

The NYS Mesonet:

The Nation's Most Advanced Statewide Network to Protect Life and Property & Build a Smart Weather Innovation Economy

Thursday, October 24, 2019





Today's Presentation:

1. Introduction
2. The Mesonet Today
3. Ongoing Collaborations
4. App Development
5. Discussion

Introduction



The Weather Enterprise

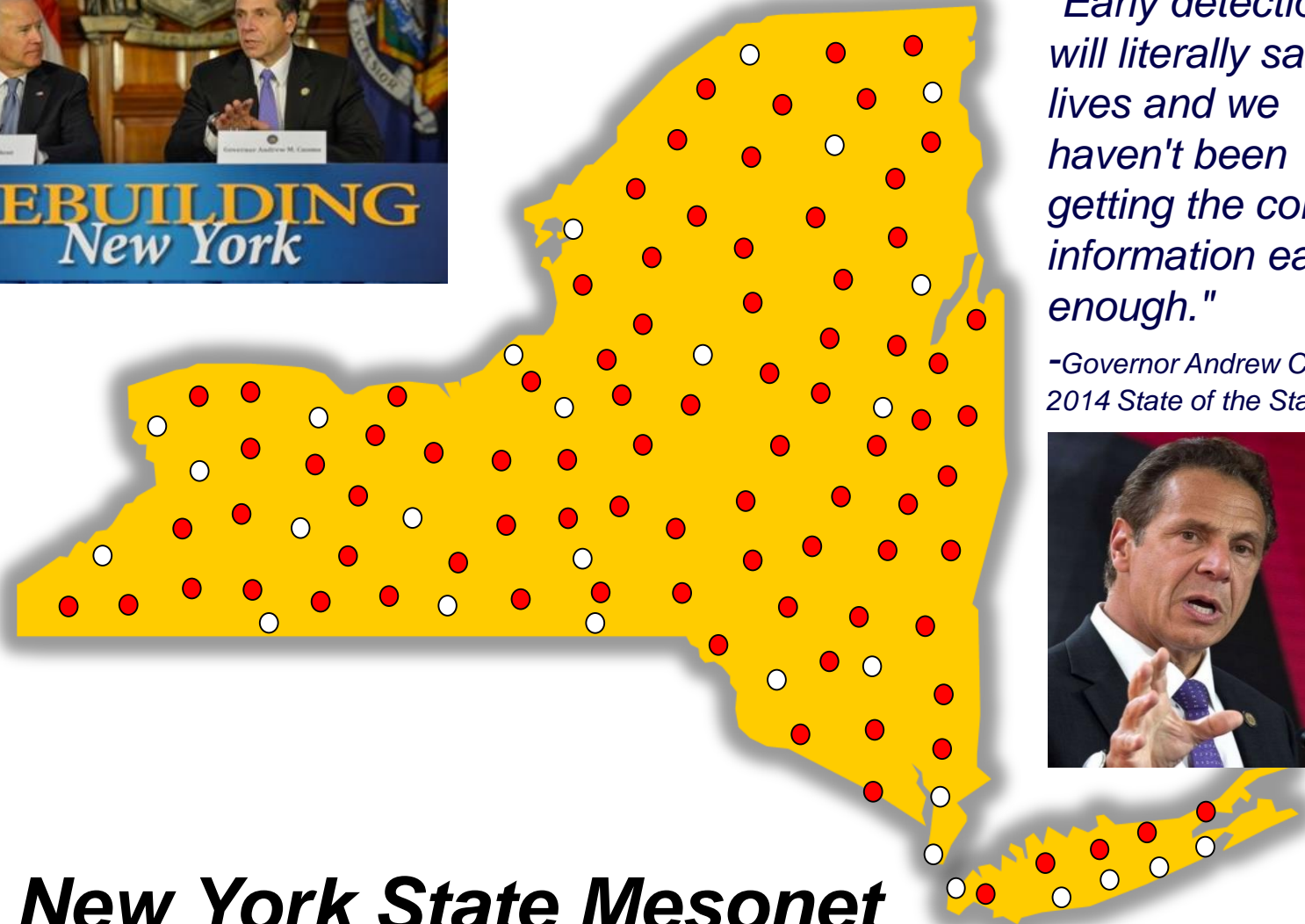


-  **Internationally Recognized, 60-Year History**
DAES, ASRC, Mesonet, COE, xCITE, E-TEC
-  **120 Atmospheric Science Researchers**
-  **\$120M+ in Extramural Funding in past 15 yrs**
-  **Largest Weather/Climate Group in NYS; One of the Largest in US**
-  **75+ Public & Private Sector Partners**
-  **25+ Yr Partnership w/National Weather Service**
-  **Most Advanced Statewide Mesonet in US**



The Vision: January 2014

- ✓ Cover Gaps
- ✓ Better Detect Weather Events
- ✓ Enhance Situational Awareness



"Early detection will literally save lives and we haven't been getting the correct information early enough."

