Advances in AMSR2 Precipitation Retrievals:

Validation and Monitoring Tools

Patrick Meyers, Scott Rudlosky, and Ralph Ferraro

cics-md
Cooperative Institute for Climate & Satellites
UNIVERSITY OF MARYLAND

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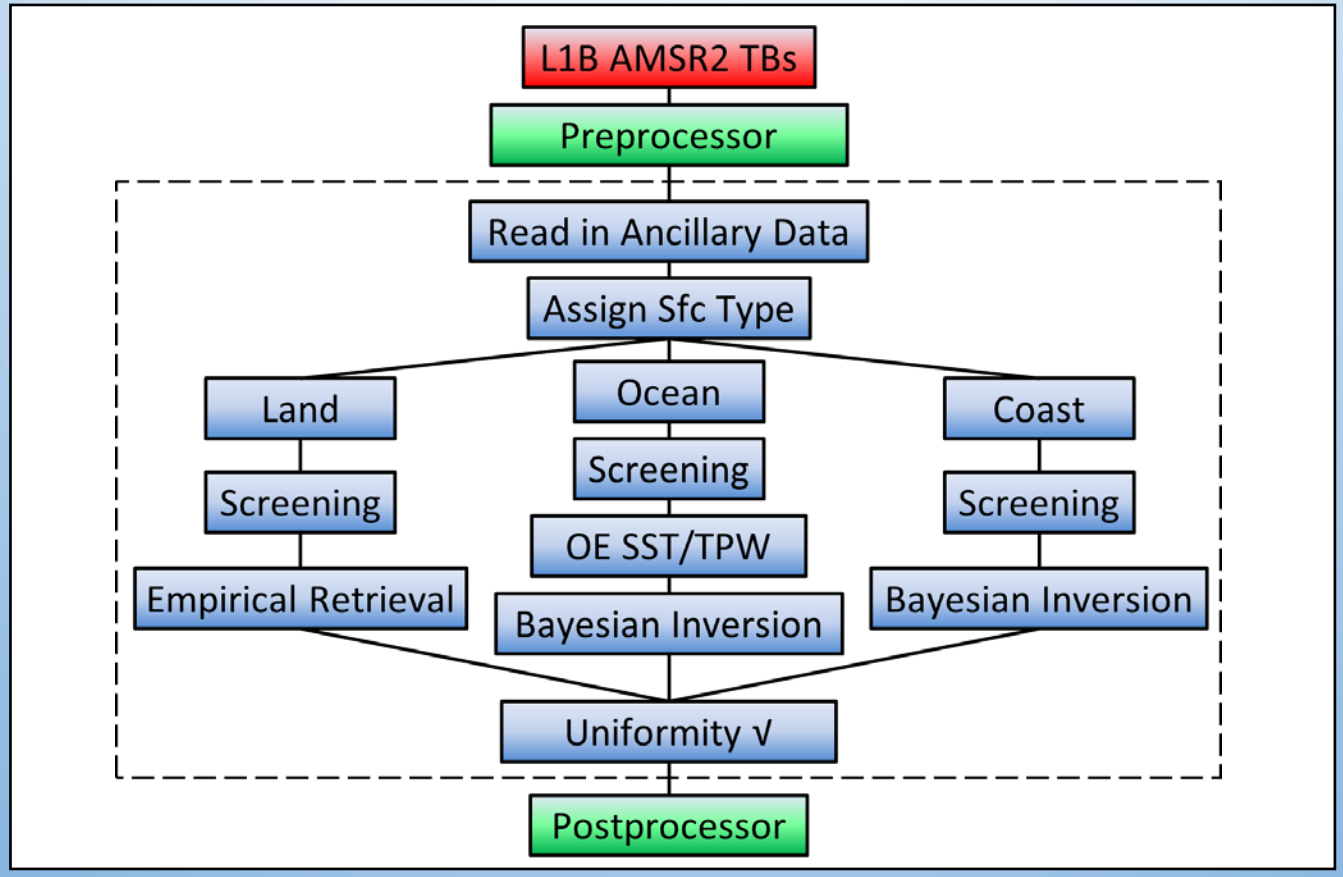
Operational AMSR2 Retrievals

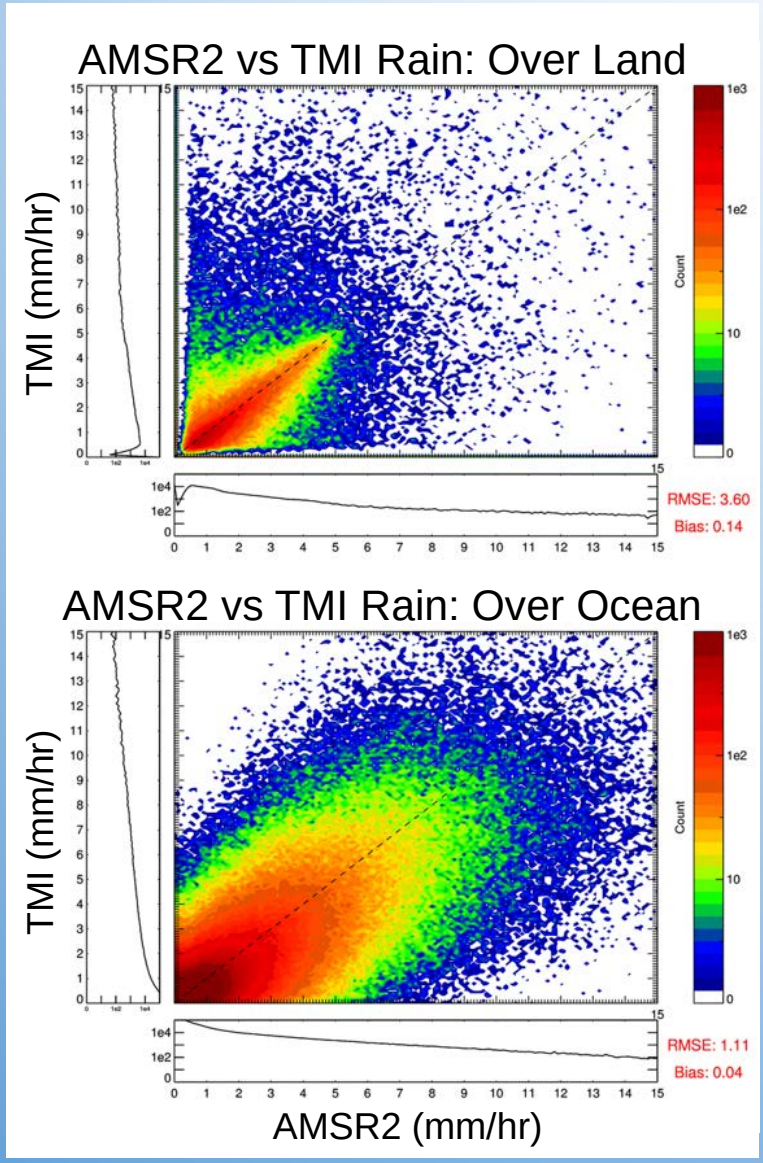
- Operational precipitation product distributed by STAR / OSPO
- Meeting all latency/accuracy requirements
- Day-2 algorithms for Snow / Sea Ice / Soil Moisture retrievals transitioning to ops

