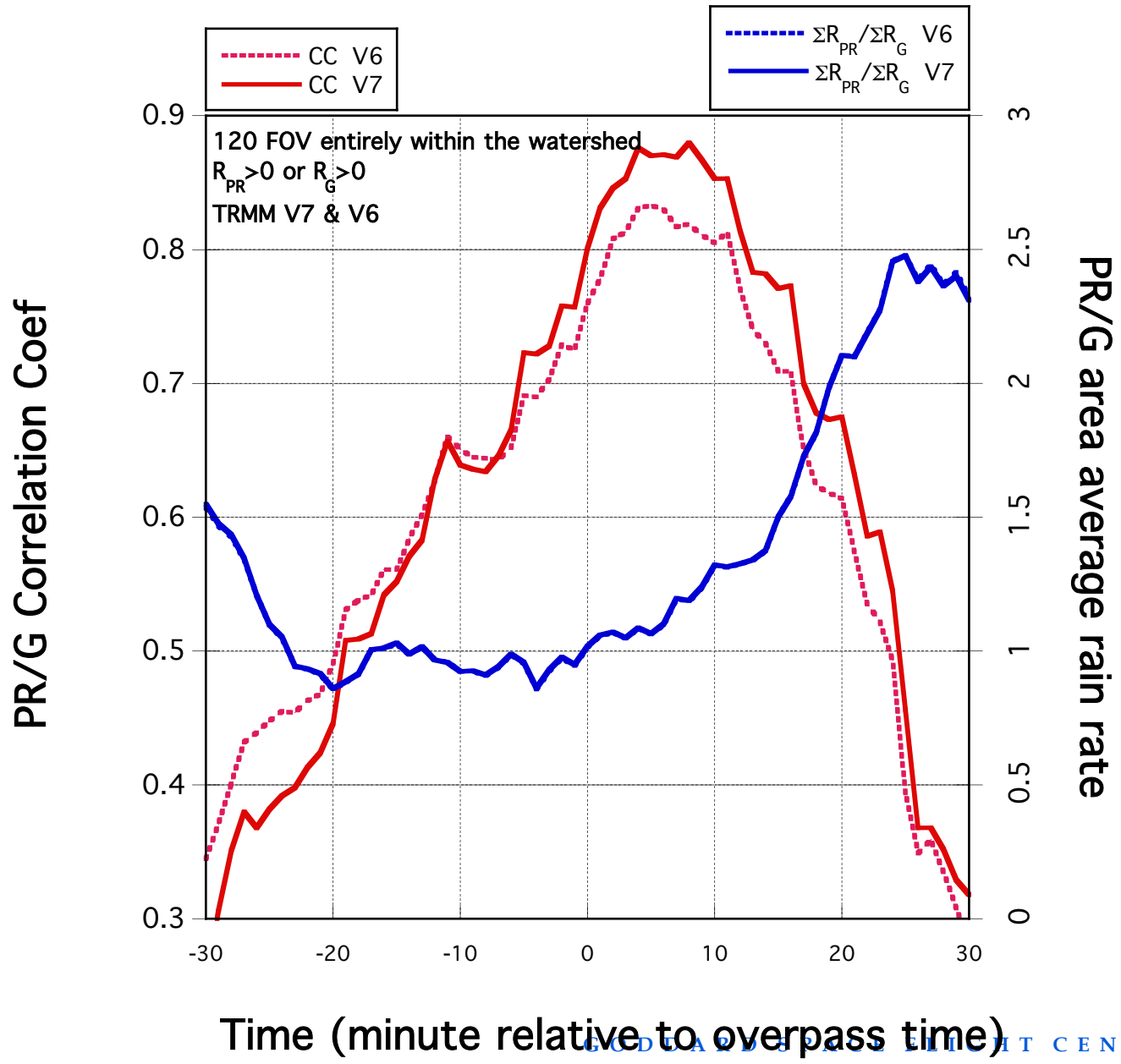
V7 Real-time Processing

- V7 near real-time data became available in early OCT.
- V7 to become the official version on DEC 1
- V6 will continue for 6 months beyond DEC 1

Latent Heating and Multi-Satellite Products

- CSH code delivered to PPS in OCT, PPS currently testing
- SLH code to be delivered to PPS by NOV
- Multi-satellite code to be delivered by end of year
 - Products to be released on 2-month delay instead of current 2-week delay
 - AMSR-E no longer available, now using NOAA MHS instead
 - SSMIS satellites likely to be included in new version

