Science & Warning Advancements with Phased Array Radar

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Relevance

NSSL’s Mission: “To understand the causes of severe weather and explore new ways to use weather information to assist National Weather Service forecasters and federal, university and private sector partners.”
Science: Does Temporal Sampling Matter?


**Phased Array Radar Innovative Sensing Experiment**

2010 PARISE

2012 PARISE

2013 PARISE

PARISE 2012

Goal: Assess impacts of 1-min updates on forecasters’ performance and warning decision process when working potentially weak tornadic events in displaced real time

1) View weather briefing and work the event using AWIPS 2

2) Produce detailed timeline of decision process (Hoffman 2005)

Sweep 1
Stimulated retrospective recall

Sweep 2
Review timeline
Revise as needed

Sweep 3
Deepen the timeline with probing questions
Performance
2 tornadic (EF0/EF1) and 2 non-tornadic events

Median Tornado-Warning Lead Time

Probability of False Alarm

Participating Warning Forecast Offices
Central & Southern NWS Regions

Years of Experience
Minutes
**Warn on precursor detection**

- **Tightening rotation in midlevels**: Warn on first signals of descent
- **Tightening rotation below midlevels**: Warn after further indications of descent
- **Rotation in lowest 4**: Warn when close to tornadogenesis

**Warn on rotation detection**

- **Low-level rotation**: Warn with certainty in low-levels

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**Severe Weather Event Occurs (Tornado)**

*At lowest elevation scan*
Summary

1-min radar updates have:
• Improved scientific understanding of storm processes
• Aided the warning decision process

Path Forward

• PARISE 2015: Increase sample size
• Analyze rapid-scan dual-polarization data
  • Understanding of severe weather processes
  • Accuracy and timeliness of warnings