*-Governor Andrew Cuomo
2014 State of the State*



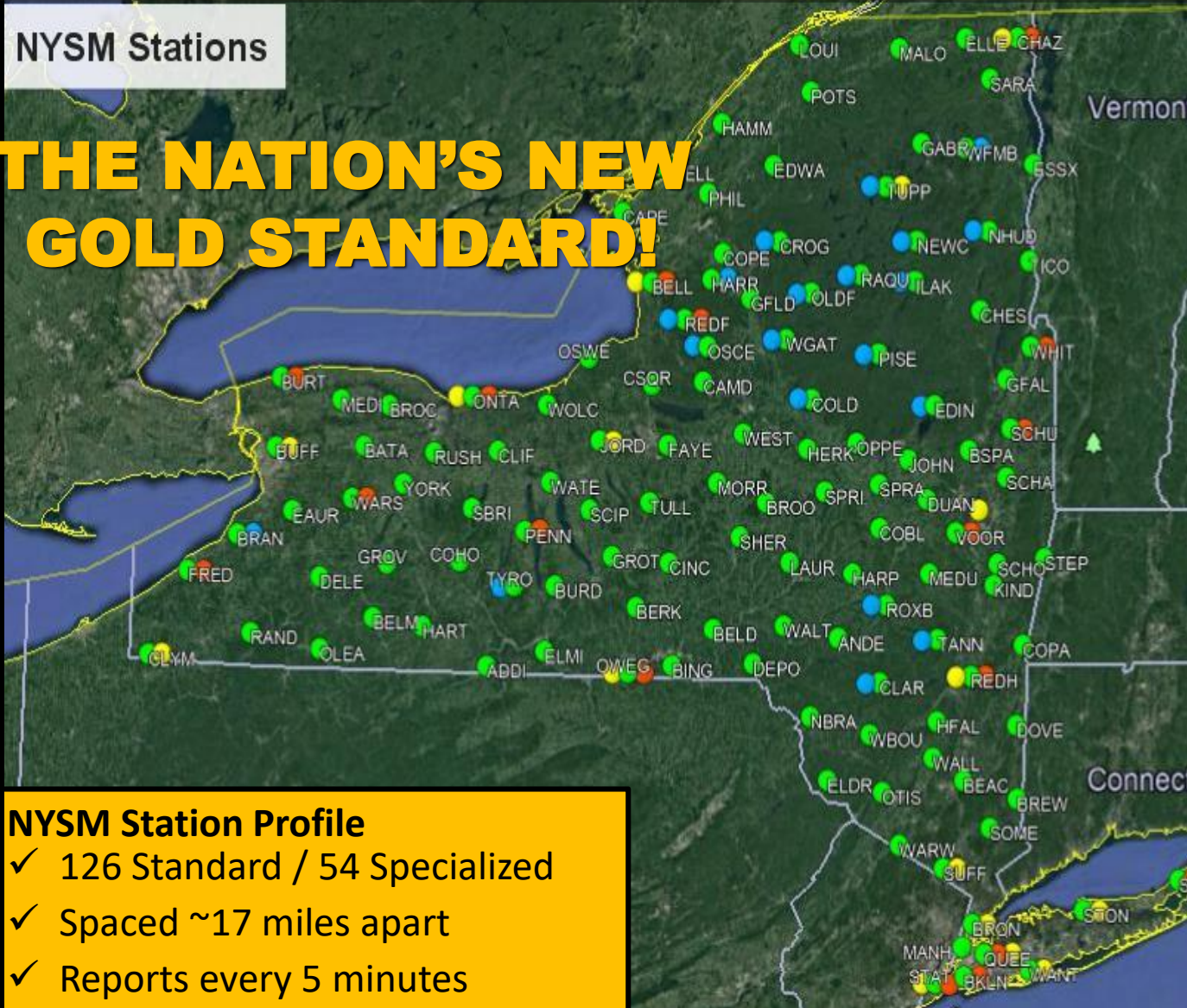
The New York State Mesonet

Completion of Mesonet: April 2018



NYSM Stations

THE NATION'S NEW GOLD STANDARD!



“The NYS Mesonet with its vertical profiling capability is a Game Changer...”

*-Louis Uccellini
National Weather Service*



- NYSM Station Profile**
- ✓ 126 Standard / 54 Specialized
 - ✓ Spaced ~17 miles apart
 - ✓ Reports every 5 minutes



✓ Annual Data Requests from State Agencies would be Equivalent ~\$2M+ in Data Revenue (Archived & Real-Time)

☁ Other state entities with which relationships are under development

- ✓ NYS DEC
- ✓ NYS DOT
- ✓ NYS Energy Research and Development Authority
- ✓ NYS Thruway Authority
- ✓ NYS Canals
- ✓ Metropolitan Transportation Authority
- ✓ NYS Independent Systems Operator
- ✓ NY Power Authority



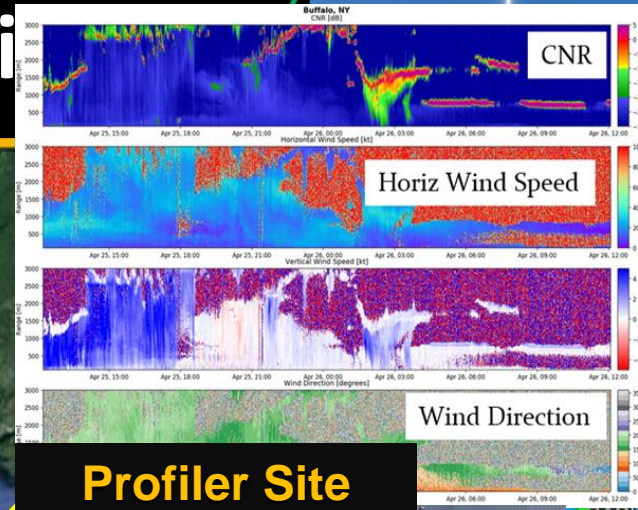
The Mesonet Today



NYS Mesonet: Standard & Special Observations



Station Types

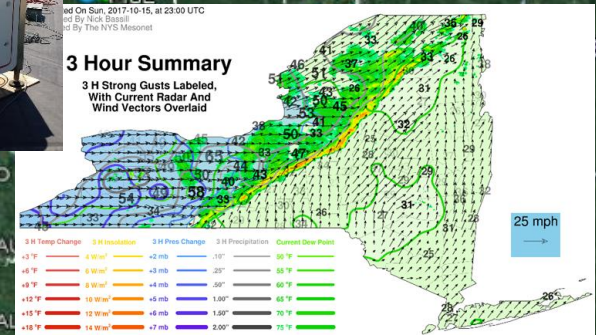


Profiler Site



- ### Standard Observations
- Precipitation
 - Temperature (2/9 m)
 - Humidity (2 m)
 - Wind Speed
 - Wind Direction
 - Surface Pressure
- ### Additional Observations
- Soil Moisture
 - Soil Temperature
 - Solar Radiation
 - Photos
 - Snow depth

