

Lessons for EarthCARE from the NASA GPM Ground Validation Program

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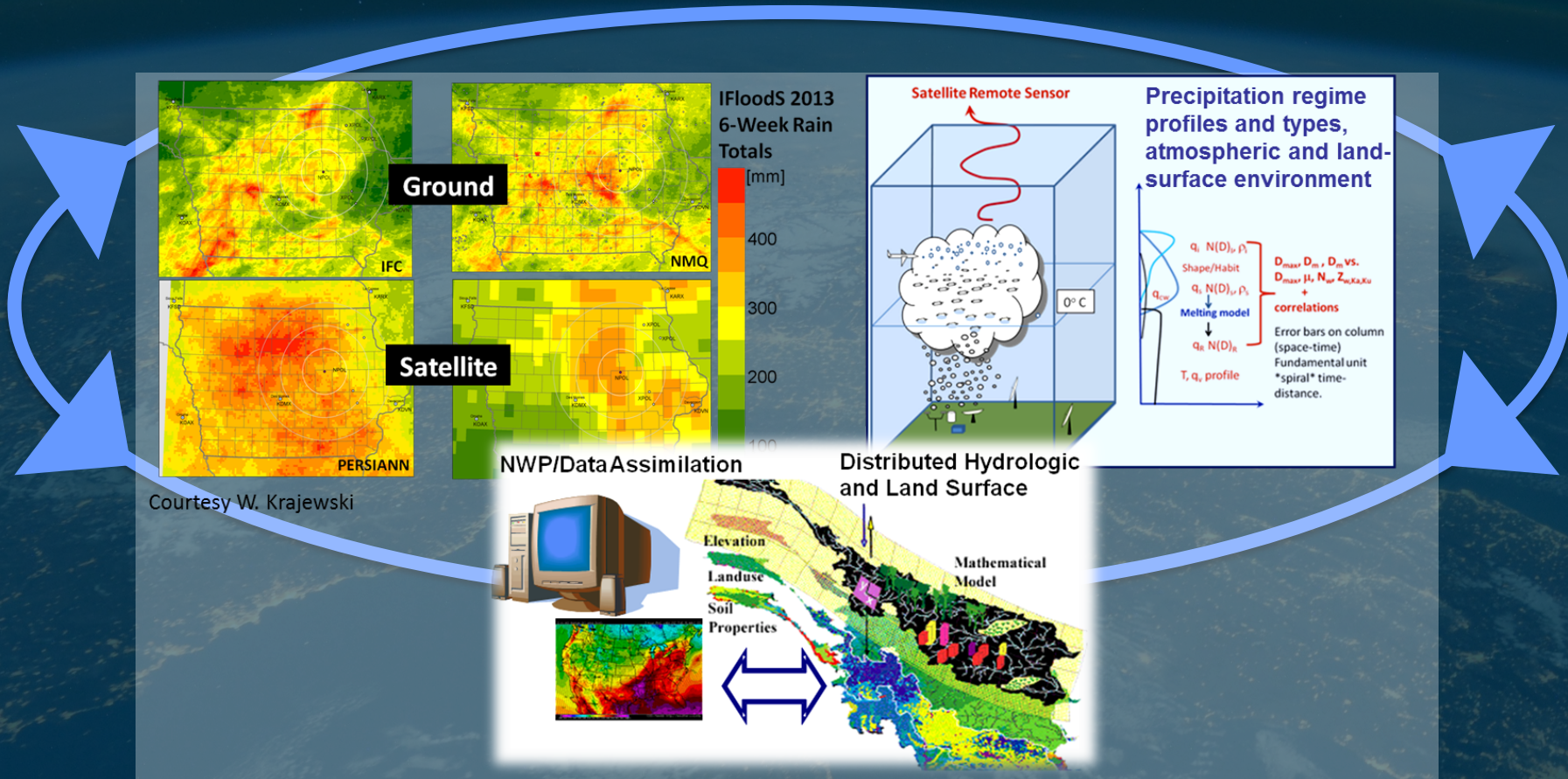
2nd ESA EarthCARE Validation Workshop

25-28 May 2021 (online)

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→ THE EUROPEAN SPACE AGENCY



- **Direct:** National network statistical comparison/assessment-(Error/Uncertainty- What/Where/When)
- **Physical:** Understand/Assess/improve physics and assumptions in retrieval algorithms (Field Meas.)
- **Integrated:** Assess Impacts/utility in presence of uncertainties (e.g., weather, climate, hydrology)

