

Research to Operations (R2O): UAlbany–NWS Albany CSTAR Program



Kristen L. Corbosiero
*Department of Atmospheric and Environmental Sciences
University at Albany*

UAlbany–NWS Albany CSTAR Program

~ *CSTAR* = Collaborative Science,
Technology, and Applied Research

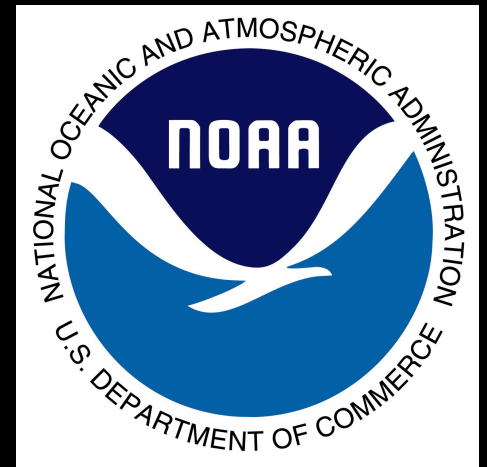
UAlbany–NWS Albany CSTAR Program

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- ~ Between **UAlbany Department of Atmospheric & Environmental Sciences** & the **Albany National Weather Forecast** (NWS) office



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- ~ Funded by the **National Oceanic and Atmospheric Administration** (NOAA)

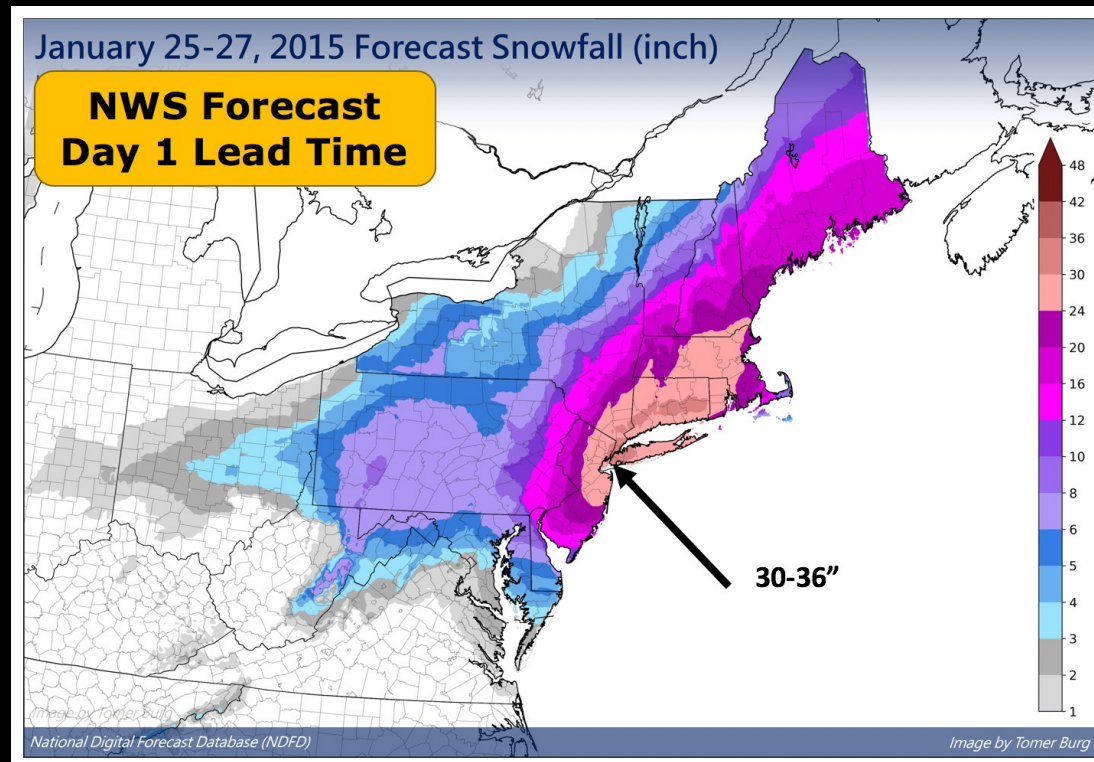


UAlbany–NWS Albany CSTAR Program

~ Engage university faculty and students in *applied research* of interest to operational forecasters

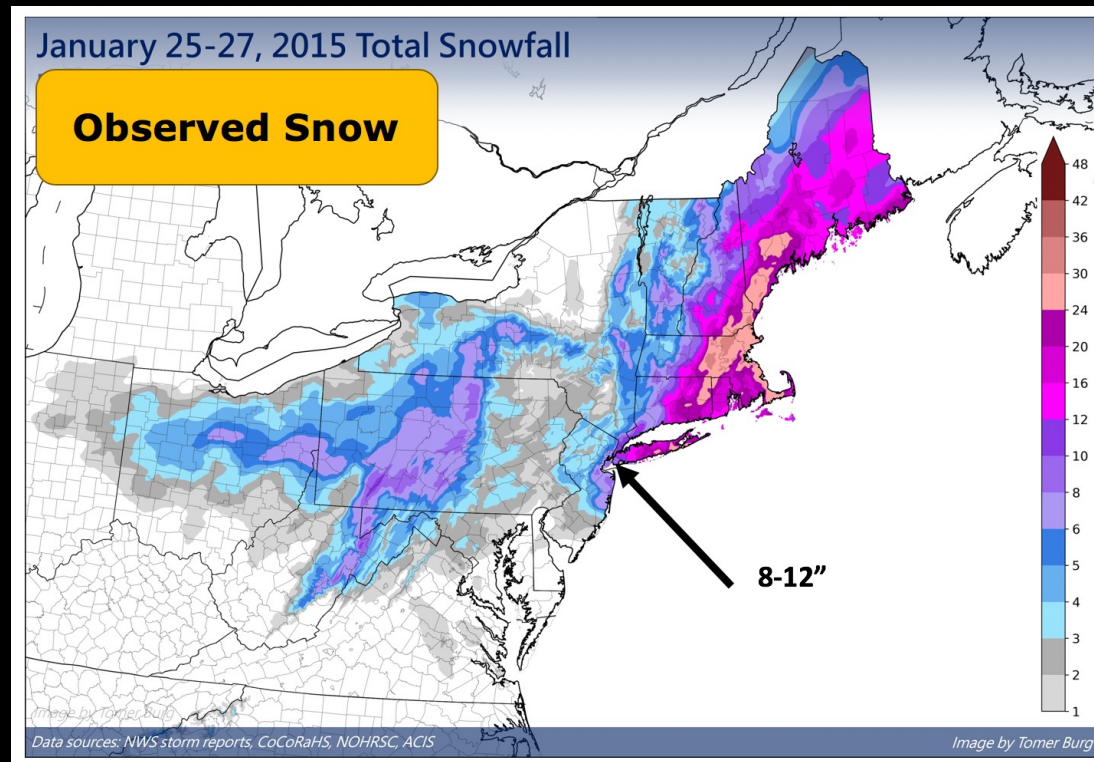
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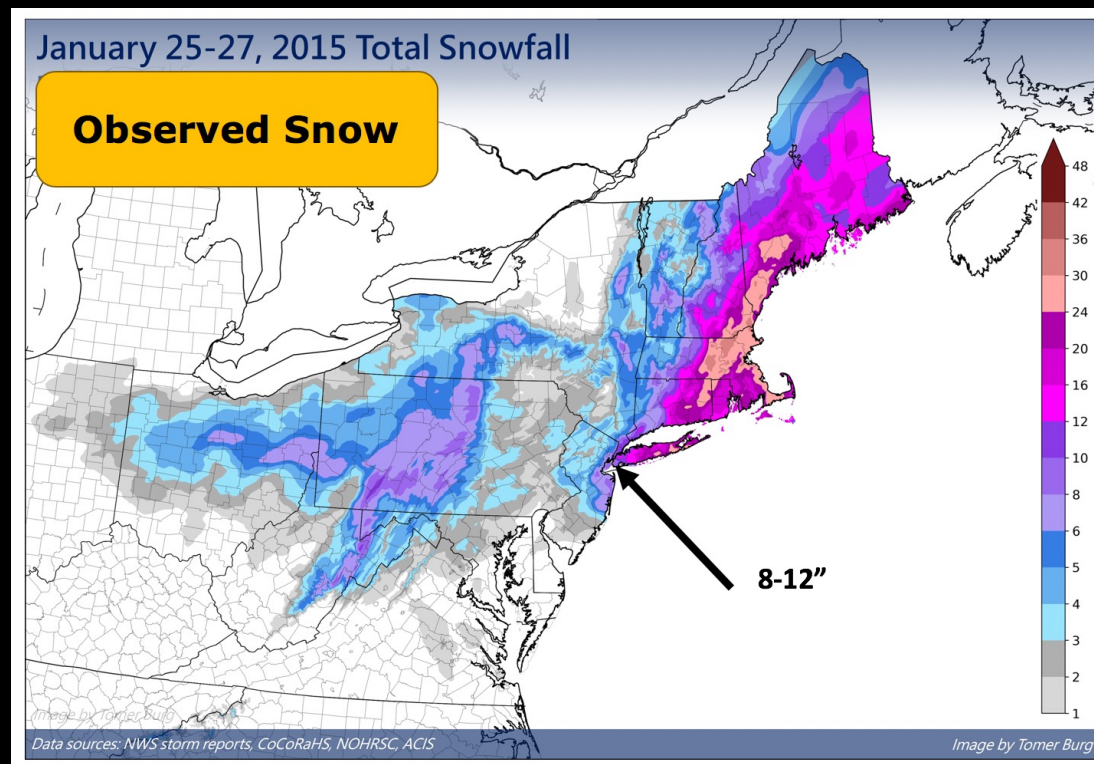
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~ Engage university faculty and students in *applied research* of interest to operational forecasters



~ *Improve forecasts* by applying scientific knowledge to operational products and services

UAlbany–NWS Albany CSTAR Program

~ Started by *Lance Bosart, Dan Keyser, and Gene Auciello* in the late 1990s



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- ~ Started by *Lance Bosart, Dan Keyser, and Gene Auciello* in the late 1990s
- ~ *Added new faculty* as DAES grew in the 2010s



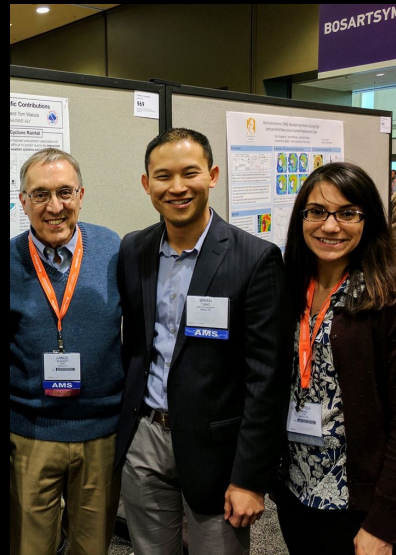
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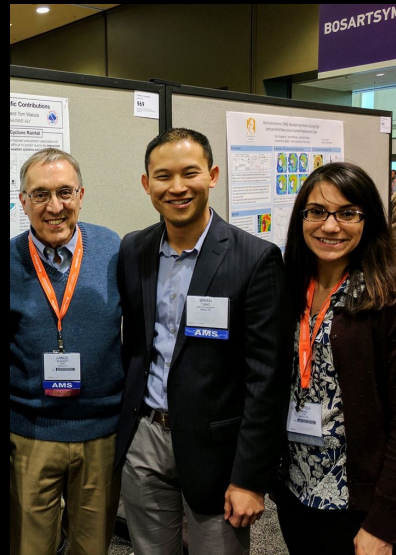
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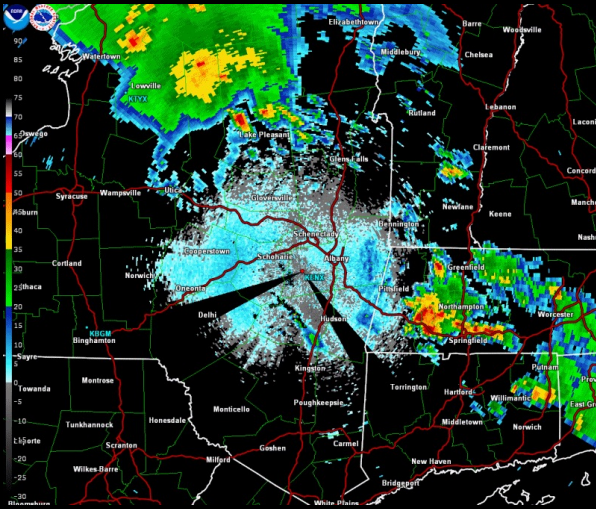


