Near Storm Environmental Awareness (NSEA) Project

David Hotz – Lead

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NSEA (SOO-DOH) Project Team

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- Stephen Keighton, SOO, WFO RNK
- Patrick Marsh, WCM, SPC
- Jason Schaumann, Senior Forecaster, WFO SGF
- Mike Sutton, ITO, WFO GRR
- Thomas Turnage, SOO, WFO GRR
- Jerry Wiedenfeld, ITO, WFO MKX

Presentation Objectives

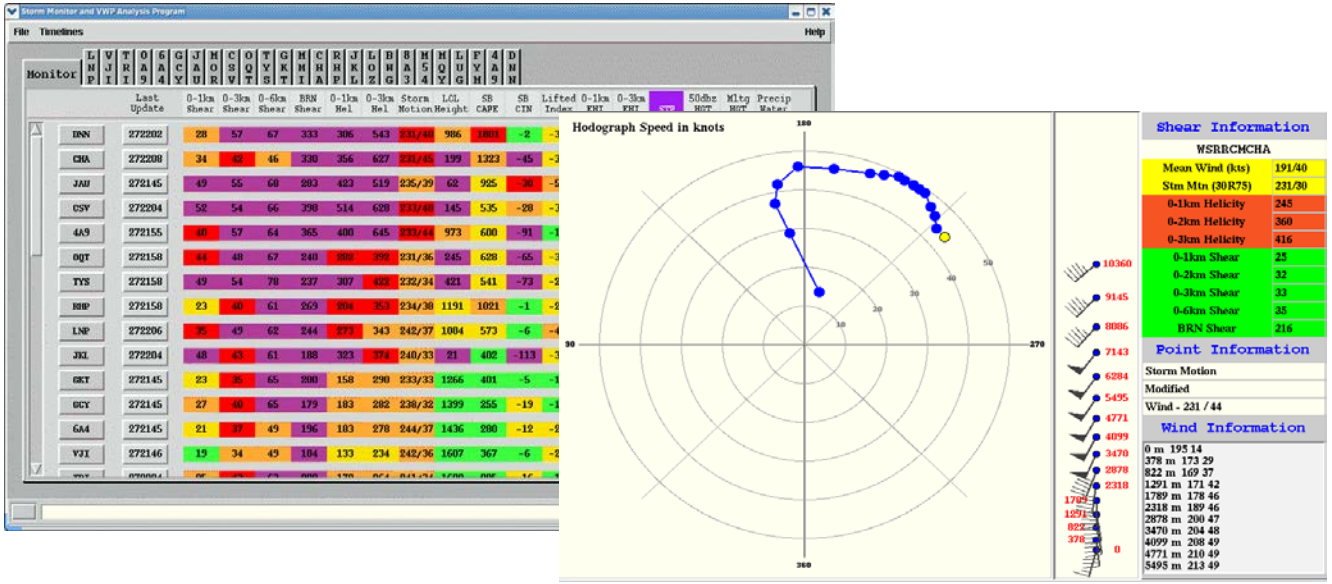
- ***Overview of the Near-Storm Environmental Awareness (NSEA) Project***
- ***Background and History of the NSEA Project***
- ***NSEA Applications***
- ***NSEA/OPG Demonstration***
- ***Temporal Resolution - Future***

Background and History of NSEA

2010-2015:

Began as an AWIPS I Application called the

Storm Monitor and Analysis Program



Jason Schaumann, Senior Forecaster, WFO SGF and David Hotz, WFO MRX

Background and History of NSEA

2015: NSEA Project began by forming a multi-regional team to develop, test, and provide training for WFO applications to improve monitoring of the Near Storm Environment.

2016: NSEA Project selected as a national STI Project.

Project Goal

Two AWIPS applications

1. NSEA Application
2. NSEA Digital Cursor Readout

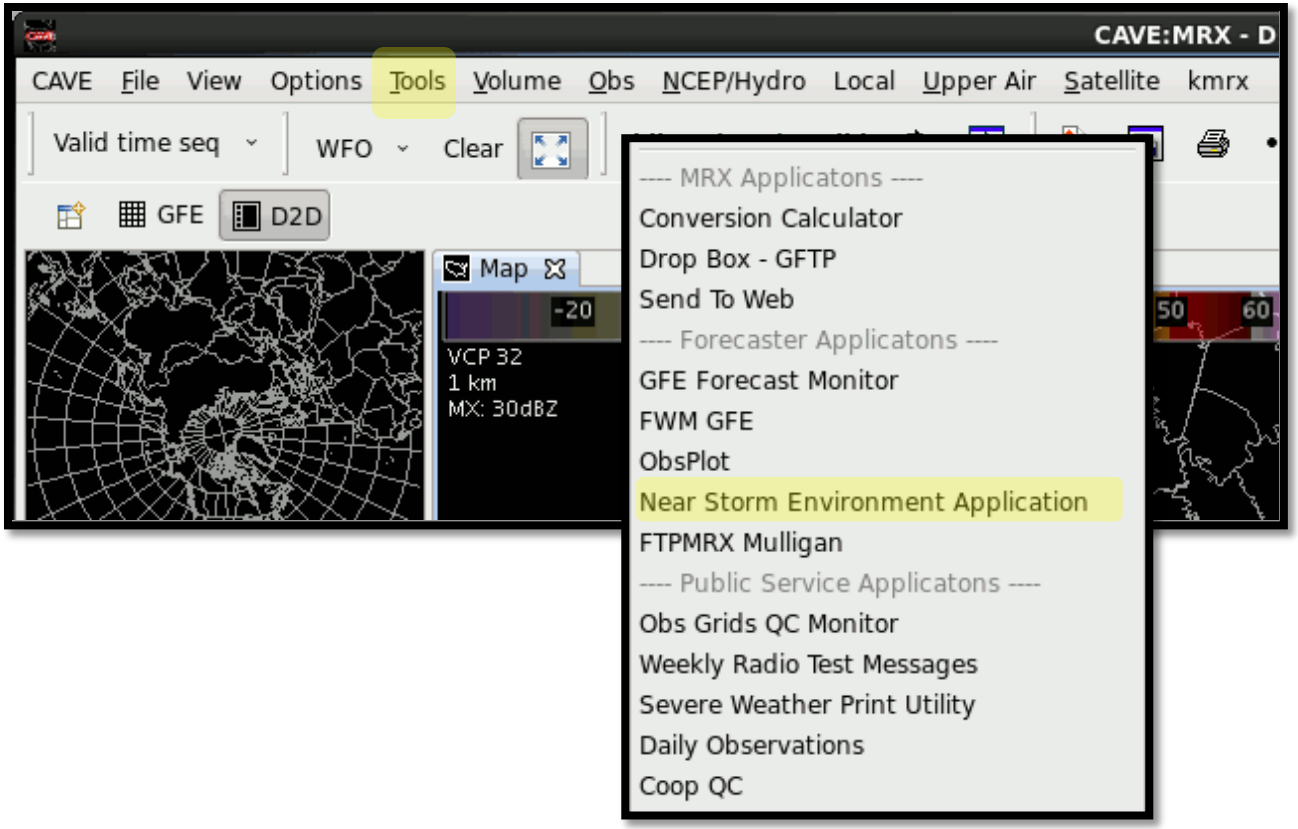
Purpose: Increase situational awareness of environment to improve warning performance and IDSS support to our customers.