3 Hour Summary



- ✓ At least 1 station per county
- ✓ Spaced ~17 miles apart
- ✓ 2,500 Upper Air Measurements
- ✓ Reports every 5 minutes
- ✓ Over 4,000 Sensors & Instruments
- ✓ Redundant communication

NYSM Stations

Mesonet
UNIVERSITY AT ALBANY

Legend
Flux
Profiler
Snow
Standard

New Hamps

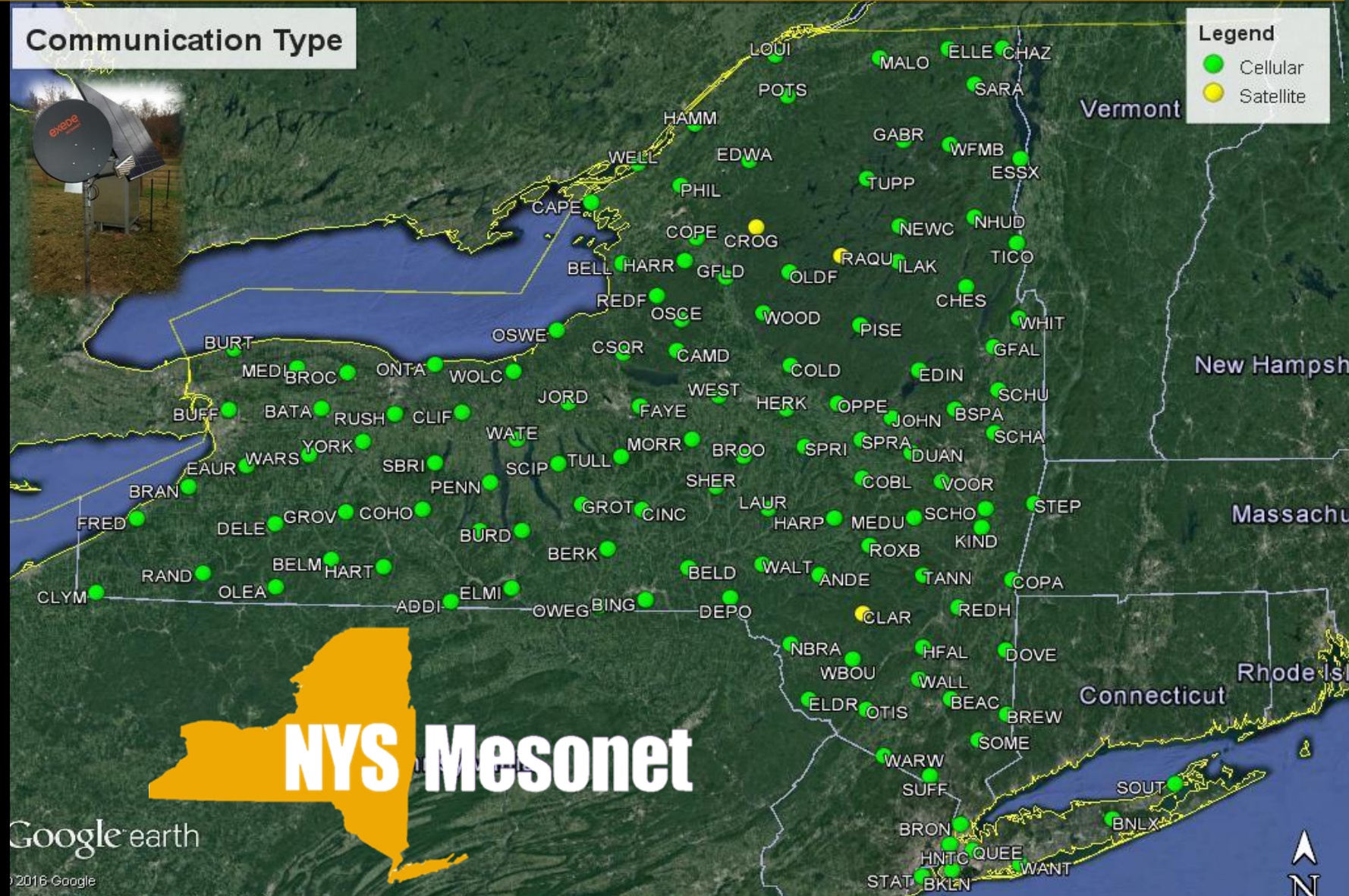
Massach

Rhode Is



Station Communications

- ✓ **2-Way Communications, Reliability, & Low Cost**
- ✓ **124 sites use Cell Comms**
2 sites use Satellite
- ✓ **Redundancy: All data reported hourly via GOES**
- ✓ **Backs up all sites whenever normal Cell/Satellite Comms Down**



