



BT TC WS HR GR UK



VCP 12
0.25 km

----- WWS HR GR UK
----- WWS HR GR UK

Dual Polarization Radar Update

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Warning Decision Training Branch



NSWW 2010
March 6, 2010

kcri 0.5 Melting Layer Tue 05:43Z + kcri 0.5 KDP 8bit Tue 05:43Z + kcri 0.5 KDP 8bit Tue 05:43Z +

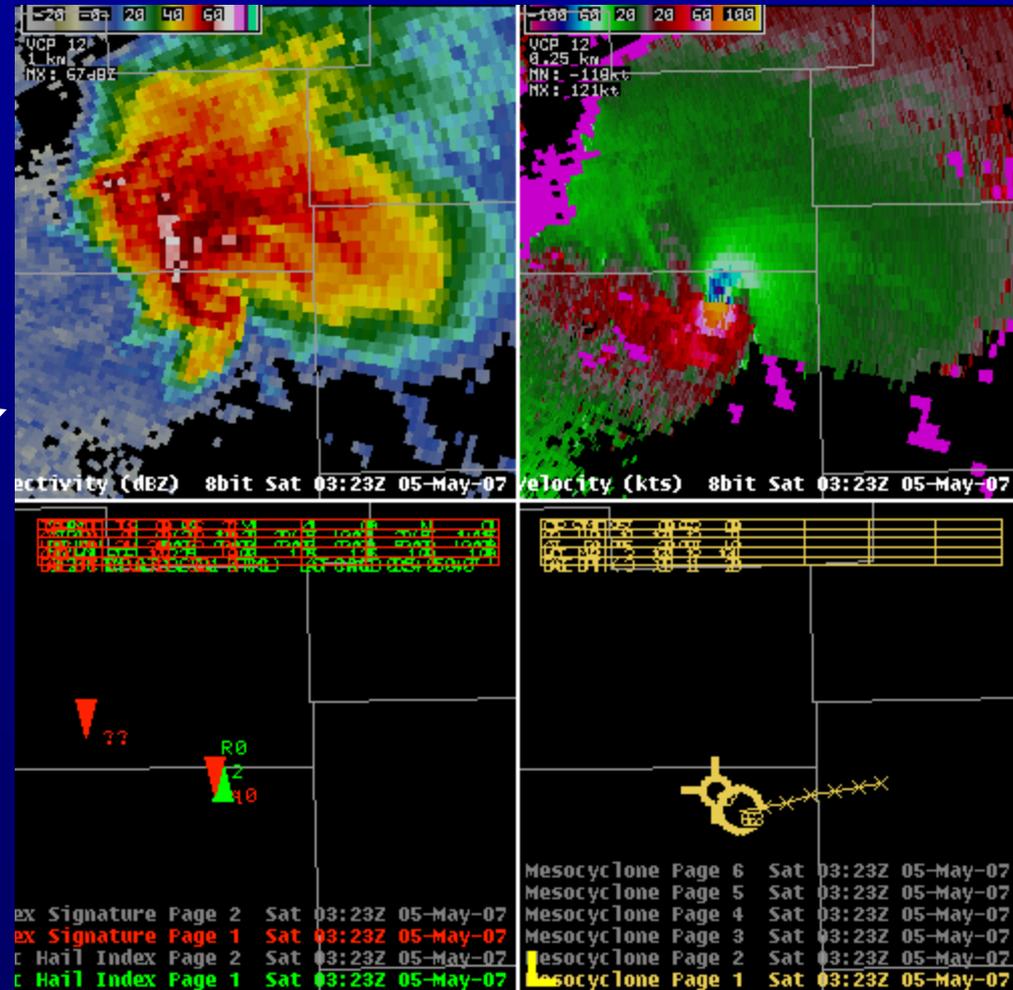
WSR-88D with Dual-Pol

Separate Receivers for
Horizontal and Vertical
Returned Power



Compare to Current Radars

- Retrofit on existing dish, tower, etc.
- Same data resolution
- Same Volume Coverage Patterns and Update Times
- Velocity, Reflectivity, Algorithms, etc.: Unchanged



Policy of "Do no harm"

List of New Products via Dual-Pol

- Differential Reflectivity (ZDR)
- Correlation Coefficient (CC)
- Specific Differential Phase (KDP)