UAlbany–NWS Albany CSTAR Program

~ *Three graduate students working with DAES advisors and NWS forecasters (focal points)*

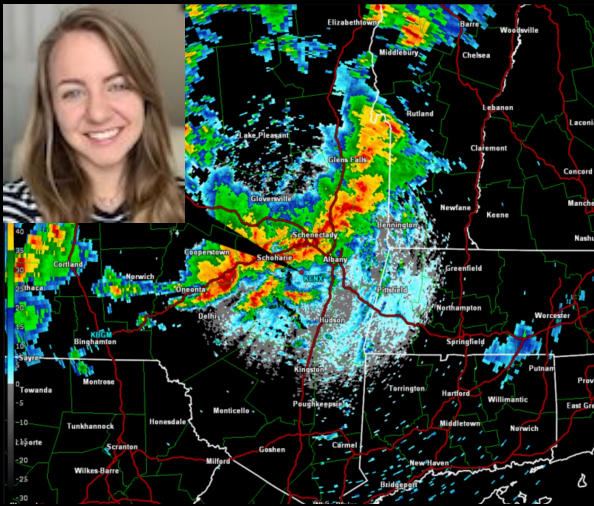
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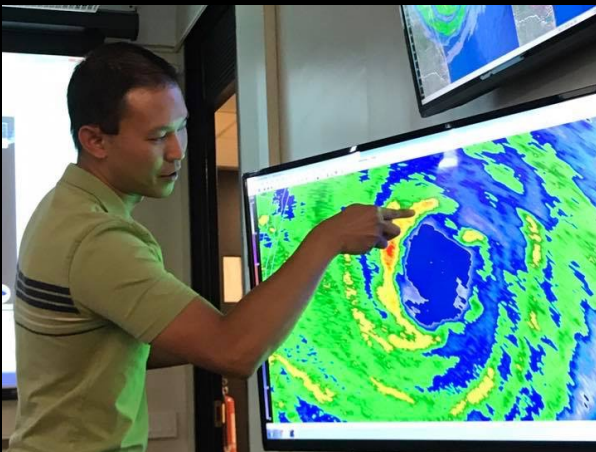
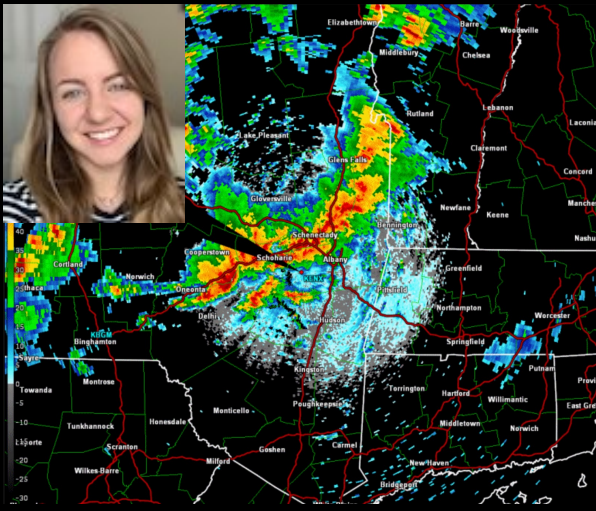
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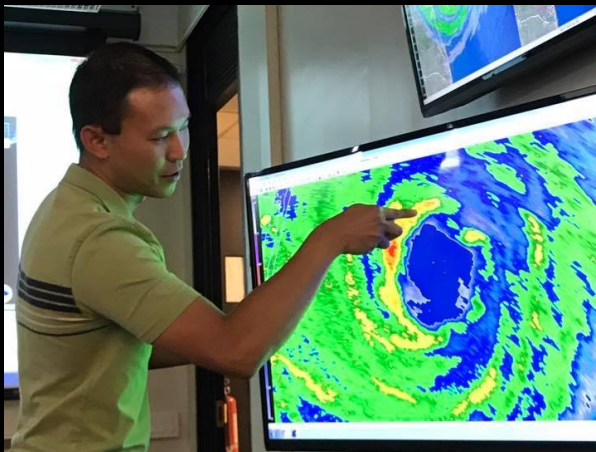
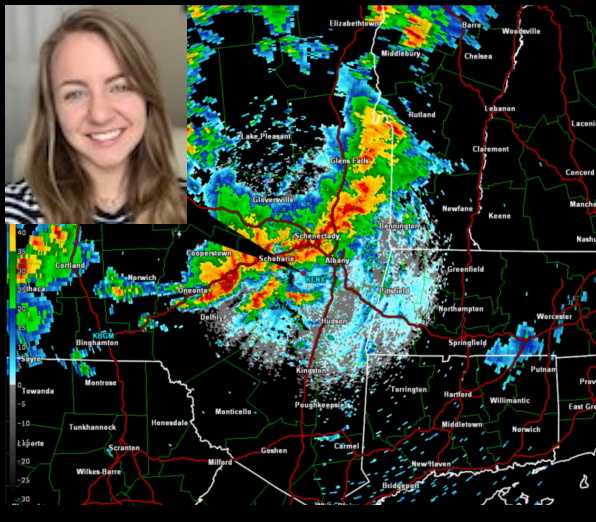
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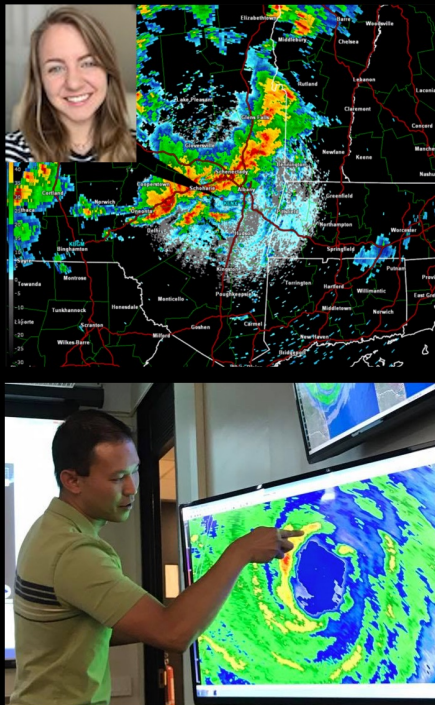
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~ Bring *improved scientific understanding and technology* into the *forecast system*

UAlbany–NWS Albany CSTAR Program

UAlbany–NWS Albany CSTAR Program

I) Winter weather

- *Mesoscale snowbands*
- *Uncertain precipitation type*

UAlbany–NWS Albany CSTAR Program

1) Winter weather

- *Mesoscale snowbands*
- *Uncertain precipitation type*

2) Severe weather

- *Prediction of severe thunderstorms*
- *Forecasting tornadoes*

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3) Tropical cyclone precipitation

- *Predecessor rain events*
- *Rainfall in complex terrain*

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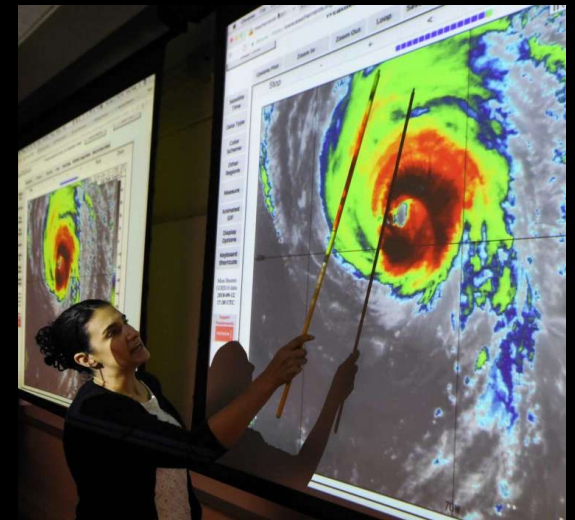
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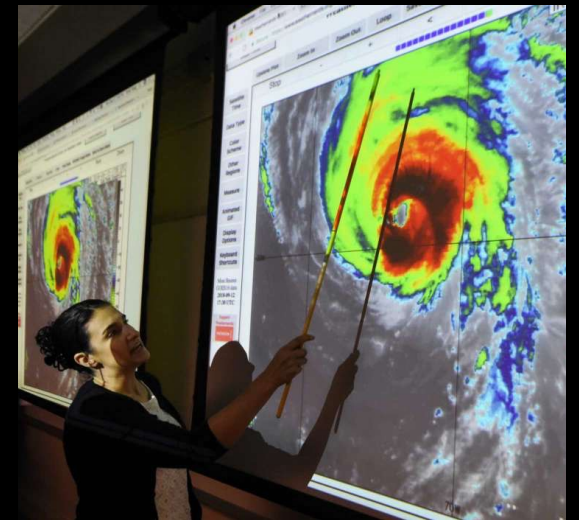


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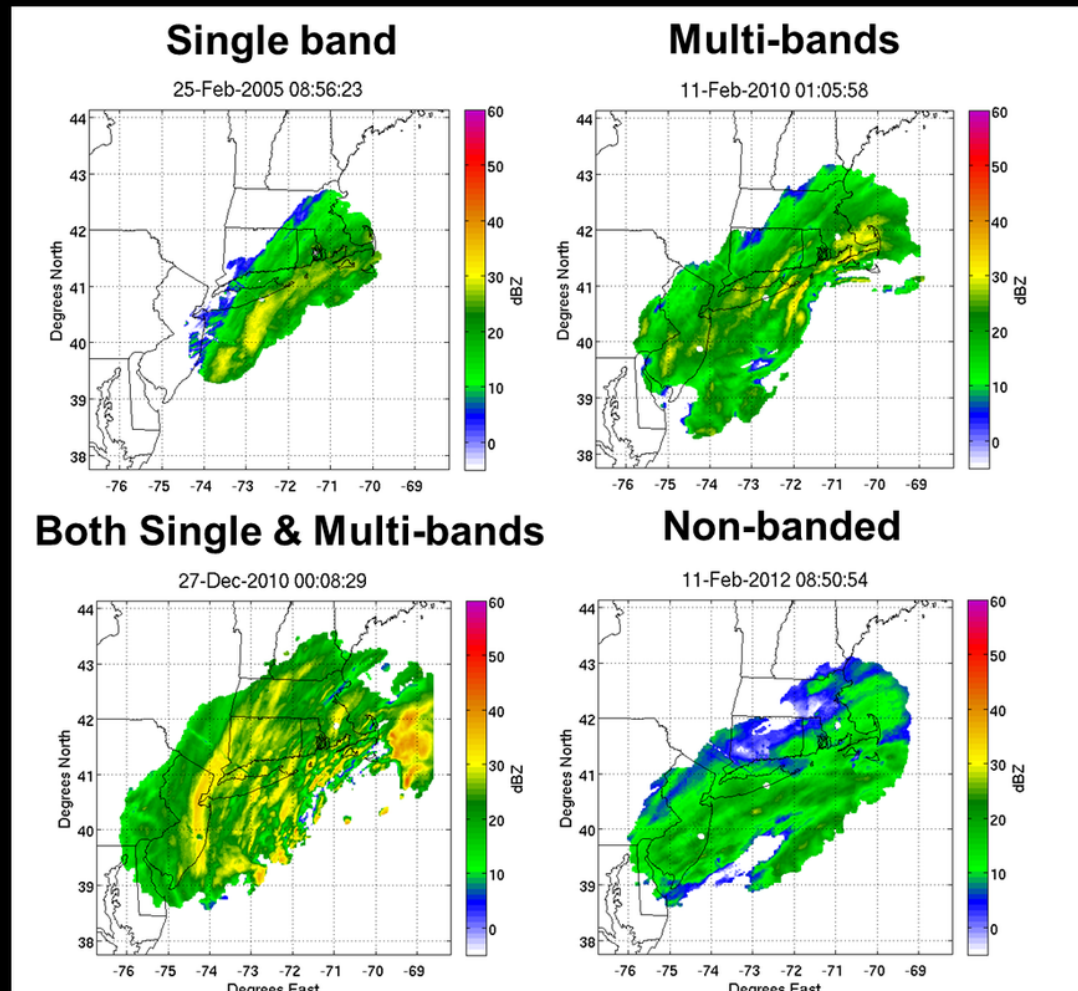
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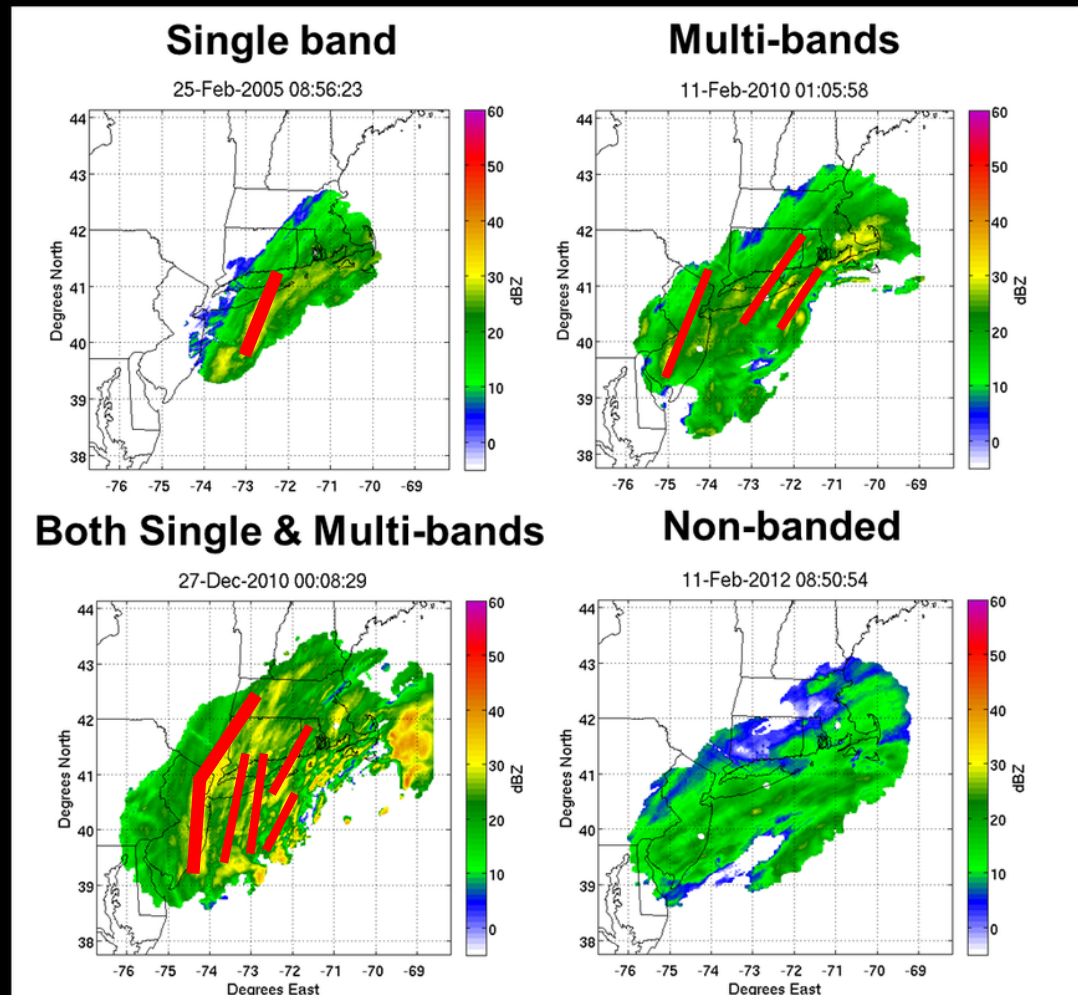