An 'End-to-End' System

✓ A Mesonet is more than just instruments



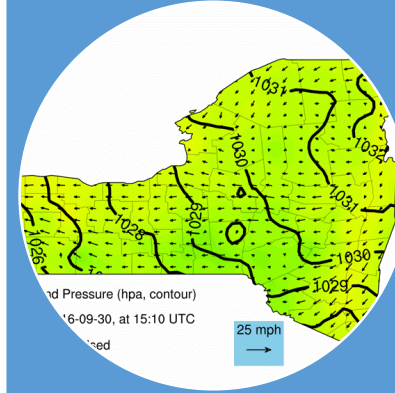
Observations

- Networks
- Sensors
- Systems



Data QA & QC

- Calibration
- Monitoring
- Correction



Analysis & products

- VAD
- Visualization
- Merging



Applications

- NWS
- Emergency Mgt
- Transportation
- Agriculture

Protecting Life & Property / Fostering a Smart Weather Economy

Thruway Micronet: 12 Stations in Western NY

Transportation Need

- ✓ Needed additional obs for monitoring Lake Effect snowbands for transportation operations

NYS Thruway Micronet

- ✓ Designed, deployed, operated by NYS Mesonet and Thruway
- ✓ Consists of 12 stations
- ✓ Measures T/RH, snow depth, wind speed/dir, and photos
- ✓ Collects data every 5 min
- ✓ Deployed in/around Syracuse (3) and Buffalo (9)
- ✓ Utility power, Ethernet comms



Operations Center: At Albany

Operations Center

- Staffed by students
- Internships available
- Monitor communications
- Field tech phone calls
- Monitor wx for techs
- Monitor tech safety
- Review data for QC

Field Operations

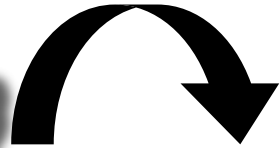
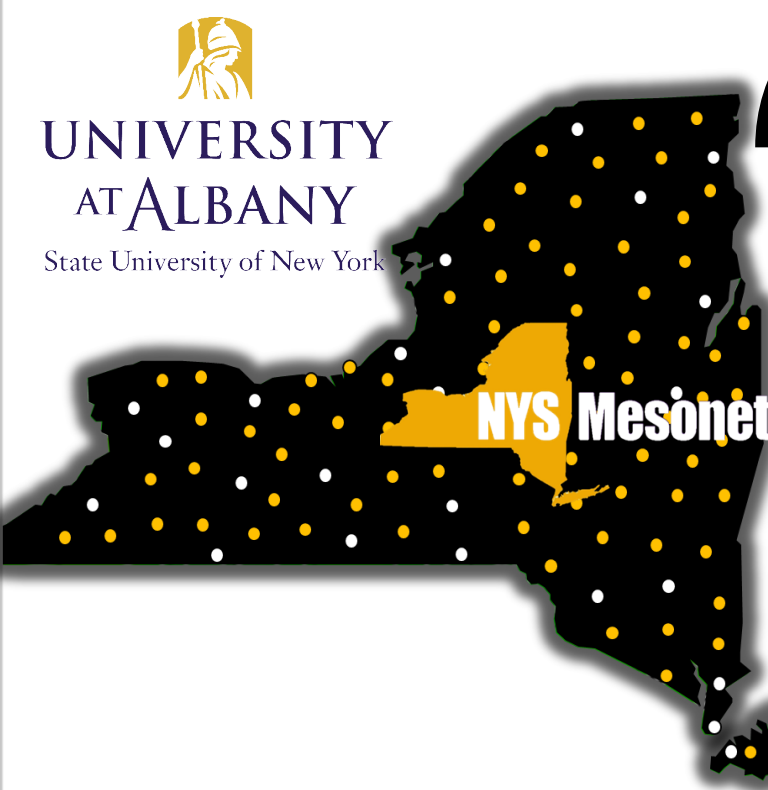
- Real-time monitoring of all data
- Dedicated field technicians for standard, profiler and SEB networks



How Mesonet Works: To Protect Life & Property



Mesonet Operations: NYS Mesonet → NWS → General Forecast → Products → Industry/Govt



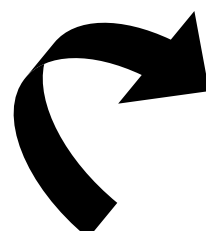
National Weather Service
Forecast Offices
Forecast Centers

Mesonet Team
Analytics, Modeling
Tools/Solutions

Real-Time/
Historical Data

Improved Forecast
More Timely Warnings

Analytics, Value Added
Products/Services



Office Emergency Management (OEM)

State Agencies & PBCs
(DOT, Thruway, DEC, Power Authority, NYISO, NYSERDA)

Local Government
(NYCOM, NYSAC)

Academia
(Research & Training)

