



# NOAA's National Weather Service Completes Doppler Radar Upgrades

Dual-Polarization Radar Proves Valuable During Recent  
Severe Weather

*Stories from  
NWS Forecasters*

April 2013

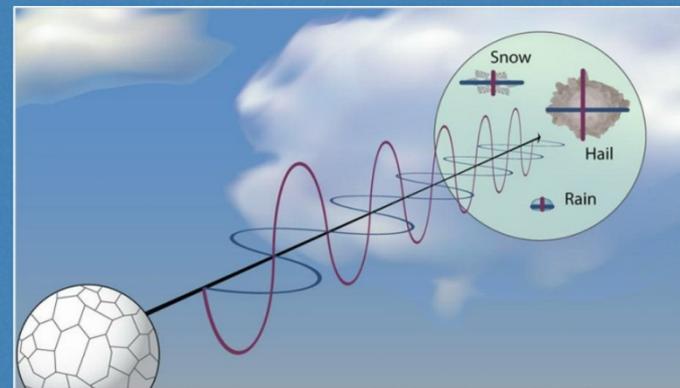


# Overview

- NEXRAD upgrade to dual polarization huge project
  - Within budget & ahead of schedule
- How does dual-pol work?
- Dual-Pol samples both horizontal *and* vertical

Able to identify:

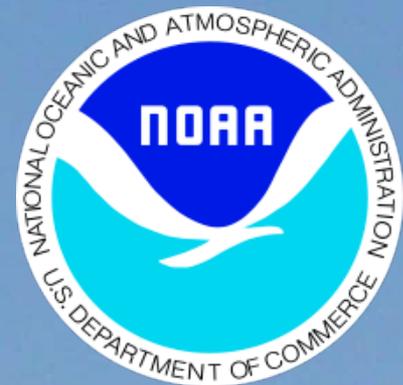
1. Non-weather: dust, birds, insects, smoke, even debris from a tornado
2. If weather, what type: rain, snow, hail



# Forecasters Share Their Stories

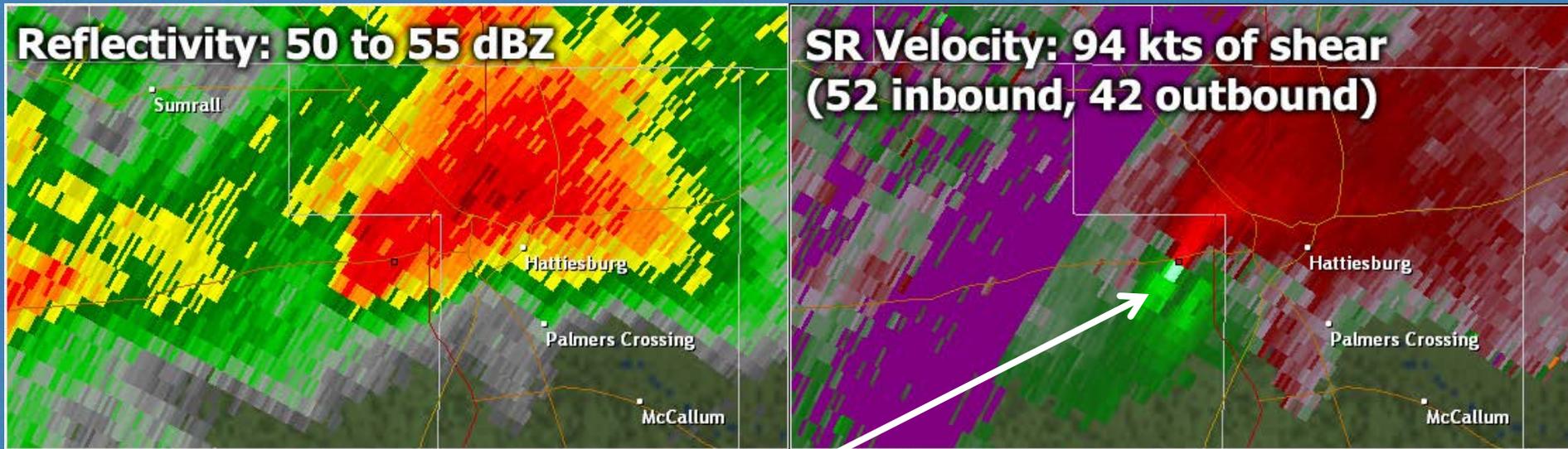
NWS forecasters:

- Alan Gerard, MIC, Jackson, Miss
- Jerilyn Billings, meteorologist, Wichita, KS
- Joey Picca, meteorologist, New York, NY