Novak (2002)
Kenyon (2013)

UAlbany–NWS Albany CSTAR Program

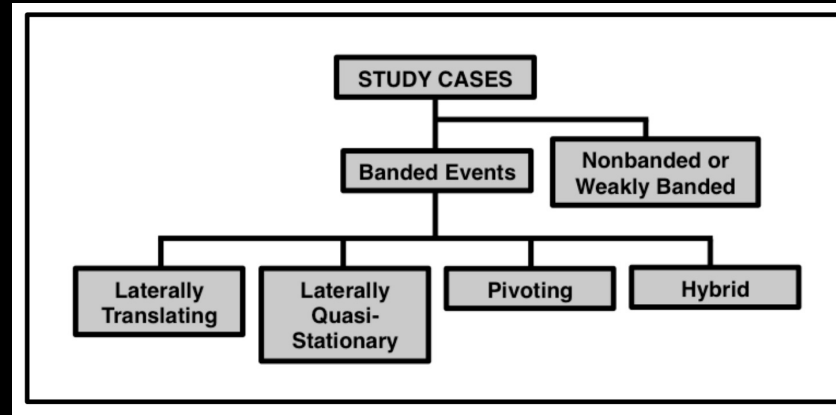
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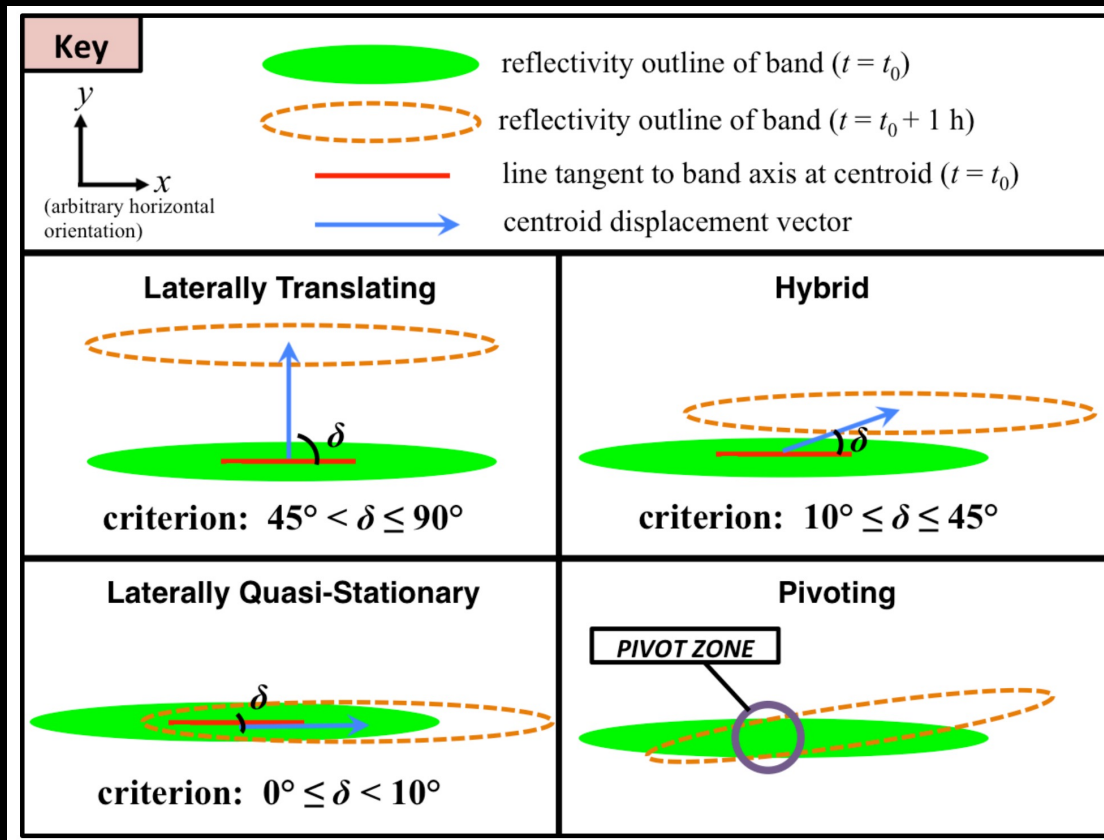
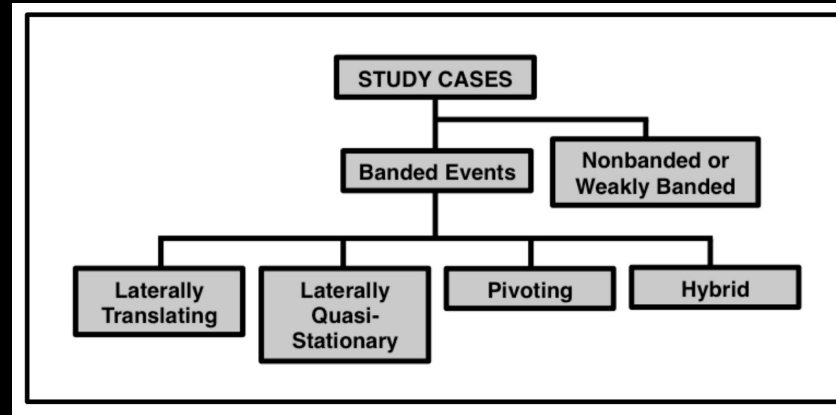