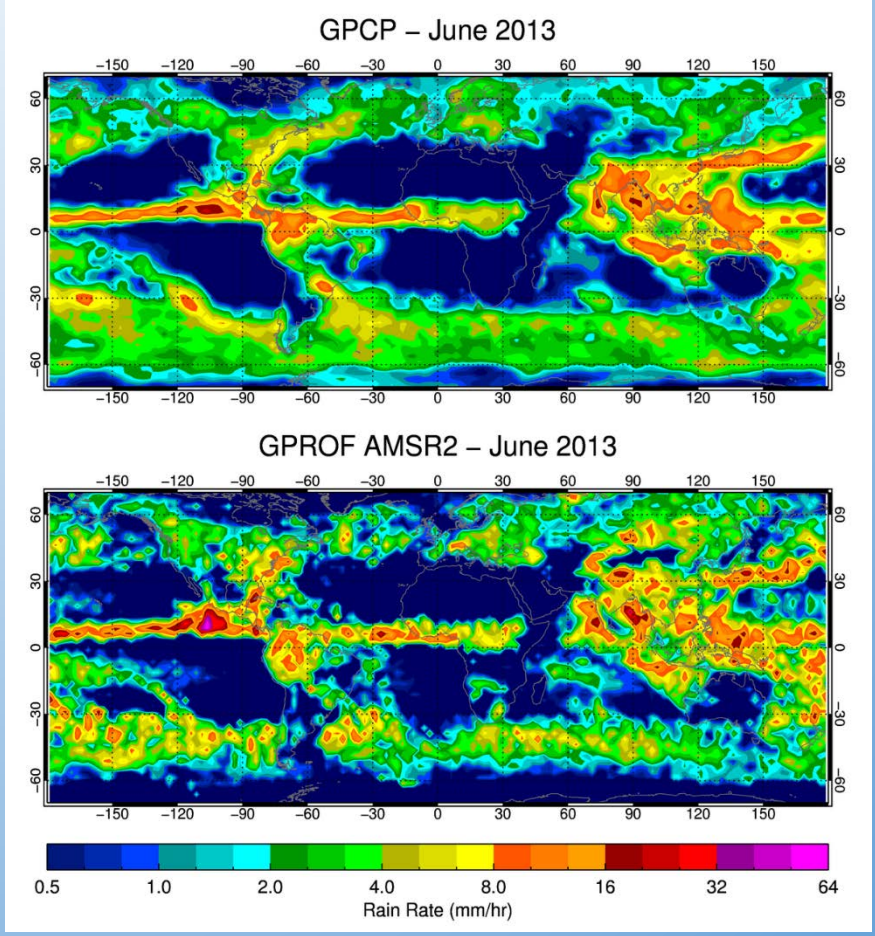
AMSR2 GPROF2010V2 Structure



- Validated against TRMM/TMI: Similar sensors, similar algorithm
- Updated screening procedures to address snow/semi-arid surface (Meyers et al. 2015)