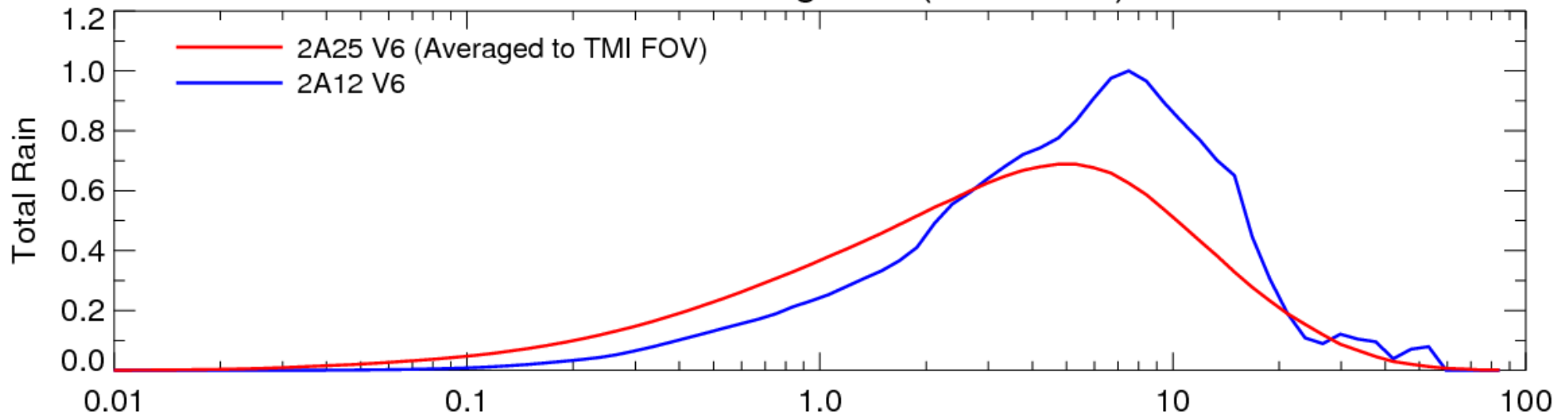




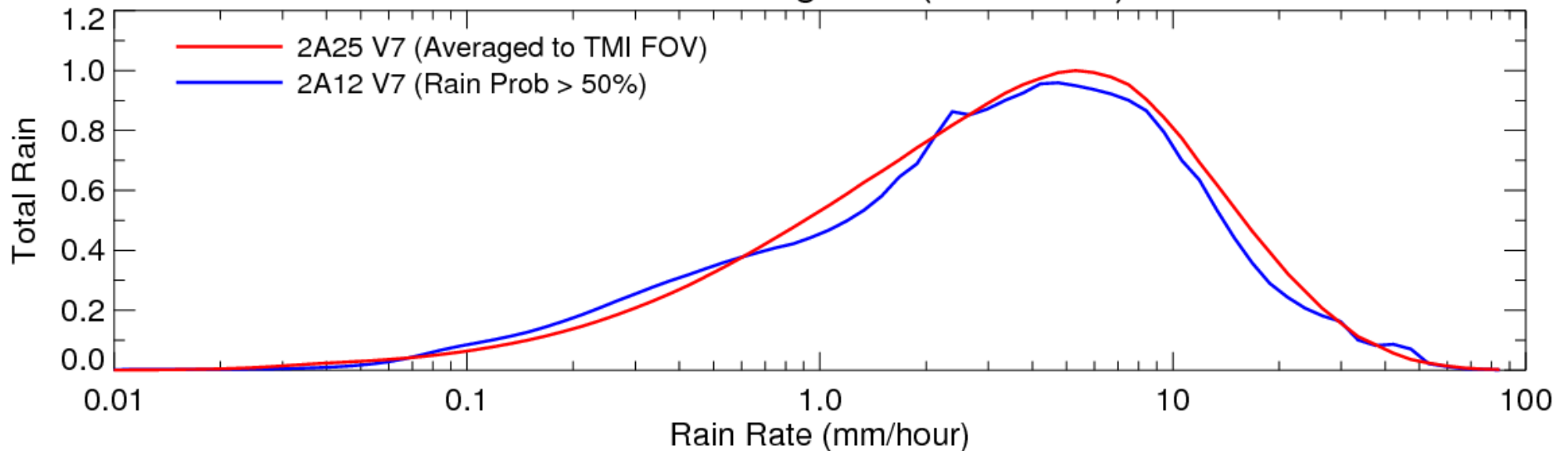
TRMM Comparison of TMI vs. PR Rain Rate PDFs

From Wes Berg, CSU

Rain Rate Histograms (TRMM V6)



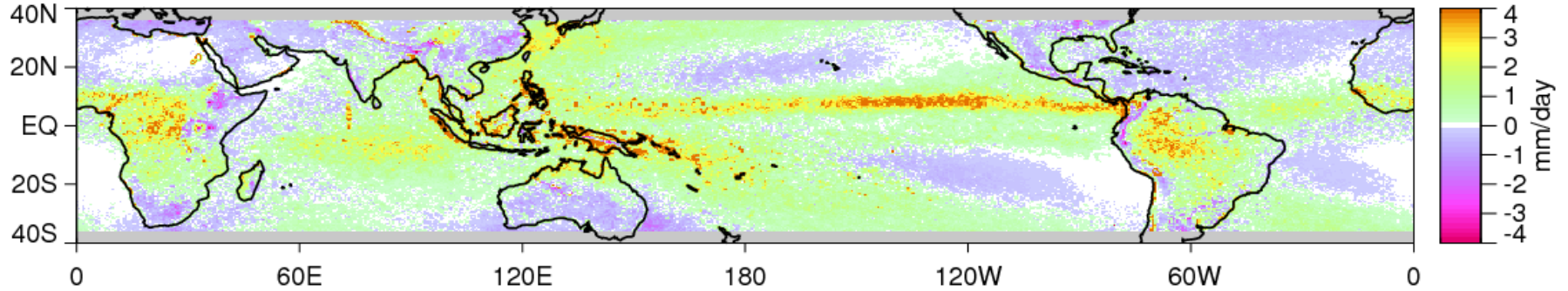
Rain Rate Histograms (TRMM V7)