Intended Users: Warning Team, Mesoanalyst, (Enhanced) Short Term Forecaster

The Vlab page for the NSEA Project:
https://vlab.ncep.noaa.gov/group/near-storm-environment-awareness-project/home

The Vlab Redmine page for the NSEA Project:
https://vlab.ncep.noaa.gov/redmine/projects/nsea-project

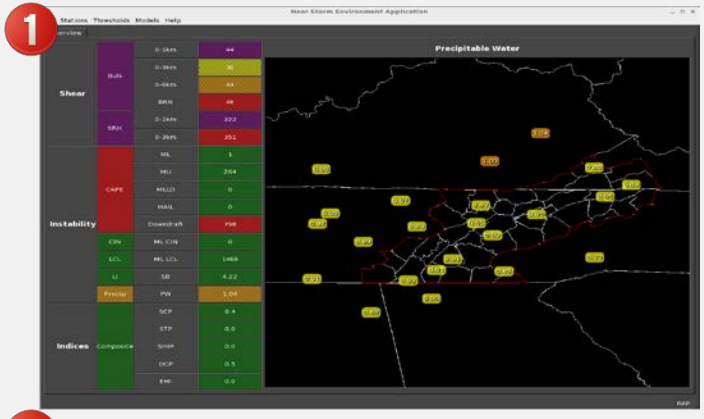
NSEA Application

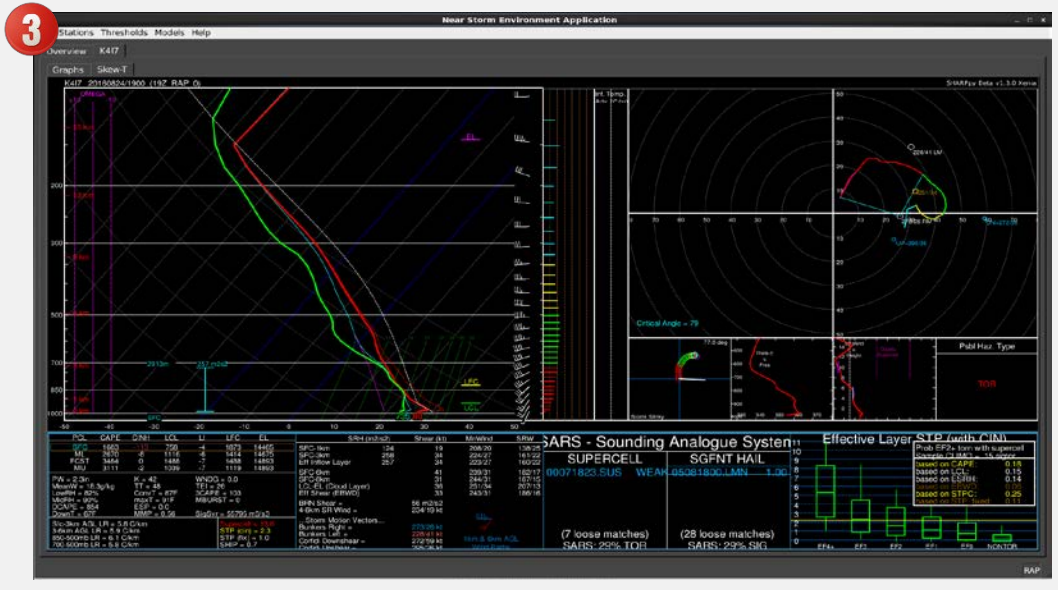


Near Storm Environment (NSE) Application within the Tools Menu

Project Accomplishments (NSEA Application)

Utilizes SHARPpy code for the SKEWT and SOUNDING Interface

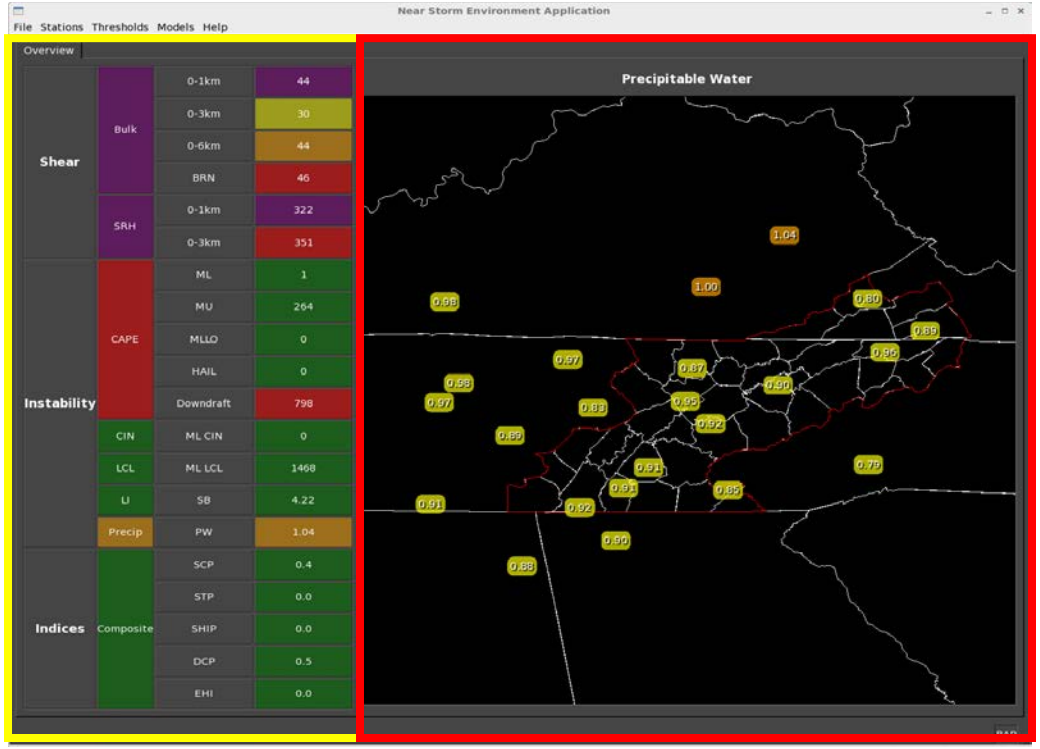




1. ***Map of parameter selected by dashboard***
2. ***Time series of all values***
3. ***SHARPpy (SkewT/Hodograph) editable***

Project Accomplishments (NSEA Application Dashboard)