AMSR2 Precipitation Validation

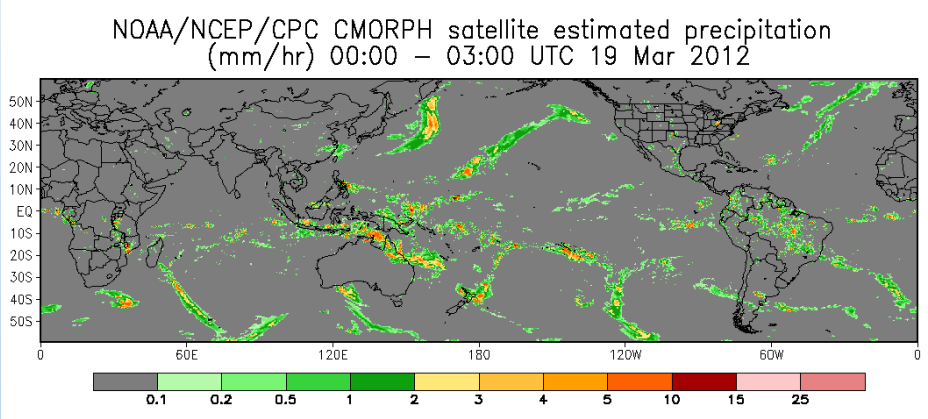


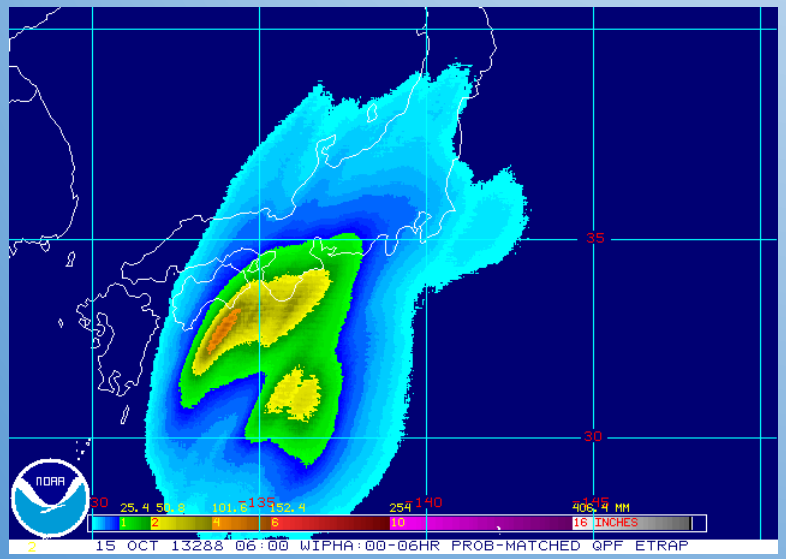


AMSR2 Applications

CPC Morphing Technique (CMORPH)

- Global precipitation analysis at high spatial/temporal resolution
- Precipitation estimates from PMW propagated by geostationary IR motion vectors





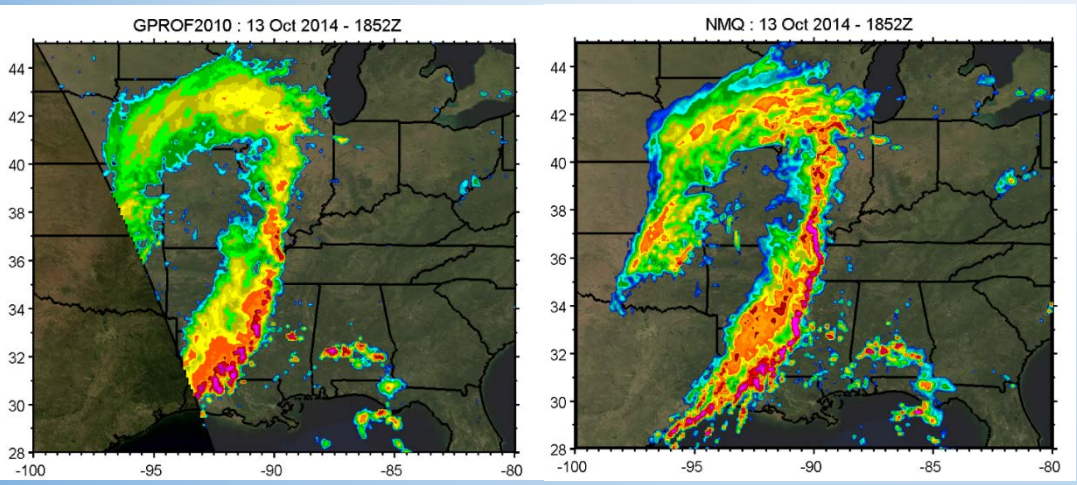
Ensemble Tropical Rainfall Potential (eTRaP)

- Cumulative 6-hr rainfall estimate from an ensemble of PWM radiometers
- Produces probabilistic and deterministic forecasts of precipitation for tropical cyclones
- Typhoon Wipha – 15 Oct 2013 (left)

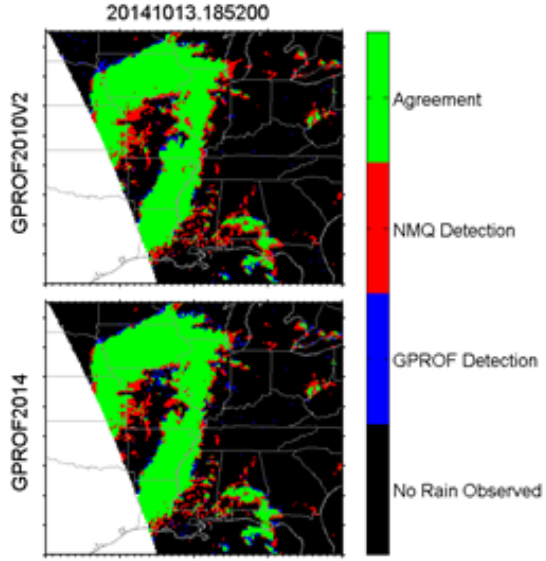
CICS-MD Proving Ground & Training Center

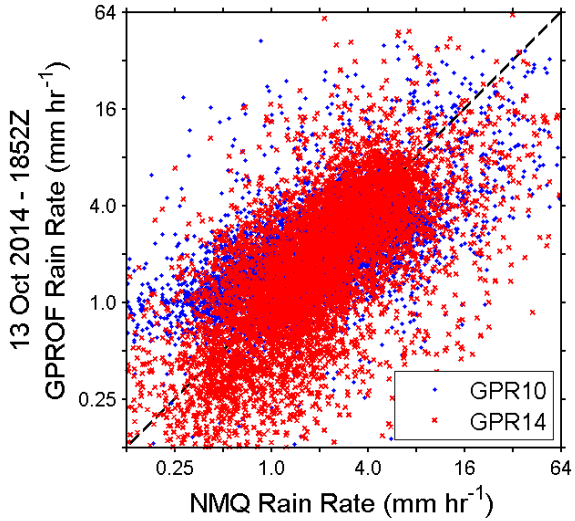
- JPSS & GOES-R risk reduction facility in development
- Provides a conduit for researchers and forecasters at NWCPC to interact
- AWIPS-II / McIDAS / WDSS
- Undergraduate career training

