



Multi-Radar Multi-Sensor (MRMS) Quantitative Precipitation Estimation (QPE)

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February 25–27, 2015
National Weather Center
Norman, Oklahoma





What is MRMS QPE?

- Radar QPE
- Gauge QPE
- Local gauge bias corrected radar QPE
- Gauge + orographic pcp climatology QPE

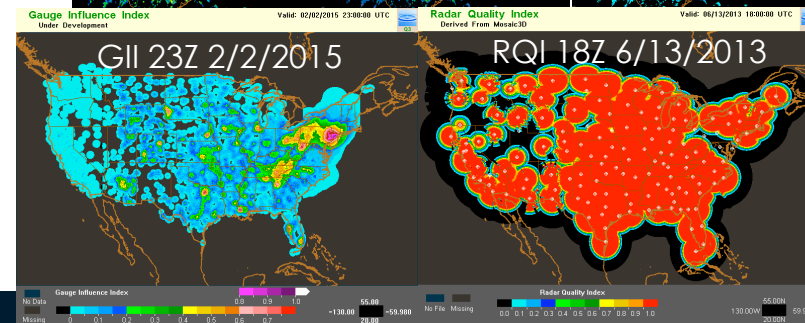
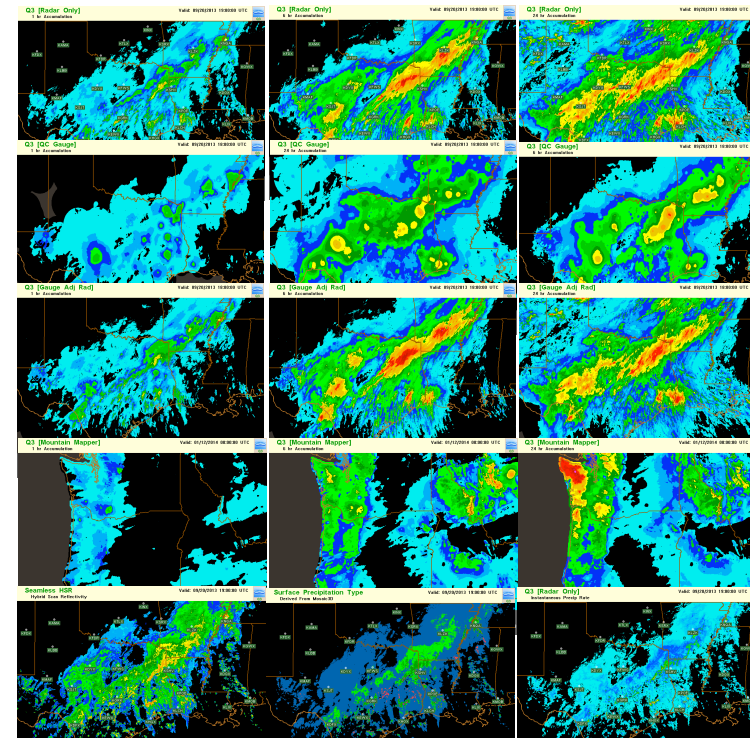
Associated with Radar QPE [1km x 1km, 2 min]:

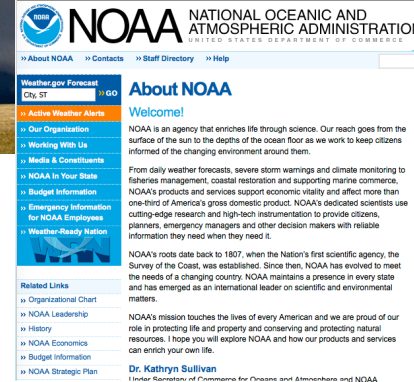
- Surface Precipitation Type
- Surface Precipitation Rate
- Radar QPE Quality Index (RQI)
- other...

