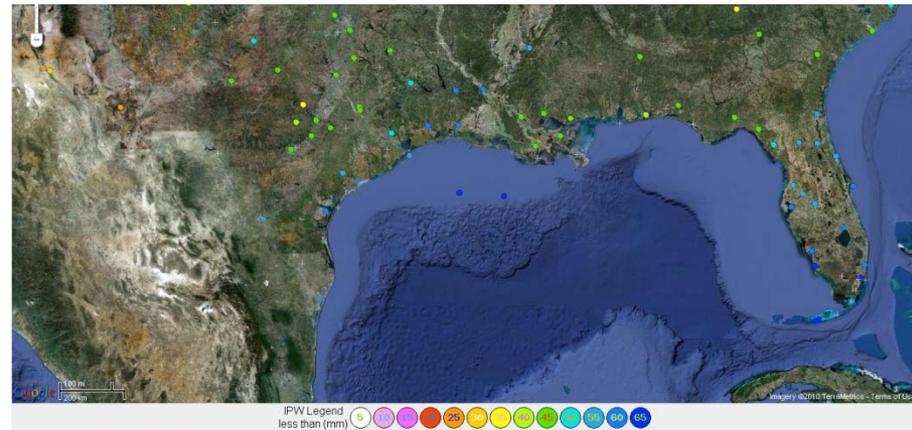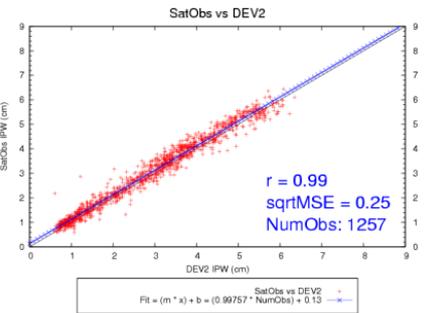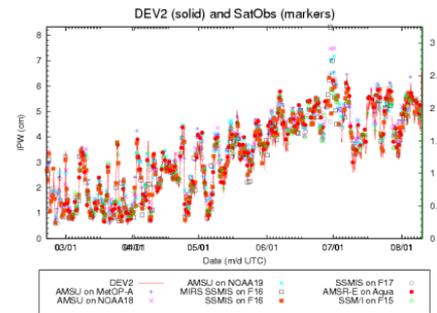