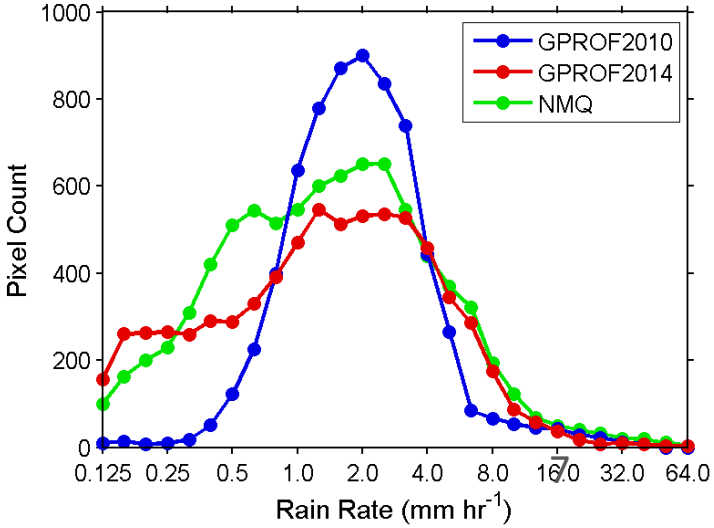
Swath-based Monitoring



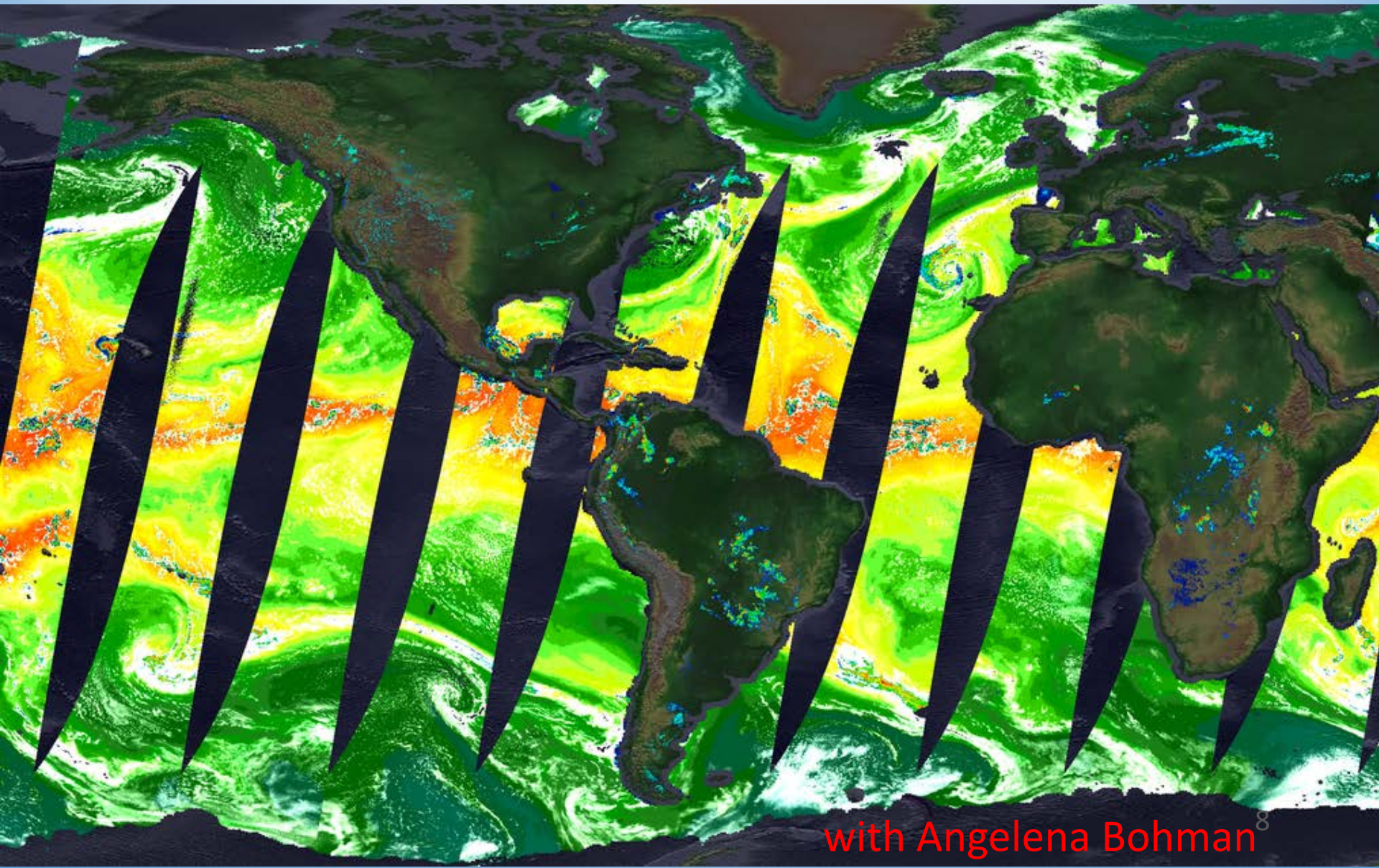
	GPROF2010	GPROF2014
Bias	-0.54 mm/hr	-0.54 mm/hr
r	0.51	0.43
RMSE	4.30 mm/hr	4.70 mm/hr
POD	76%	80%
FAR	6%	7%





