

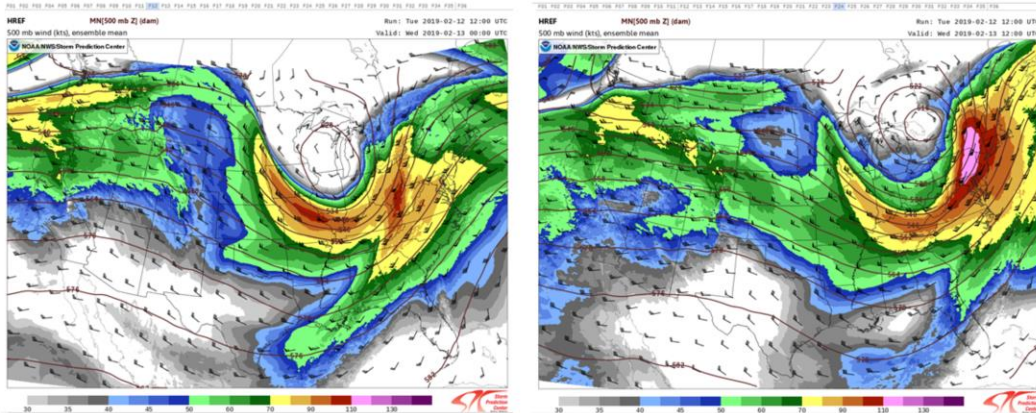
The February 12-13, 2019  
winter storm in eastern NY and  
western New England

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WFO Albany, NY

# Outline

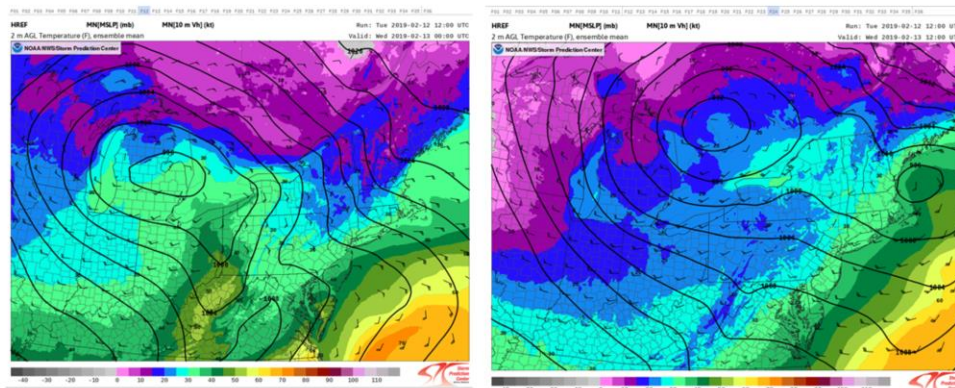
- Large-scale pattern
- Meso-scale pattern
- Model forecasts
- Observations
- Summary and conclusions

## 500 mb heights and wind



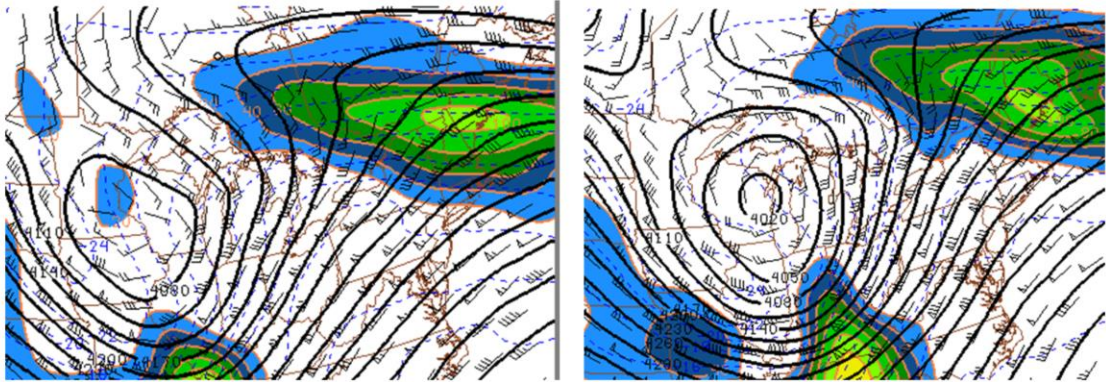
A deepening 500 mb trough moved east-northeast across the southern and central Great Lakes on February 12<sup>th</sup> into the 13<sup>th</sup>. The closed low tracked well to the northeast of eastern New York and western New England, across southern Ontario.