- Algorithms
 - Melting Layer
 - Hydrometeor Classification

- 9 NEW Precipitation Estimation Products

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- Correlation Coefficient (CC)
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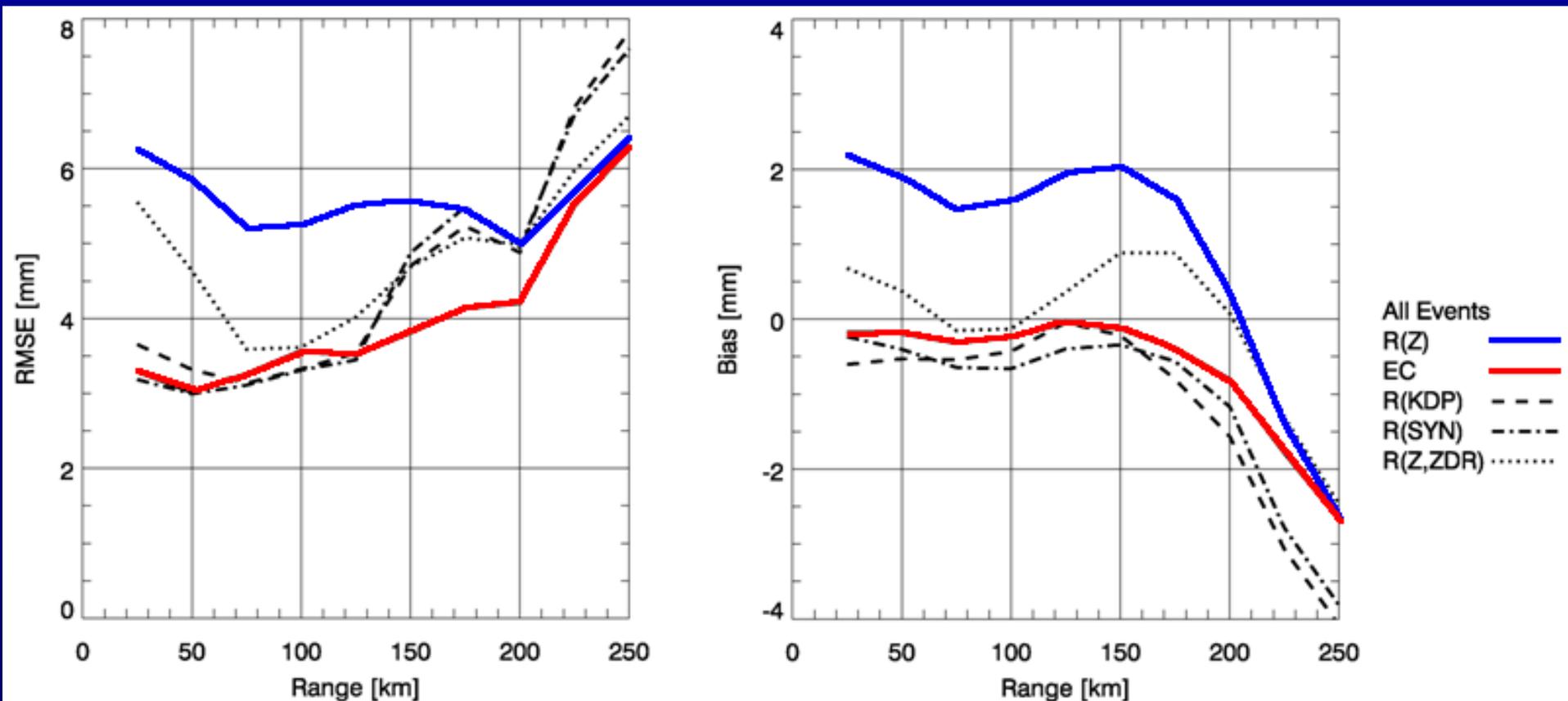
- Algorithms
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Highlights of How Dual-pol Data Will Aid Decision Makers

1. Better precipitation estimation
2. Improved detection and mitigation of non-weather echoes
3. Melting layer identification
4. Hydrometeor classification
5. New severe storm signatures