Developed by Aaron Anderson

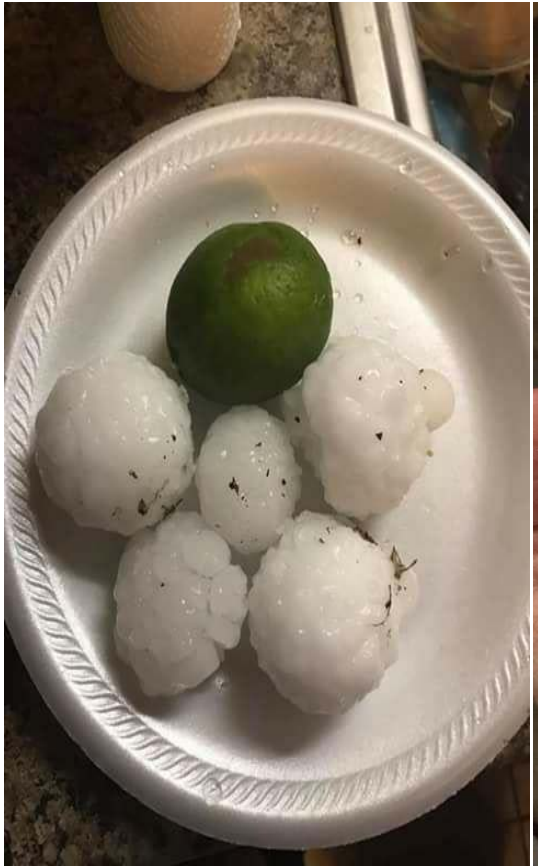


The parameters are color-coded based on thresholds set by the office. The color coded thresholds allow the forecaster to maintain awareness of the environment in/near the CWA. The color displayed is the "highest" value found in all stations.

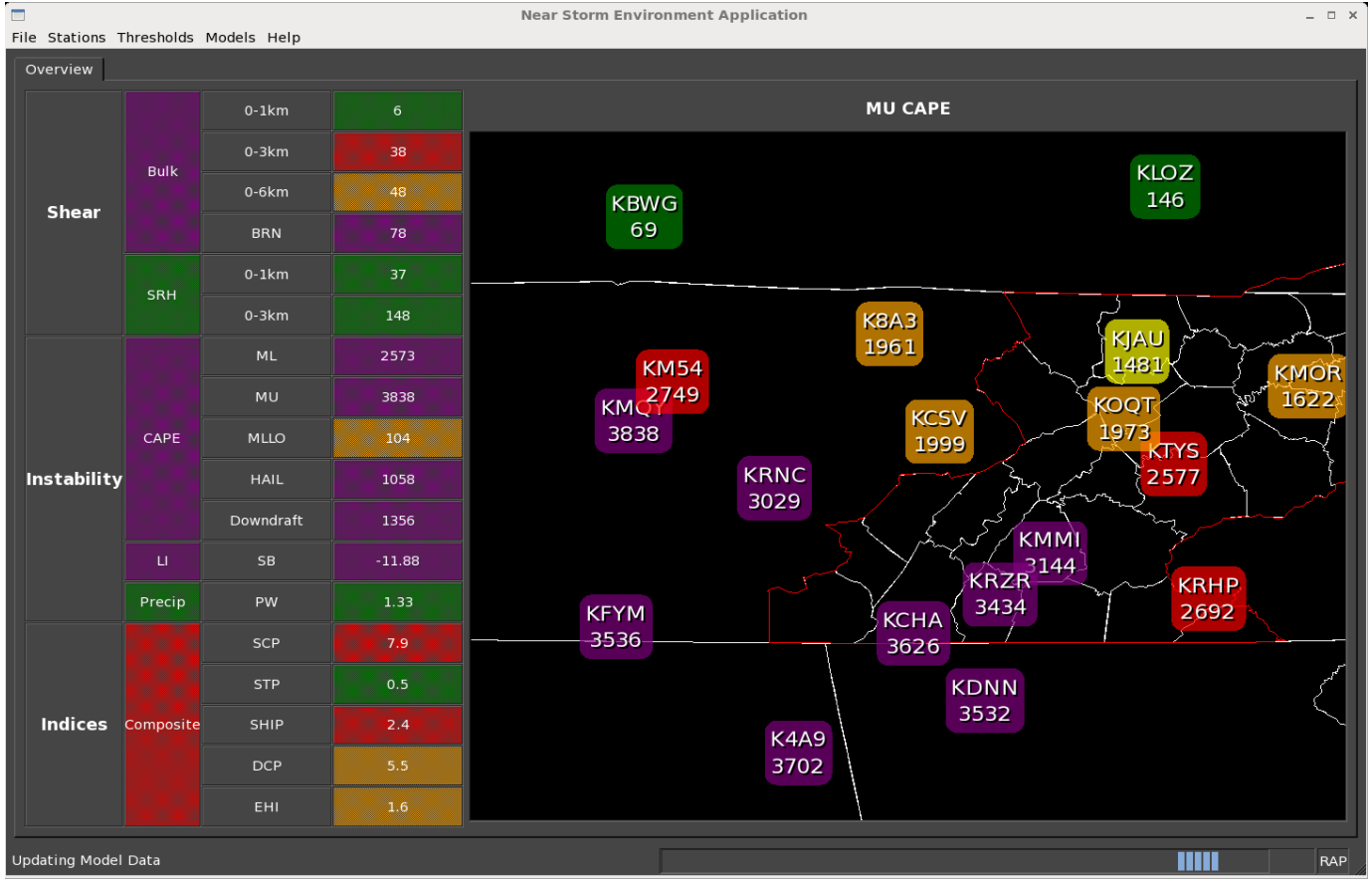
Hovering over the parameter in the table triggers that parameter to be displayed in the map. Each parameter within the table will also display within the County Warning Area (CWA) map. Each station will be plotted by the color-coded thresholds.

Forecasters will be able to zoom in/out of the map. Stations just outside of the CWA can also be plotted.