# PMSL and surface temperatures



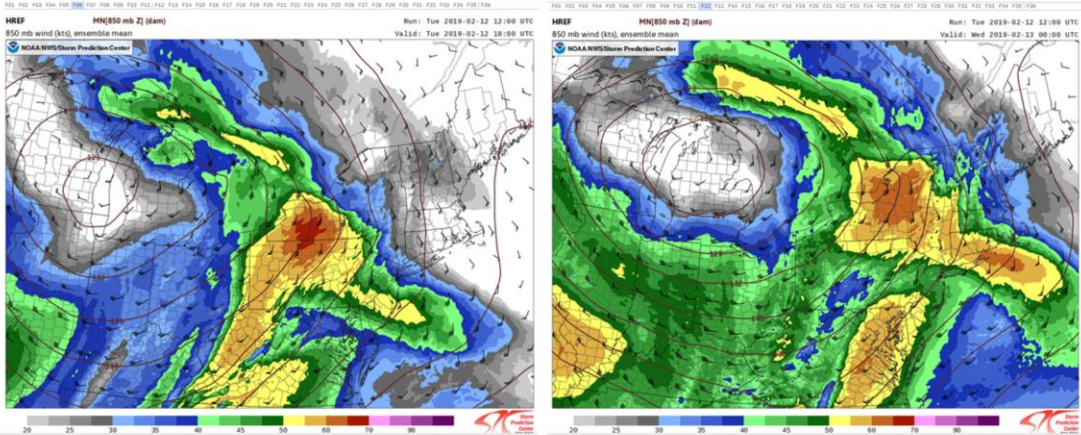
Surface low pressure tracked across lower Michigan, with secondary development along the south New England coast.

700 mb heights, wind and frontogenesis at 18z 2/18 and 00z 2/13



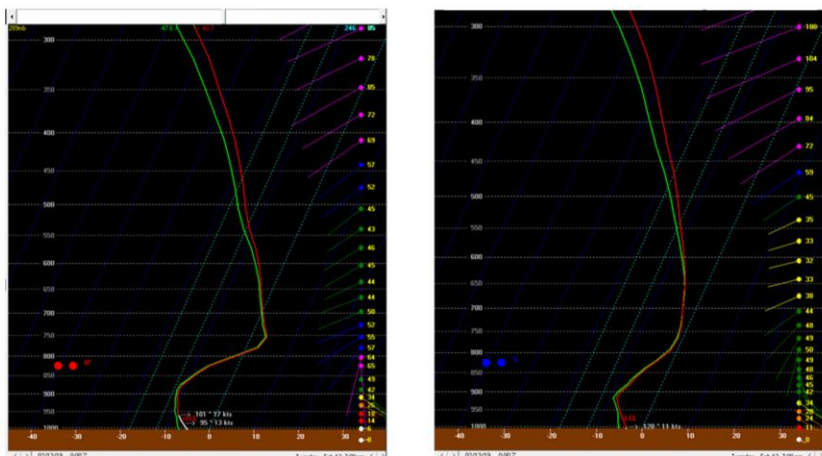
Diffluent flow at 700 mb resulted in a deformation zone and substantial frontogenesis over upstate New York and New England from the 12<sup>th</sup> to 13<sup>th</sup>.

## 850 mb heights and wind at 18z 2/12 and 00z 2/13



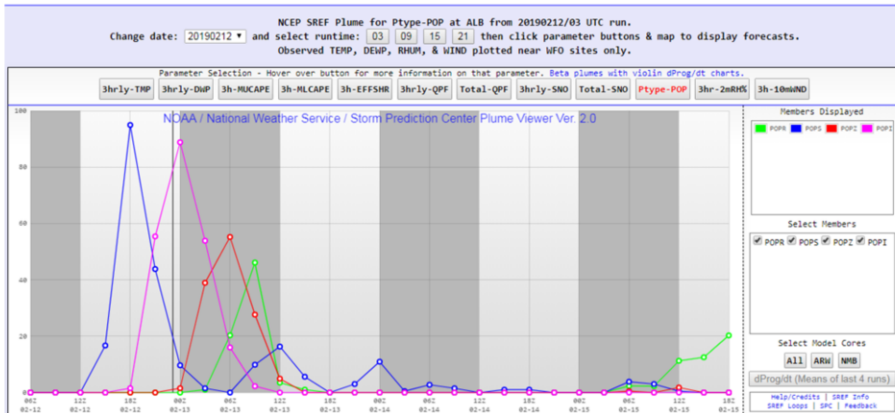
A low-level southerly jet at 850 mb with speeds greater than 50 kts developed across eastern and central NY on the 12<sup>th</sup>. This resulted in significant isentropic lift for several hours across the area during the afternoon and into the evening on the 12<sup>th</sup>.