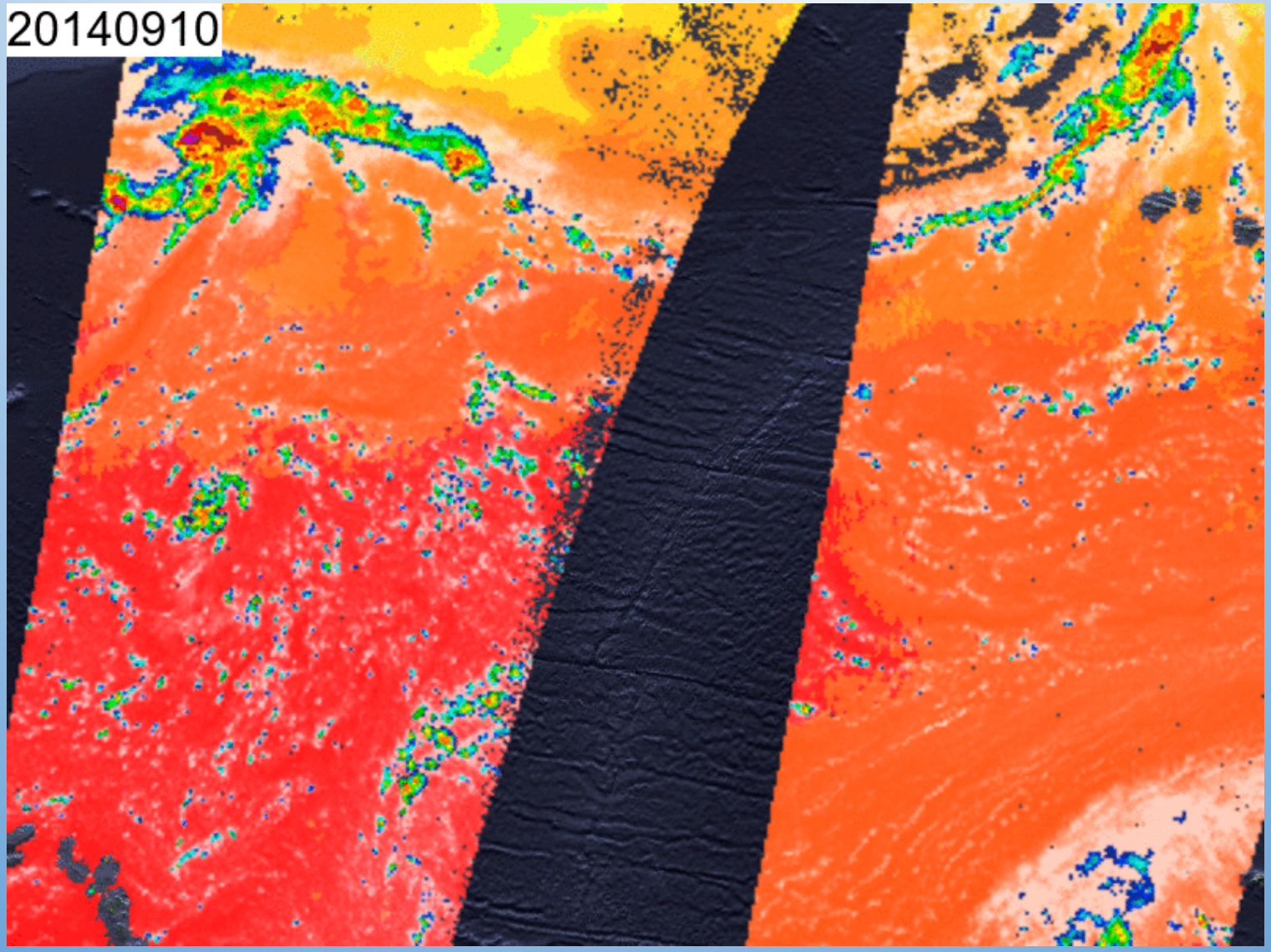


AMSR2 Monitoring Tools



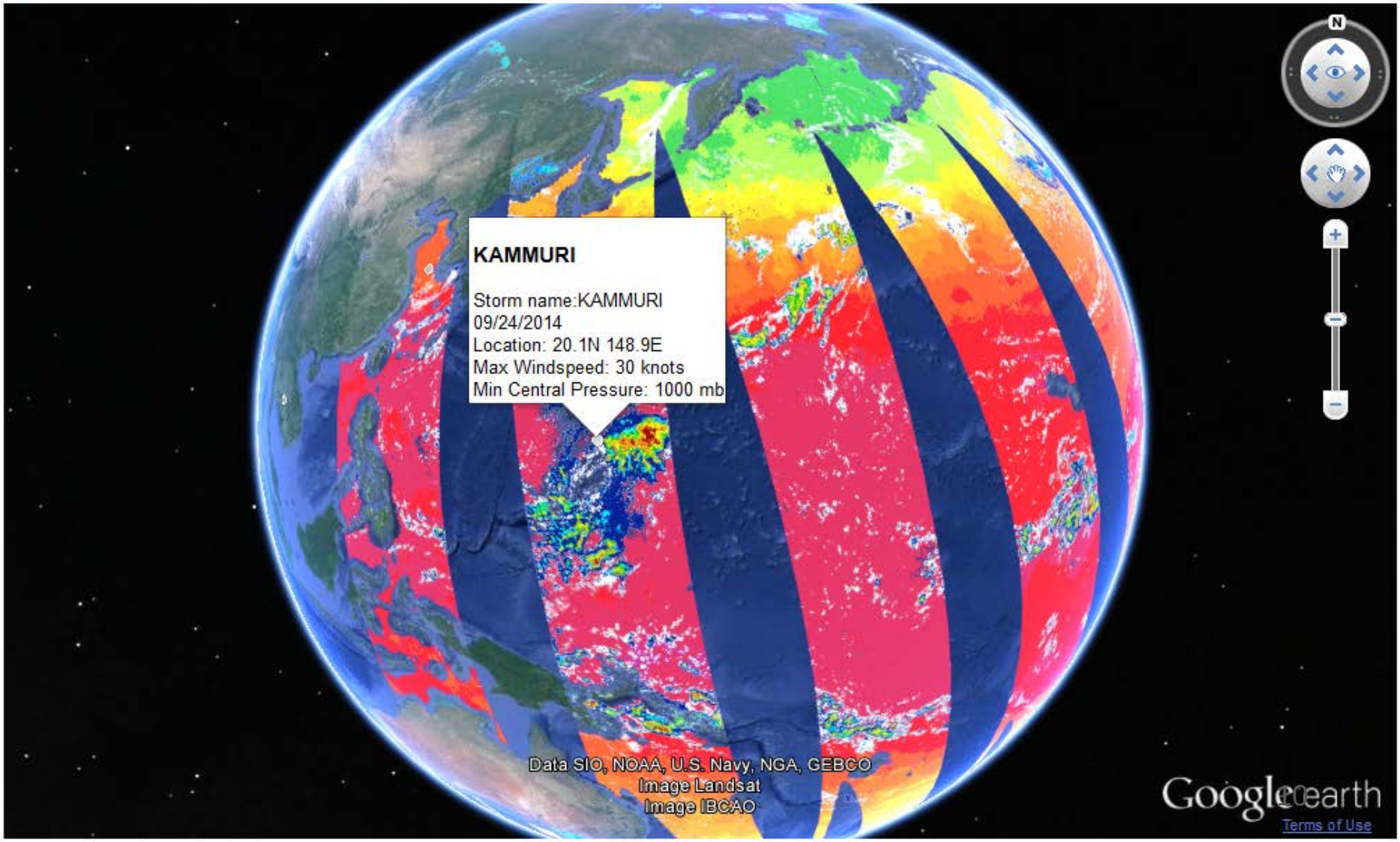
with Angelena Bohman

Hurricane Edouard – Sept 2014