Associated with Gauge QPE [1km x 1km, 1 hr]:

- Gauge Influence Index (GII)

1, 3, 6, 12, 24, 48 and 72 hr accumulations





Relevance

MRMS

Uses most advanced **polarimetric radar** technologies and provides **high-resolution** information of **precipitation types and amounts** for the nation

Products are used by WFOs, RFCs and private companies for **flash flood and river flood warnings** and **water resources management**

NOAA's mission

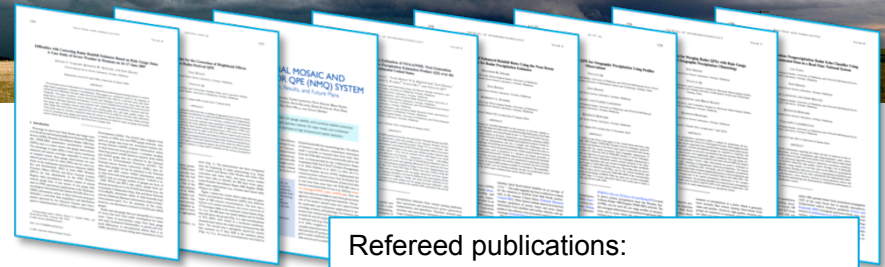
Use **cutting-edge** research and high-tech instrumentation to provide citizens, planners, emergency managers and other decision makers with **reliable information they need.**

Protect life and property and conserve and protect **natural resources**

~70 users from government agencies, universities, and private companies



Quality



Refereed publications:
18 on MRMS QPE R&D;
40+ on MRMS product applications

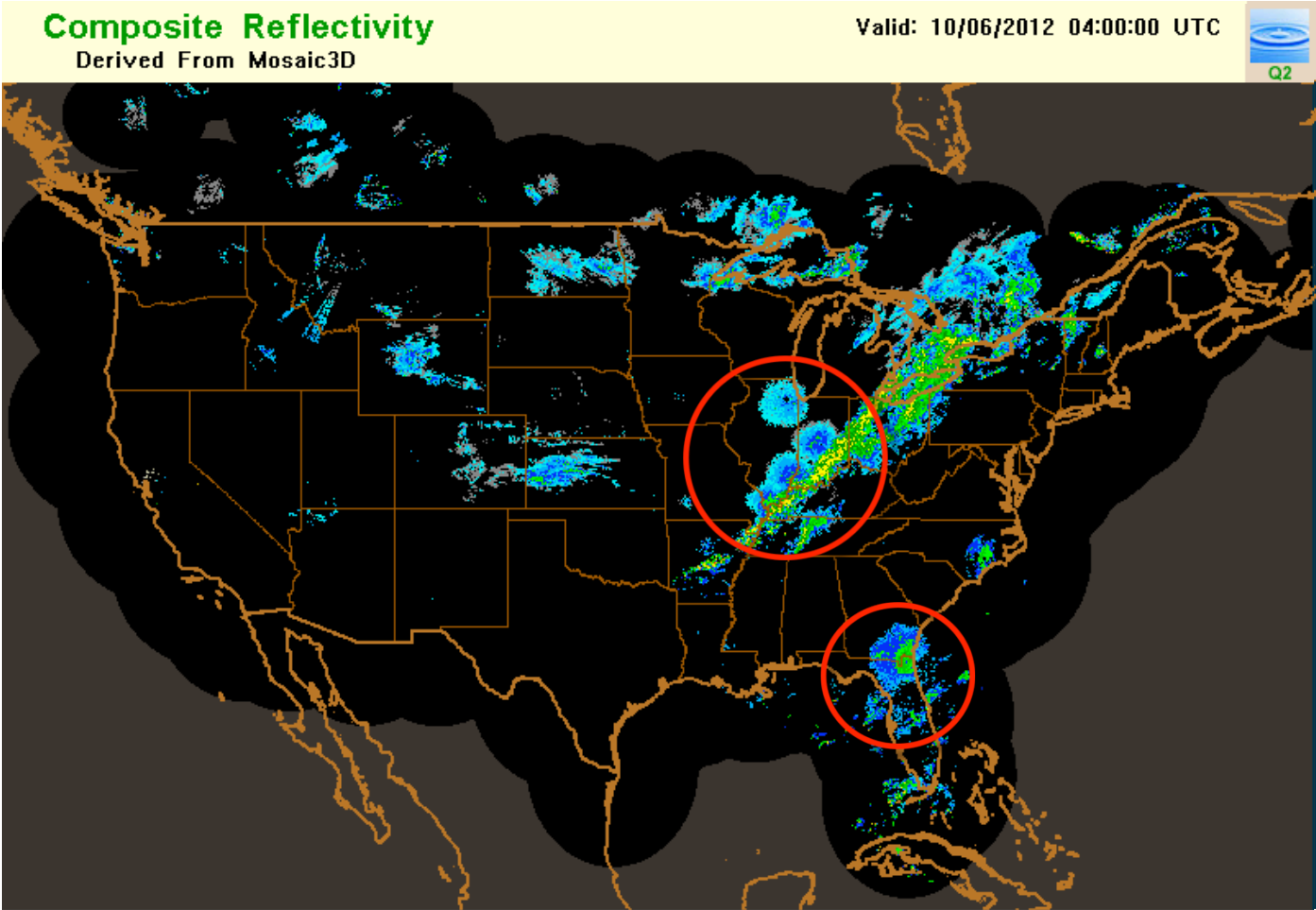
Stage-II radar QPE	2009 “Q2” radar QPE	Present “Q3” radar QPE	
		Features	Impacts
Single-pol radar data quality control (QC)	Single-pol radar QC with environmental data	Dual-pol radar data QC	Elimination of non-meteorological echoes
	Automated precipitation classification	Automated precipitation classification	More accurate spatial distributions of precipitation
One Z-R per radar domain	Five Z-Rs	Probability of Warm Rain; Weighted mean of multi Z-Rs	
		Vertical Profile of Reflectivity (VPR) correction	Mitigated range-dependent radar QPE error
4 km, 1 hr	1 km, 5 min	1 km, 2 min	Higher-resolution for flash flood and urban hydrology applications