NSEA Application During A Large Hail/Wind Event



NSEA Application During A Large Hail/Wind Event

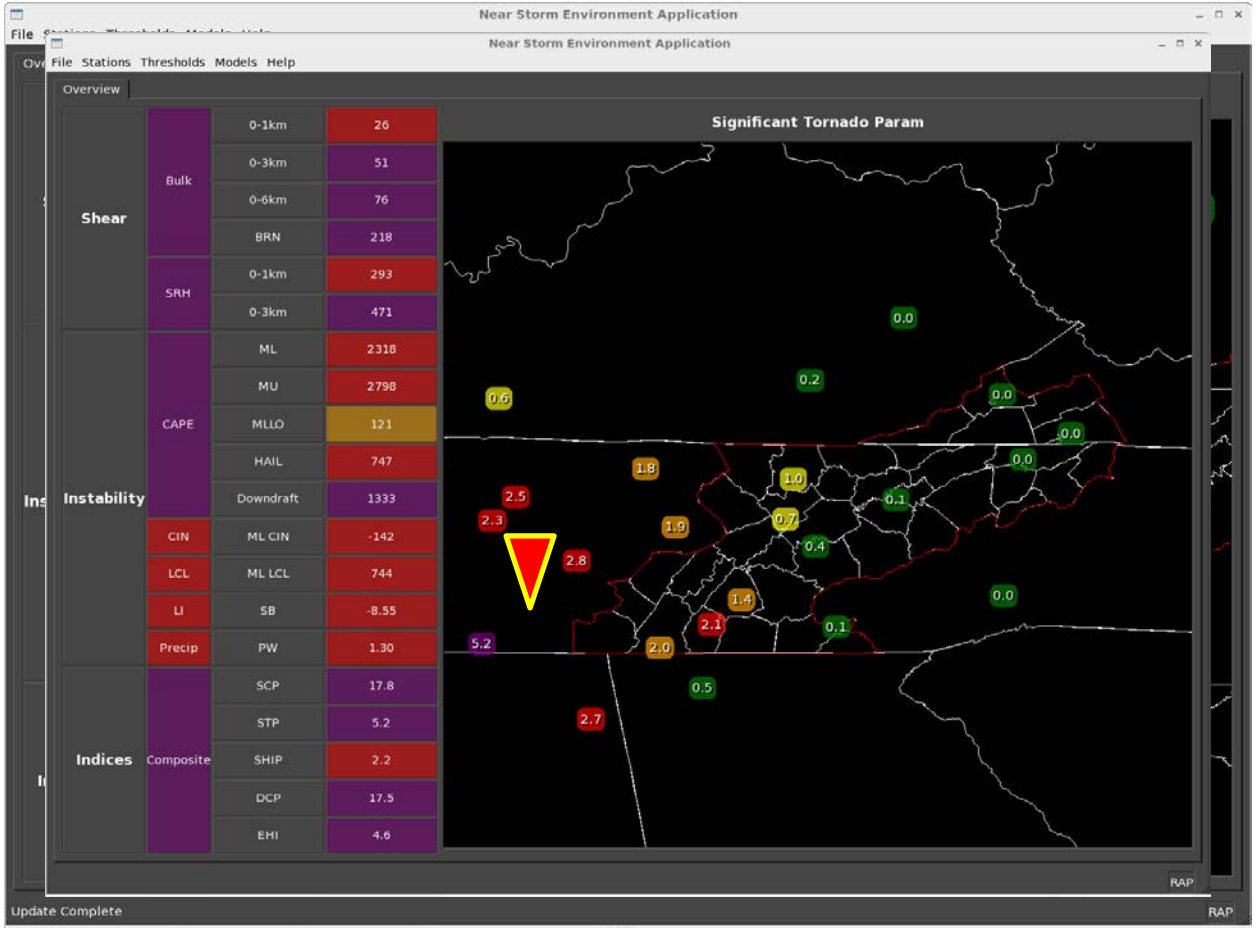


The high ML/MU CAPES, Downdraft CAPE, Derecho Composite Parameter (DCP) also noted the environment conducive to damaging winds.

The high HAIL CAPE, ML/MU CAPES, 0-6km Shear, and SHIP Comp parameters suggested an environment for large hail.

***The color code thresholds help* differentiate the areas and magnitude.**

NSEA Application During A Potential Tornado Event



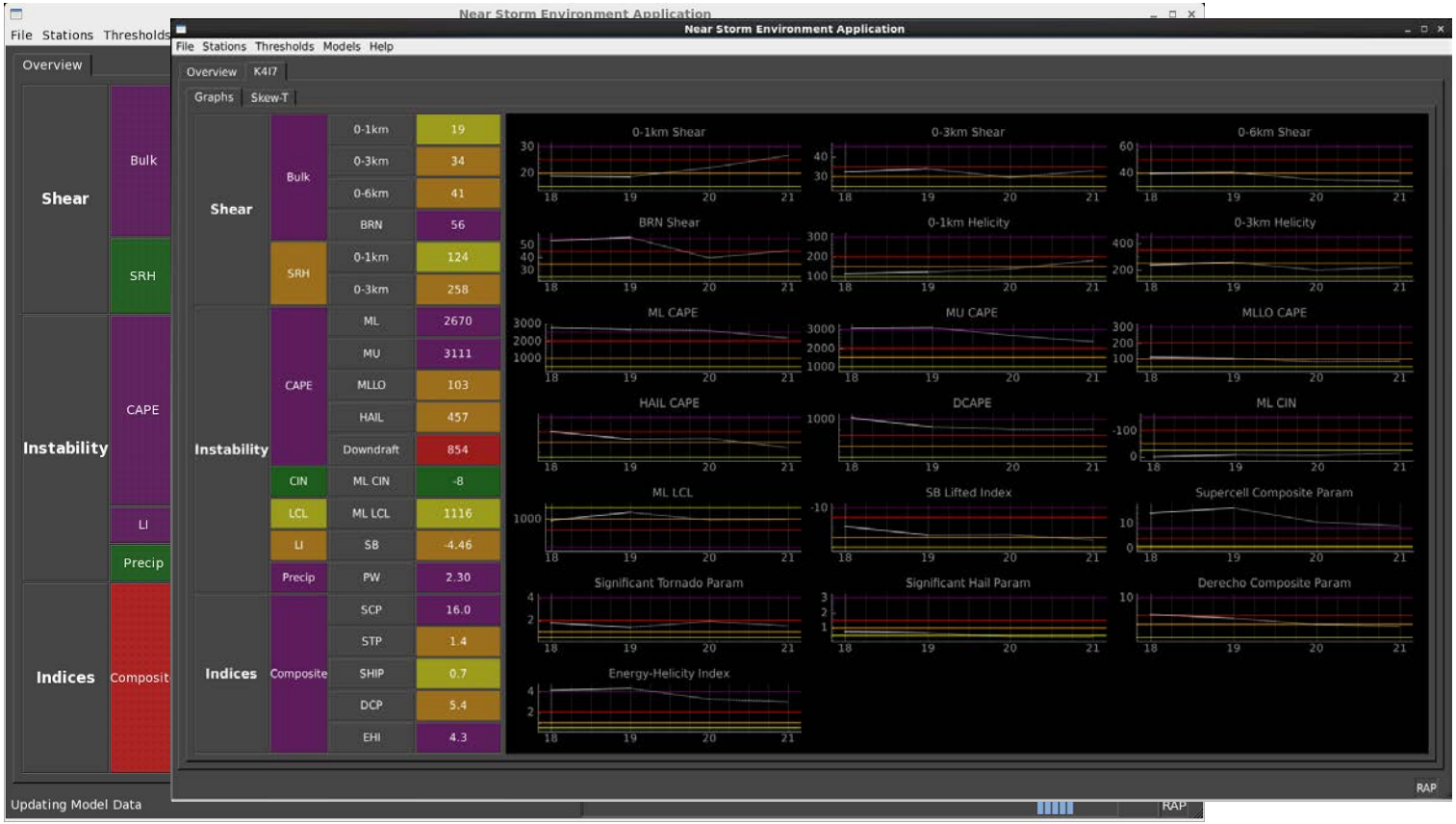
The Significant Tornado Parameter (STP) showed relatively high values across southern middle Tennessee into southeast Tennessee.