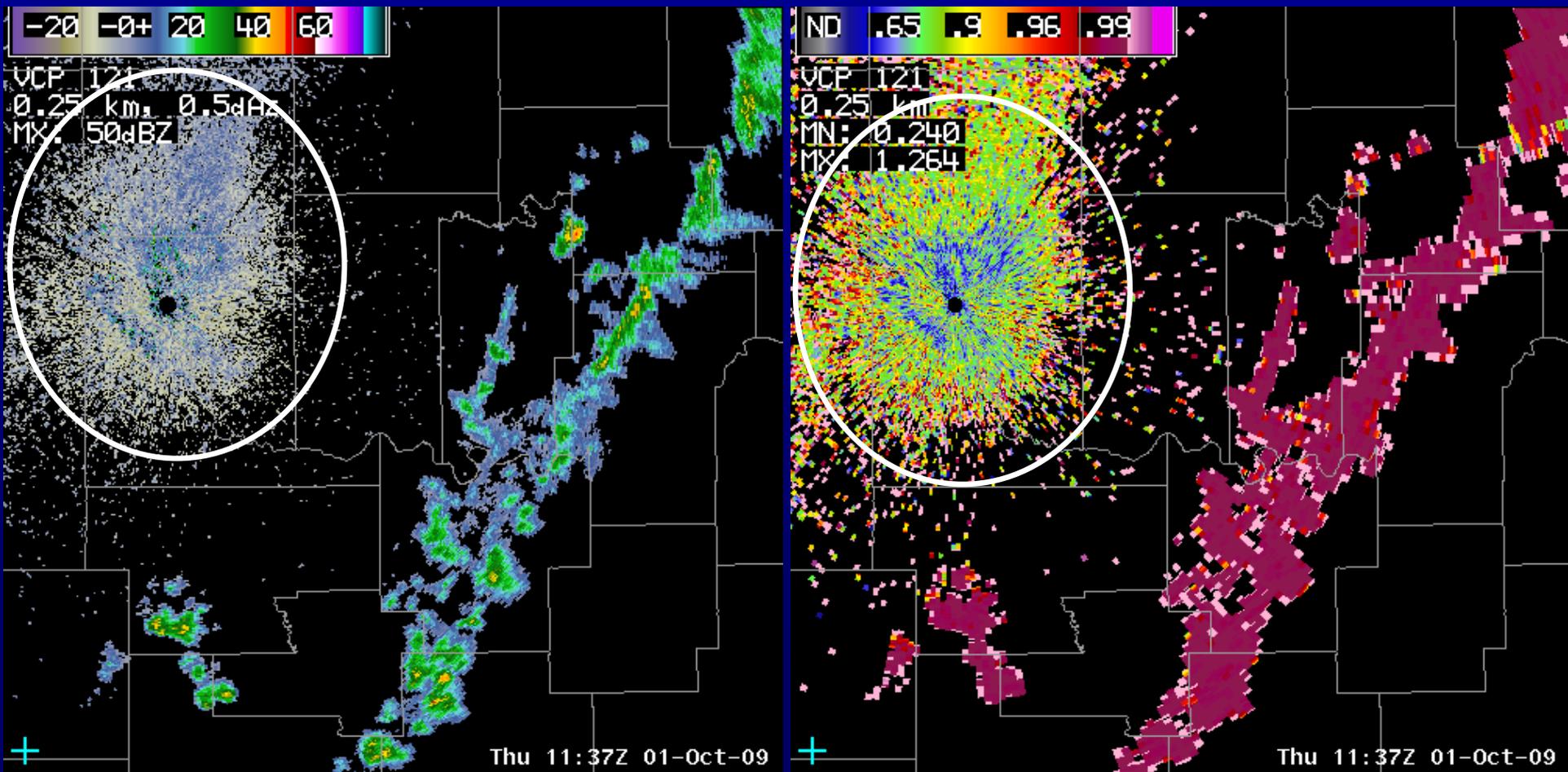
1. Better Rainfall Estimation



→ Based on 43 events (179 hrs) of radar rainfall data comparisons to a dense network of rain gauges in C. OK

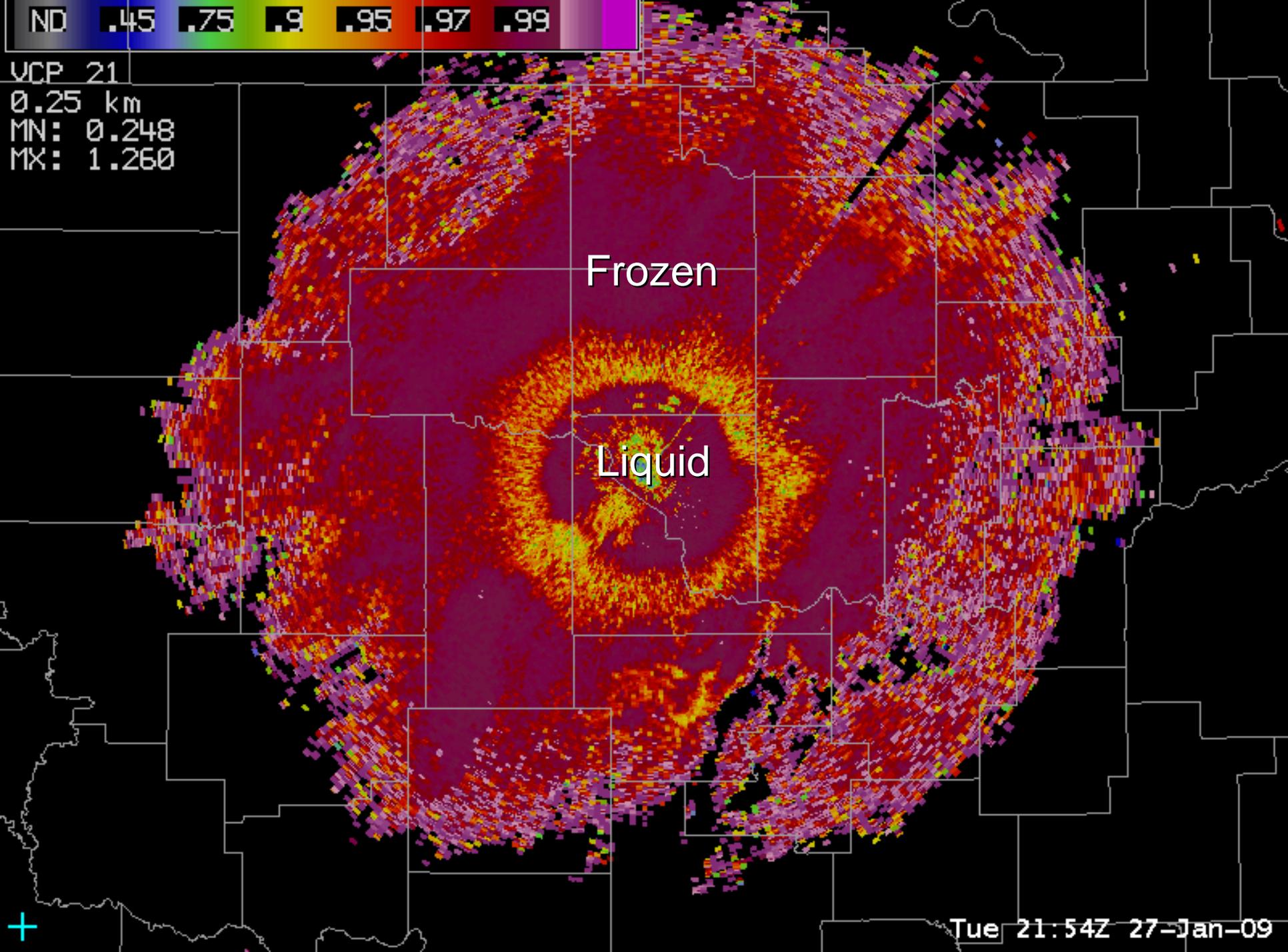
2. Improved Detection and Mitigation of Non-Weather Echoes