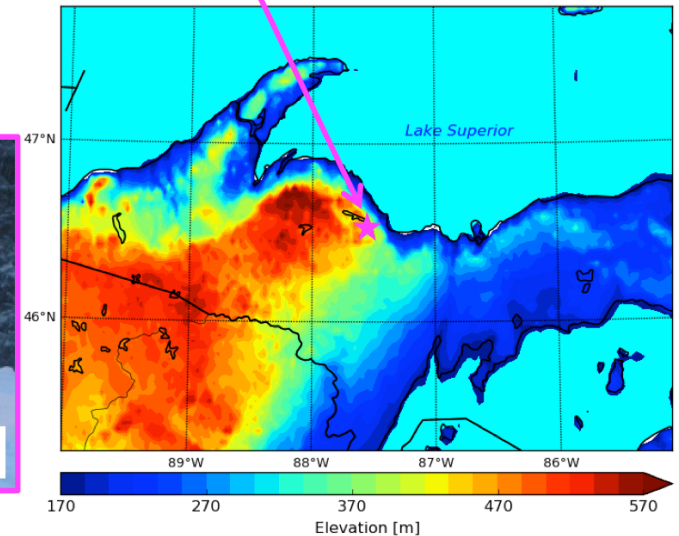
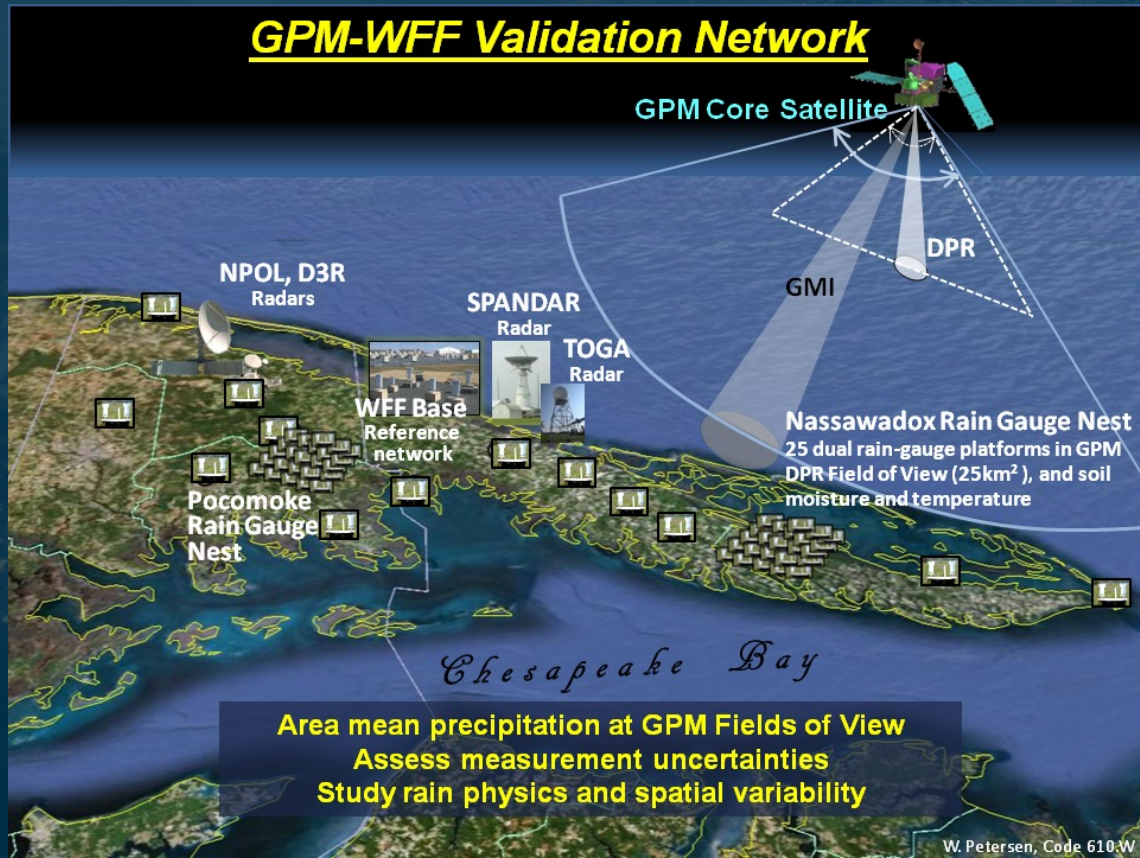
GPM Field Campaigns



GPM Long-Term Data Collection Supersites

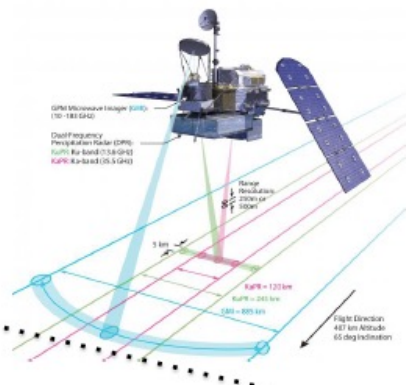
NASA Wallops Flight Facility, VA, USA

Marquette, MI, USA



Leveraging Operational Radar Networks for GV

GPM & GV-MRMS



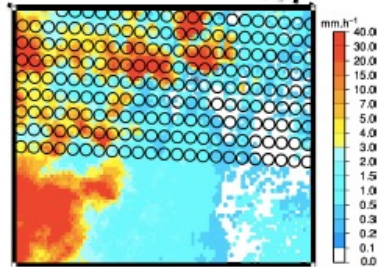
Reference precipitation added value:

- gauge adjustment
- quality/quantity controls
- finer spatial resolution than any satellite precipitation

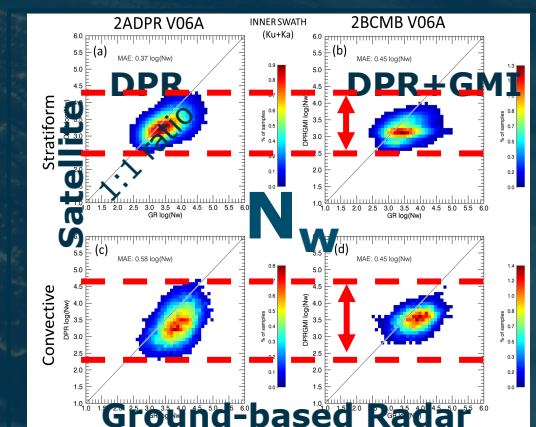
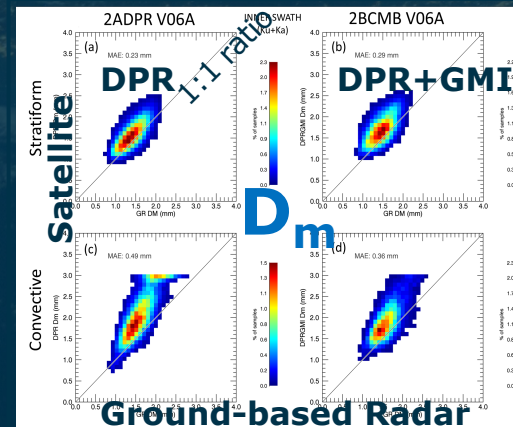
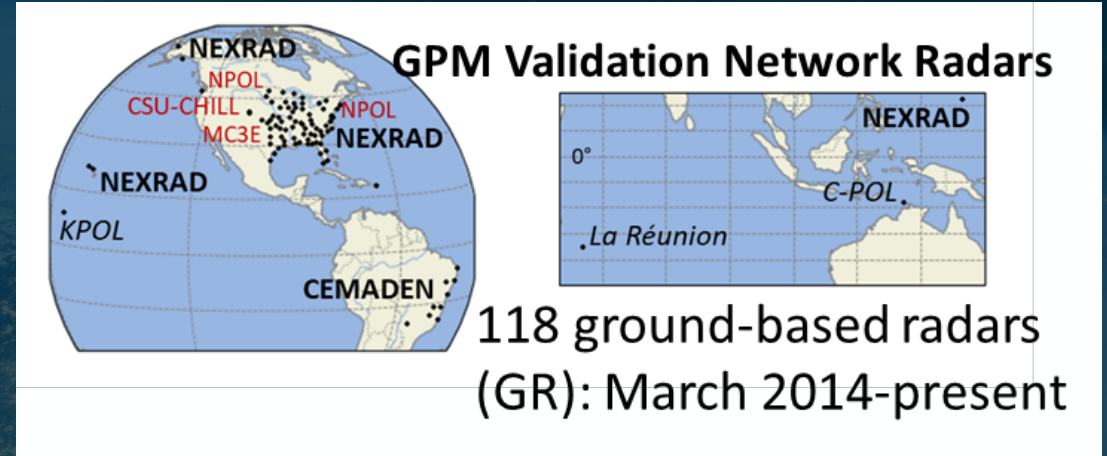
Time period: 2014/03 – present

Access and documentation:

<https://ghrc.nsstc.nasa.gov/hydro/details/gpmmrms>



*courtesy of Pierre Kirstetter
Univ. of Oklahoma*



*courtesy of Patrick Gatlin
NASA MSFC*

- 1. Purpose, timing, and cadence of GV field campaigns should carefully consider pre- and post-launch eras*
 - balance for algorithms pre-launch, science or algorithm weaknesses discovered after launch
- 2. Science interaction/communication between GV and algorithm developers/cultures is invaluable.*
- 3. Data analysis and data collection need to balance*
 - lots of data, not enough people/time to process and analyze- impacts phasing and lead time for use in/impact to algorithms
- 4. Phasing of GV analysis and new product version releases needs to be considered.*
 - longer lead times for GV analysis and feedback prior to version release would be worthwhile
- 5. GV data processing, archive, access*
 - Identify a strategy and DAAC pre-launch
- 6. Interagency product leveraging with analysis augmentation works well*
 - operational networks offer spatial/temporal coverage needed to develop satellite product performance statistics
- 7. Pre-launch international partnering is important/valuable.*
 - Consider potential problematic "regimes" for measurement/retrieval combined w/expected data quality
- 8. Anticipate and plan for post-launch validation of likely "popular" mission products*
 - e.g., not necessarily an L1 requirement, but oft-used and mission-produced L3 products such as IMERG.

Credit to Walt Petersen for many of these!