A tornado was reported across southern middle Tennessee.

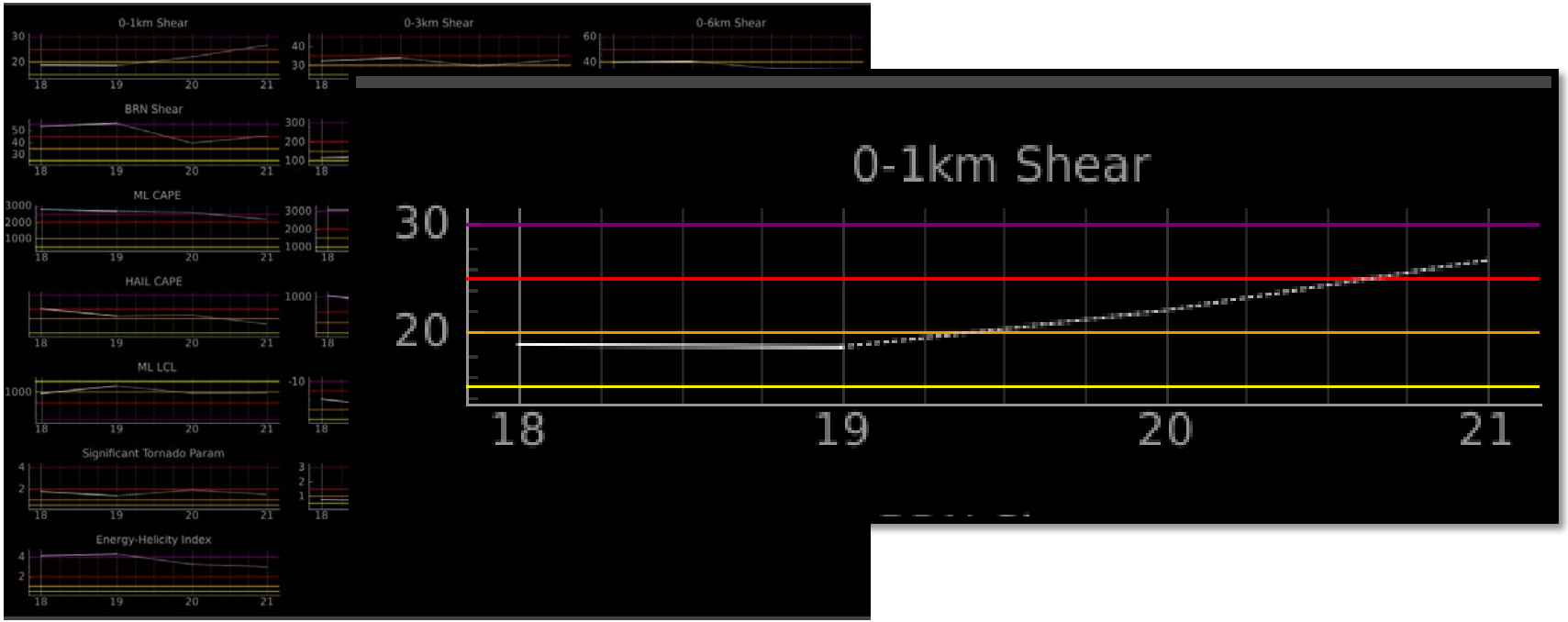
***The color code thresholds help* differentiate the areas and magnitude. The display of multiple parameters allows the forecaster to quickly monitor the NSE.**

Project Accomplishments (NSEA Application Time Series)