## NAM and GFS soundings at ALB valid 00z 2/13



The 12z run of the NAM forecast a shallow warm nose at Albany between 800 and 700 mb during the evening on the 12<sup>th</sup>, indicative of sleet potential for that area. The GFS was colder in that layer, indicating that the precipitation would remain snow through 00z on the 13<sup>th</sup>.

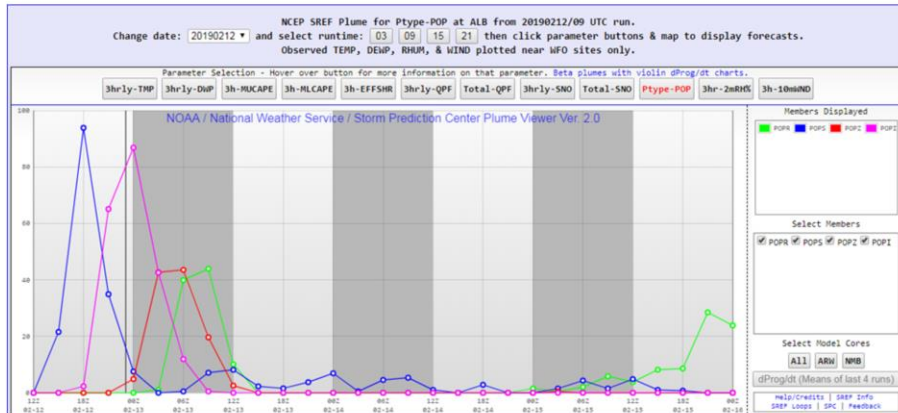
## SREF p-type plumes for ALB from the 03z run on 2/12



03z 12<sup>th</sup> SREF plume forecasts valid at ALB indicated a high likelihood that precipitation would start as snow during the afternoon on the 12<sup>th</sup>, then a high likelihood of sleet around 00z, followed by freezing rain and rain overnight.

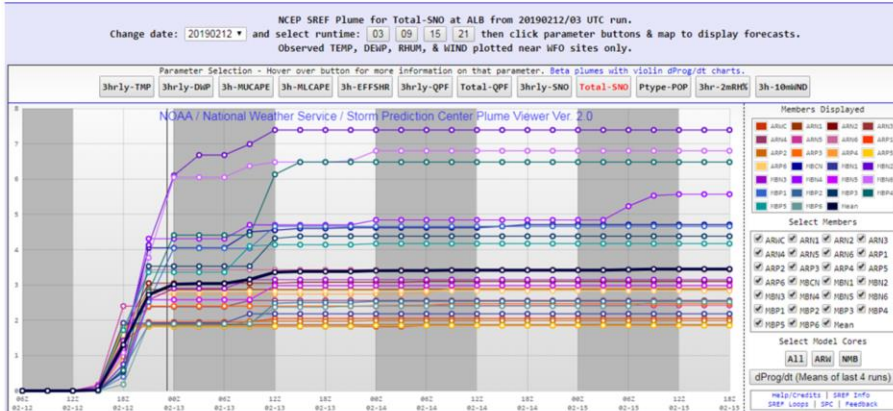


## SREF p-type plumes at ALB from the 09z 2/12 run



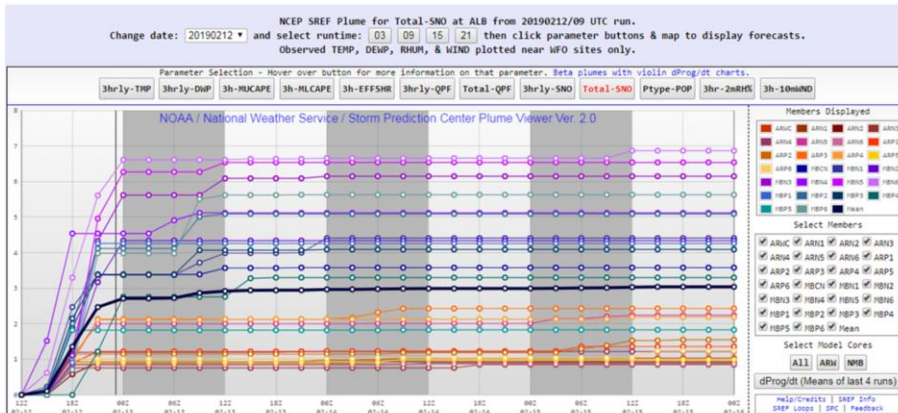
These forecasts remained consistent on the 09z run of the SREF. A scenario featuring snow changing to sleet and freezing rain was indicated.