AMSR-2 Data:

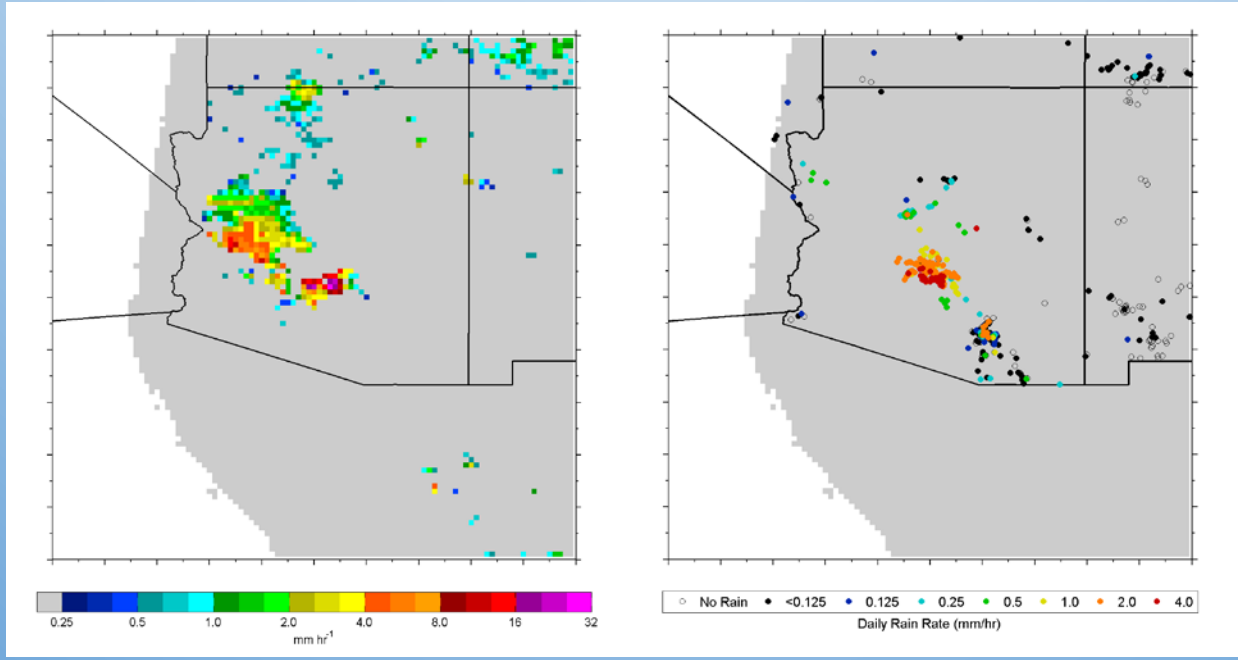
Ascending	Descending	
☑ sst	☐ sst	
☐ tpw	☐ tpw	
☑ rain	☐ rain	☑ current storms
☑ clw	☐ clw	
☐ ws	☐ ws	