Developed by Aaron Anderson

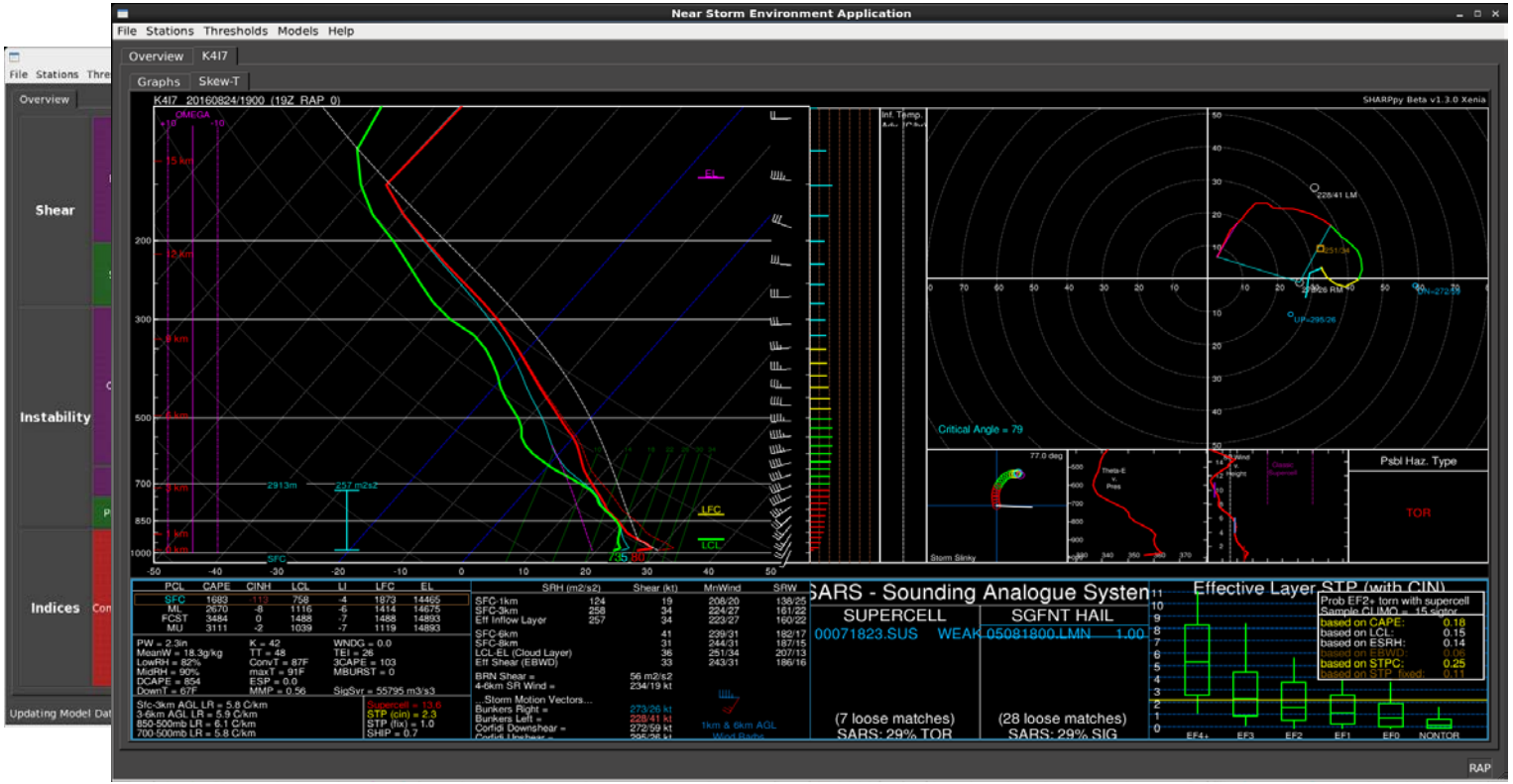


NSEA Time Series – Closer Look



The time series graphs go back 1 hour and ahead 2 hours based off the RAP13 model for each parameter. The lines are color-coded based off the thresholds set for each parameter.

NSEA SkewT/Hodograph utilizes SHARPpy



Credits of the developers of SHARRPpy:
http://sharppy.github.io/SHARPpy/contributors.html

Project Accomplishments (NSEA Digital Cursor Readout)

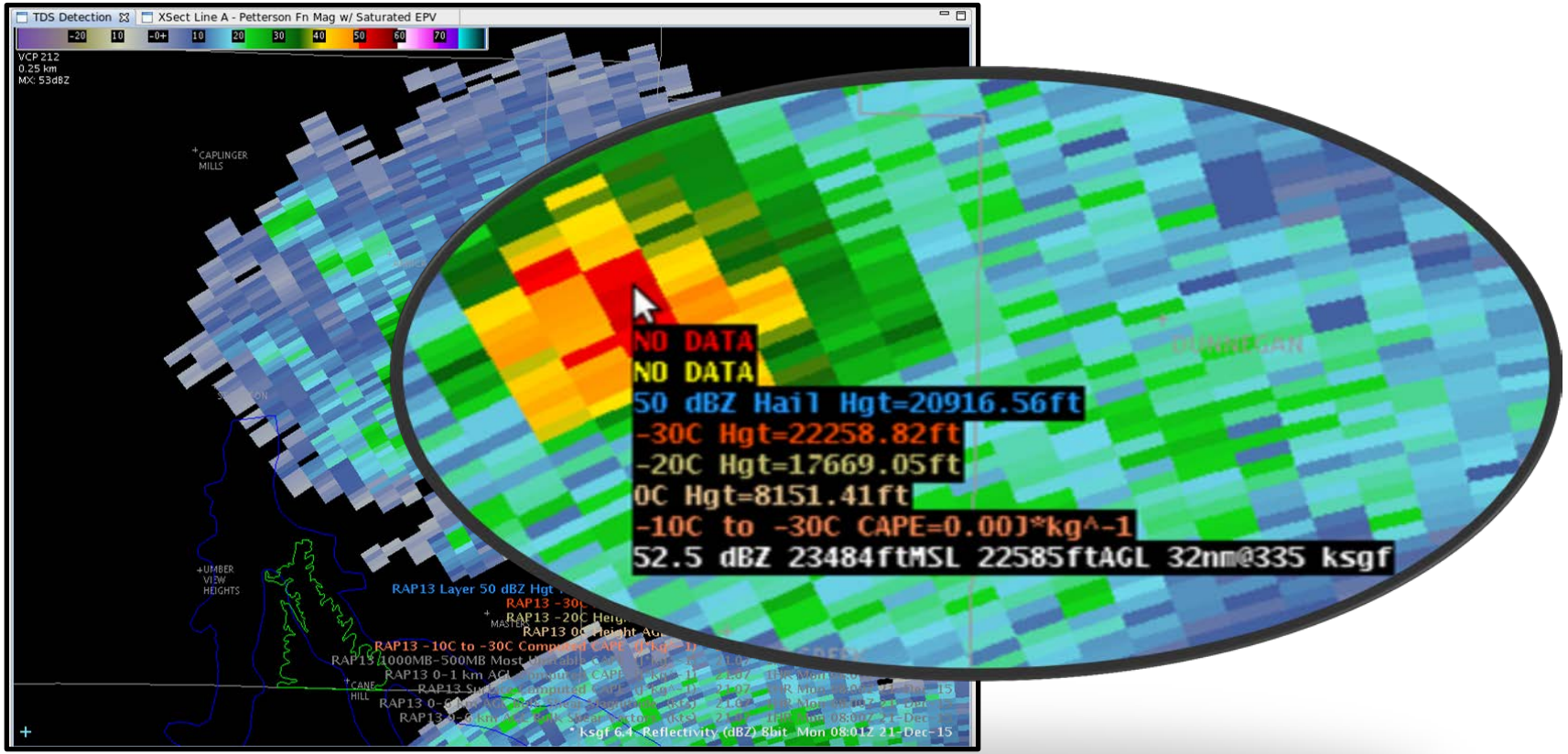
Developed by Jason Schaumman, Mike Sutton and Aaron Anderson

Pre-Defined Parameter Bundles
Elevated CAPE
Pulse Severe
Hail
Supercell
Heavy Rain/Flooding
QLCS

RAP, LAPS, and HRRR-based "families" for different scenarios (convection and heavy rain)