- Chaff, AP/Ground Clutter, Birds/Insects



3. Melting Layer Detection

- Melting hydrometeors easy to spot!
- Applications
 - Winter weather nowcasting: Rain/snow/freezing rain/sleet
 - Rainfall estimation



4. Hydrometeor Classification

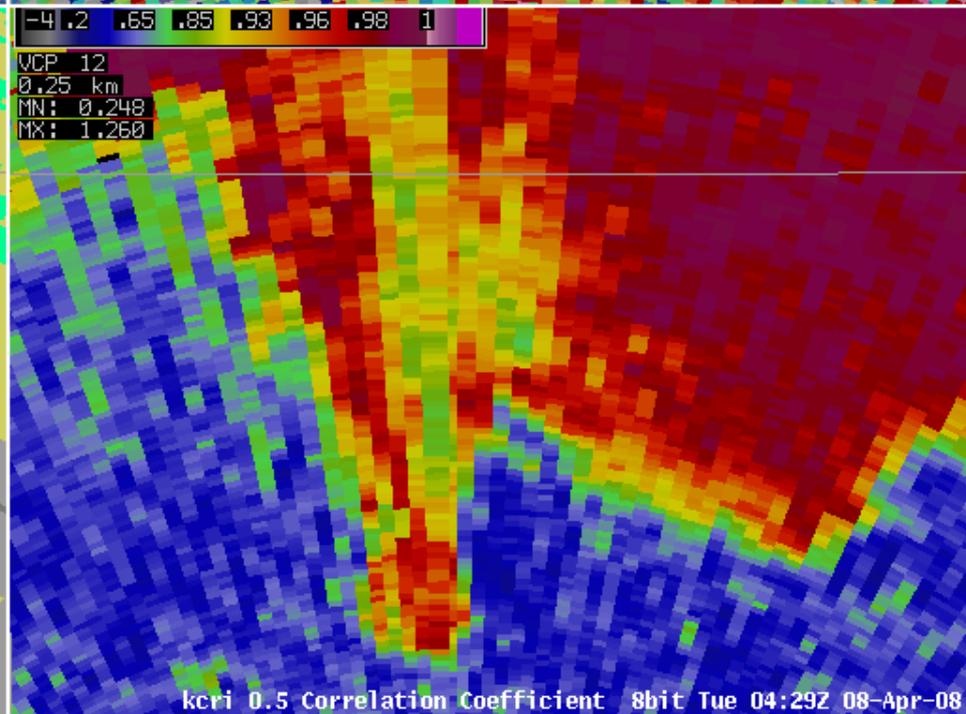
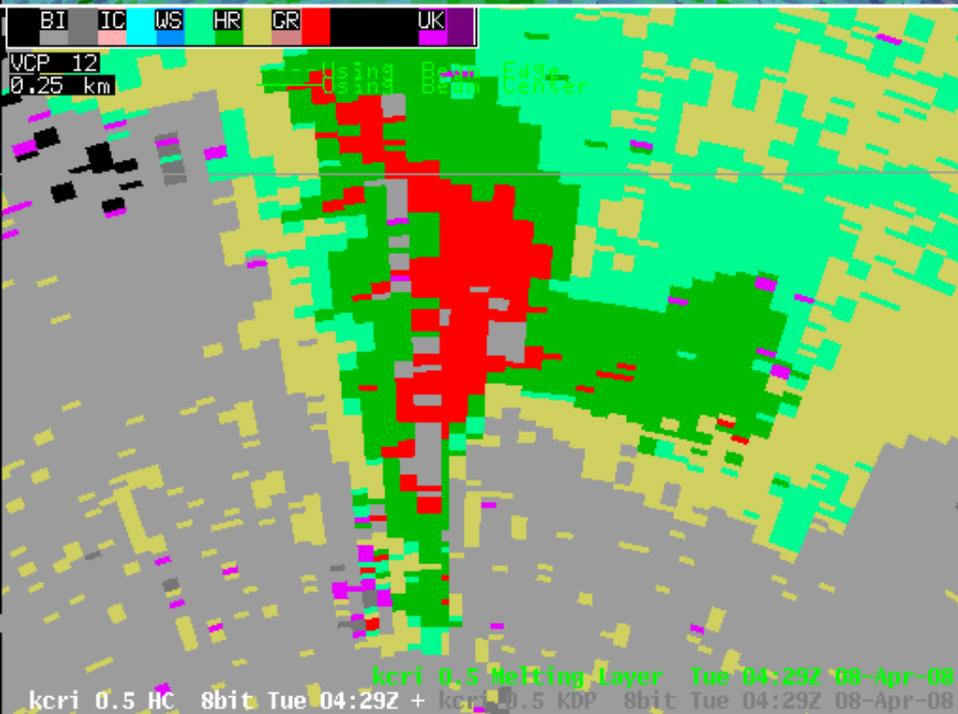
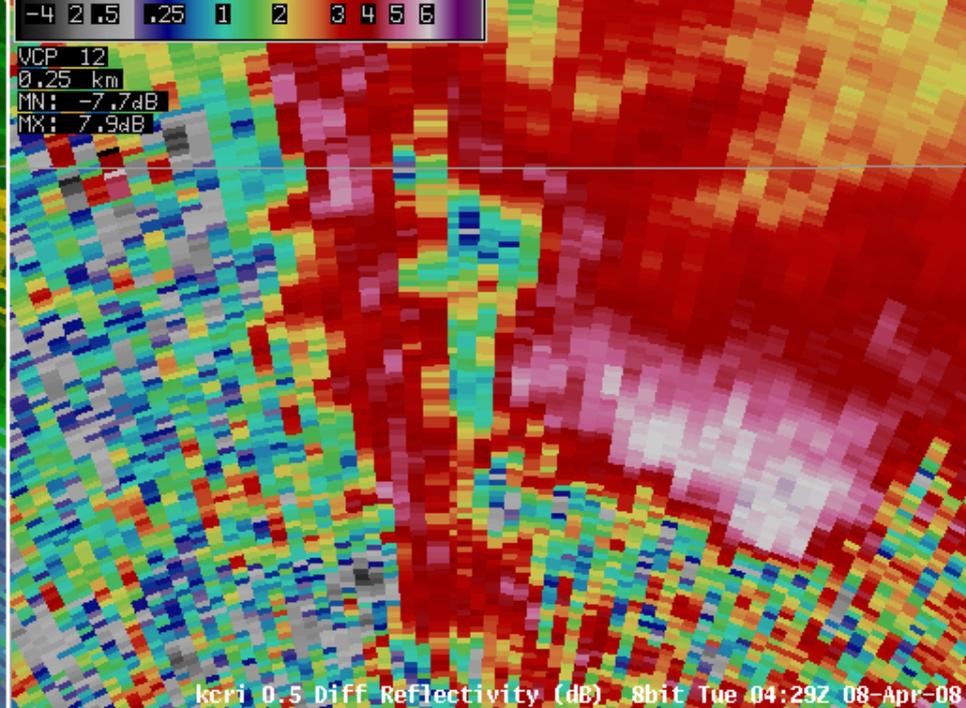
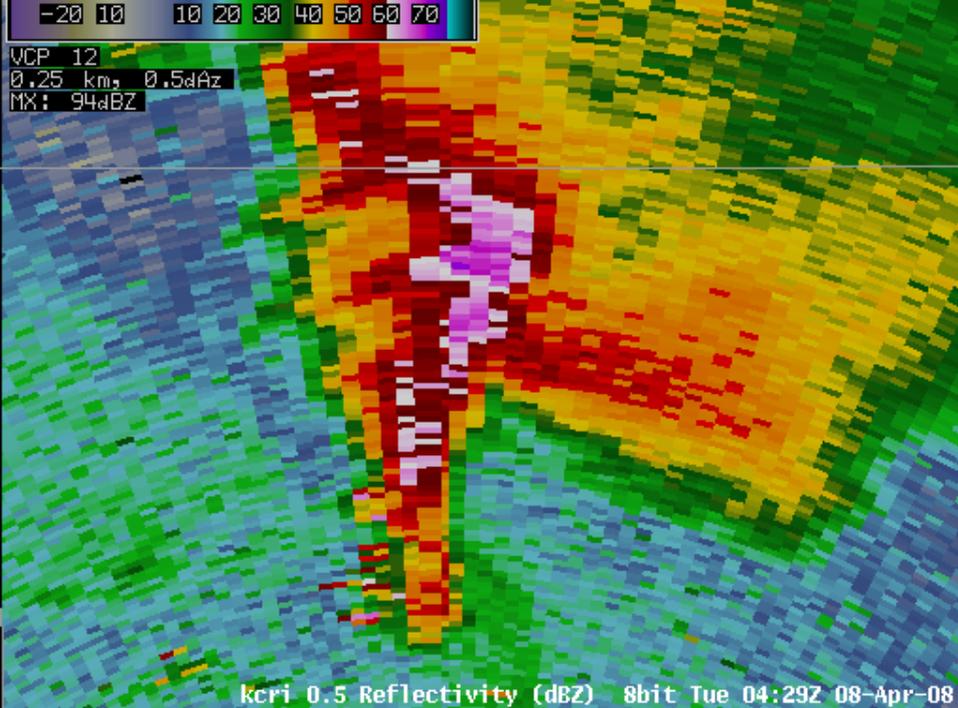
- Algorithm makes best guess of dominant radar echo type
 - Every radar elevation angle