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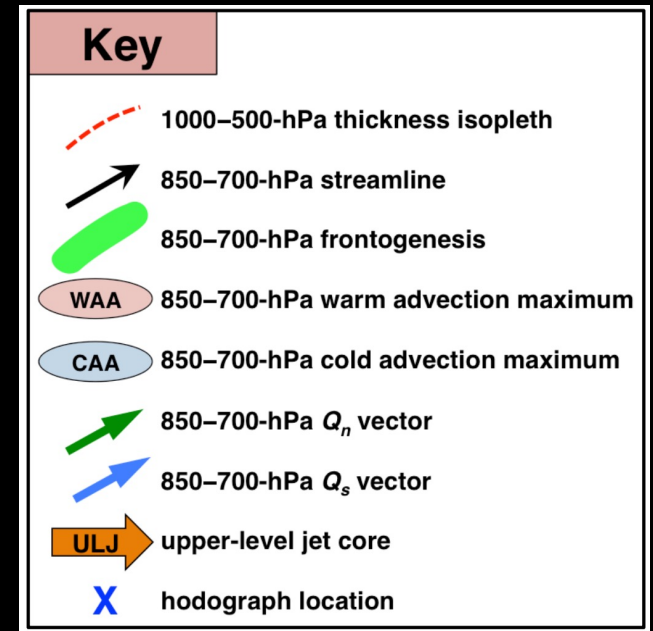
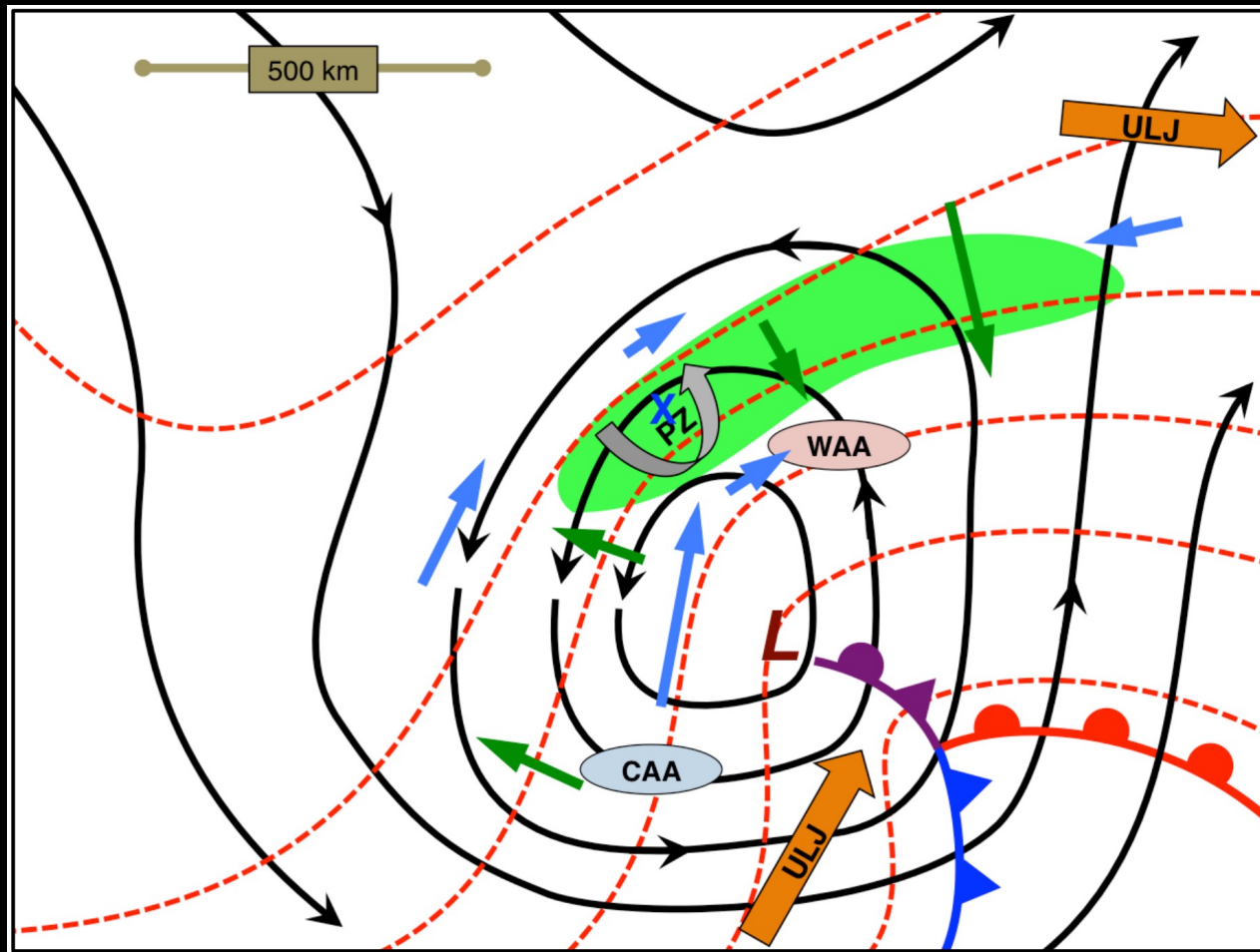
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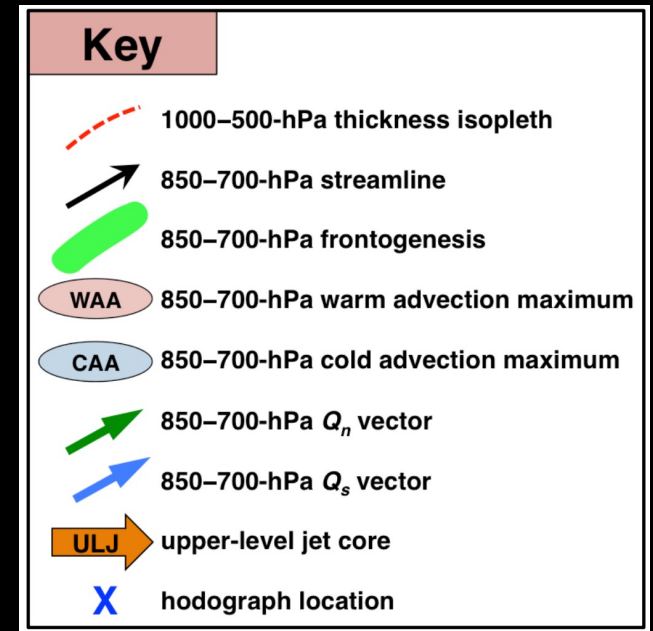
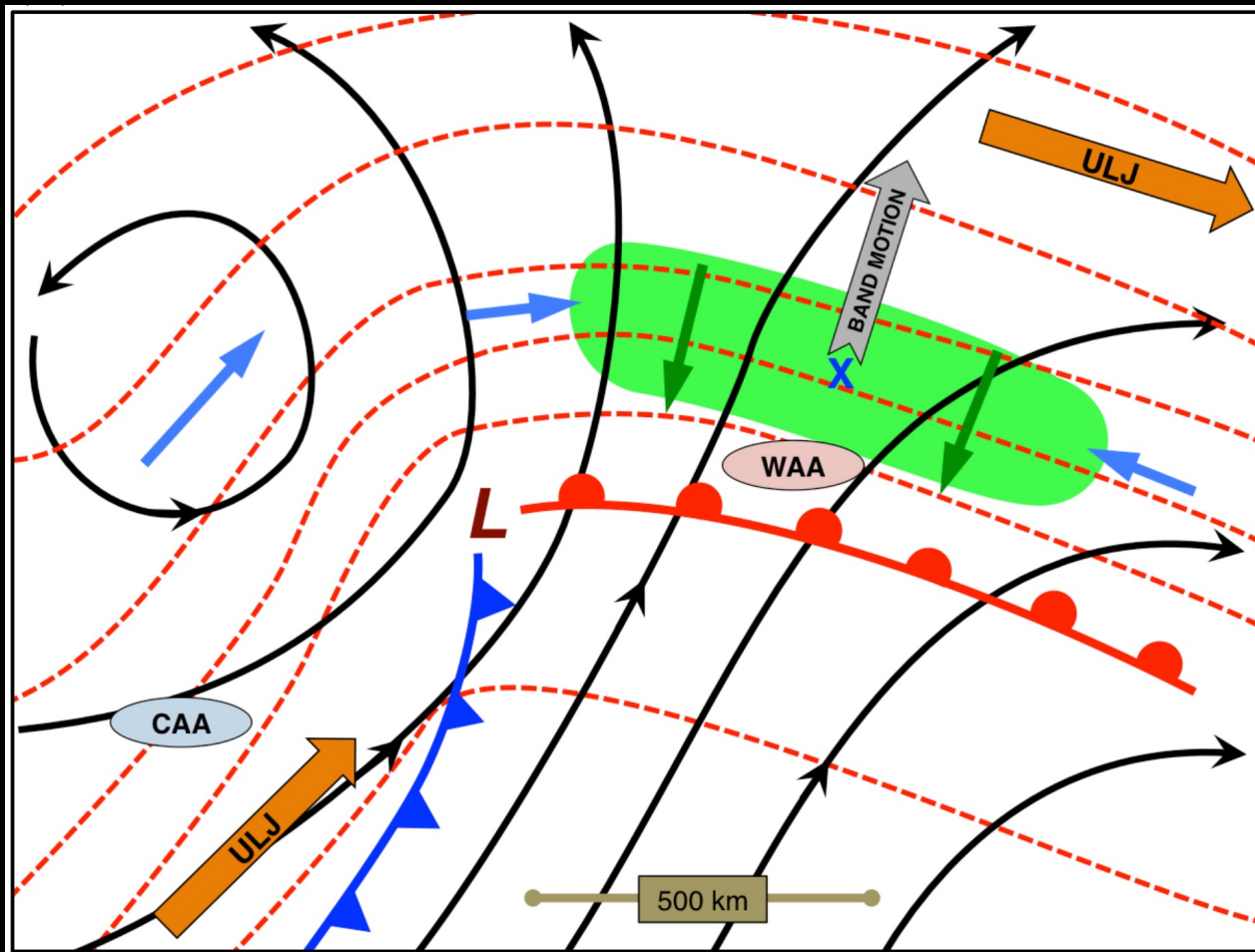
- *Pivoting snowbands*



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I) Winter weather

- *Laterally translating snowbands*



UAlbany–NWS Albany CSTAR Program

I) Winter weather

- *Laterally translating snowbands*

FXUS61 KALY 142116
AFDALY

AREA FORECAST DISCUSSION
National Weather Service Albany NY
416 PM EST Fri Jan 14 2022

Strong isentropic lift, aided by a powerful low-level jet of 50+ knots, will be allowing for a laterally translating band of snowfall (based of CSTAR research) to lift from south to north across the area for late Sunday night. 12z GEFS show 850 u wind anomalies of -4 to -5 STD, which is very impressive. This suggests very strong flow, which will supply abundant moisture and will upslope into the high terrain. Snowfall rates will easily exceed 1" per hour within this snowband and rates could reach 2" to 3" per hour where the upslope enhances the precip. The band looks to move quickly and will be rocketing northward across the area for the late overnight hours.

SHORT TERM...Frugis

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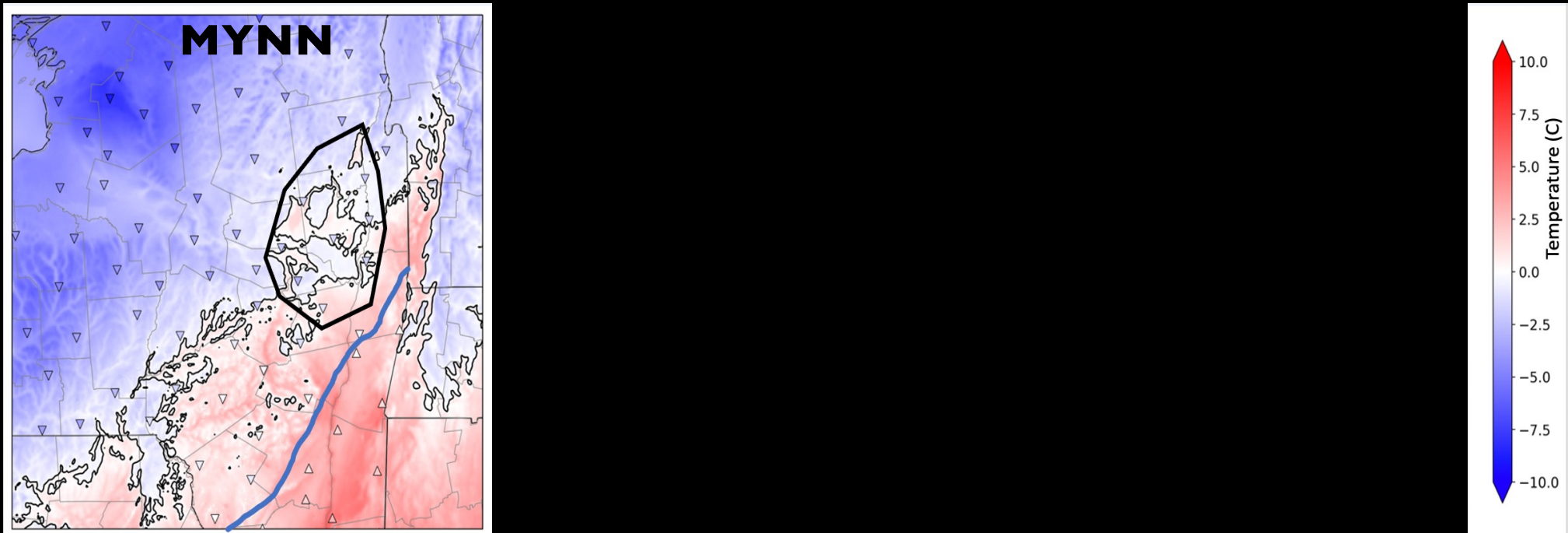
I) Winter weather

- *Near-freezing uncertain precipitation type*

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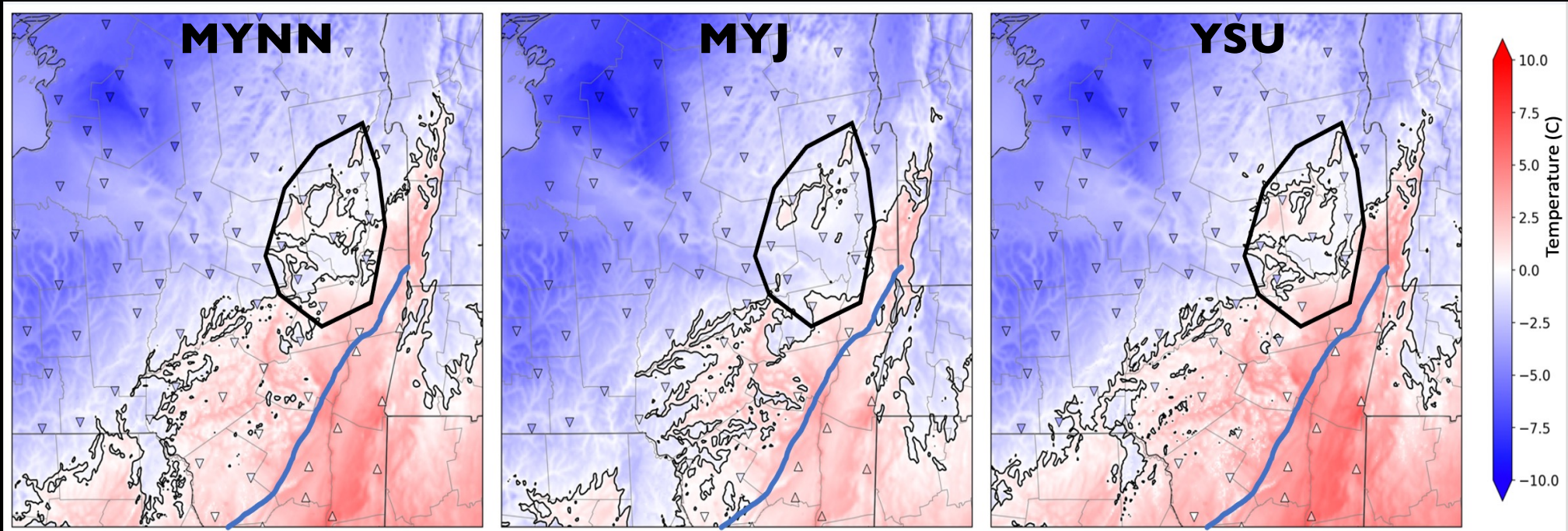


- Color fill is WRF 2-m temperature
- Up-triangle indicates above-freezing NYSM site
- Down-triangle indicates below-freezing NYSM site