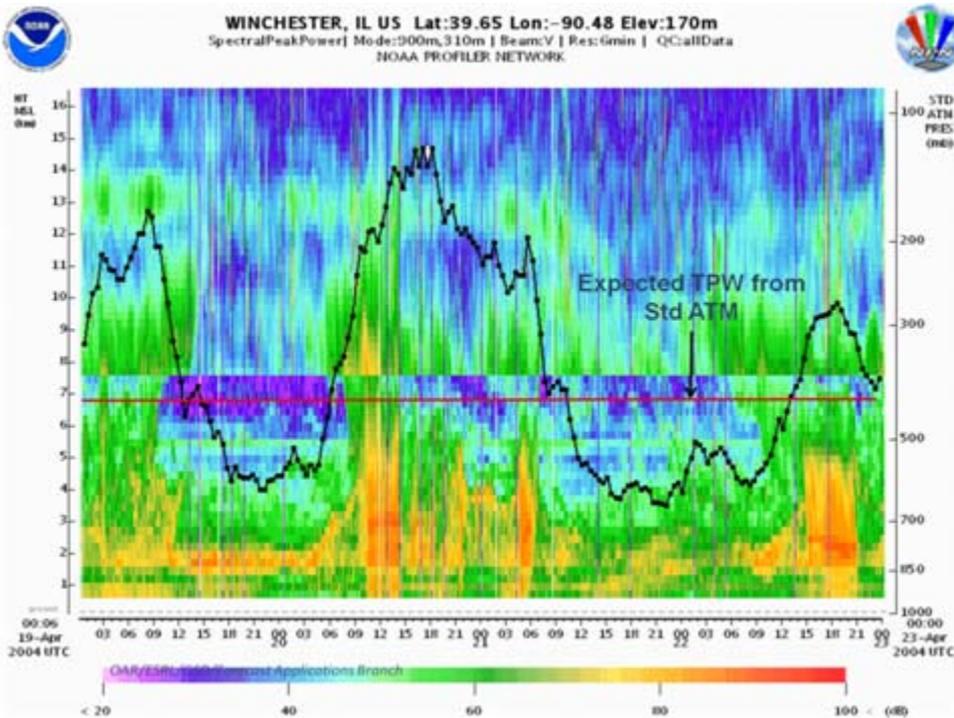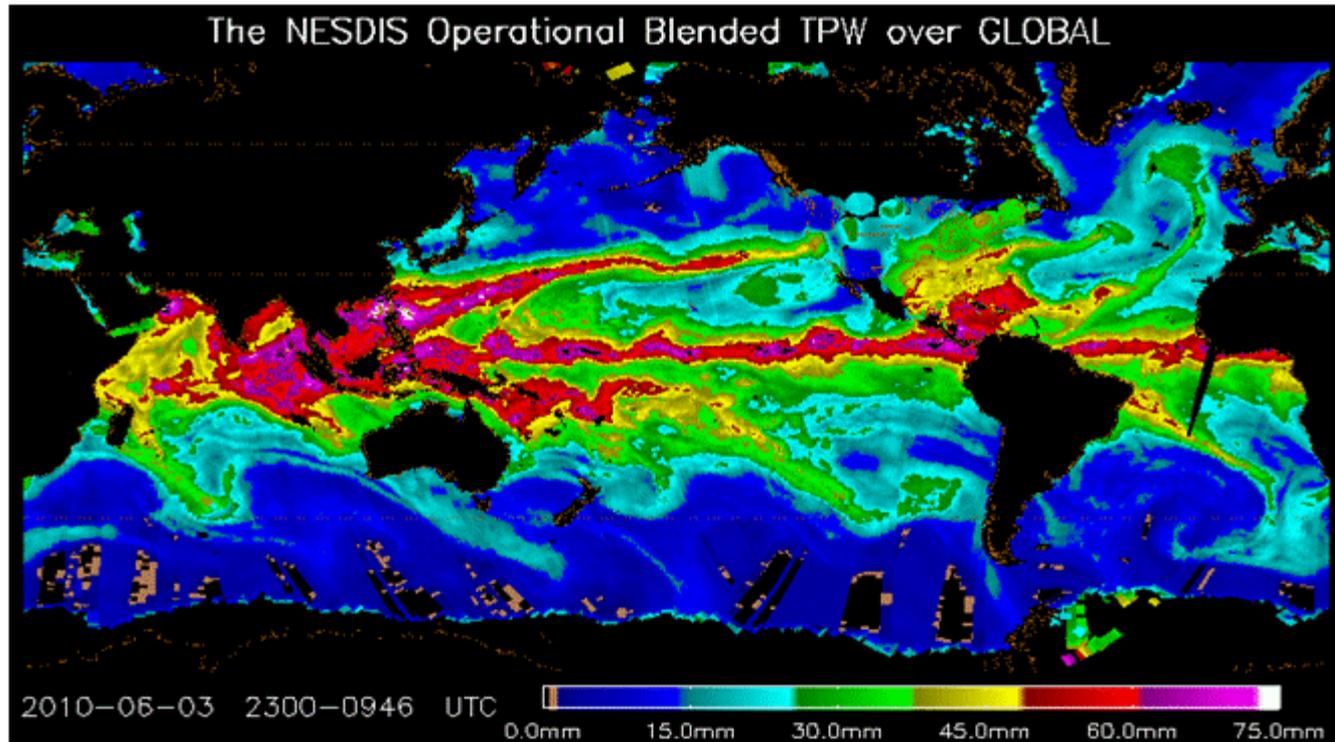# Cal/Val of GPM Observations