# February 10, 2013 Tornado Hattiesburg, MS

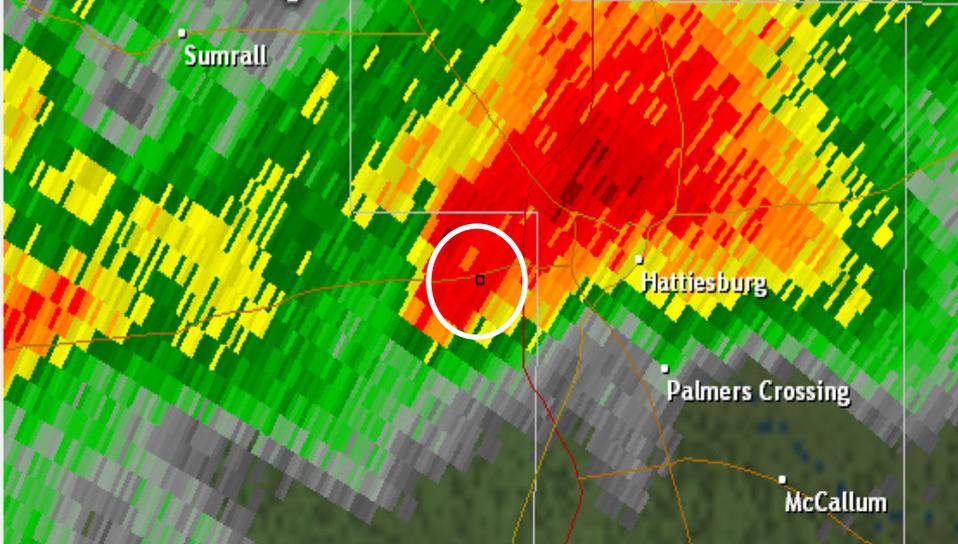
Speaker: Alan Gerard, meteorologist-in-charge, Jackson, Miss., NWS Forecast Office



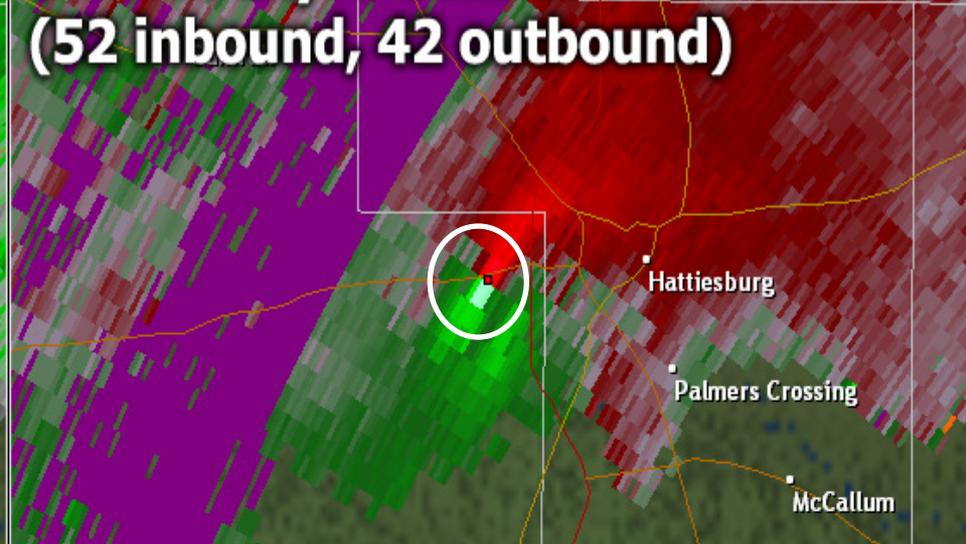
- Doppler radar reveals rotation in storm approaching Hattiesburg
- Without dual-pol, need spotters or “ground truth” to verify tornado