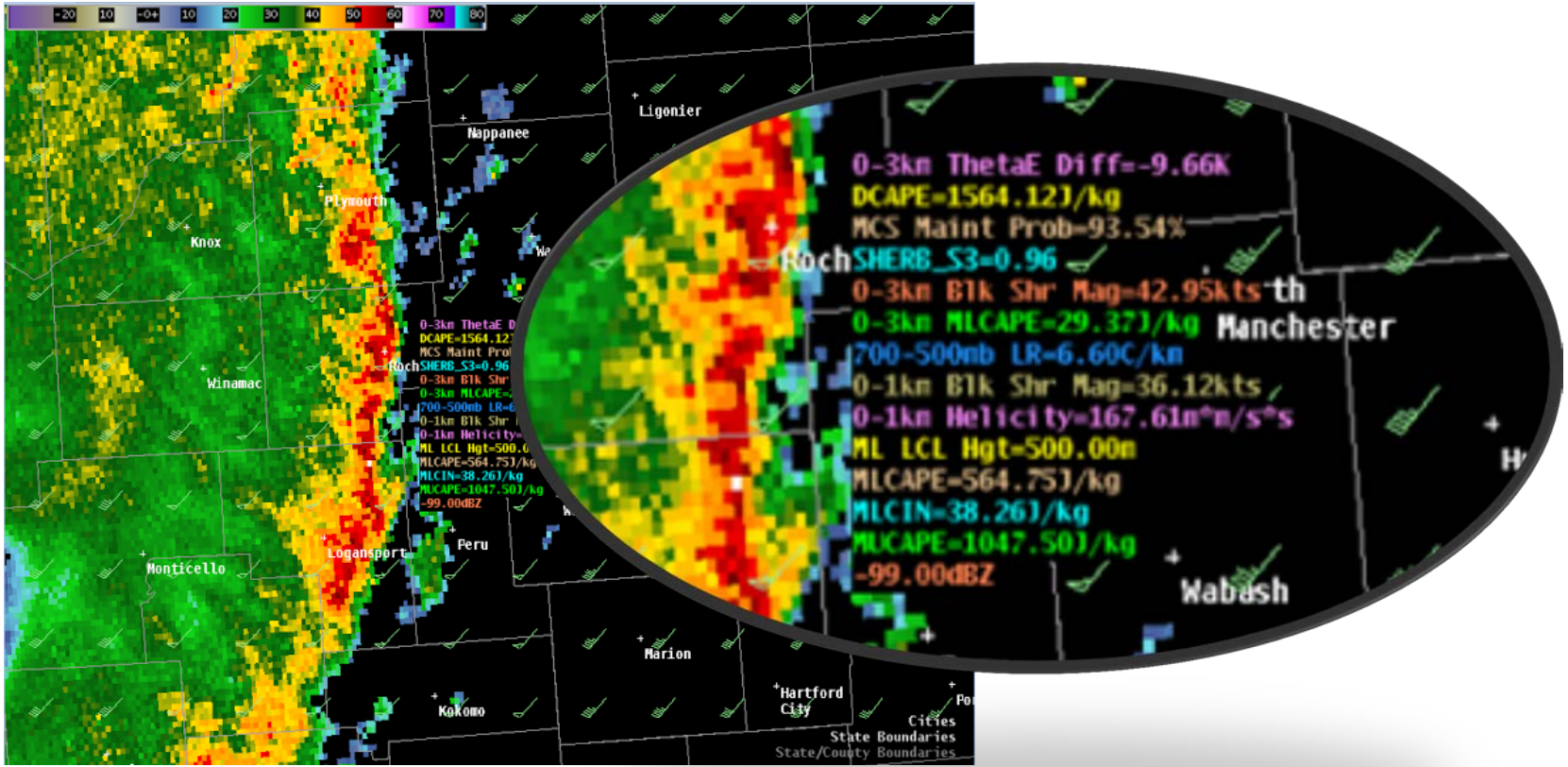
Project Accomplishments (NSEA Digital Cursor Readout)