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# Global TPW Observations



- TPW estimates *over water* come from **AMSU/SSMI.**

- TPW estimates *over land* come from **GPS-Met**.

- **GPM/GMI** will provide high quality microwave obs for satellite intercalibration and TPW retrievals.

- **GPM/DPR** will provide measurements of cloud structure, rainfall, and rain rates.

# What We Expect to See
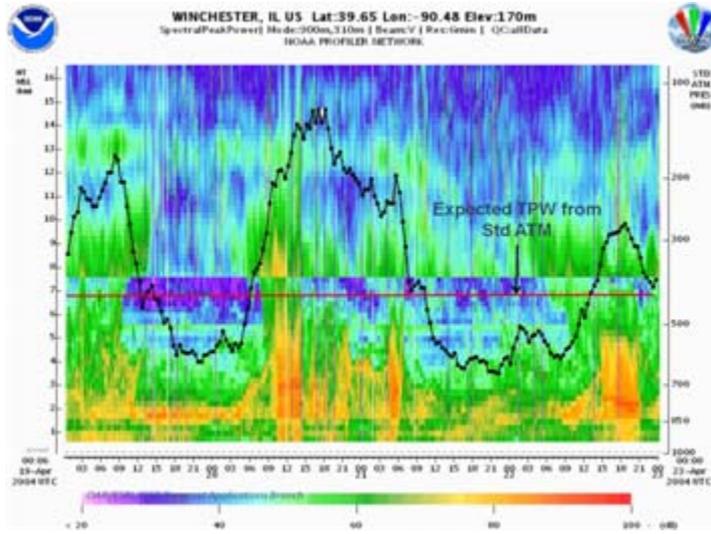


Based on HMT & NPN experience
- ✓ Reflectivity $\alpha$ mixing ratio
- ✓ PW increases prior to CI
- ✓ POP and precipitation amount highly correlated with PW & UMF
- ✓ Thresholds vary by region and season

**NAM PW 3-h Fcst valid 17-Aug-2010 21 UTC**





LAPS Moisture Flux

3
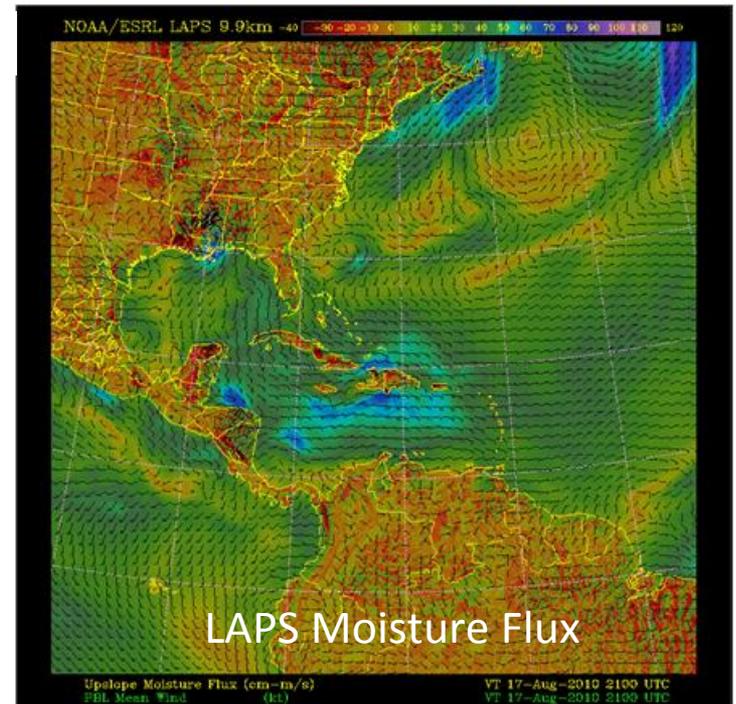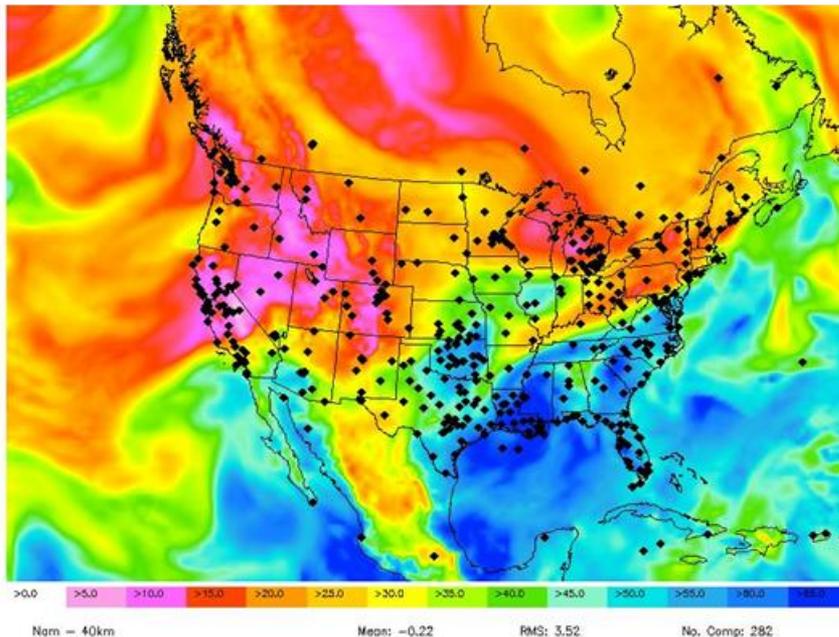
# Questions to Address With GPM