## SREF snowfall plumes at ALB from the 03z 2/12 run



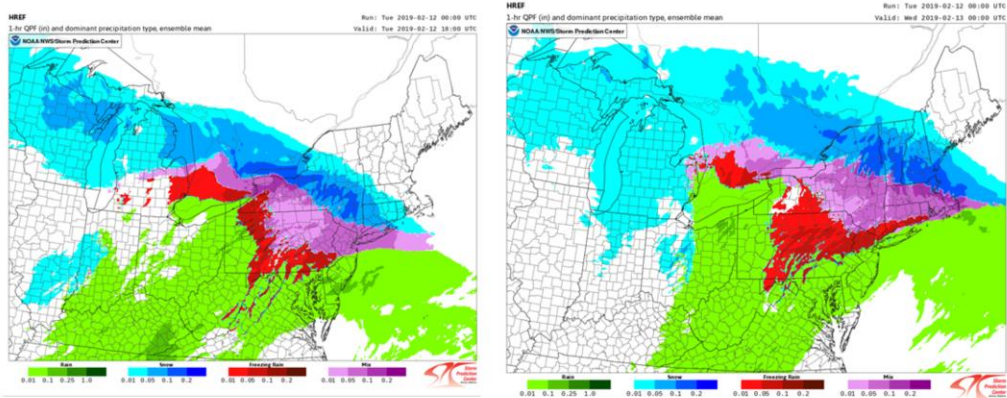
Snowfall forecasts for Albany from the 03z run of the SREF indicated mean snowfall totals of 3 to 4 inches, but several runs indicated slightly less, in the 2 to 3 inch range. A few outliers were also indicating amounts of over 6 inches.

## SREF snowfall plumes at ALB from the 09z 2/12 run



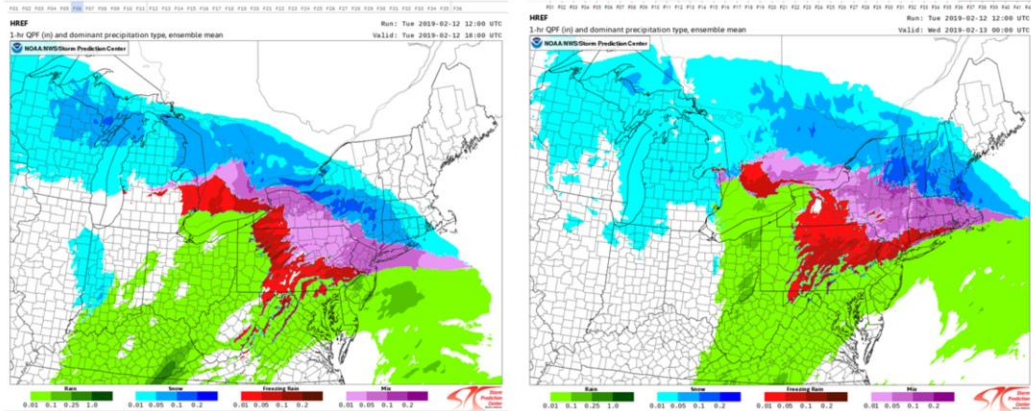
Forecasts from the 09z run of the SREF were similar to the 03z run. A mean of around 3 inches was forecast, with a cluster of runs forecasting a scenario with only an inch of snow, then several runs also showing higher amounts.