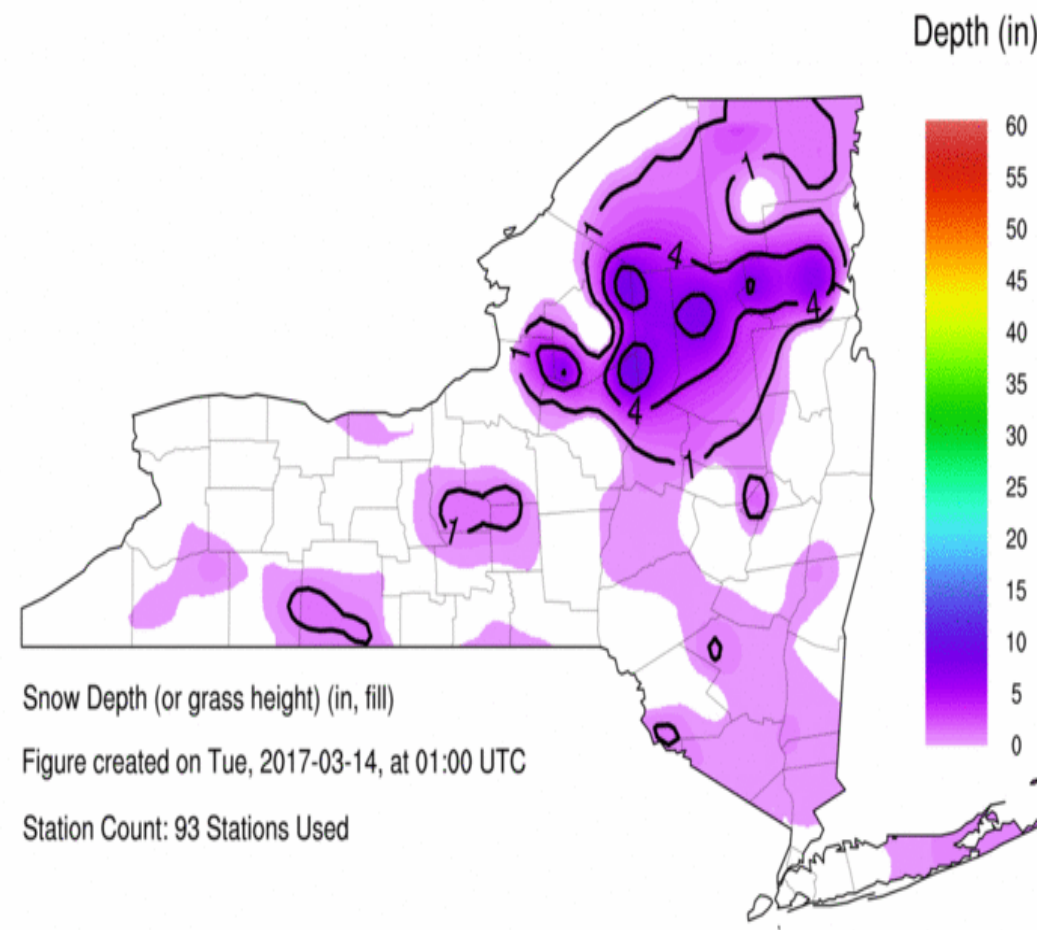
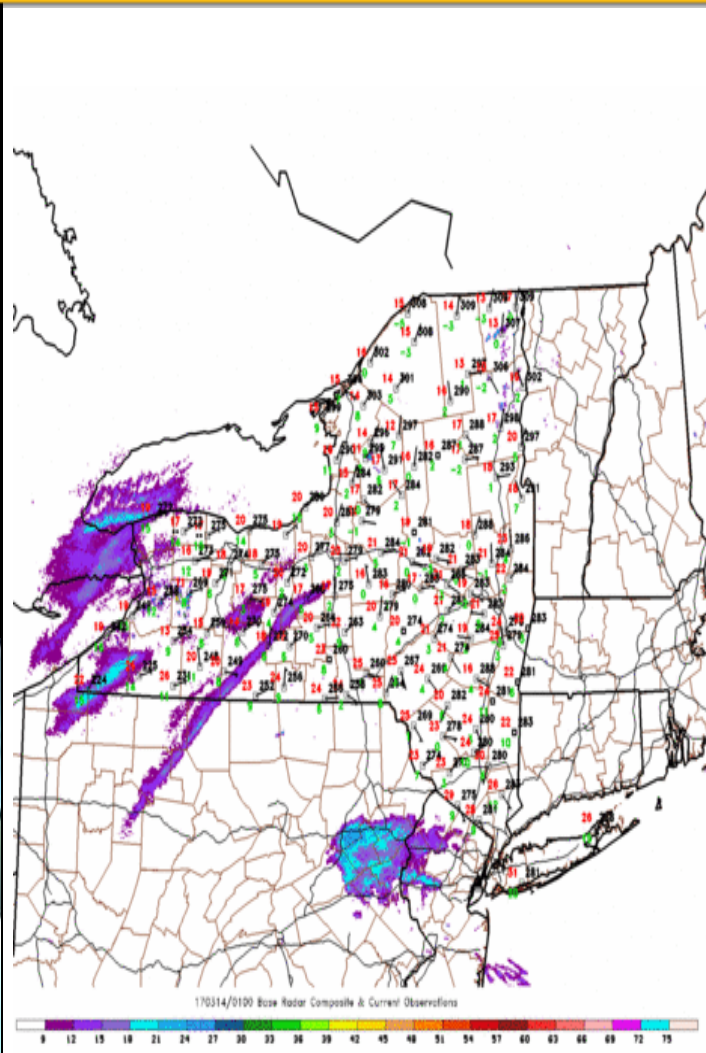
Industry
(Energy, Transportation, Agriculture, Financial)

Example of Benefit: 1st Responders/Decision Makers

- ✓ Snow Depth
- ✓ Snow Rate

“If only I had this resource during the snow event (March 2017) it would have helped immensely with operations”

Patrick Hoehn
Syracuse Division
NYS Thruway Authority



Snow Depth (or grass height) (in, fill)