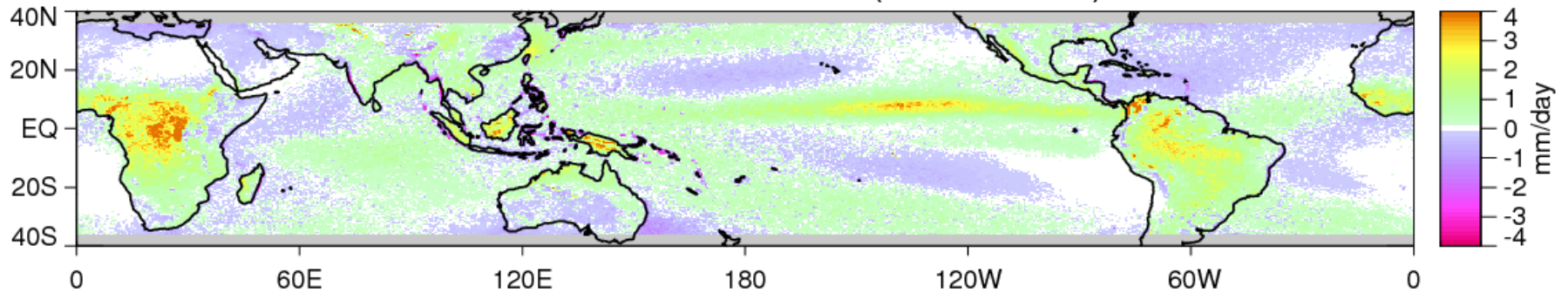
Regional TMI - PR Differences

From Wes Berg, CSU

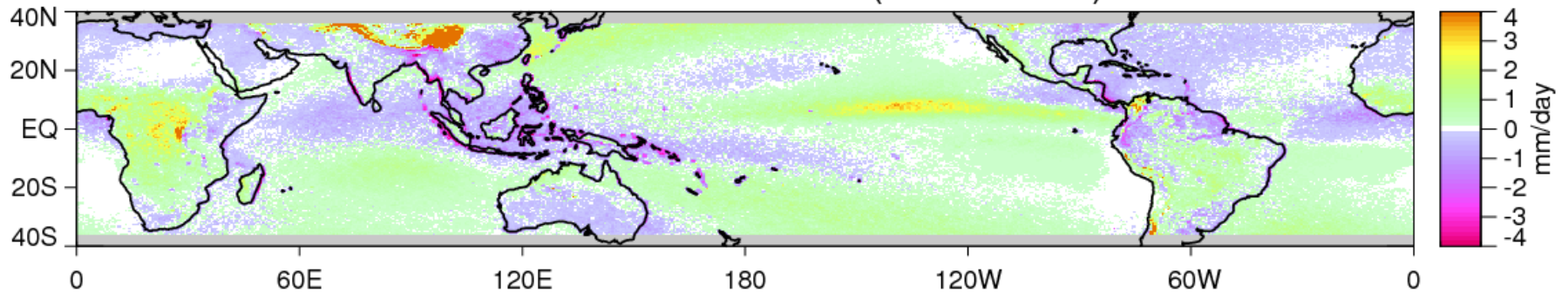
Version 5 TMI - PR Rainfall (1998 - 2002)



Version 6 TMI - PR Rainfall (1998 - 2010)



Version 7 TMI - PR Rainfall (1998 - 2010)