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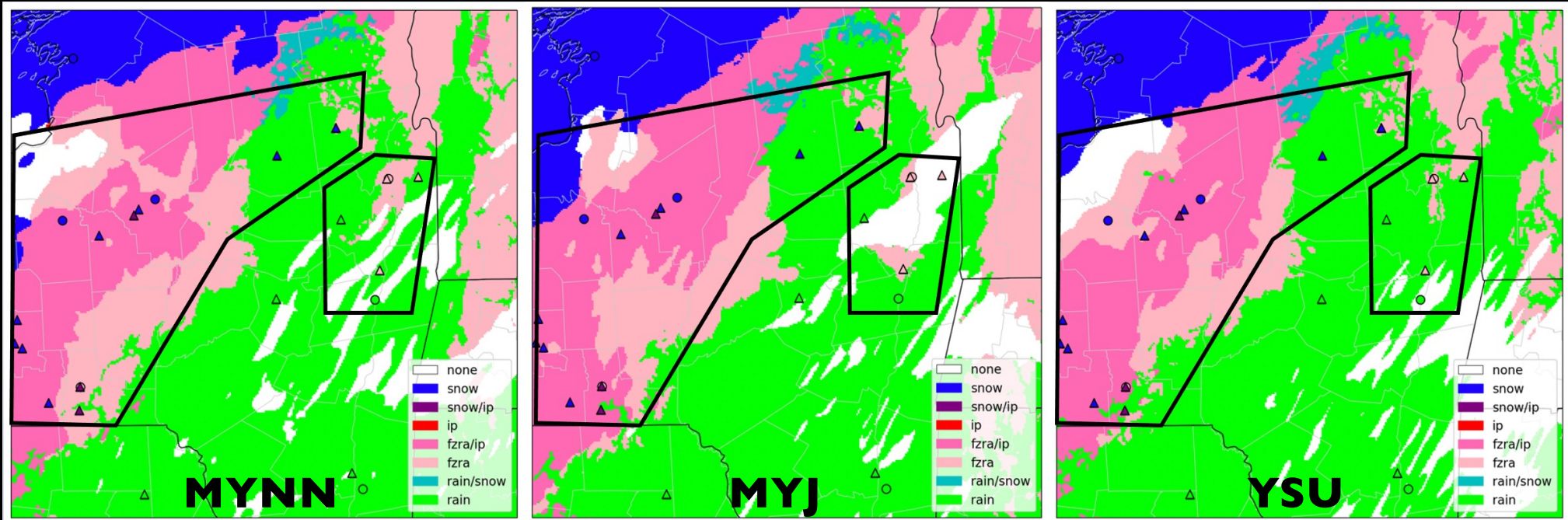


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Fill = WRF simulated p-type
Circle = ASOS report
Triangle = mPING report

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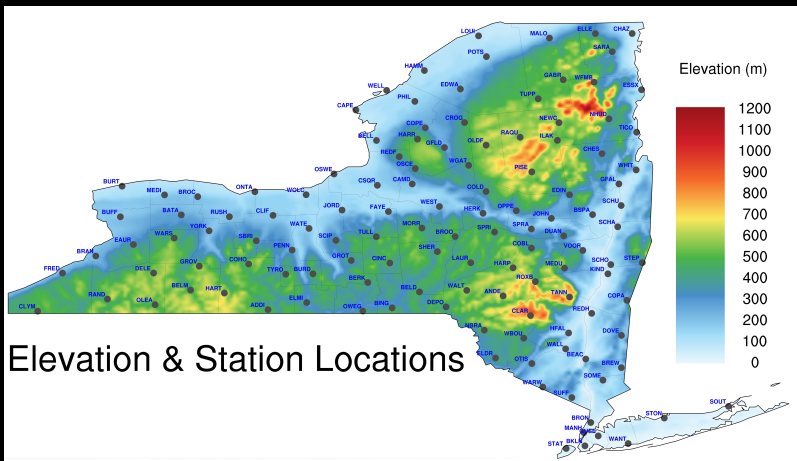
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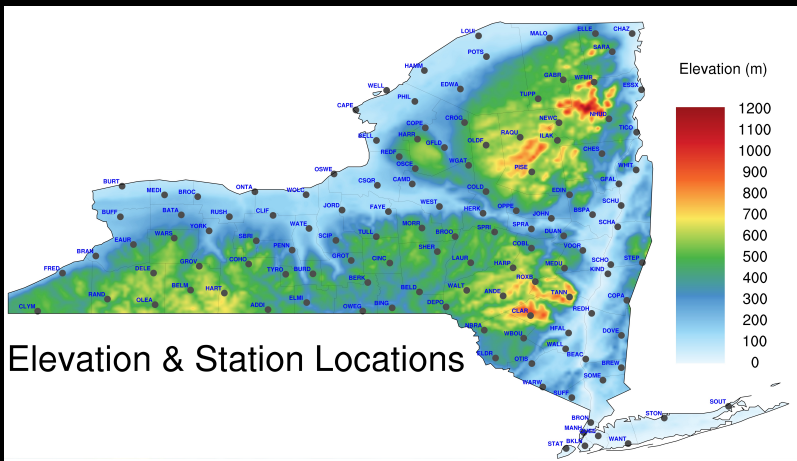
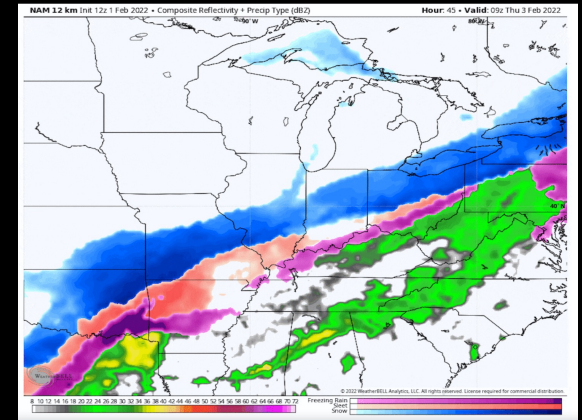
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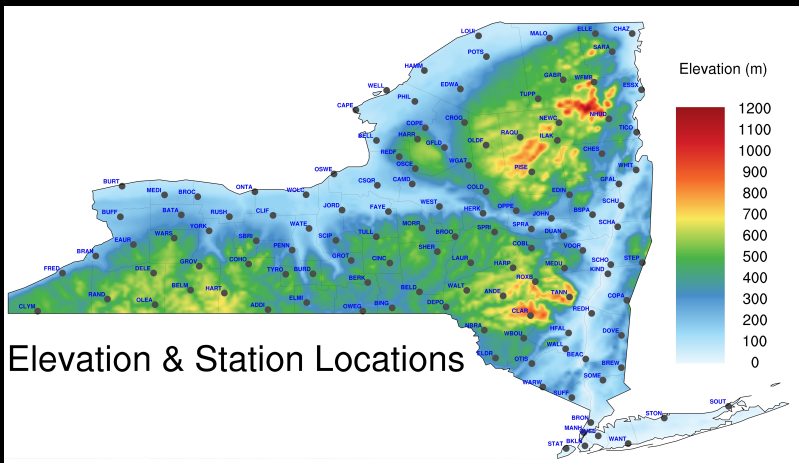
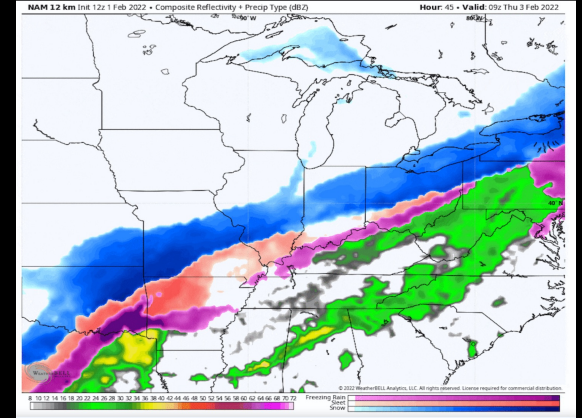


Elevation & Station Locations

UAlbany–NWS Albany CSTAR Program

I) Winter weather

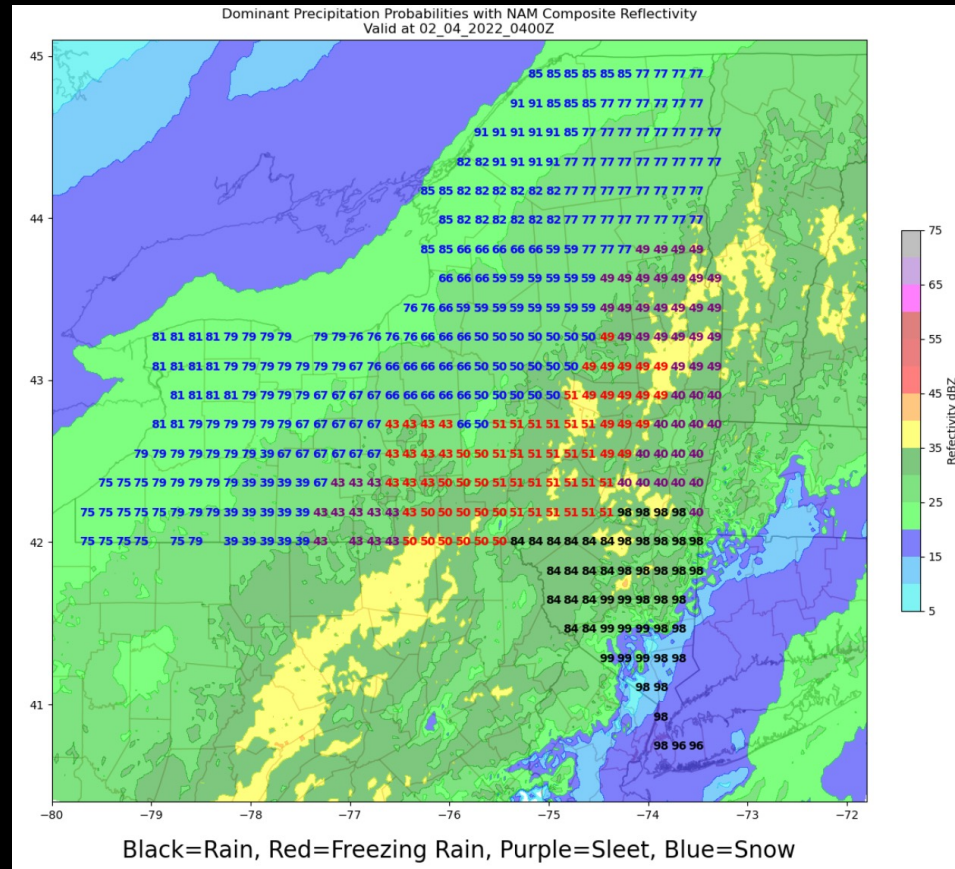
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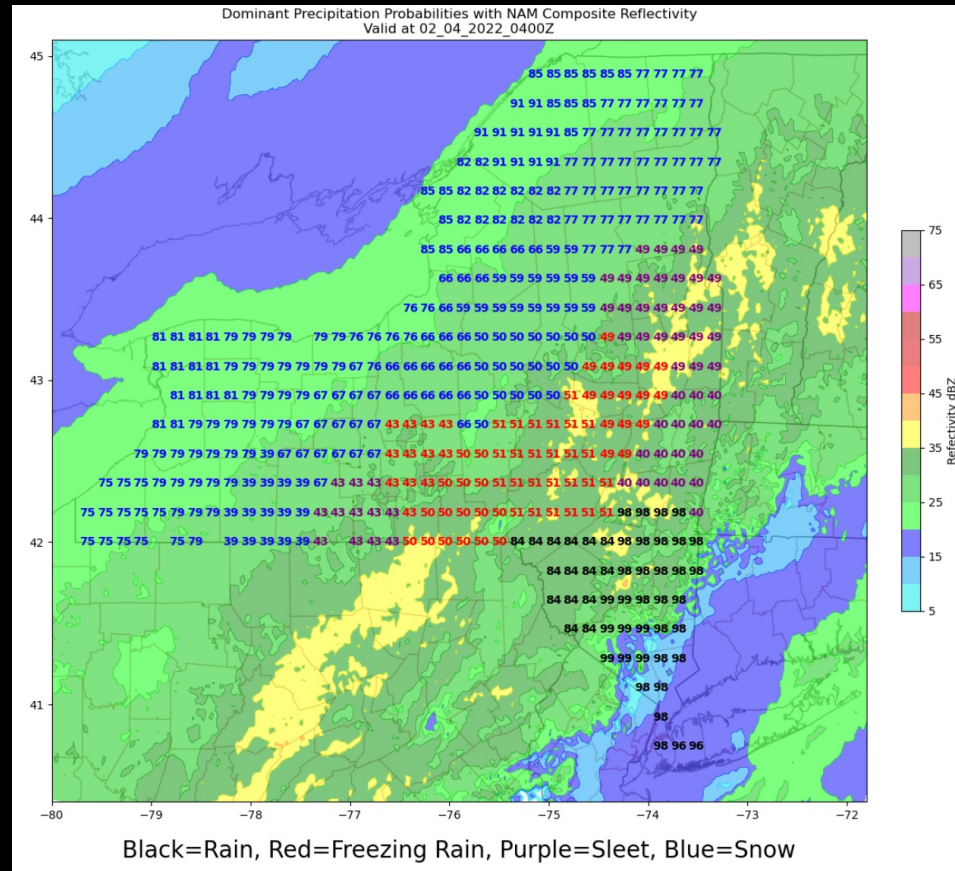


Filipiak (2022)

UAlbany–NWS Albany CSTAR Program

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Filipiak (2022)

Dewpoint at surface	Temperature at surface	Positive Area	Max Wet Bulb 925-700hPa	Surface Wet Bulb Temperature	Min Temperature surface-850hPa	Temperature at 850hPa	Max Temperature 850-700hPa	Mean Temperature surface to 850hpa	Dewpoint at 925hPa
0.05826	0.049744	0.0489	0.04838	0.04403	0.04156	0.034428	0.033562	0.033138	0.032682

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FXUS61 KALY 040234

AFDALY

AREA FORECAST DISCUSSION

National Weather Service Albany NY

934 PM EST Thu Feb 3 2022

.NEAR TERM /THROUGH FRIDAY/...