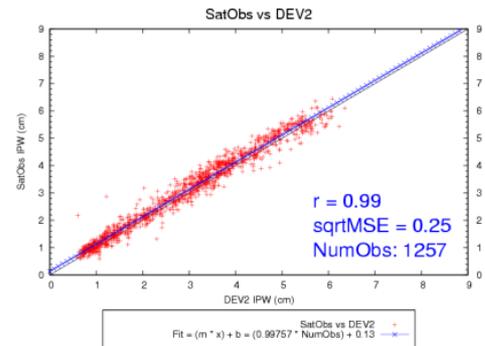- What is the accuracy and precision of onshore and offshore TPW estimates from different sensors?
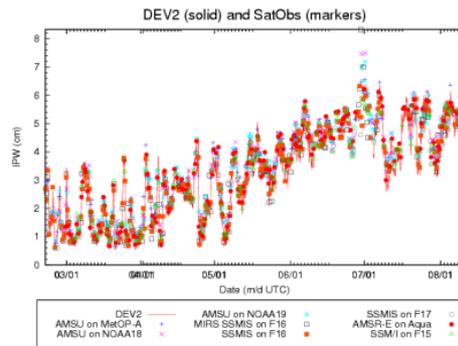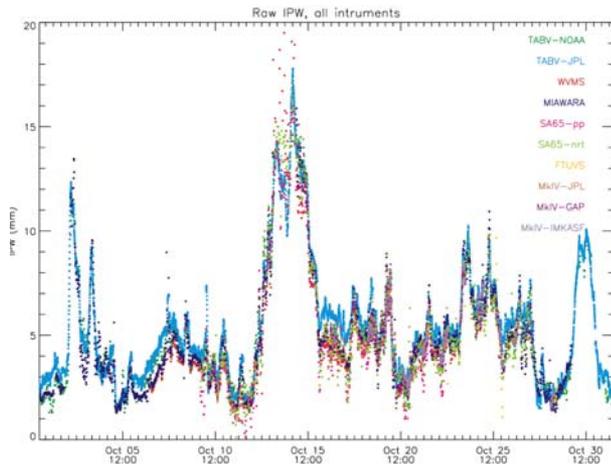


- Can we use ground-based observations to verify on-orbit calibration (e.g. CLAREO) and reduce ambiguity in satellite inter-calibrations?

- Can we reliably use stable ground-based observations to objectively monitor sensor performance?

- Will improved observation accuracy result in forecast improvements?

# GPS-Met Requirements

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***Total Precipitable Water***

| Observation Requirement | T/O | Geographic Coverage | Vertical Resolution | | Horizontal Resolution | | Measurement Accuracy | | Measurement Precision | | Sampling Interval | | Data Latency | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Microwave radiances | T | Global | | | 40 | km | | | | | 3 | hr | 1 | hr |
| | O | Global | | | 10 | km | | | | | 1 | hr | 0.5 | hr |
| Radar reflectivity | T | Global | 500 | m | 10 | km | | | | | 3 | hr | 1 | hr |
| | O | Global | 250 | m | 5 | km | | | | | 1 | hr | 0.5 | hr |
| TPW Retrieval | T | Global | n/a | | n/a | | 1 | mm | 2 | mm | 3 | hr | 1 | hr |
| | O | Global | n/a | | n/a | | 0.5 | mm | 1 | mm | 1 | hr | 0.5 | hr |
| | T | | | | | | | | | | | | | |
| | O | | | | | | | | | | | | | |

Comments:

# Gaps in current satellite product suite

- Spatial (coverage) gaps:

- Temporal gaps:

- Latency gaps:

- Accuracy shortcomings: Continuous monitoring of observation and retrieval accuracy needed.  Accuracy needs to be verifiable.

- How GPM era products might help (if it's possible to speculate): Test ideas about how best to accomplish continuous monitoring and Cal/Val.

# Next Steps for GPM-era data & products

- What are funded activities within your program/project over the next five years?

    GPS-Met sustainment from OAR; ongoing HMT support from PSD.

- What are your funding gaps & limitations?

    No funds identified for GPS R2O; insufficient funds in OAR to support ongoing GPS-Met R&D

- What are your plans to work with other elements of NOAA?

    NWS/NESDIS R2O transition; GOES-R, GRUAN

- What are your plans to work with NASA?

    Ongoing collaborations with GSFC, LaRC & JPL on observation verification, QC, climate applications