Hail Bundle



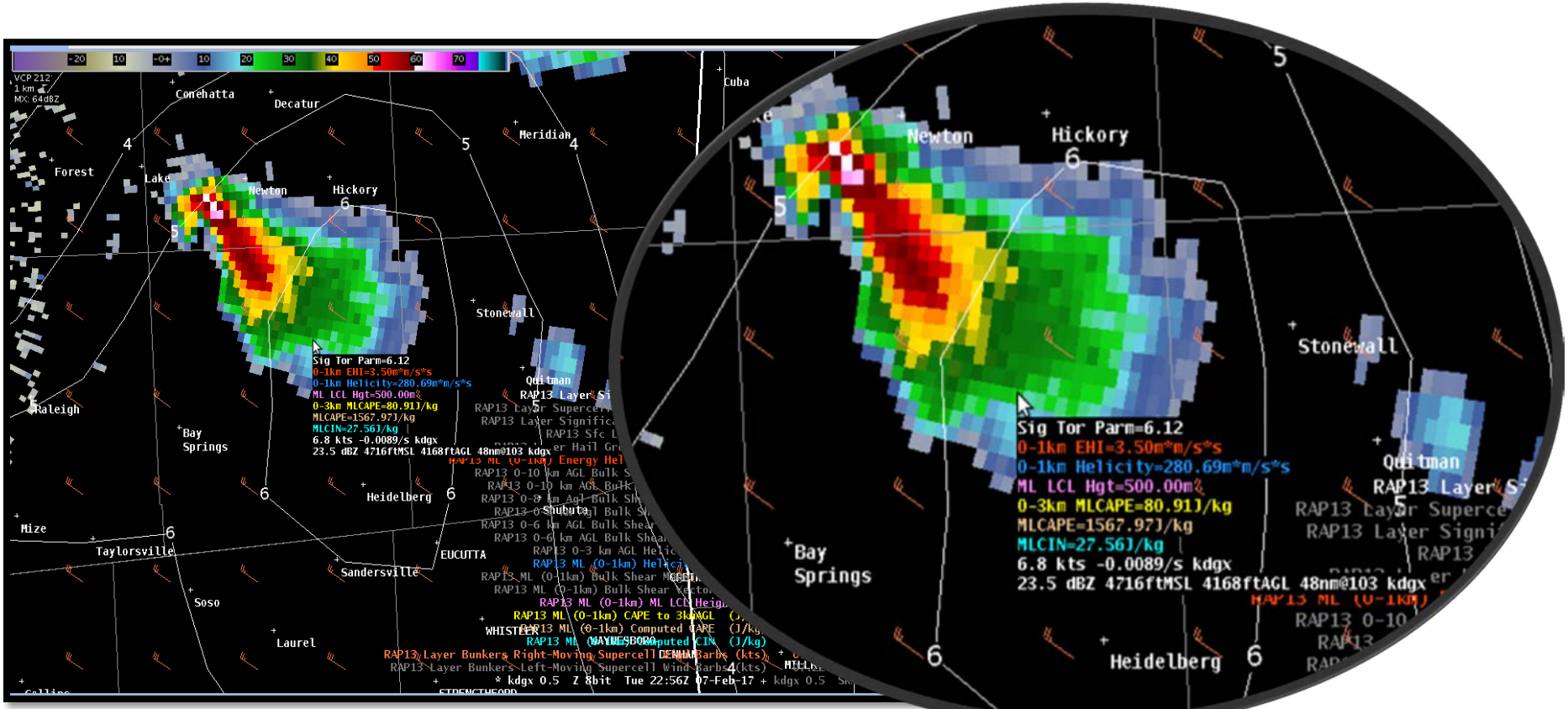
Project Accomplishments

“QLCS Environment” NSEA Bundle

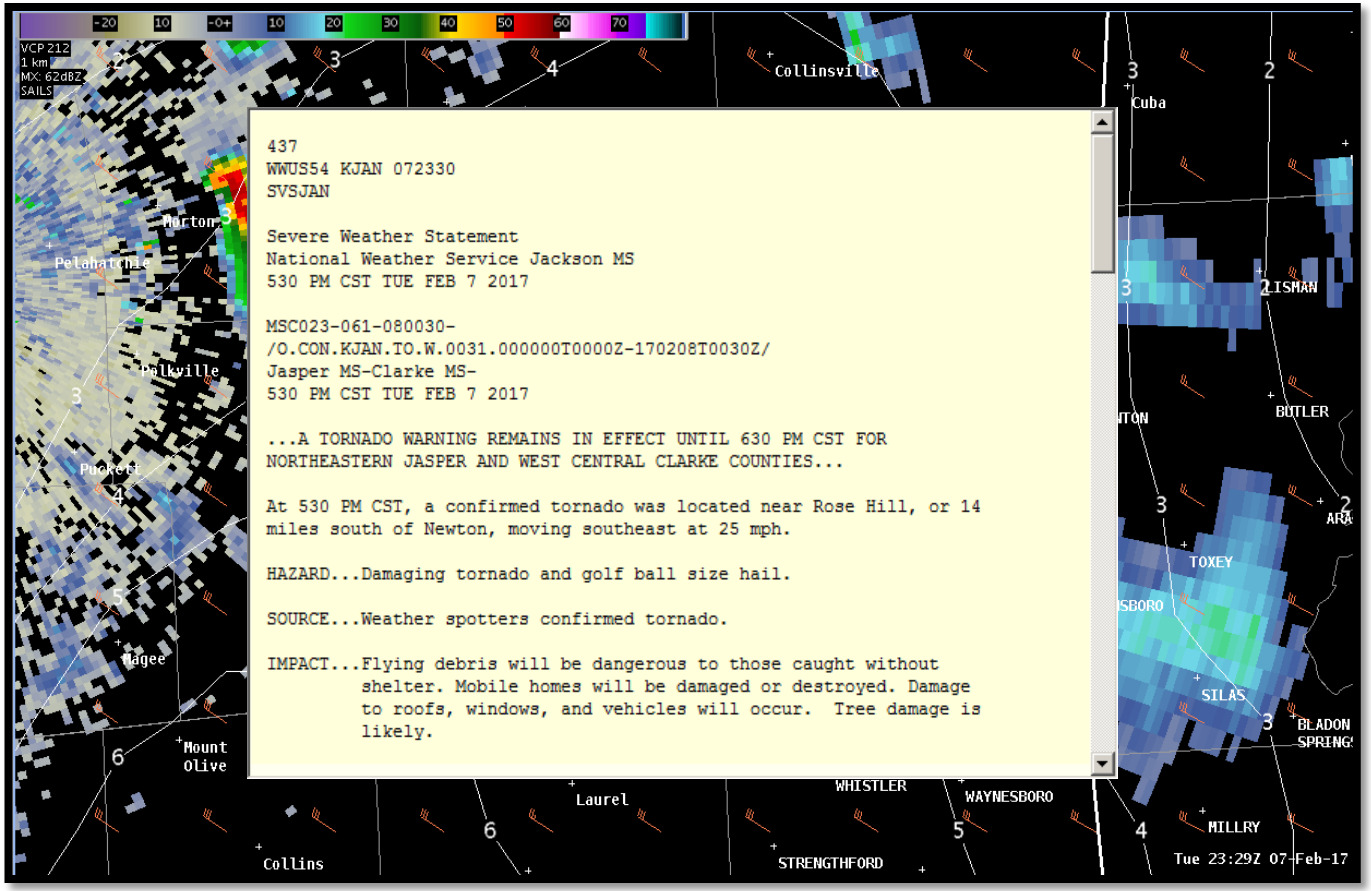


Project Accomplishments

Supercell Tornado Environment Bundle



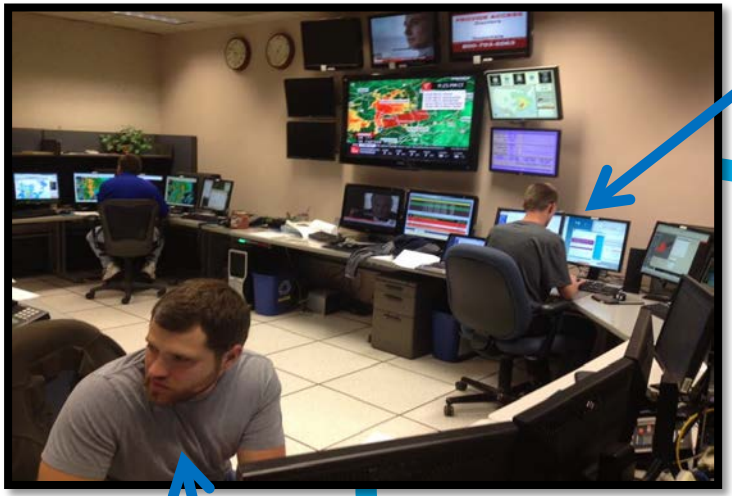
“Supercell Tornadic Environment” NSEA Bundle



“Supercell Tornadic Environment” NSEA Bundle Utilized During the New Orleans Tornado Outbreak

I did manage to get a sneak peak at a tornado super cell with the "NSEA Cursor Readout". It was an eye opener to see "Supercell Tornadic Environment" indices in real time next to the threatening storm! It is an awesome application. (SOO LIX)

WFO Scenario – Using NSEA Applications



Short-Term Forecaster/ mesoanalyst (multiple duties) (NSE Application)

- **NSE Tool will highlight areas in/near the CWA that are most prone to severe weather.**
- **Able to monitor numerous parameters.**
- **Tool will help forecasters quickly diagnose the environments potential severity and severity type.**

Radar Operator (NSE Cursor Readout Bundles)

- **Radar operator will able to display thermodynamic, wind shear, composite, etc. fields on-top of radar data.**
- **Allows the radar operator to have better situational awareness of the severity potential and severity type.**

Best Practice: Increased Situational Awareness

What’s Happening Now

Bi-weekly coordination calls with OPG until evaluation.

3 members from the NSEA Project team traveled to the OPG during the last week of March. The purpose is to work with OPG to make sure the NSEA/OPG Evaluation is ready.

A Subject Matter Expert (SME) from the NSEA project team will be available during the OPG evaluations.

Future Plans

Evaluation of NSEA Applications at OPG May-June, 2017 (4 weeks)

Purpose is to demonstrate, evaluate, and gather feedback from incoming forecasters on the two NSE applications. Use of the applications at different office positions/functions and with other NSE Applications, such as ProbSevere.

Final goal is to gain approval to have the NSEA Digital Cursor Readout baselined. The NSEA Application will remain a VLAB local application project for continued development after OPG.

Higher Temporal Resolution is Critical for Improved NSE Analysis

Possible ways to improve temporal resolution:

- **Higher temporal model resolution (Example: RUA)**
- **Utilizing higher resolution observation platforms, such as 5-mintue METARs, GOES-R wind information, aircraft observations, etc.**

Recommend further research/projects focusing on the best ways to combine these platforms.

NSEA Project..Questions

Thanks for your interest in the NSEA Project

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