Based on reports from spotters, social media and data from the NY State Mesonet, and experimental precipitation type CSTAR output, sleet and freezing rain occurring to the Johnstown/Amsterdam area and even near the Herkimer sawtooth. Some slight reductions in the snow forecasts out there and a slight increase in the ice forecasts from the Capital Region east and south.

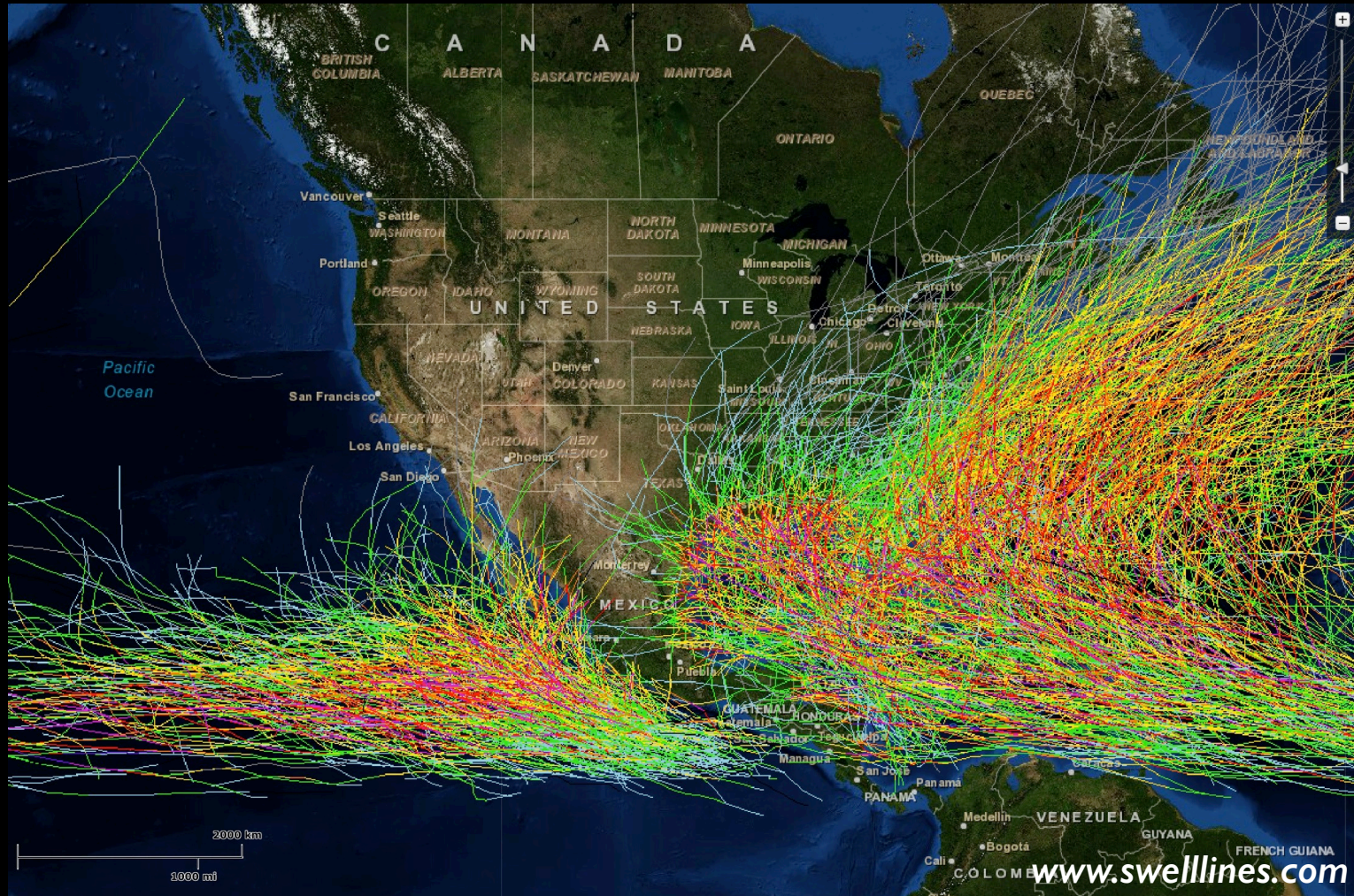
NEAR TERM...SND/NAS

UAlbany–NWS Albany CSTAR Program

3) Tropical cyclone precipitation

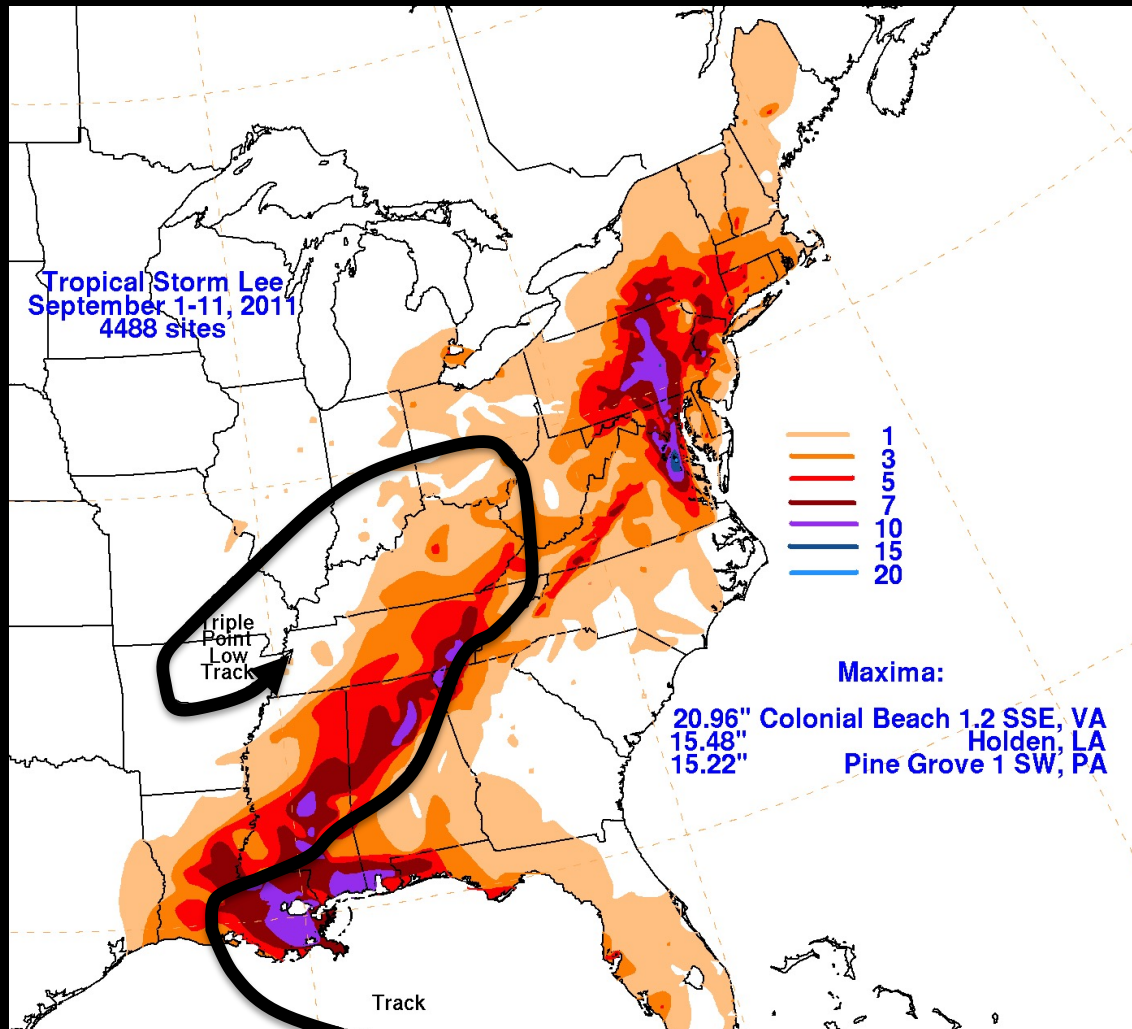
UAlbany–NWS Albany CSTAR Program

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Roth (2011)