Current Classification Options

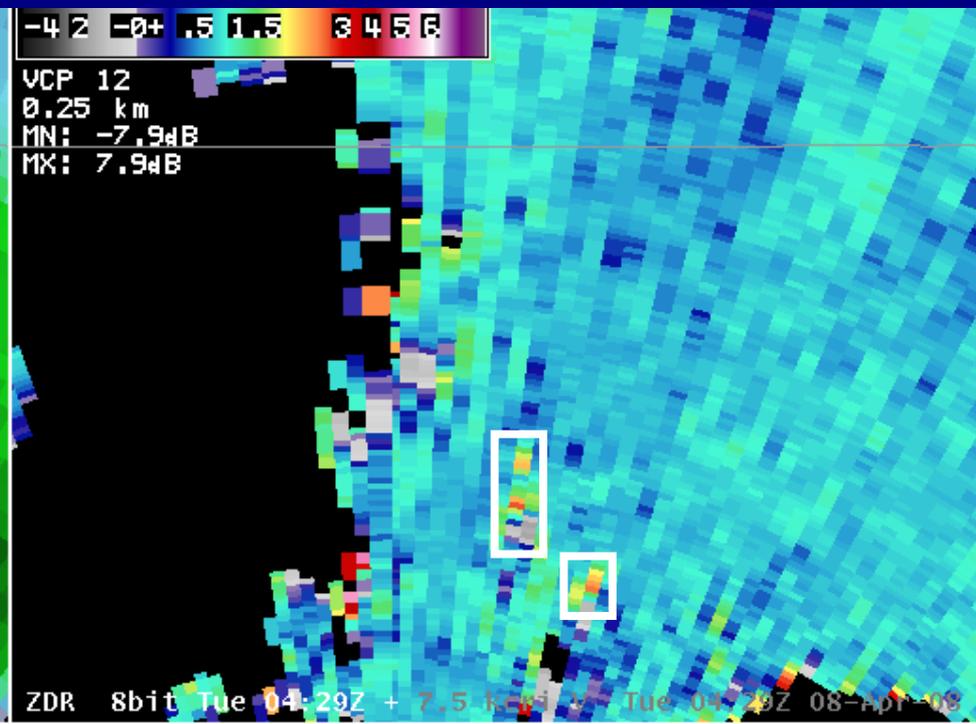
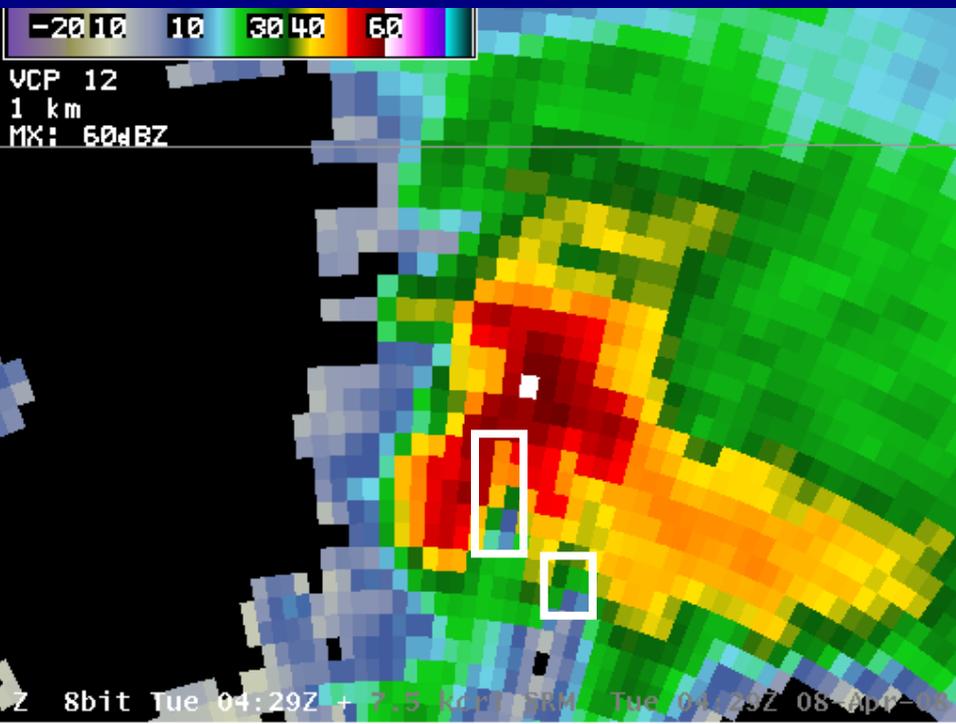
5. Severe Storm Signatures

- Hail Detection
- Updraft Detection
- Tornadic Debris Detection
- Research finding others