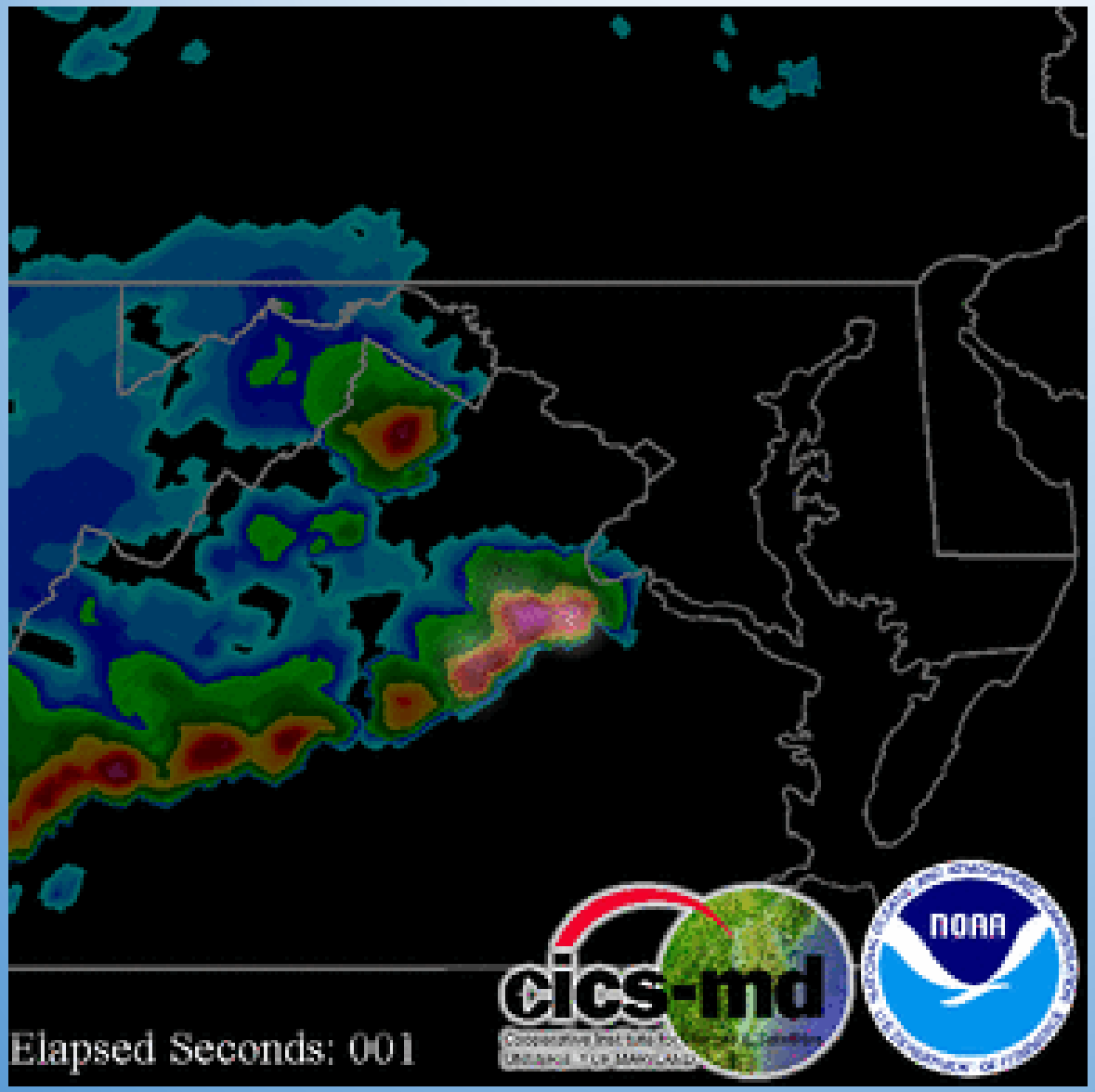
CoCoRaHS

Community Collaborative Rain, Hail, & Snow Network

- Independent source for event detection with mesoscale resolution in populated areas.



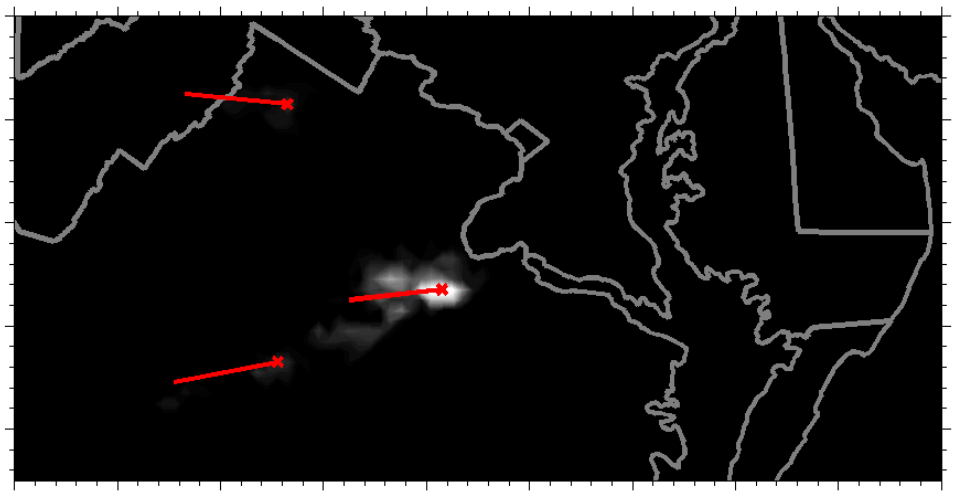
Fusion with Lightning Data



- Validation of Conv / Strat
- Incorporate into rain algorithm

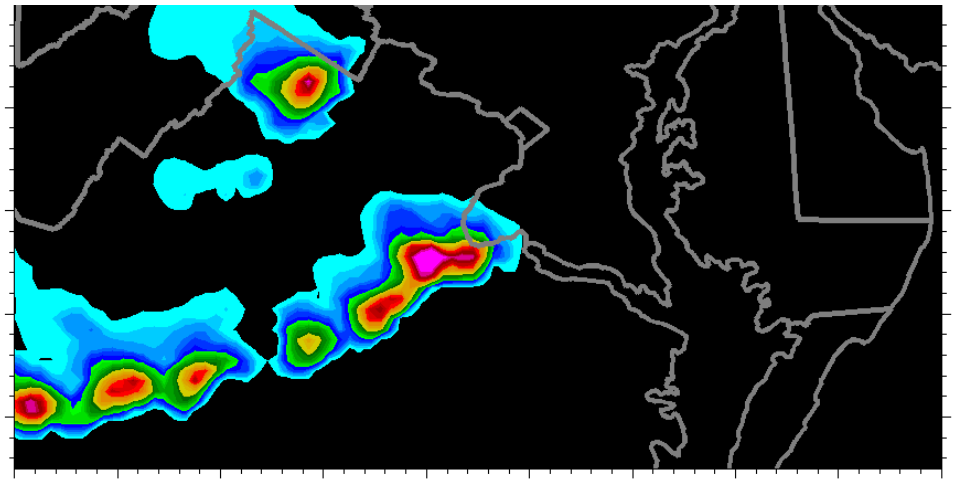
Lightning Motion

- Estimated cell direction
- 1 min intervals
- Linearly interpolated in space
- Edges assigned mean flow