UAlbany–NWS Albany CSTAR Program

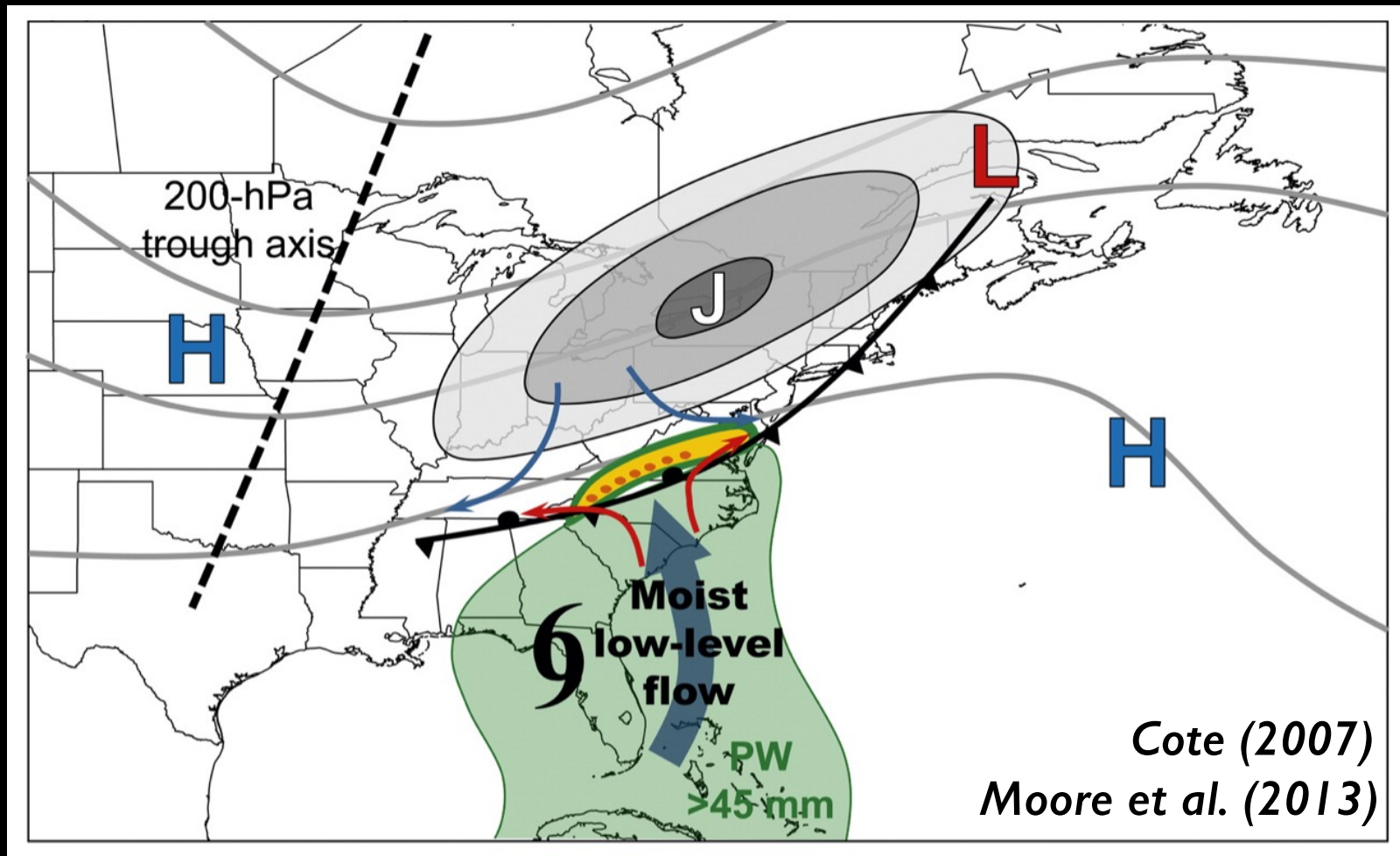
3) Tropical cyclone precipitation

- ***Predecessor rain events (PREs)***

UAlbany–NWS Albany CSTAR Program

3) Tropical cyclone precipitation

- *Predecessor rain events (PREs)*



UAlbany–NWS Albany CSTAR Program

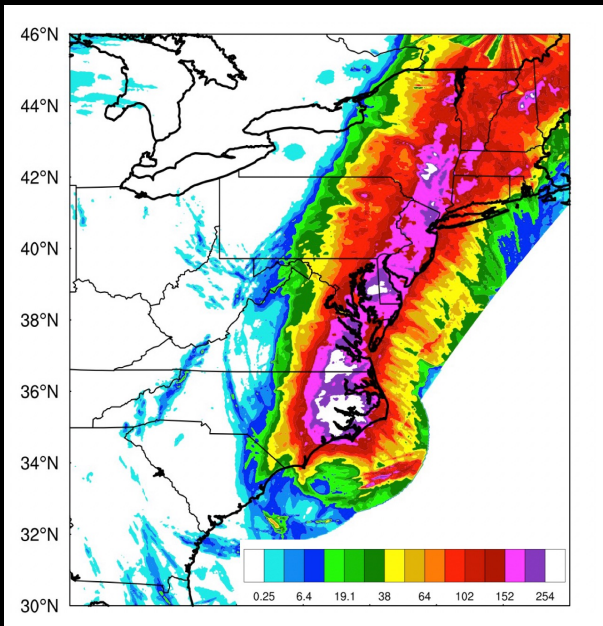
3) Tropical cyclone precipitation

- ***Rainfall in complex terrain***

UAlbany–NWS Albany CSTAR Program

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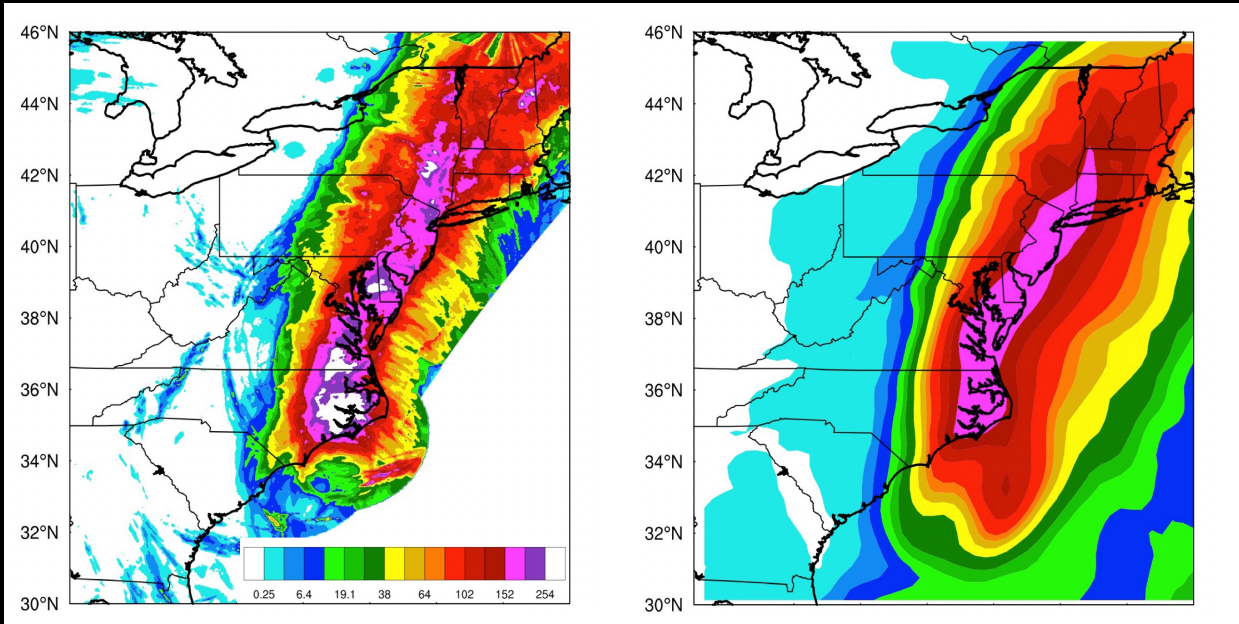


Observed rainfall

UAlbany–NWS Albany CSTAR Program

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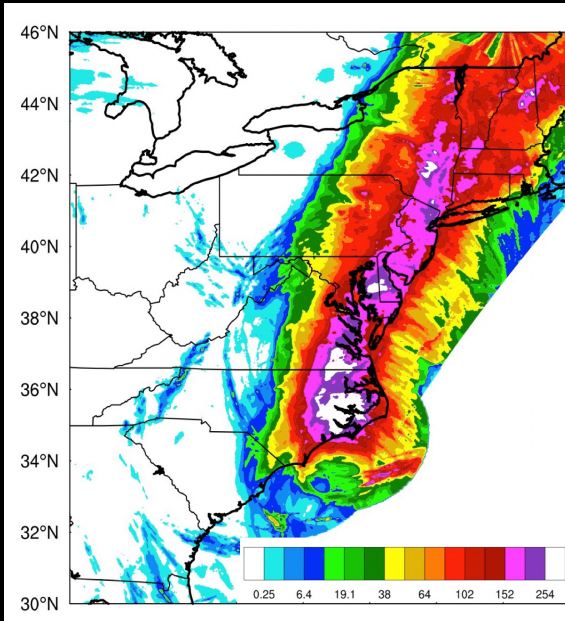
Observed rainfall

*80-member GFS ensemble
mean rainfall*

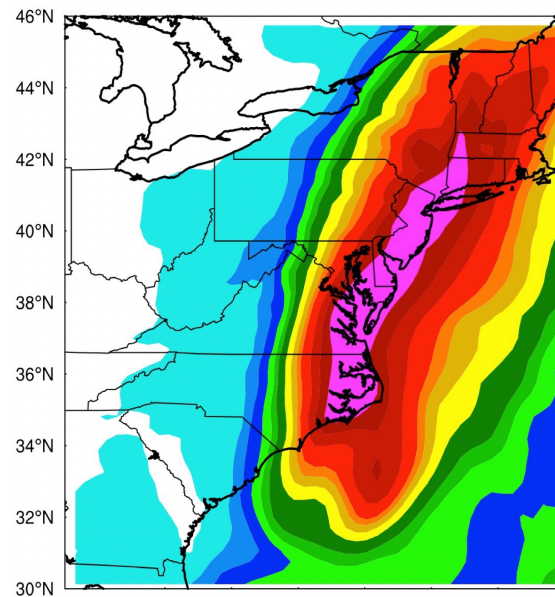
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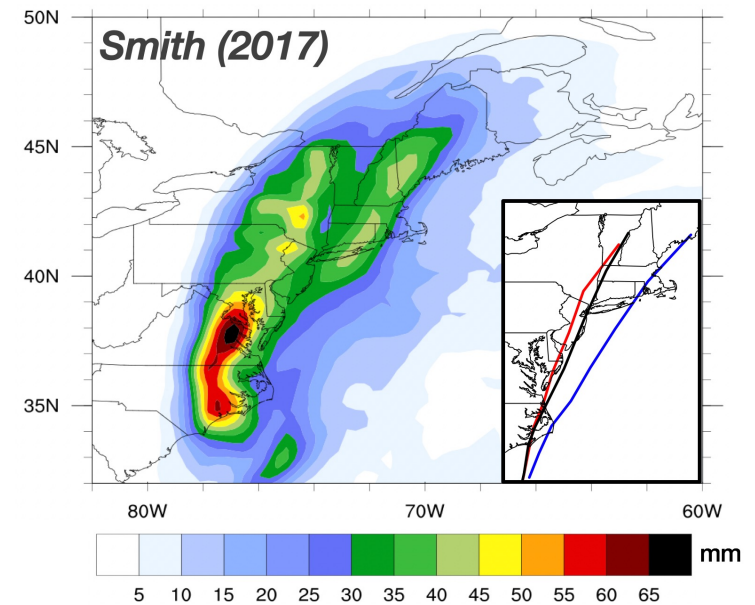
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Observed rainfall