# With Dual-pol: Confirmed Damaging Tornado

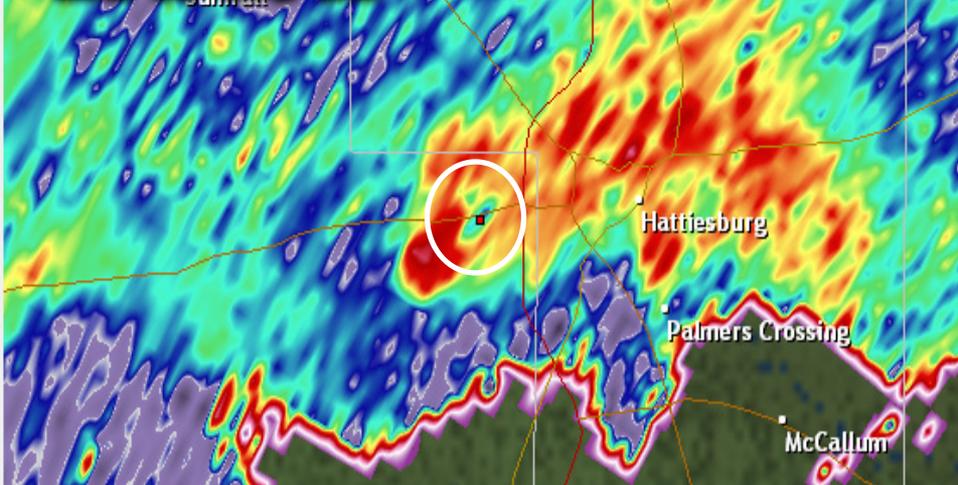
**Reflectivity: 50 to 55 dBZ**



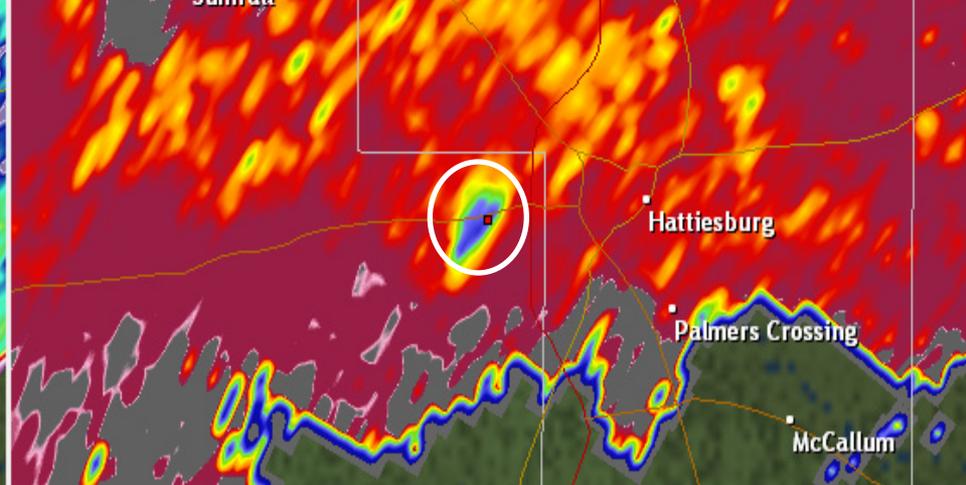
**SR Velocity: 94 kts of shear  
(52 inbound, 42 outbound)**



**Differential Reflectivity:  
-1.1 to 1.8 dB**



**Correlation Coefficient: .52 to .76**



# EF-4 Tornado in Hattiesburg



- ZERO deaths, 82 injuries
- Confident warnings, accurate and actionable information from the Dual-Pol radar