Figure created on Tue, 2017-03-14, at 01:00 UTC

Station Count: 93 Stations Used

Public Access: Webpage and Social Media



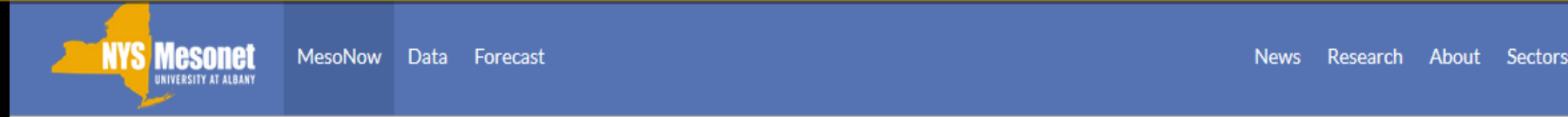
✓ <http://nysmesonet.org>



✓ [Twitter.com/nysmesonet](https://twitter.com/nysmesonet)



✓ [Facebook.com/nysmesonet](https://facebook.com/nysmesonet)



Your Current Weather and Forecast

Voorheesville

21°F
Wind Chill 14°F
Dec 14, 2017 9:45 AM EST

Site Information

Elevation:	378 feet
Relative Humidity:	61%
Dewpoint:	10°F
Wind:	W at 6 mph
Gust:	12 mph
Station Pressure:	992 mb
Sea-Level Pressure:	1,007 mb
Solar Radiation:	201 W/m ²
Snow Depth:	1"

Meteogram

Latest Camera Image

Dec 14, 2017 9:50 AM EST West

Liquid-Equivalent Precipitation

1 day:	0.02"
3 days:	0.12"
7 days:	0.33"

Soil Temperature and Moisture

2 in.:	33°F	0.22 m ³ /m ³
10 in.:	37°F	0.18 m ³ /m ³
20 in.:	40°F	0.16 m ³ /m ³

Radar Satellite 24 Hour Precip Air Temperature Wind

Show ASOS/AWOS stations

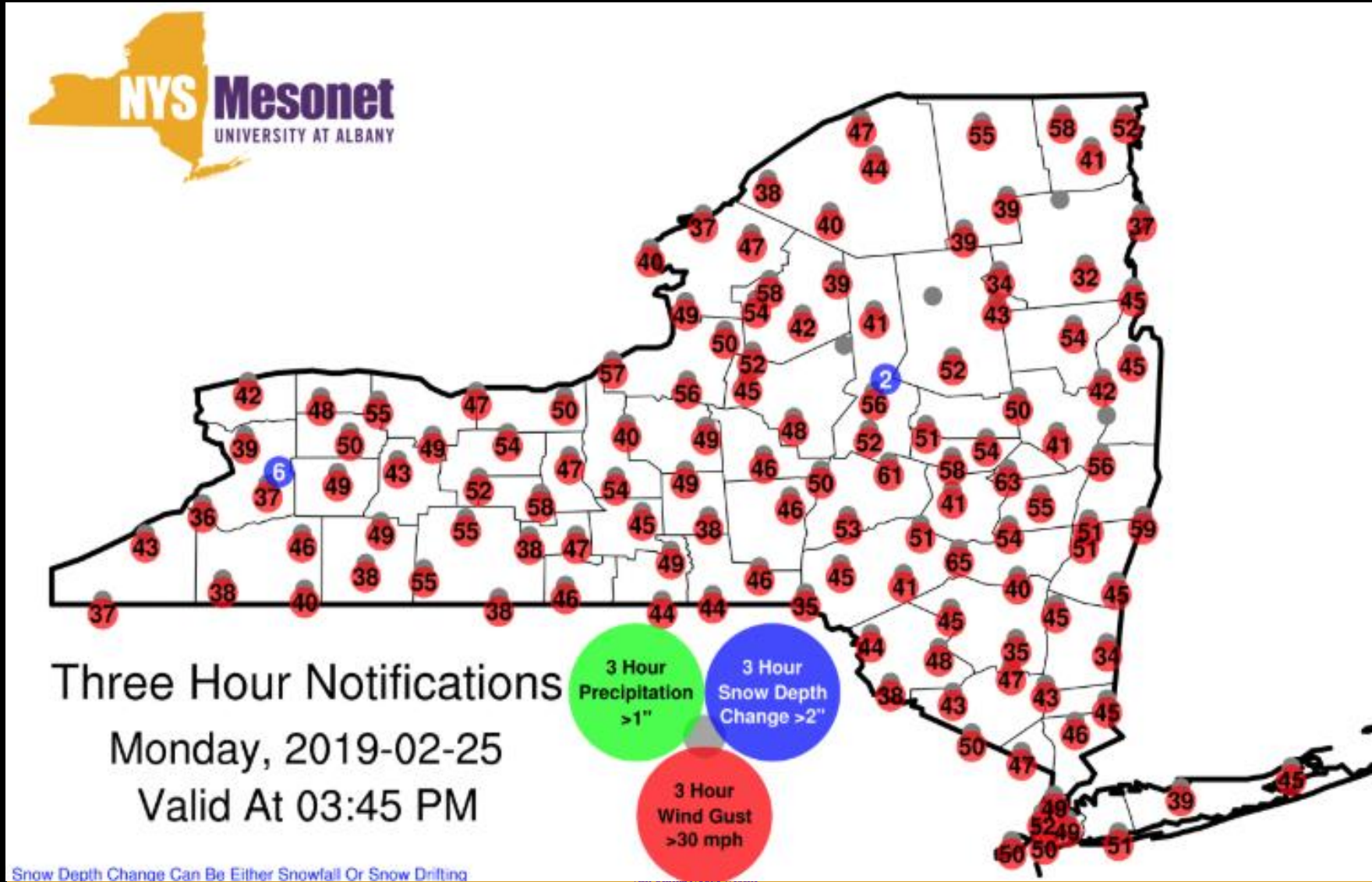
Leaflet | Powered by Esri

Ongoing Collaborations



✓ All maps update automatically with the latest data – no refresh needed!