*80-member GFS ensemble
mean rainfall*

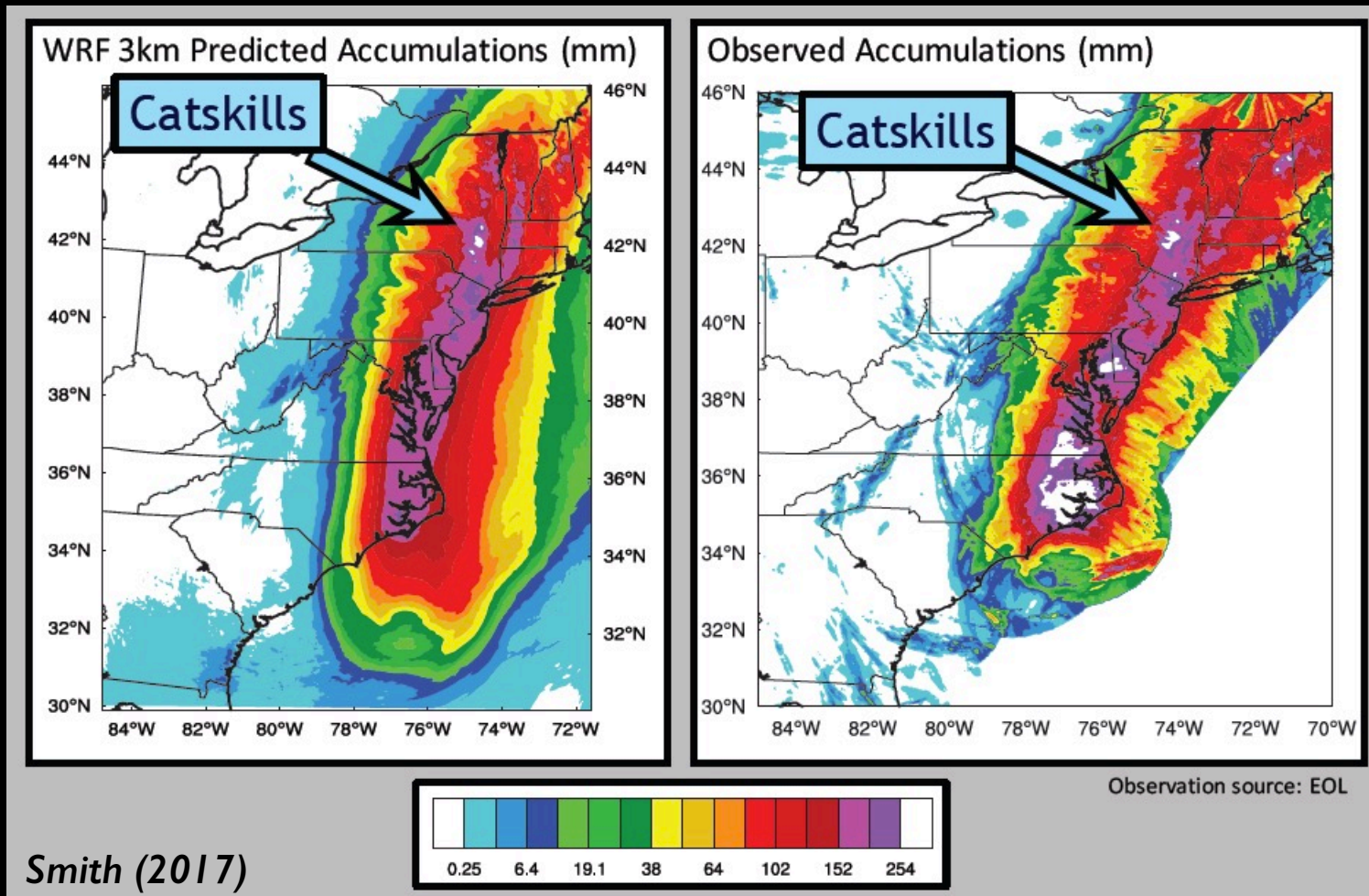


*80-member GFS ensemble
standard dev. rainfall*

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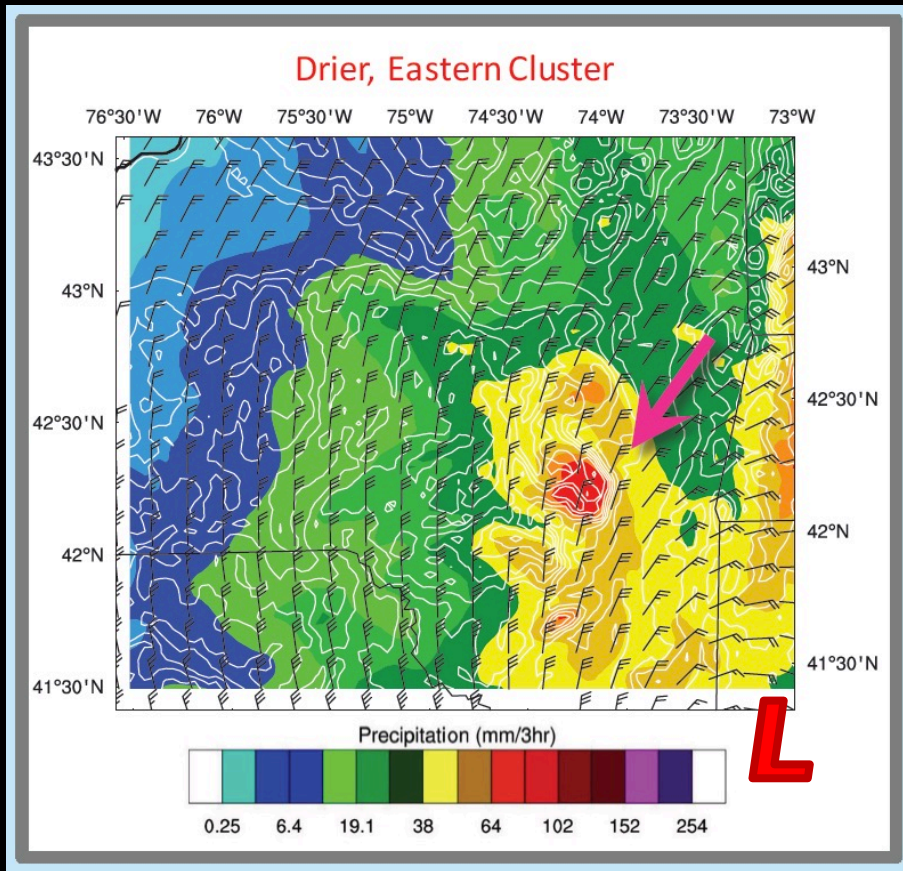
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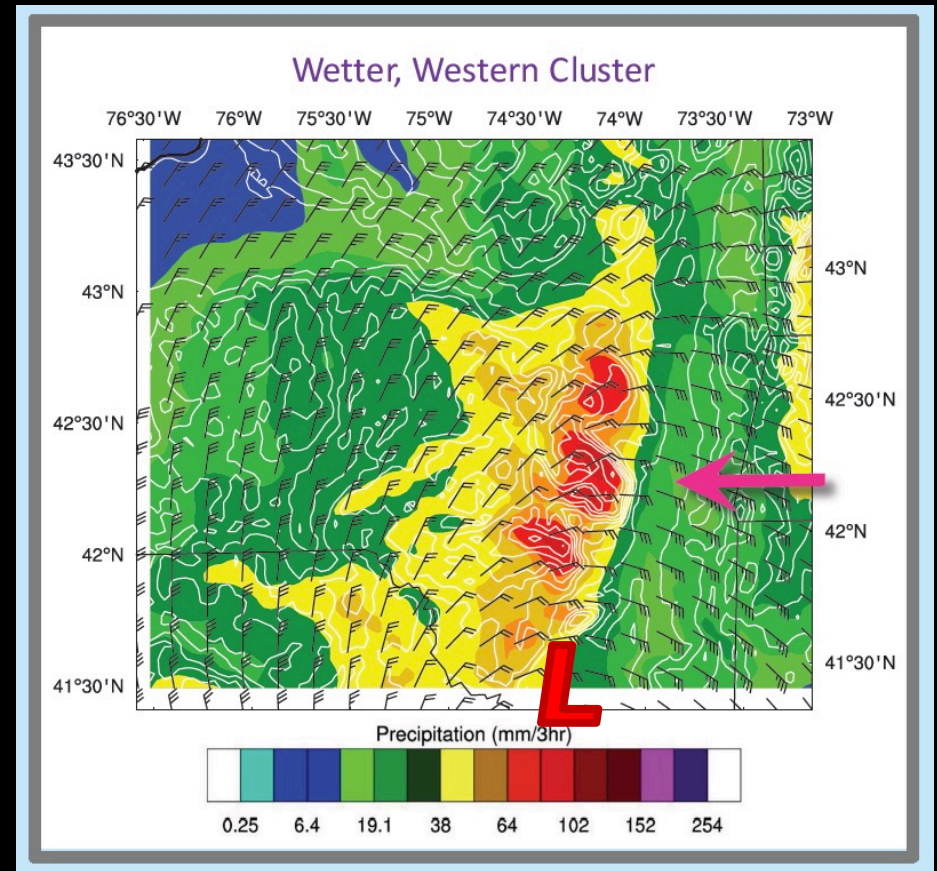
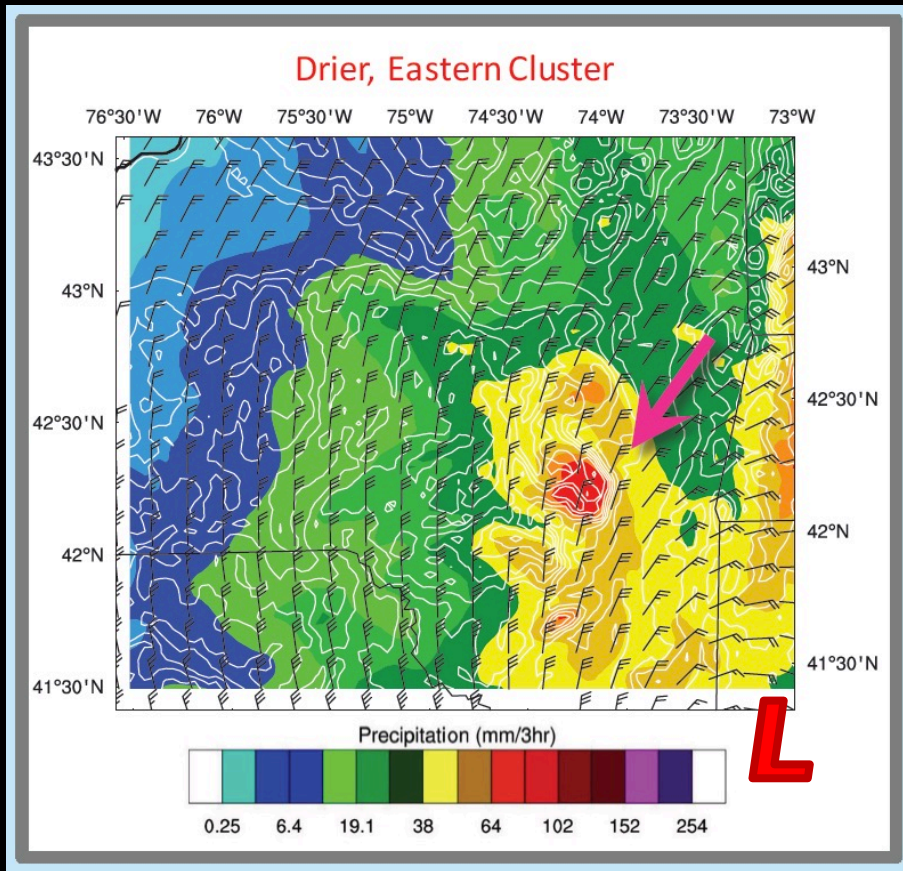
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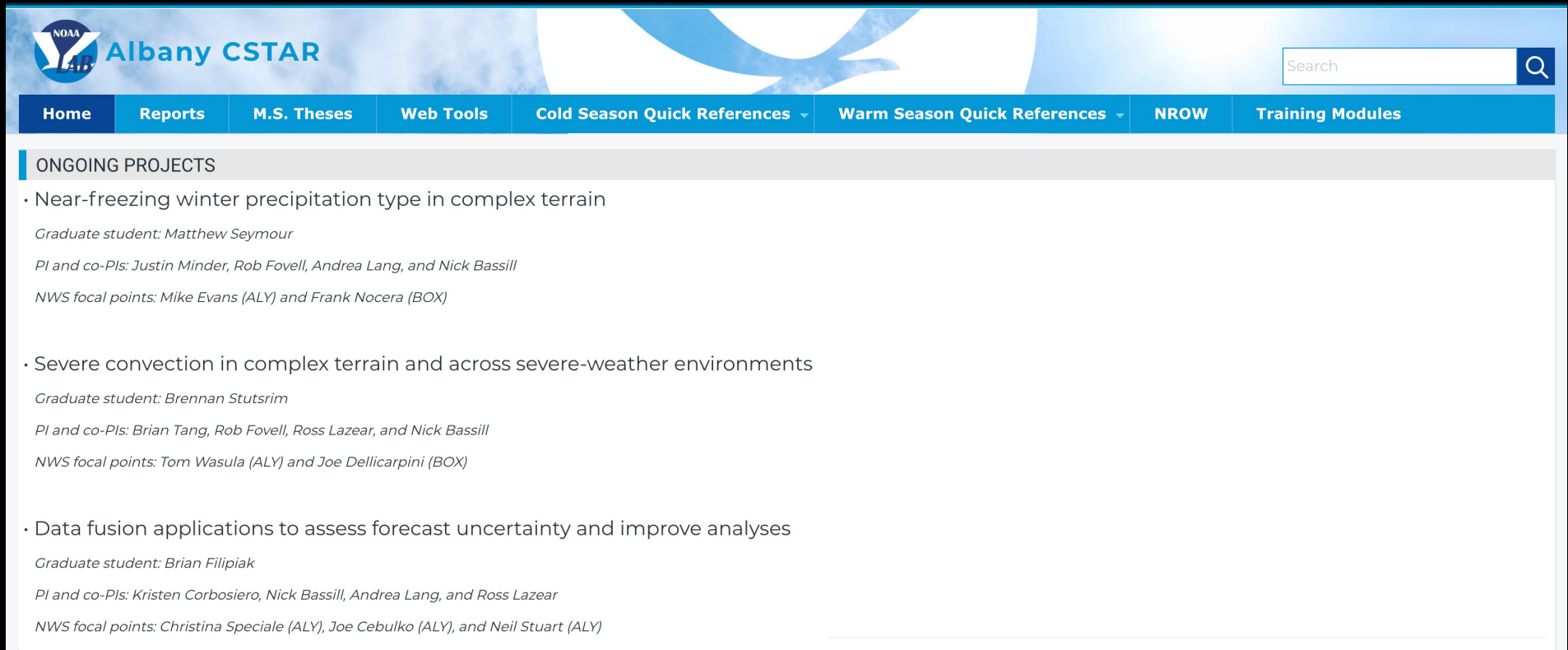
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~ After the *research* was complete, students met with *focal points* for R2O

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~ More recently, [NOAA VLab](#)



The screenshot shows the NOAA VLab Albany CSTAR website. The header features the NOAA VLab logo and the text "Albany CSTAR". A search bar is located in the top right corner. Below the header is a navigation menu with the following items: Home, Reports, M.S. Theses, Web Tools, Cold Season Quick References, Warm Season Quick References, NROW, and Training Modules. The main content area is titled "ONGOING PROJECTS" and lists three projects:

- Near-freezing winter precipitation type in complex terrain
Graduate student: Matthew Seymour
PI and co-PIs: Justin Minder, Rob Fovell, Andrea Lang, and Nick Bassill
NWS focal points: Mike Evans (ALY) and Frank Nocera (BOX)
- Severe convection in complex terrain and across severe-weather environments
Graduate student: Brennan Stutsrim
PI and co-PIs: Brian Tang, Rob Fovell, Ross Lazear, and Nick Bassill
NWS focal points: Tom Wasula (ALY) and Joe Dellicarpini (BOX)
- Data fusion applications to assess forecast uncertainty and improve analyses
Graduate student: Brian Filipiak
PI and co-PIs: Kristen Corbosiero, Nick Bassill, Andrea Lang, and Ross Lazear
NWS focal points: Christina Speciale (ALY), Joe Cebulko (ALY), and Neil Stuart (ALY)