↑
Operational in Sep. 2014



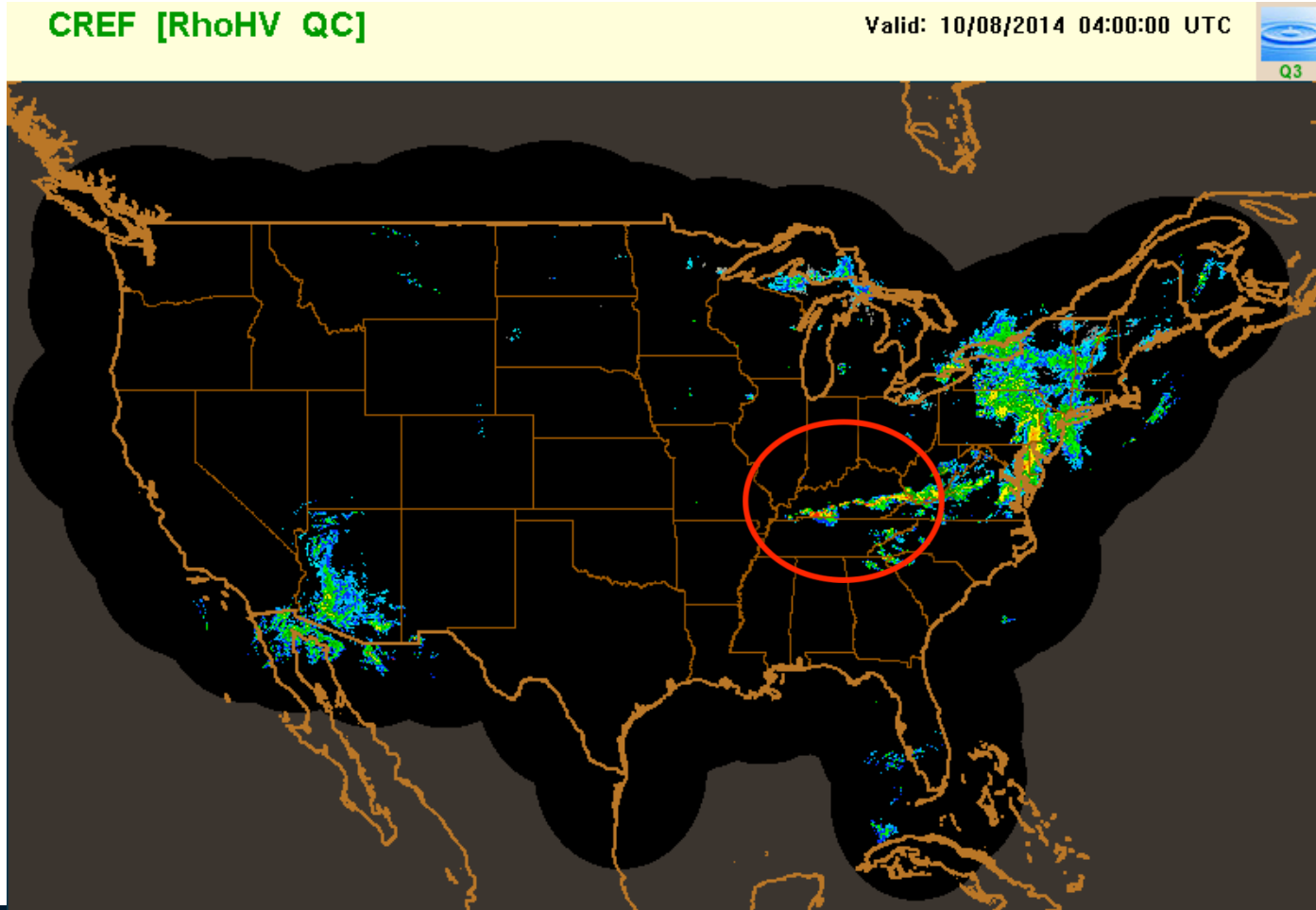


Quality (single-pol QC 2009)