✓ Each square lists a different type of data – such as “Precipitation” or “Past Weather”



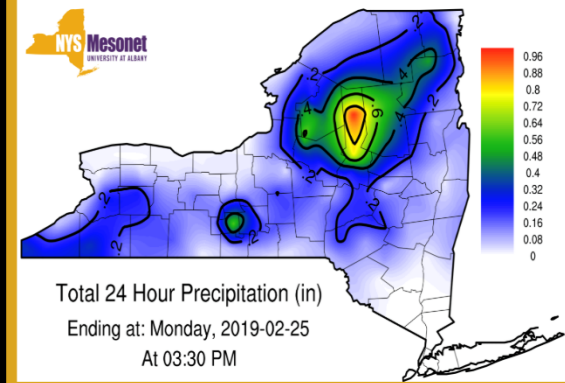
NYS Mesonet Dashboard: Tailored User Options

✓ For each square, you can use the dropdown menu in the upper left to change your map in that square

✓ Clicking on any image will take you to a full-sized window of just that image, which in certain cases provides added functionality

New York State Mesonet Dashboard

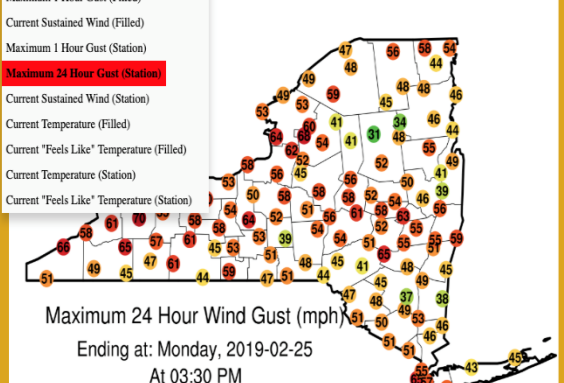
Precipitation Square



Total 24 Hour Precipitation (in)
Ending at: Monday, 2019-02-25
At 03:30 PM

Image Updates Every 30 Minutes

Wind & Temperature Square

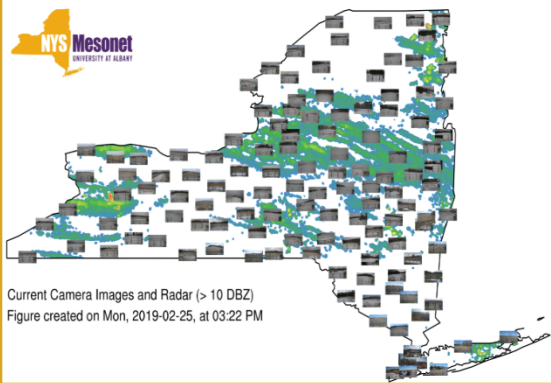


Maximum 1 Hour Gust (Filled)
Current Sustained Wind (Filled)
Maximum 1 Hour Gust (Station)
Maximum 24 Hour Gust (Station)
Current Sustained Wind (Station)
Current Temperature (Filled)
Current "Feels Like" Temperature (Filled)
Current Temperature (Station)
Current "Feels Like" Temperature (Station)

Maximum 24 Hour Wind Gust (mph)
Ending at: Monday, 2019-02-25
At 03:30 PM

Image Updates Every 30 Minutes

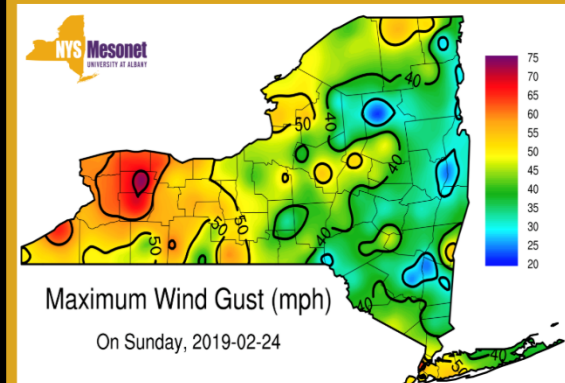
Miscellaneous Square



Current Camera Images and Radar (> 10 DBZ)
Figure created on Mon, 2019-02-25, at 03:22 PM