# Flash Flooding in Jackson



00:56

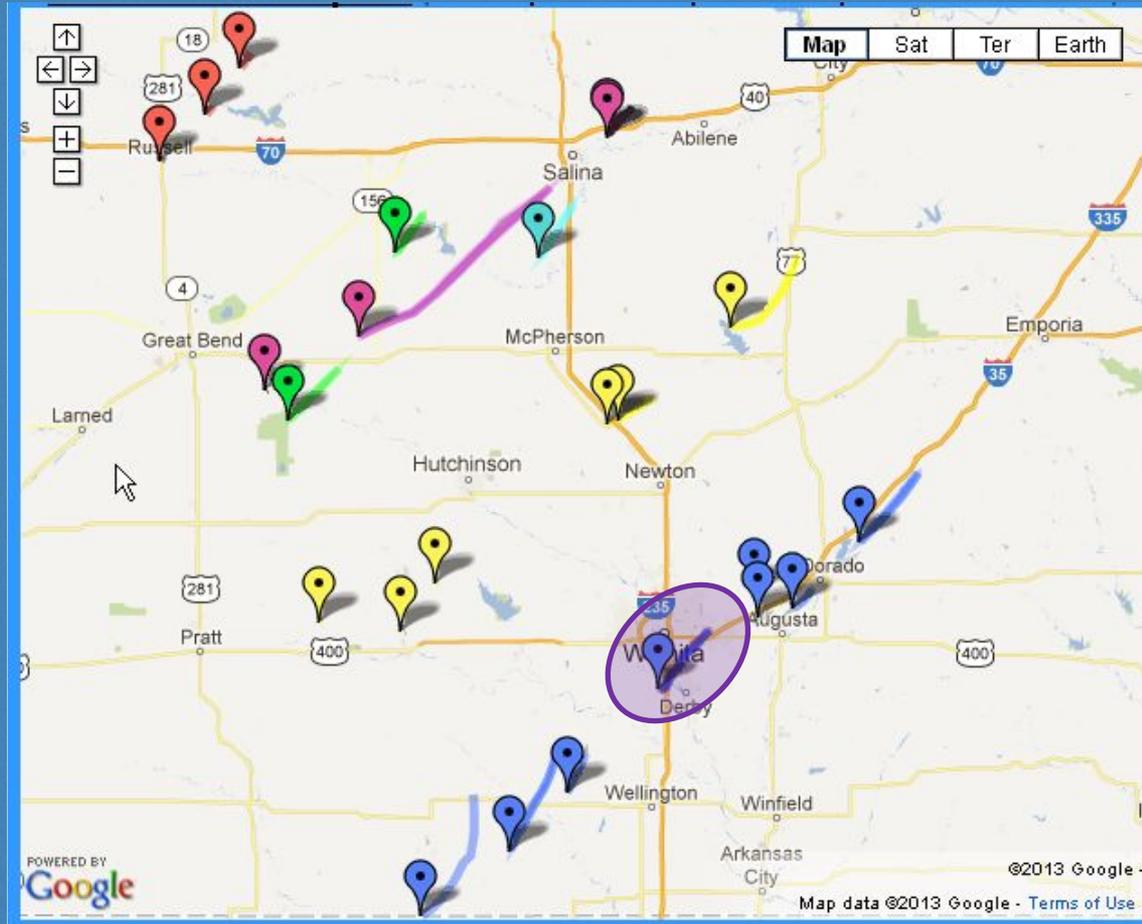
01:09



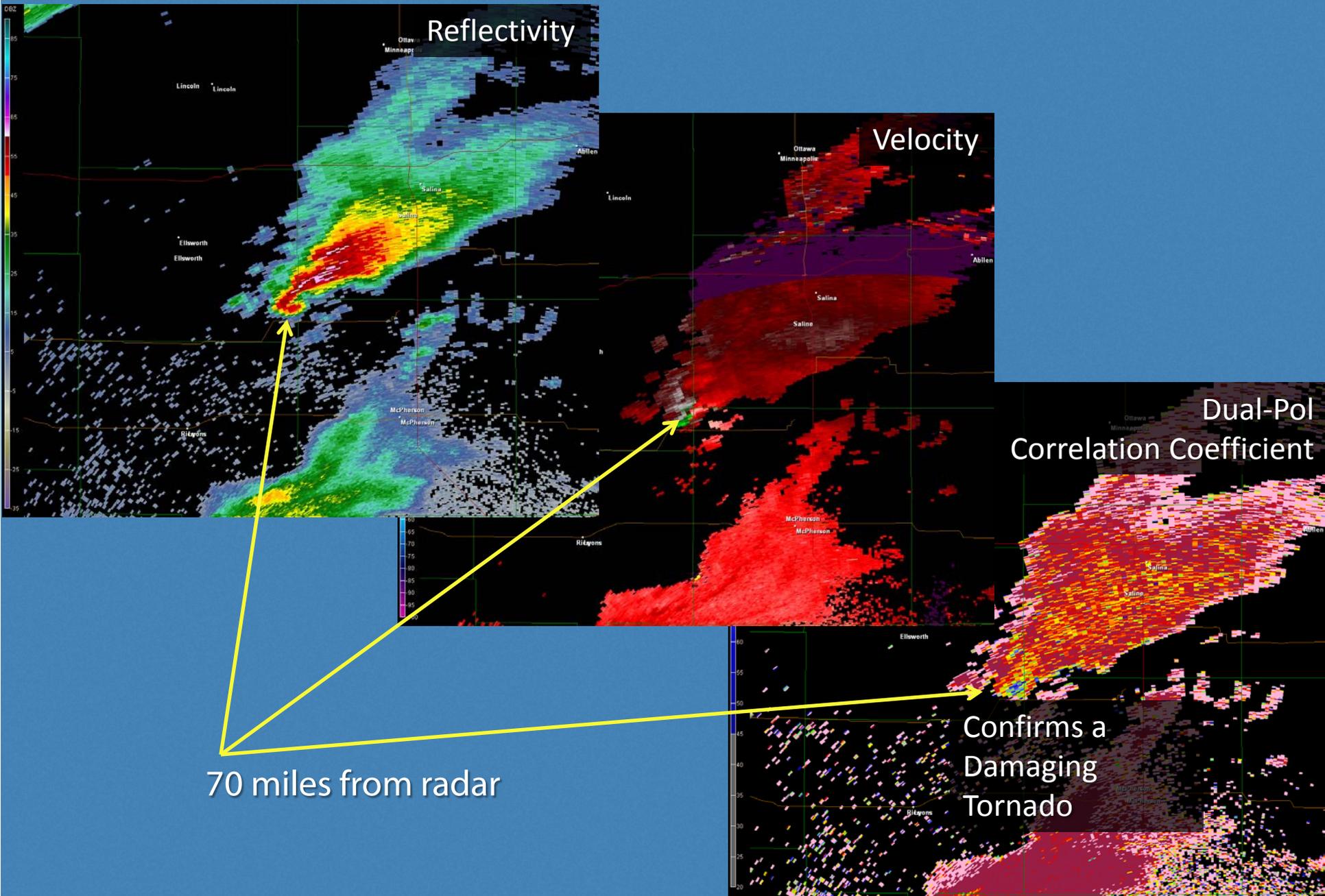
# April 14, 2012 Tornado Outbreak Wichita, KS

Speaker: Jerilyn Billings, meteorologist, Wichita, KS, NWS forecast office

- >100 tornadoes tore through region, 24 in Wichita's area of responsibility
- Long range outlook increased awareness
- Dual-Pol radar improved forecaster confidence in the tornado warnings issued, and hail detection