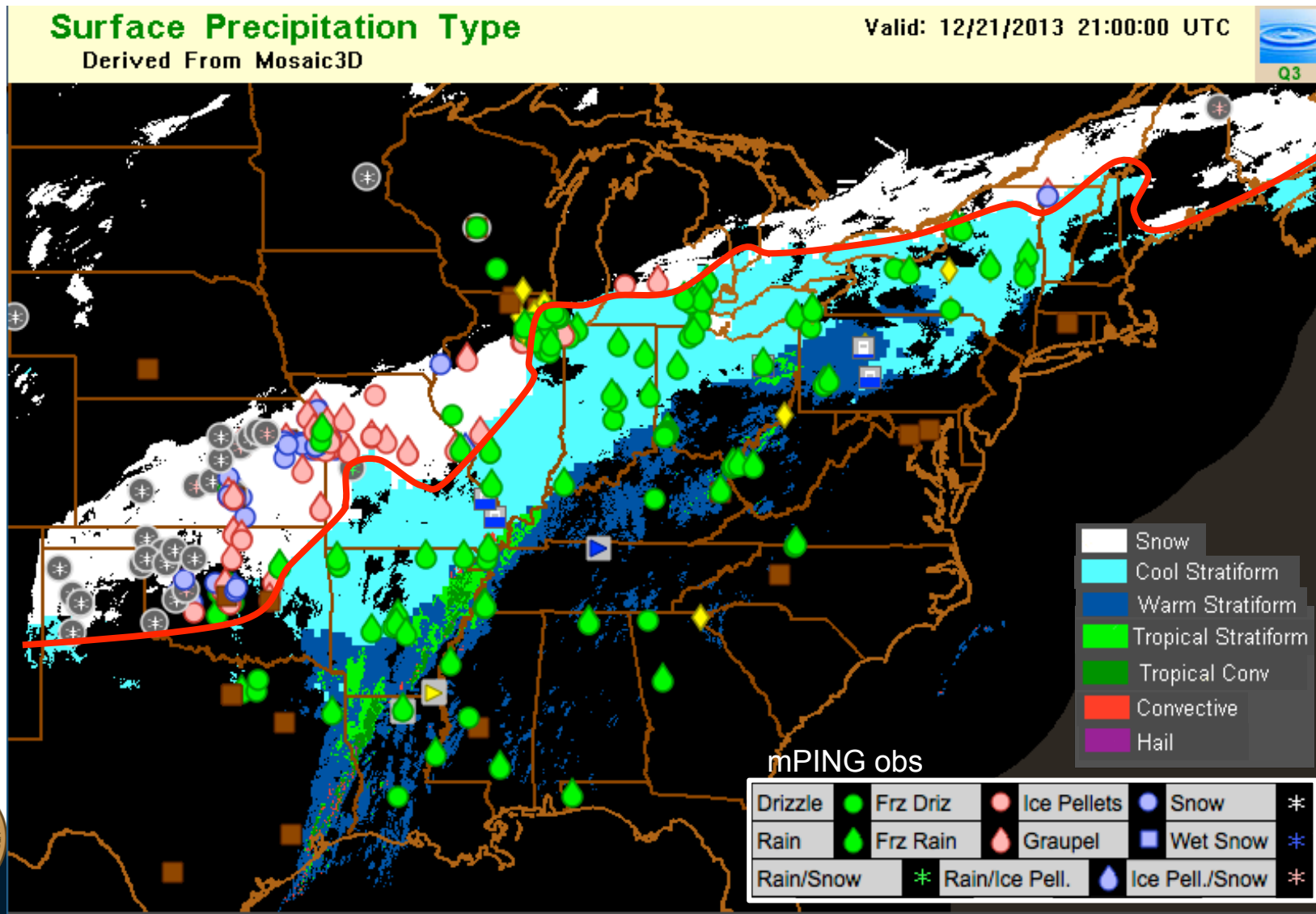




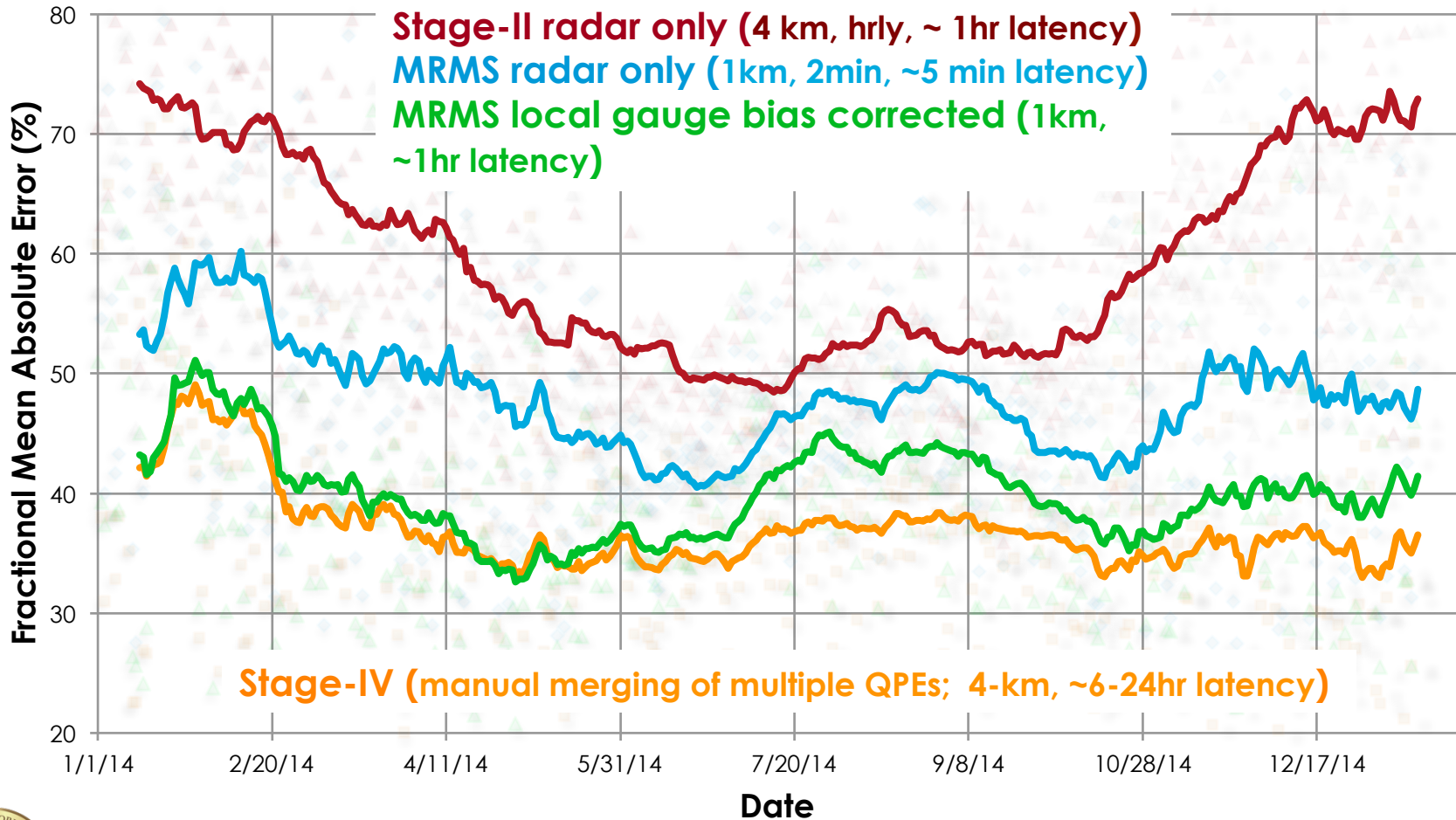
Quality (dual-pol QC present)



Quality (precipitation classification)