Most Images Update Every 5 Minutes

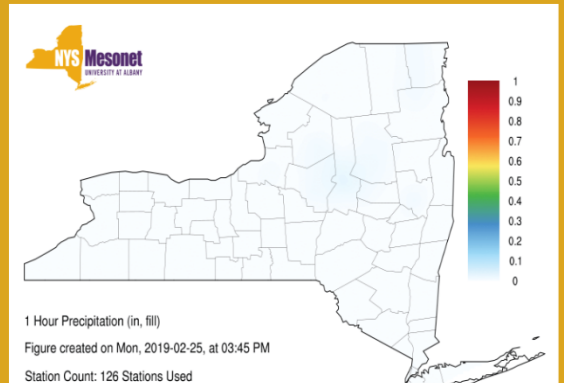
Past Weather Square



Maximum Wind Gust (mph)
On Sunday, 2019-02-24

Image Updates After Each Calendar Day

Animation Square

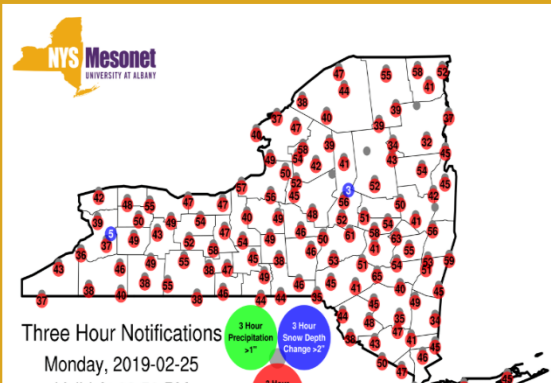


1 Hour Precipitation (in, fill)
Figure created on Mon, 2019-02-25, at 03:45 PM
Station Count: 126 Stations Used

Data Valid: 2019/02/25 20:40:00 UTC

Most Animations Update Every 5 Minutes

Significant Weather Notifications



Three Hour Notifications
Monday, 2019-02-25
Valid At 03:50 PM

Snow Depth Change Can Be Either Snowfall Or Snow Drifting

Image Updates Every 5 Minutes

[Reset Squares](#)

[See Additional Maps](#)
[View Dashboard Fast Facts](#)
[Visit Official NYSM Website](#)

- ✓ Any image can be right-clicked and saved, to easily add to a presentation
- ✓ Every bit of data is provided exclusively by the NYS Mesonet – the only exception is radar data



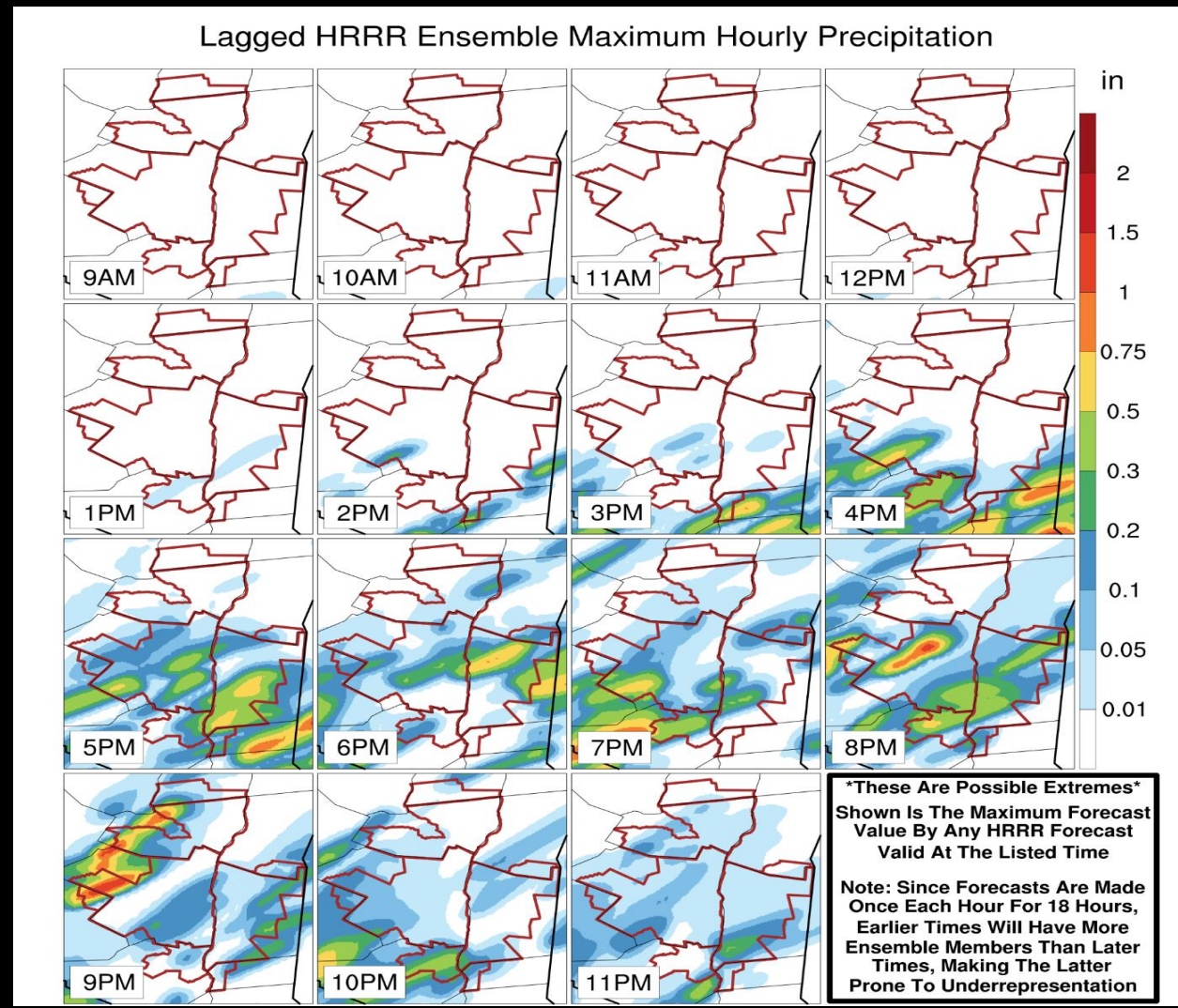


- ✓ All maps update with the latest data automatically – as often as every 5 minutes!
- ✓ The presentation, display, and types of maps included can be changed to suit different needs
- ✓ With care, external data sources could be incorporated
- ✓ Additionally, NYS Mesonet data can be combined with forecast data to add further value

Enhancing Mesonet Value for EM efforts including utilities



- ✓ Ongoing Efforts to exploit:
 - NYS Mesonet Data
 - Risk-Related Products and
 - Provide Associated Training



App Development



Mesonet App Coming Soon!



Thank You!