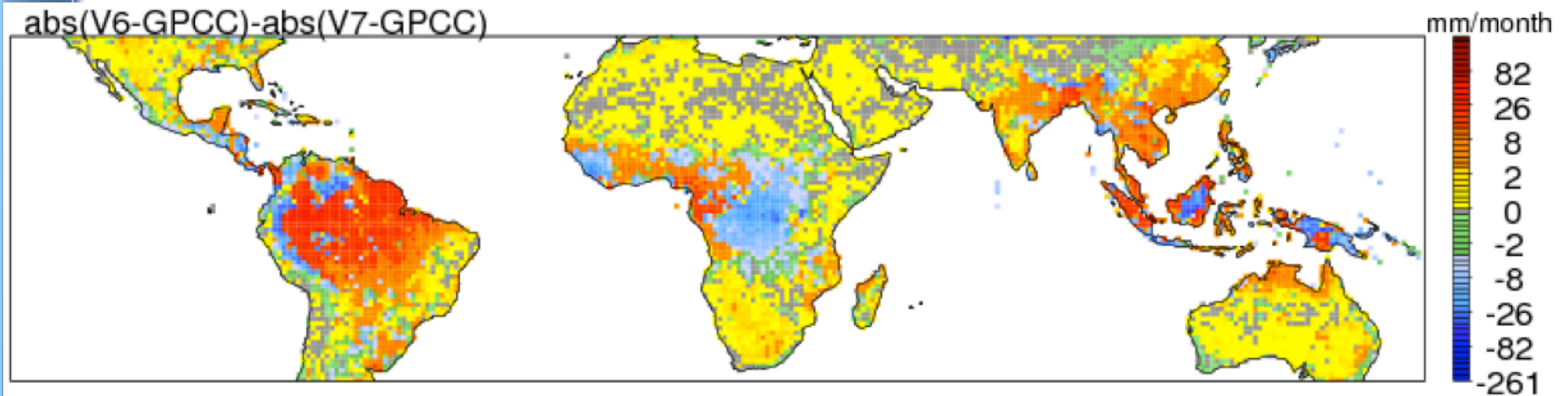


TRMM: TMI - PR Differences

Rainfall retrieval improvements in V7

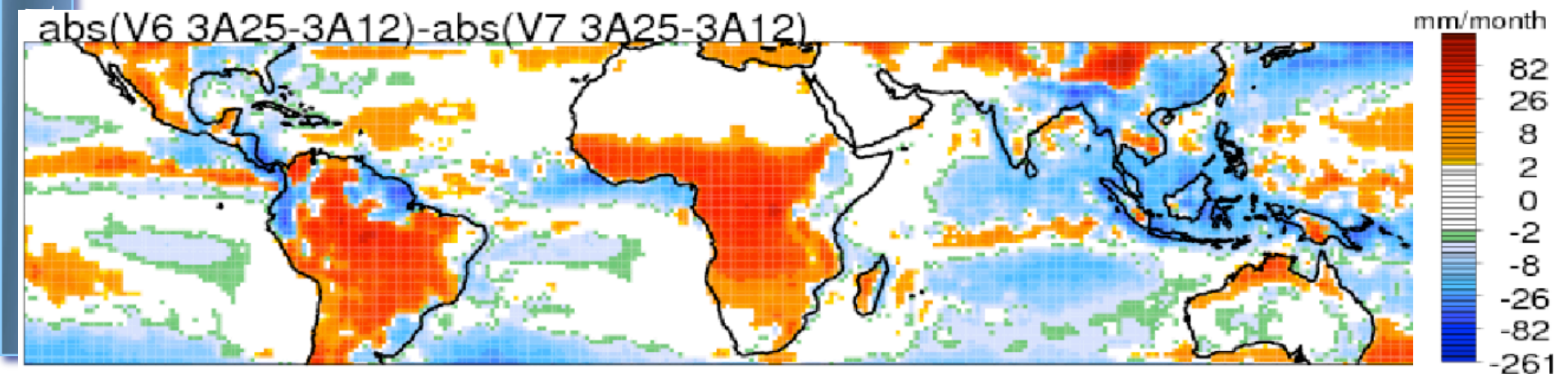
From Chuntao Liu, Univ. of Utah

PR V7 vs. Rain Gauge climatology



Rainfall

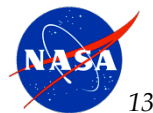
PR vs. TMI

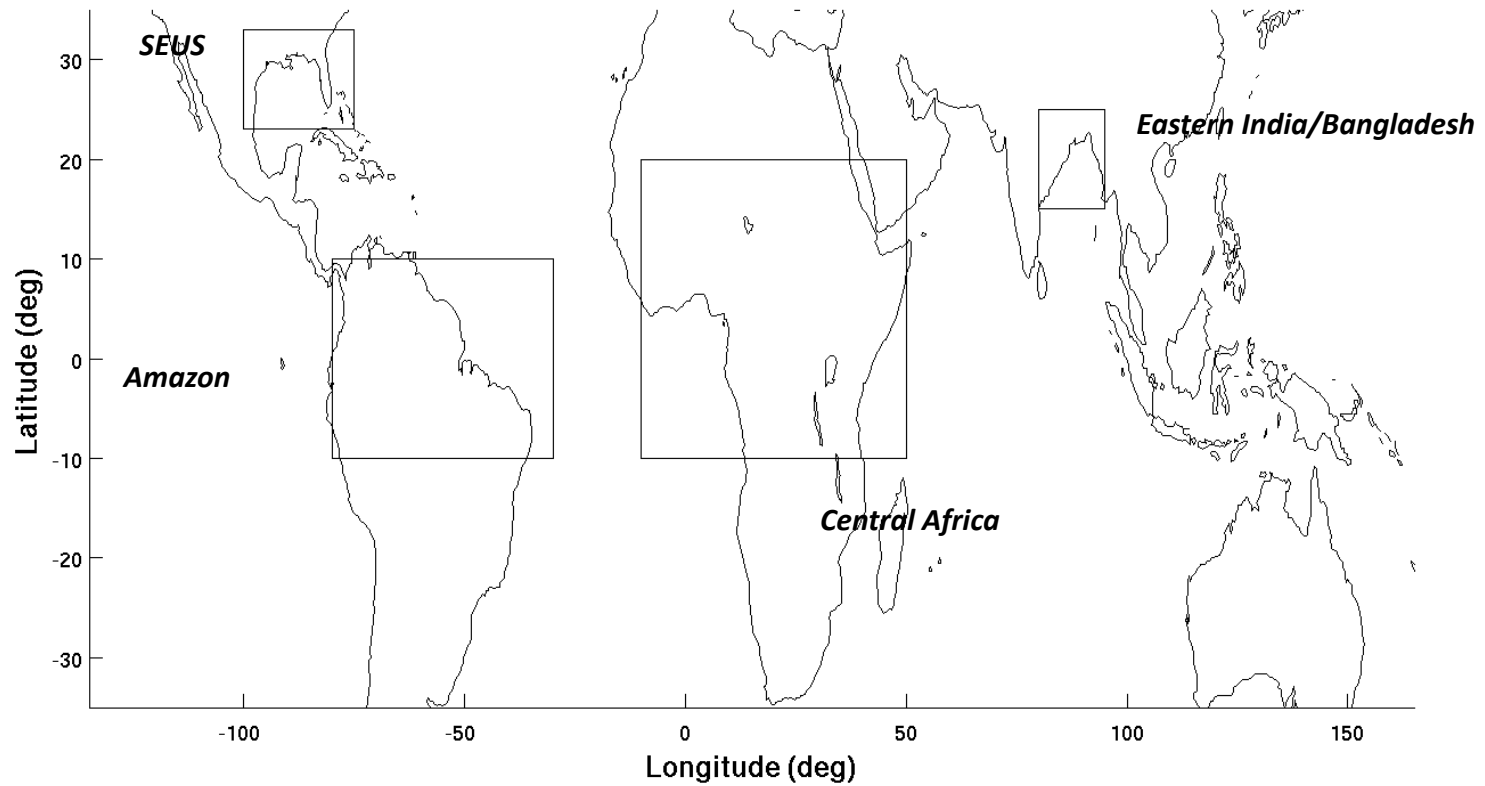


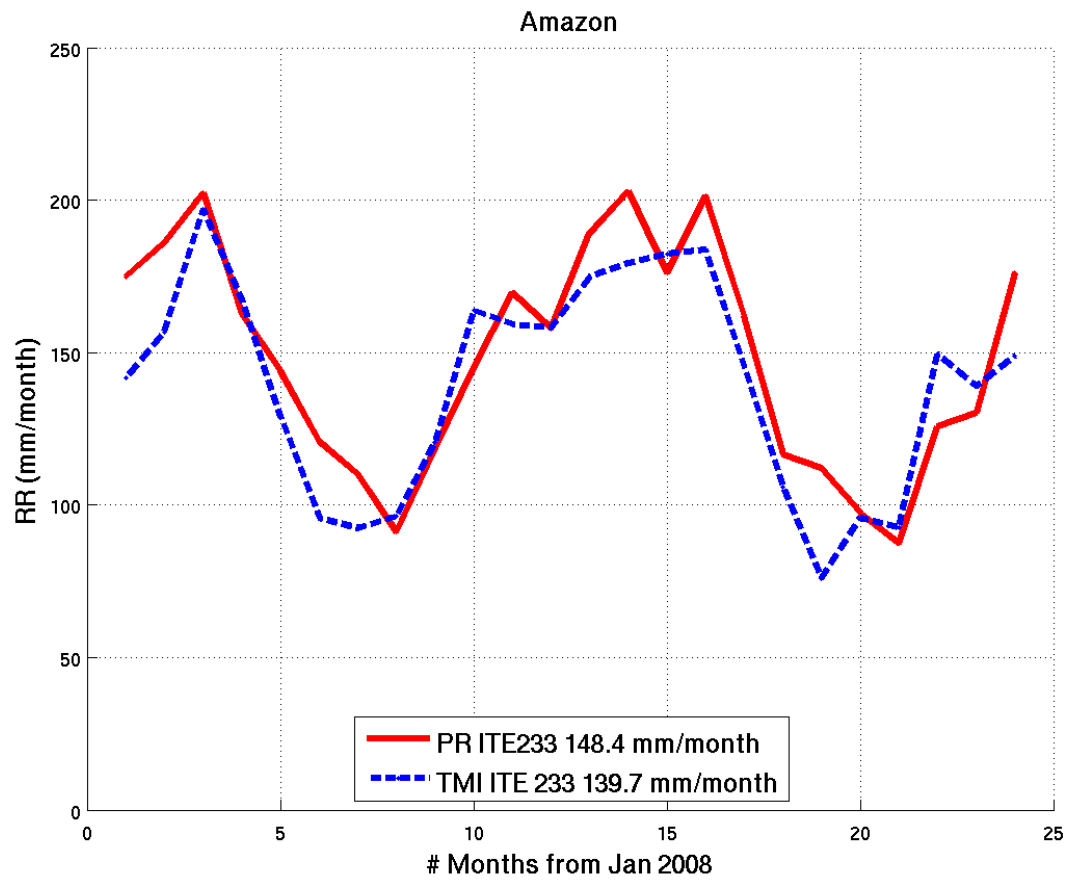
- 14 year climatology of rain rate estimates, gridded reflectivity, and convective/stratiform classification using data from Kwajalein, Melbourne, and Houston.
- Developed a physically-based, modular QC algorithm based on dual-pol properties of precipitation. Extendable to any dual-pol radar.
 - Relevant for WSR radars with DP capability, and D3R and NPOL.
 - KMLB is scheduled to be upgraded to DP in Jan 2012.
- Adapted and applied a self-consistency calibration technique for absolute reflectivity calibration. Currently being applied to KPOL and NPOL data. Adapted and applied techniques for DP-based rain rate and DSD retrievals.
- Products from 21 WSR-88D sites in the southeast CONUS and 12 sites in midwest CONUS in support of the GPM GV program.
- GV staff have participated in the planning and execution of several GPM GV field campaigns, including LPVEx, MC3E and GCPEX.
- Comprehensive support for the Wallops Precipitation Research Facility, including data QC, analysis, precipitation estimation, and DSD retrievals.