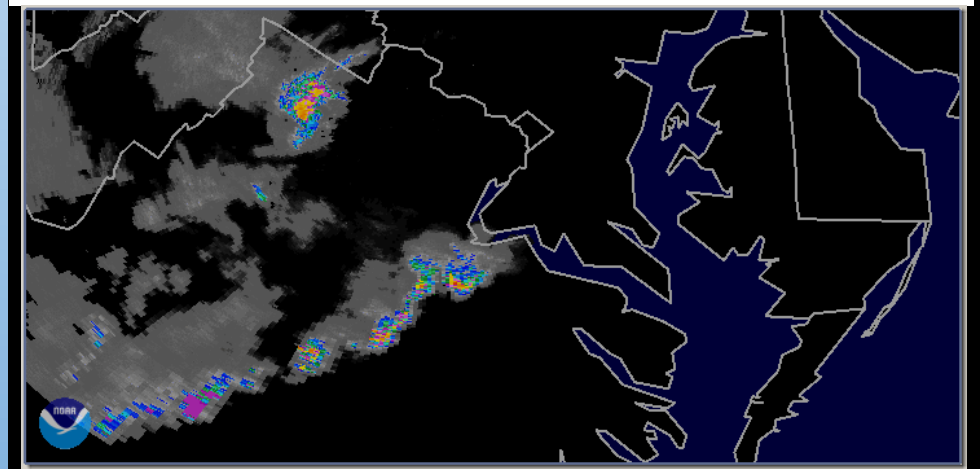
AMSR2 Propagation

- AMSR2 overpass at t_0
- Motion using ONLY lightning
- New flow field each minute
- Original AMSR2 pixels advected and regridded
- Rough feature motion



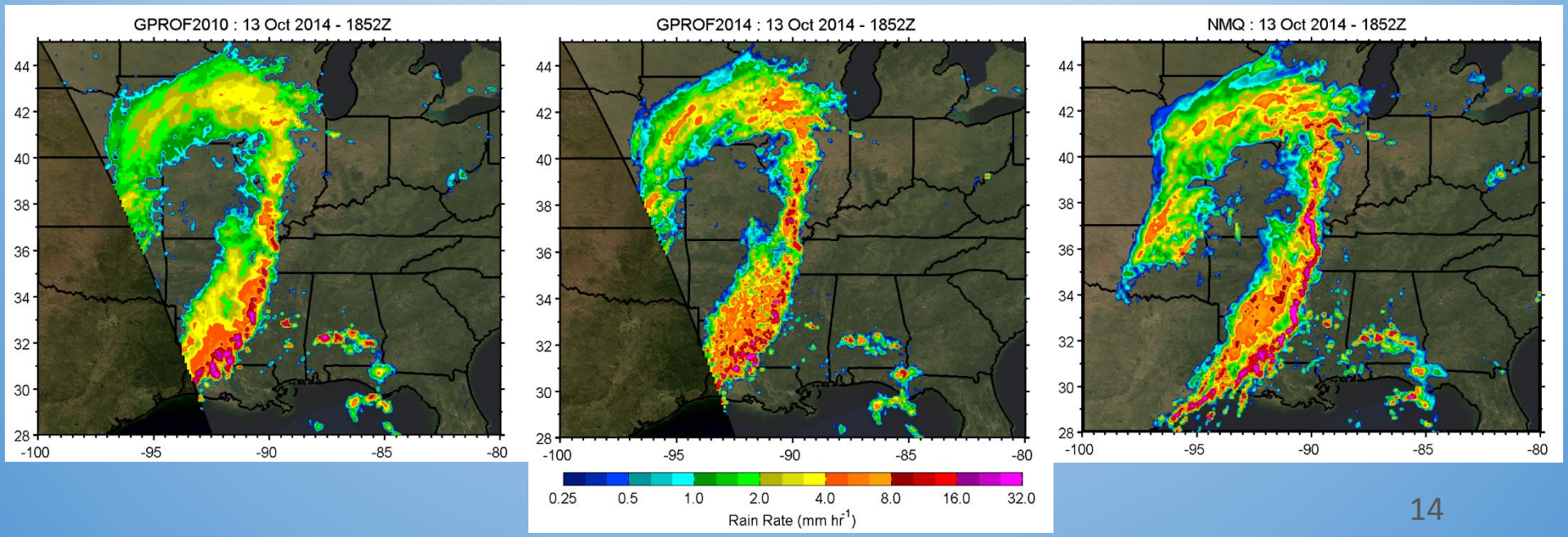
NEXRAD Precipitation

- Radar estimate of storm motion
- Ground truth



Moving to the GPM Era: GPROF2014

- Fully Bayesian precipitation retrieval
- Considered for NOAA AMSR2 EDR once algorithm stabilizes



Summary

- GPROF2010V2 is operational for AMSR2
- Latency and accuracy requirements met
- Several monitoring/validation tools developed for automated display
- Future developments will leverage multi-platform observations