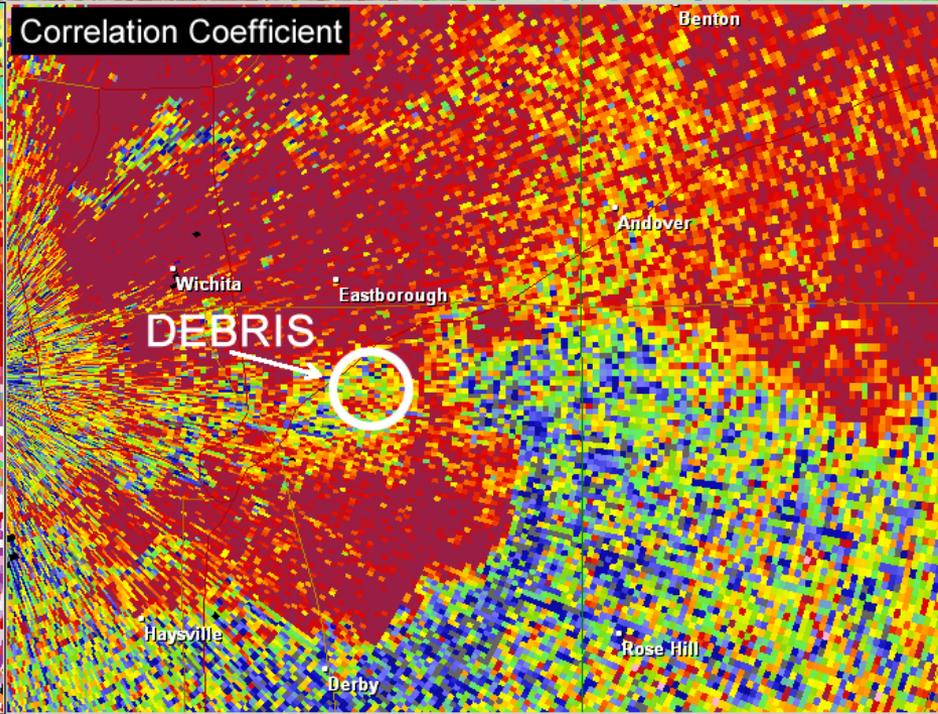
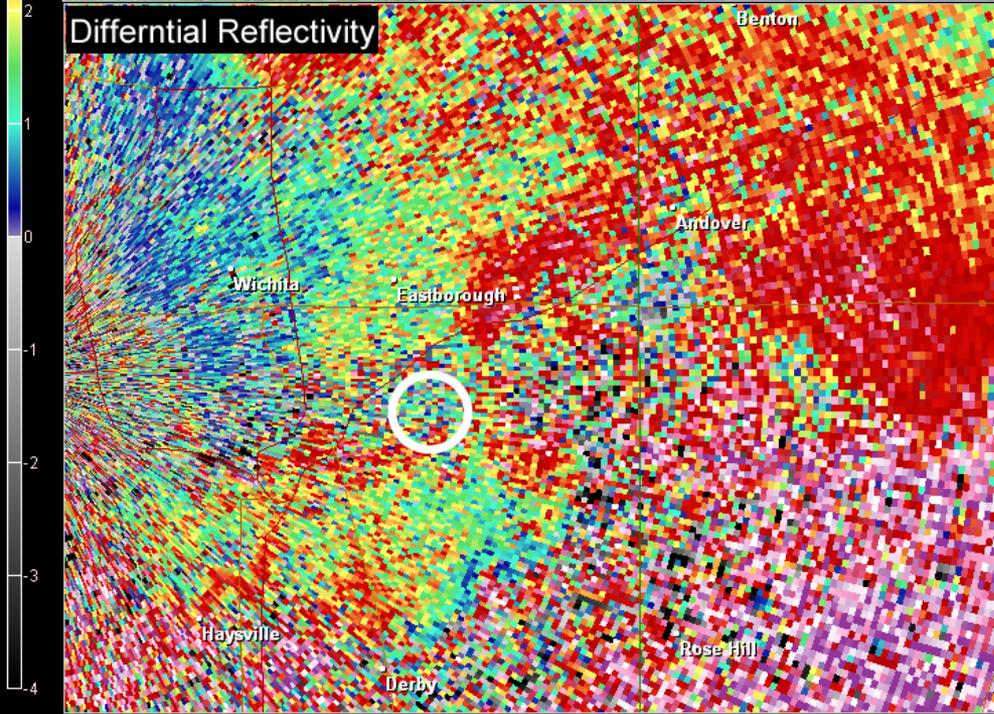
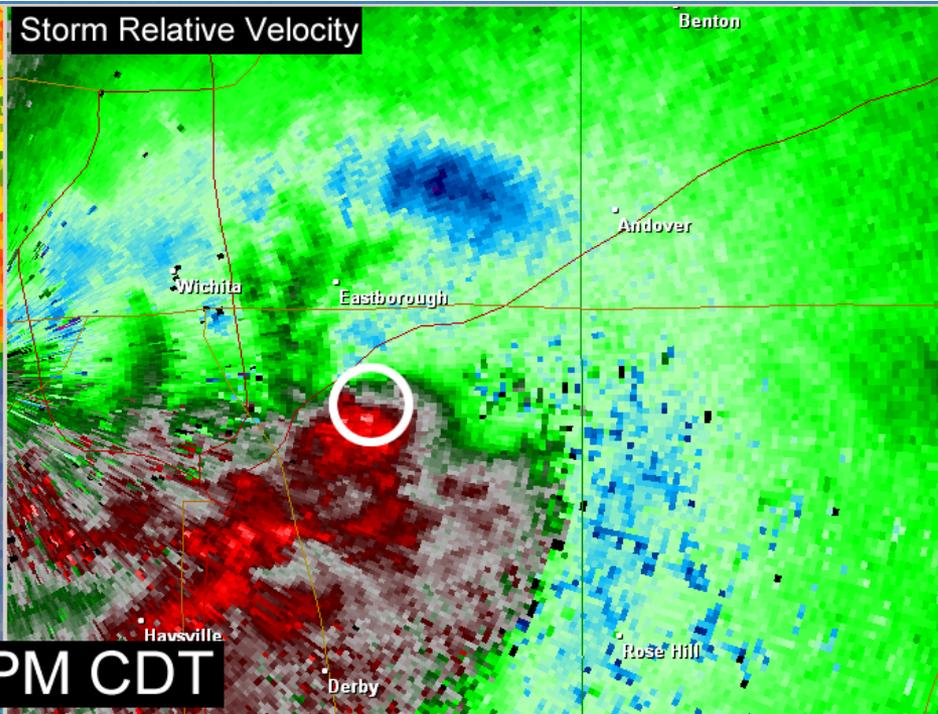
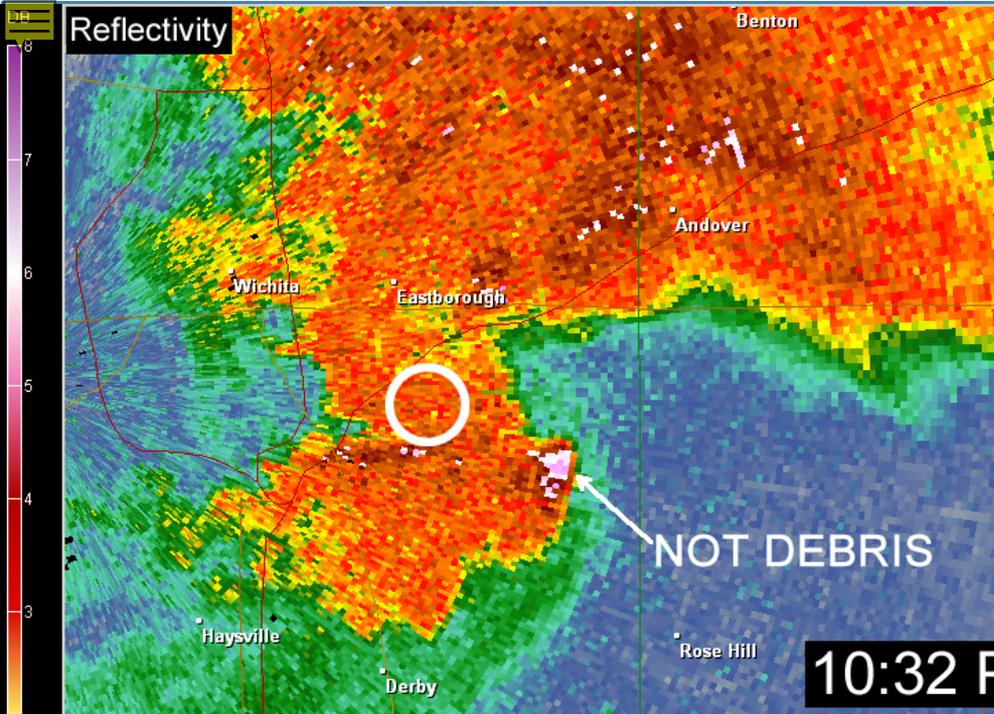