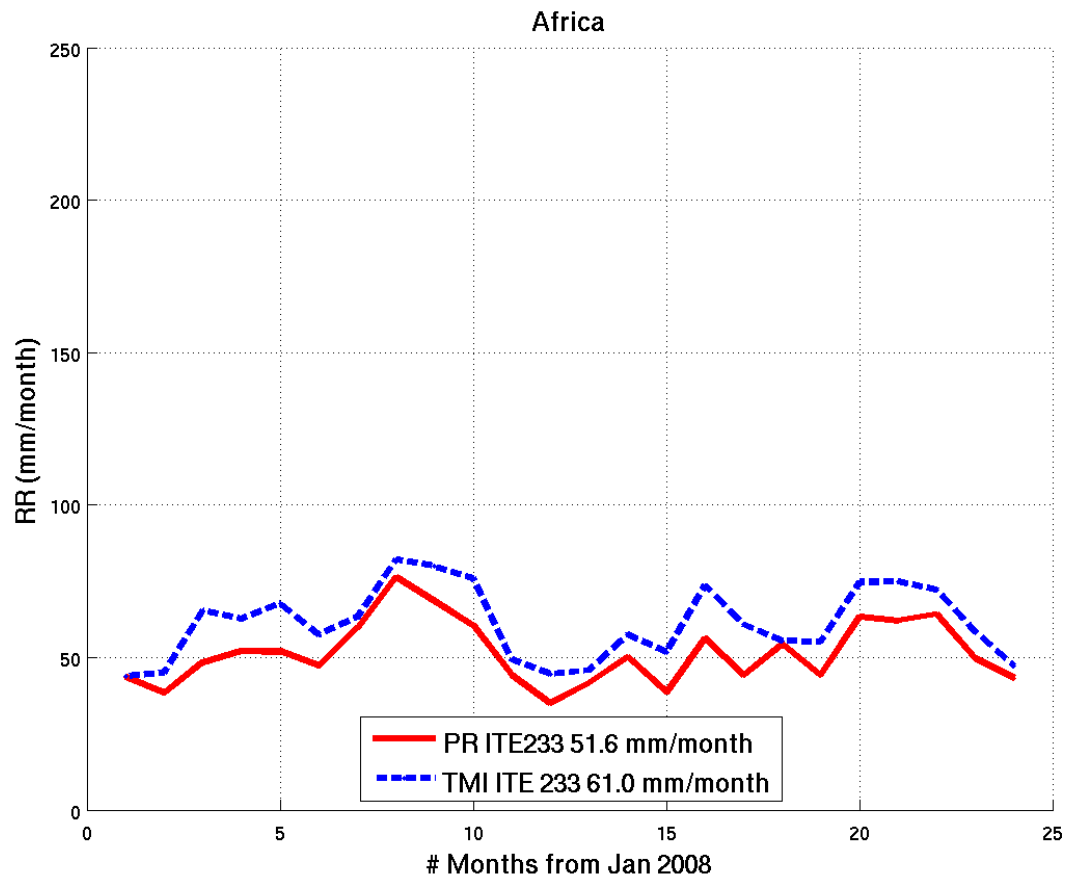
TRMM

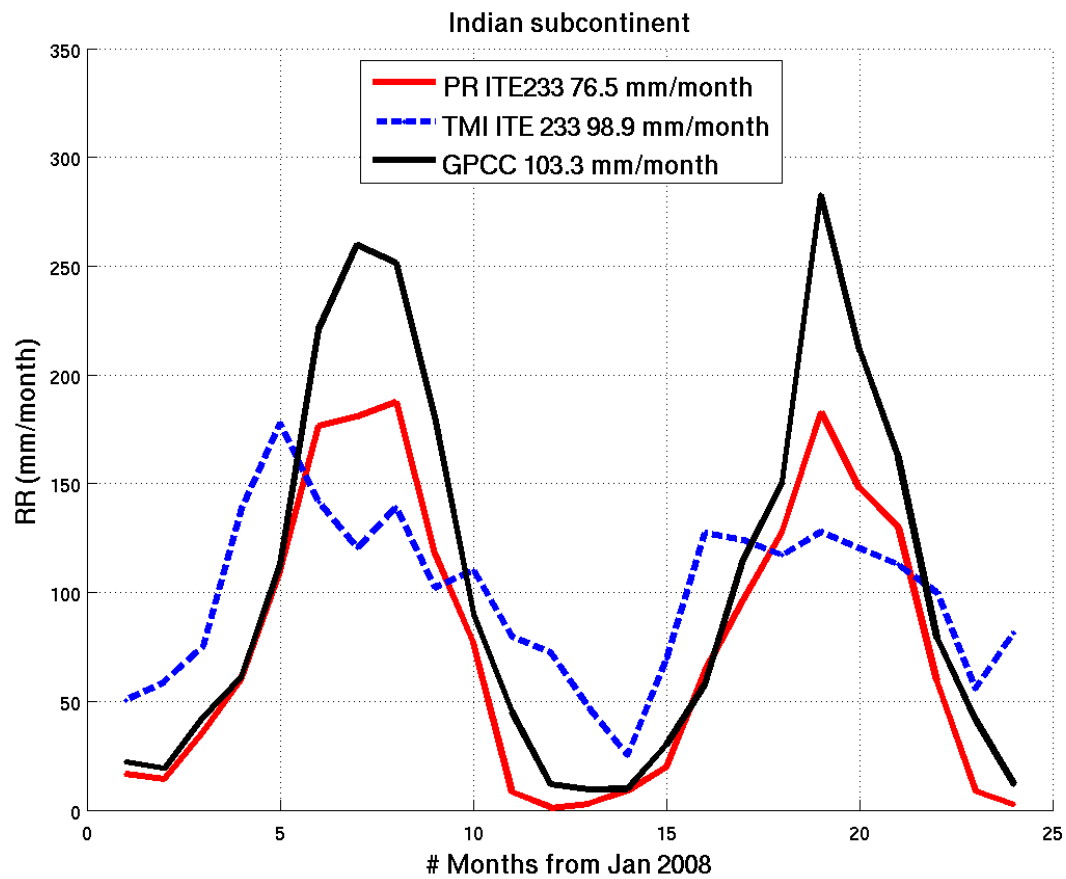
Tropical Rainfall Measuring Mission

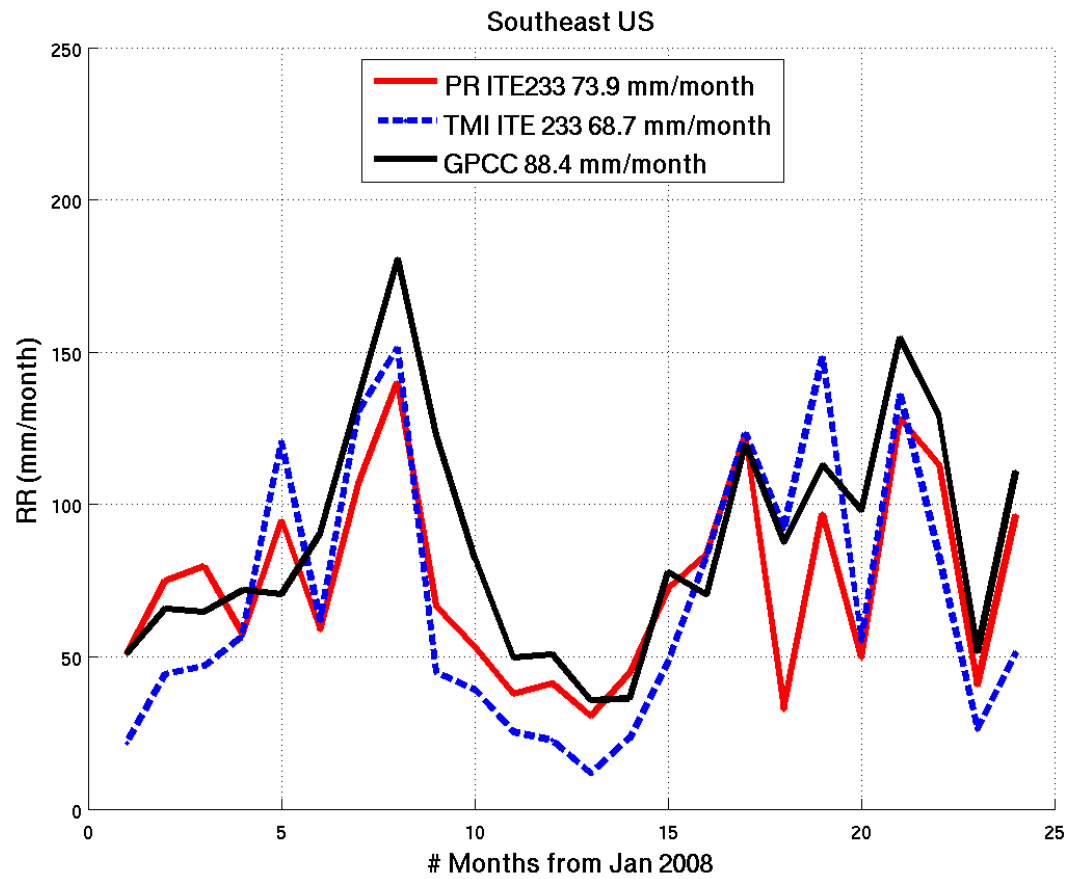












TRMM V7 vs. V6

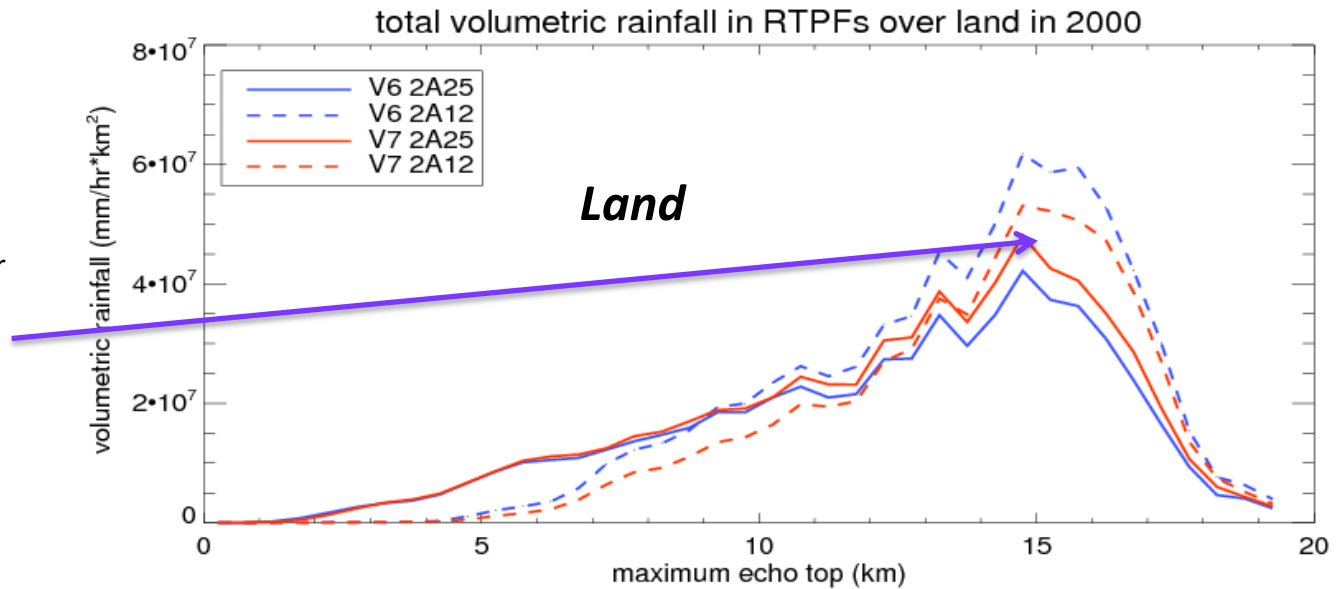
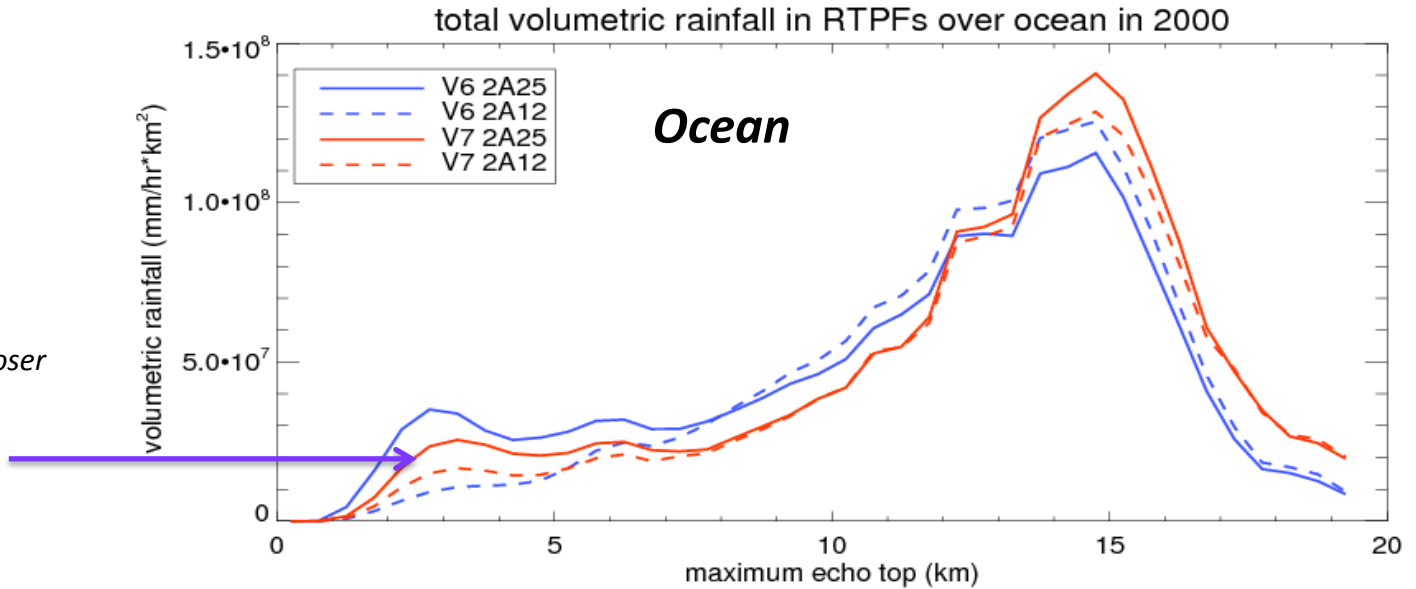
Rain fall contribution from precipitation systems with different height