Performance (QPE)



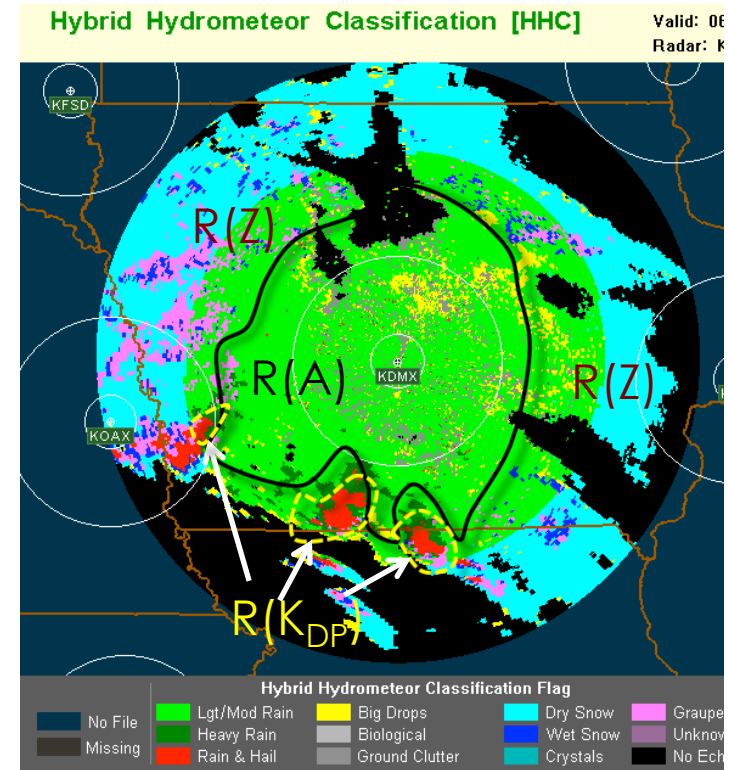
What's Next?

- Evaluate latest dual-pol radar QPE techniques across **ConUS** for **all seasons**
- Based on the evaluation, develop a new synthetic dual-pol radar QPE in MRMS (“**Q3DP**”).

$$R = \begin{cases} R(A) & \text{rain} \\ R(K_{DP}) & \text{hail/rain mix} \\ R(Z_{VPRC}) & \text{melting layer/ice} \end{cases}$$

A: specific attenuation
 K_{DP} : specific differential phase
 Z_{VPRC} : reflectivity with vertical profile of reflectivity correction

- Towards operational implementation in 2016-17.



Thank You!

MRMS - NSSL DEV
Application Suite
Launcher

Multi-Radar Multi-Sensor System

Single Product Maps <small>-Image Viewer-</small>	3D Product Tools <small>-Image Viewer-</small>	Data Plot Tools <small>-Plot Utility-</small>	Gauge/QPE Compare <small>-Comparison Utility-</small>	Two Product Maps <small>-Comparison Utility-</small>	VPR Plots <small>-Plot Utility-</small>
MRMS vs mPING <small>-Data Analysis-</small>	Level 3 Metadata <small>-Data Analysis-</small>	Level 3 Scatterplots <small>-Data Analysis-</small>	Simple Product Kiosk <small>-Image Viewer-</small>		Polar Products <small>-Legacy-</small>

Welcome to the Web Application Launcher
for Investigating the MRMS/Q3 System

Near the top of this page there is a horizontal row of tabs or buttons

- Hover over each button for a brief explanation of that item
- Click on the button to open that web application in a new browser window

The MRMS project is a joint initiative between the National Severe Storms Laboratory, Federal Aviation Administration, National Weather Service/Office of Hydrologic Development, the Office of Climate, Water and Weather Services and the University of Oklahoma Cooperative Institute in Mesoscale Meteorological Studies.

MRMS is an automated system that rapidly and intelligently integrates data from multiple radars and radar networks, surface and upper air observations, and numerical weather prediction (NWP) models. It serves as an international testbed for research, development, evaluation and science to operations infusion of high resolution 3D radar mosaic for NWP model data assimilation and aviation applications. It also generates a suite of quantitative precipitation estimation ("Q3") products for the monitoring and warnings of floods and flash floods and in support of comprehensive hydrologic and ecosystem modeling.

[2005 Legacy QVS](#)
[2012 Legacy QVS](#)

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mrms.ou.edu