# Example: Value Added via Dual-Pol Information



70 miles from radar

Confirms a  
Damaging  
Tornado



# Event Summary



- No fatalities in Wichita despite EF-3 damage
- Our consistency and confidence in the path and expected impacts from the tornado meant people were ready and took action in Wichita



# February 8-9, 2013 Blizzard

## New York, New Jersey, Southern New England

Speaker: Joey Picca, meteorologist, Upton, N.Y., NWS forecast office

- Blizzard = heavy snow + strong wind
- Also areas with persistent sleet and ice

- Where's the sleet and ice?
- Where's the heavy snow?
- Conventional radar can't tell us



# February 8-9, 2013 Blizzard

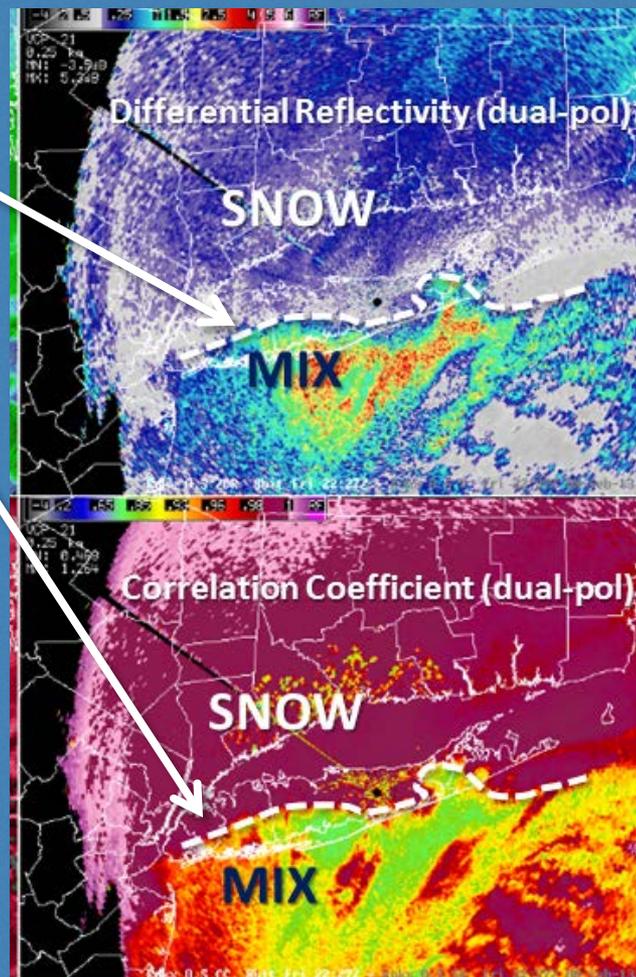
## New York, New Jersey, Southern New England

Speaker: Joey Picca, forecaster, Upton, N.Y., NWS forecast office

- Dual-pol reveals the heavy snow and the sleet/ice
  - Easy to locate and track
- “Snow/Mix” Transition easy to locate and track



- NWS NYC tailored forecasts with new confidence and precision
- Improved deployment of resources around Tri-State
- NY State OEM: “...your forecasts were timely, helpful and most accurate, almost to the inch of snow...”



# On-site DSS for NYC Emergency Management...

[19:16:03]

<nws-william.goodman@nwschat.weather.gov/NWSChatLive\_161.185.150.244\_135334>  
NWS: Bill G here at NYC OEM EOC...please let me know about reports of changeover to snow in/near NYC as I'm not sitting by a window. :) Heard precip changed to snow back at my house 35-40 min. ago...uh-oh...