Tropical Rainfall Measuring Mission

Red: V7
Blue: V6
Solid: PR
Dashed: TMI

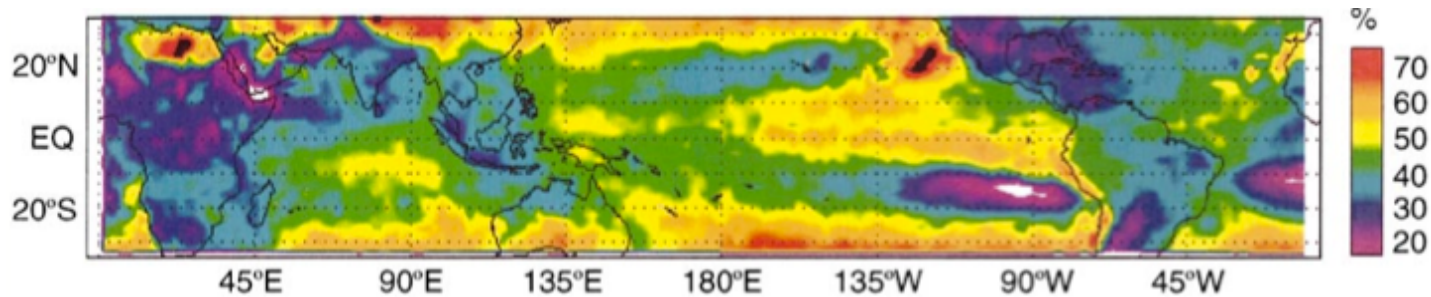
Over ocean, better consistency between PR and TMI in shallow systems. (Two red curves are closer than two blue curves)

Over land, better consistency between PR and TMI in deep systems. (Two red curves are closer than two blue curves)



- *New V7 concepts = small rain cells, “randomly” appearing shallow non-isolated pixels, and high storm height*
- *V7 generally shifted pixels from stratiform to convective (esp. 152 to 292)*
- *V7 20°N-20°S stratiform rain fraction near 35% (cf. 40% in V5)*

V5 stratiform rain fraction based on Schumacher and Houze (2003)



V7 stratiform rain fraction for Jun 99-May 00 and 2008