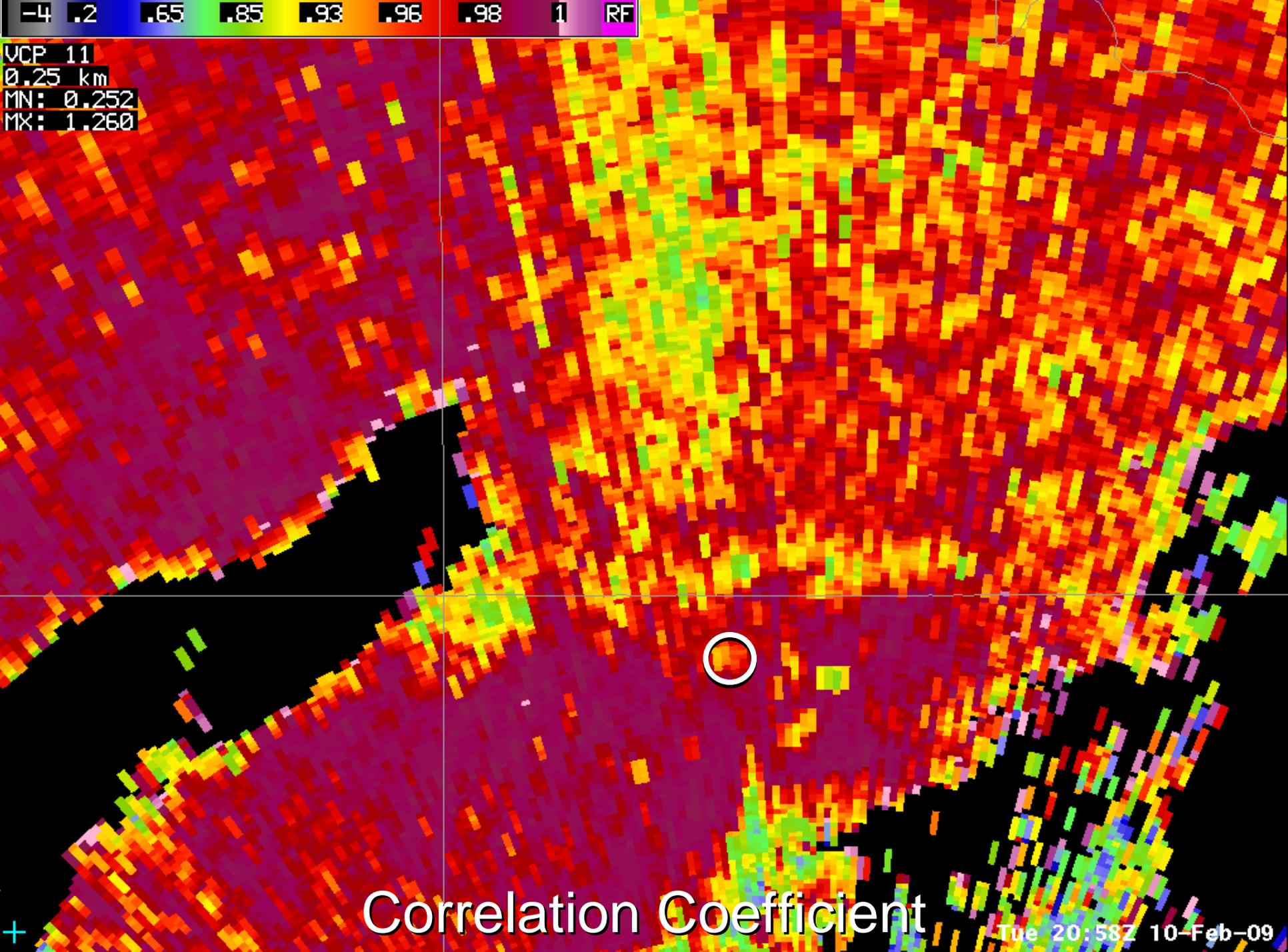
Updraft Detection

- “ZDR columns”: regions of liquid water found above the environmental 0°C height