[19:18:54]

<nws-joe.picca@nwschat.weather.gov/NWSChatLive\_140.90.75.204\_132343> Hey Bill, the melting layer is quickly crashing down. A lot of areas on LI switching over. Heard some reports from the city of it switching. CPK showing snow. LGA changed over.



Manhattan, NY (Gothamist)



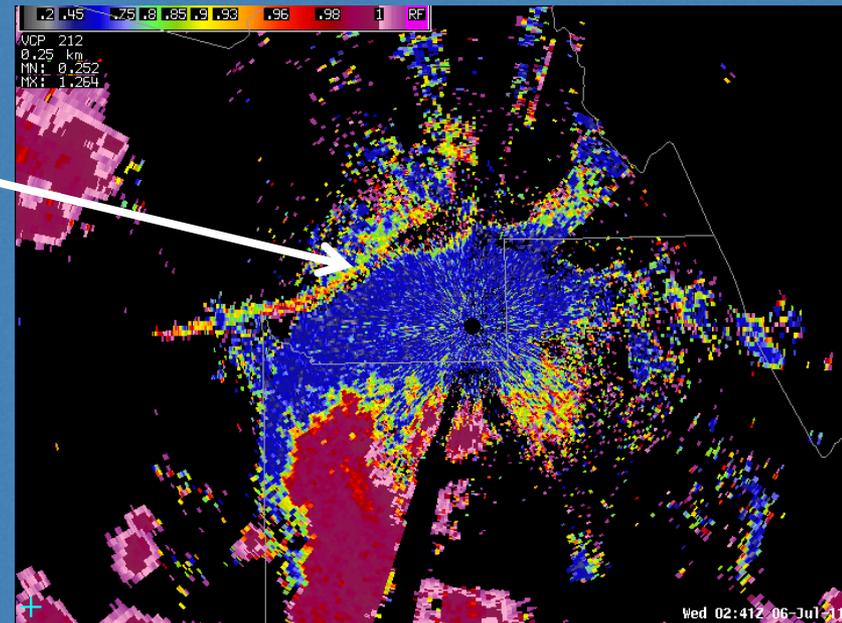
NWS Office (Upton, NY -- Long Island)

# Dual-Pol Benefits Across the USA

- Phoenix, AZ dust storms
  - Rapid drop in visibility, high risk of traffic accidents, air traffic grounded



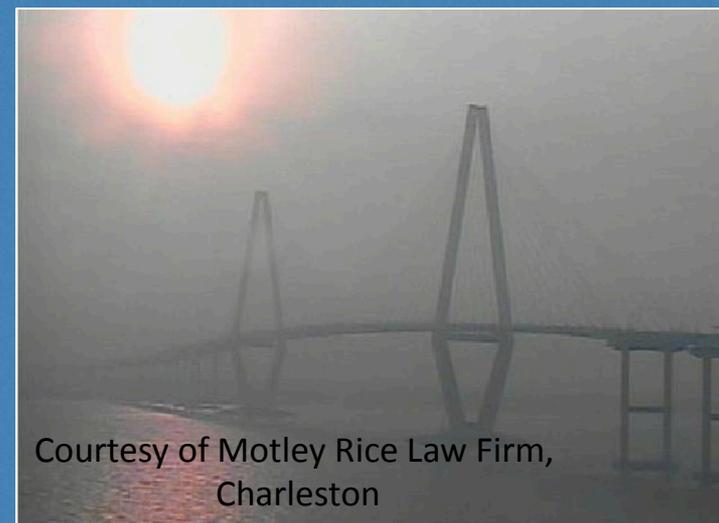
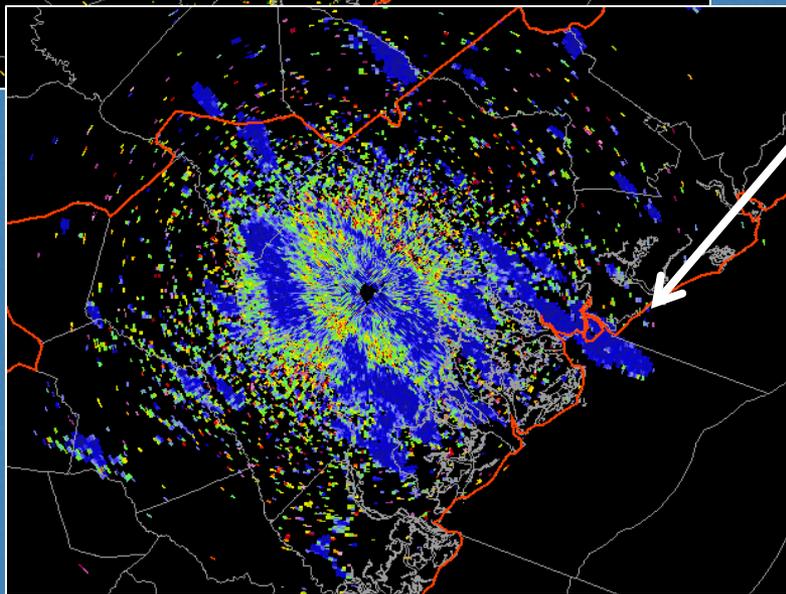
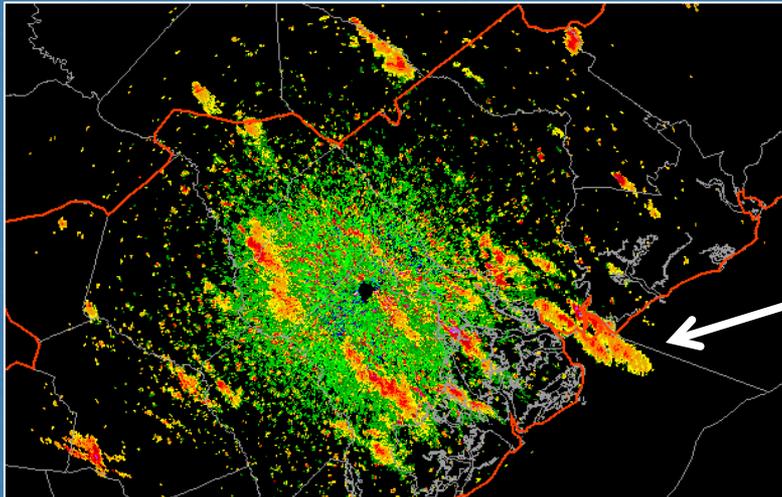
- Dust "cloud" easy to locate, track, and estimate depth with dual-pol



# Dual-Pol Benefits Across the USA

- Charleston, SC

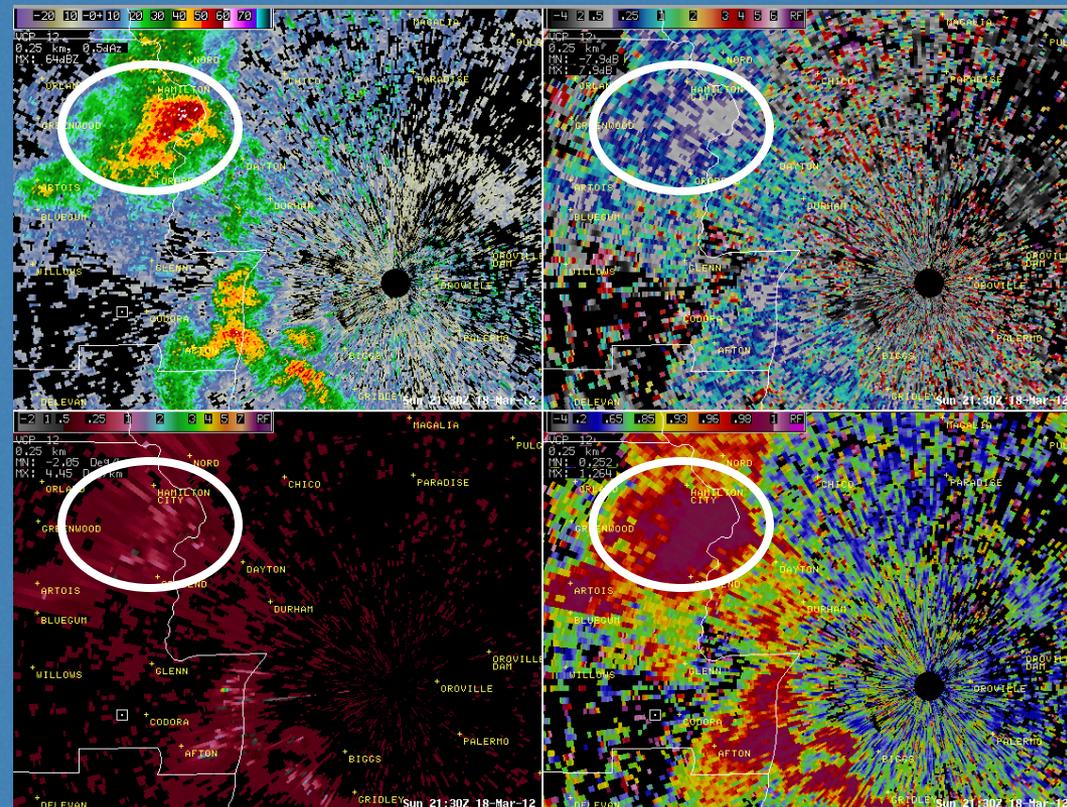
- Crucial to identify smoke vs. rain
- Air quality/health
- Visibility of  $< 1$  mi shuts down traffic in Charleston Harbor, costs millions/hour
  - NWS coordinates with Harbor Master
- Fires are easy to spot with dual-pol



Courtesy of Motley Rice Law Firm,  
Charleston

# Dual Pol Benefits Across the USA

- Small hail in CA has **big** impacts
  - Fatality accidents on freeways
  - Central Valley agriculture
- Dual-pol shows **which** storm has lots of small hail, yet very little rain
  - Impact areas pinpointed



# NOAA's National Weather Service Completes Doppler Radar Upgrades

Thank You for joining us.  
Questions?

For more information, visit:

<http://noaa.gov/wrn>

Watch [http://www.youtube.com/watch?v=tX6LH\\_I3P3Y](http://www.youtube.com/watch?v=tX6LH_I3P3Y).

Dual-pol interview <http://www.nssl.noaa.gov/news/video/bite-sized-dualpol/>

Frequently asked Q's:

<http://www.roc.noaa.gov/wsr88d/PublicDocs/DualPol/DPFAQ.pdf>