UCP 11
0.25 km
MN: 0.252
MX: 1.260



Correlation Coefficient

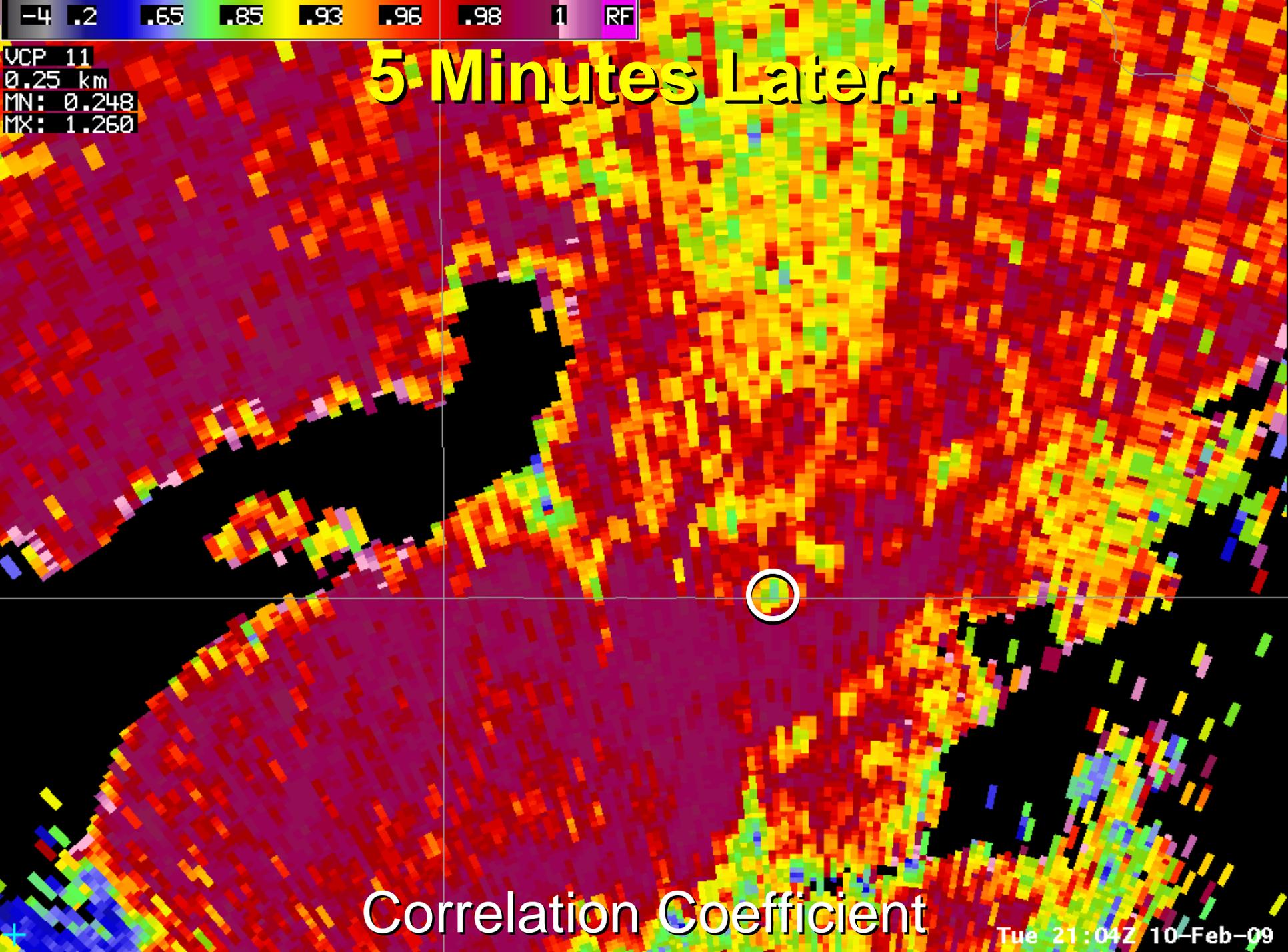
Tue 20:58Z 10-Feb-09

+



VCP 11
0.25 km
MN: 0.248
MX: 1.260

5 Minutes Later...

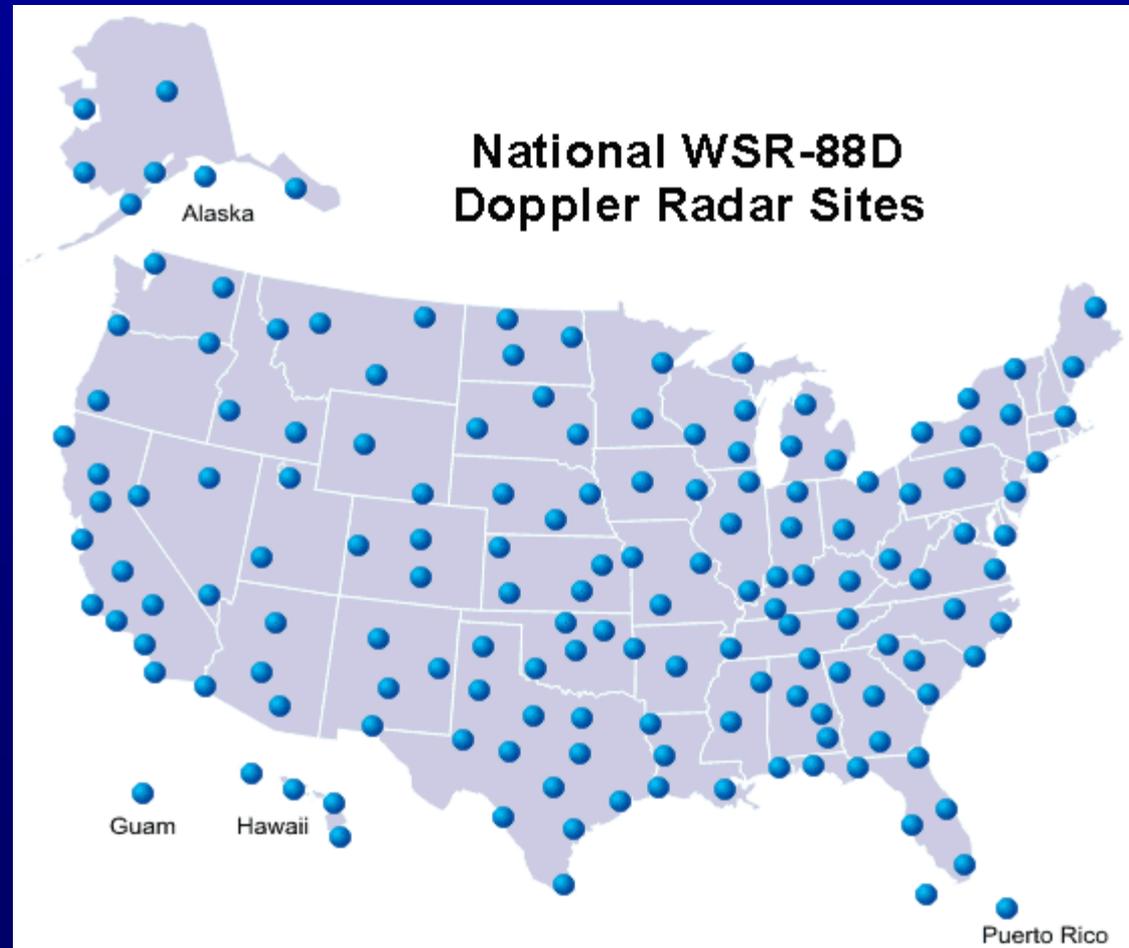


Correlation Coefficient

Tue 21:04Z 10-Feb-09

When/What is the Impact?

- All WSR-88Ds upgraded 2010-2012
- 10-14 days radar downtime during upgrade



Target Two Critical Stakeholders

Course	WSR-88D Dual Pol Operations Course	Dual-Pol Education and Outreach
Audience	All NWS Forecasters <ul style="list-style-type: none">- Meteorologists- Hydrologists- CWSUs	<ul style="list-style-type: none">- First Responders- Broadcast Mets- HMTs- Emergency Managers- Other Public Stakeholders
Scope	<ul style="list-style-type: none">- Two ~8 hour courses delivered over 2 years- Web-based & Simulations	<ul style="list-style-type: none">- Two online modules- Support materials for WCMs

Latest Dual-Pol Schedule

2010 JFM	2010 AMJ	2010 JAS	2010 OND	2011 JFM	2011 AMJ	2011 JAS	2011 OND	2012 JFM	2012 AMJ	2012 JAS	2012 OND	2013 JFM	2013 AMJ	2013 JAS	
			Beta Test 1 st Radars upgraded												
				Deployment 10-14 days downtime each radar											
		WDTB's Dual-Pol Outreach Course Targeted audience: EMs, first responders, media, general public													
		WDTB's Dual-Pol Operations Course Part 1 Topics: Background and Theory End Goal: Develop Expertise													
						WDTB's Dual-Pol Operations Course Part 2 Topics: Advanced Applications and Simulations End Goal: Fully Integrated into Operations									

Questions?

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www.wdtb.noaa.gov/modules/dualpol