## HREF weather from the 00z 2/12 runs valid at 18z and 00z



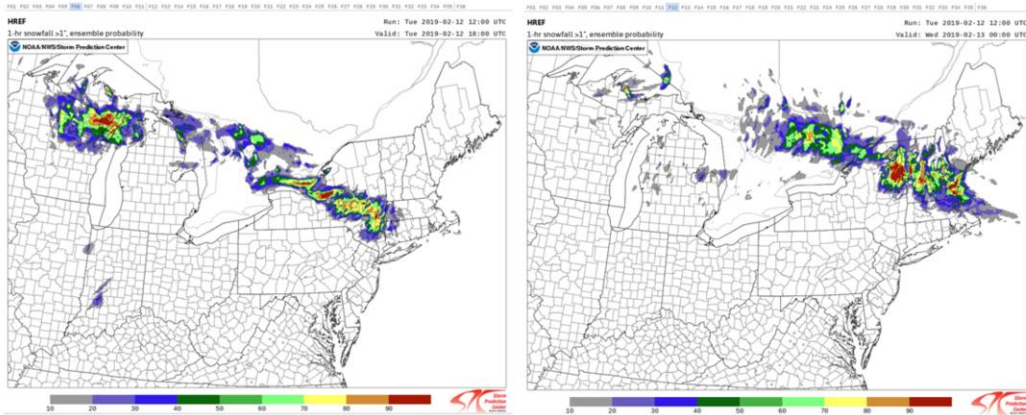
The high resolution ensemble forecast run at 00z indicated a period of snow for all of eastern New York and western New England centered around 18z, followed by a large area of sleet centered around 00z.

## HREF weather from the 12z 2/12 runs valid 18z and 00z



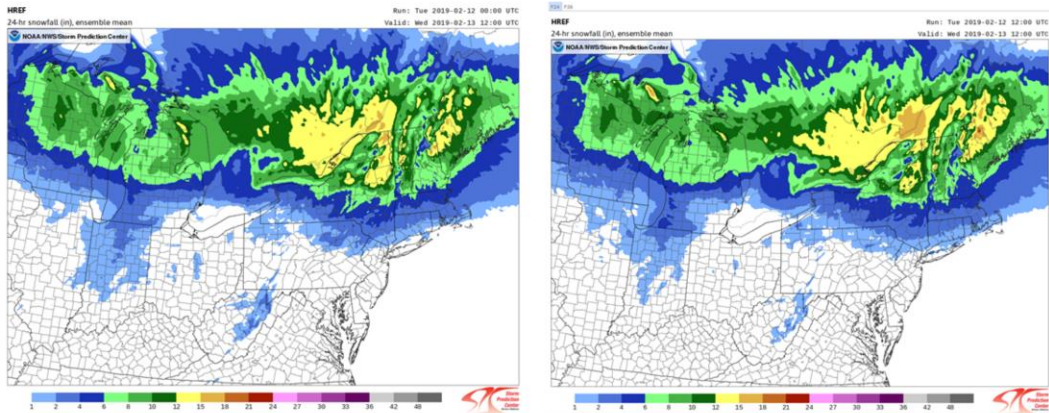
The 12z HREF was quite similar to the 00z run, indicating that snow would transition to sleet across much of the area by 00z.

## HREF probability of greater than 1 inch per hour snowfall from the 12z 2/12 run



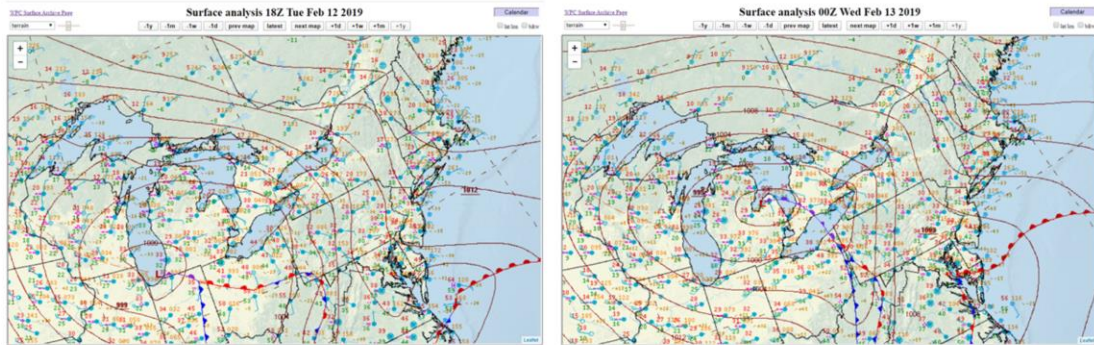
Probabilities for an inch or more per hour of snow indicated a band of heavy snow potential moving northward across the Catskills and mid-Hudson Valley at 18z, reaching the central Adirondacks and central Vermont by 00z. This indicated that only a brief period of heavy snow would be likely as the band of heaviest snow shifted rapidly northward.

## HREF mean 24-hour snowfall from the 00z and 12z 2/12 runs



Mean snowfall forecasts indicated up to a foot of snow for the southern Adirondacks, with 6 to 10 inches from Albany north to the upper Hudson Valley. 4 inches or less was the most likely forecast for the mid-Hudson Valley and southern Catskills. Run-to-run consistency remained high.

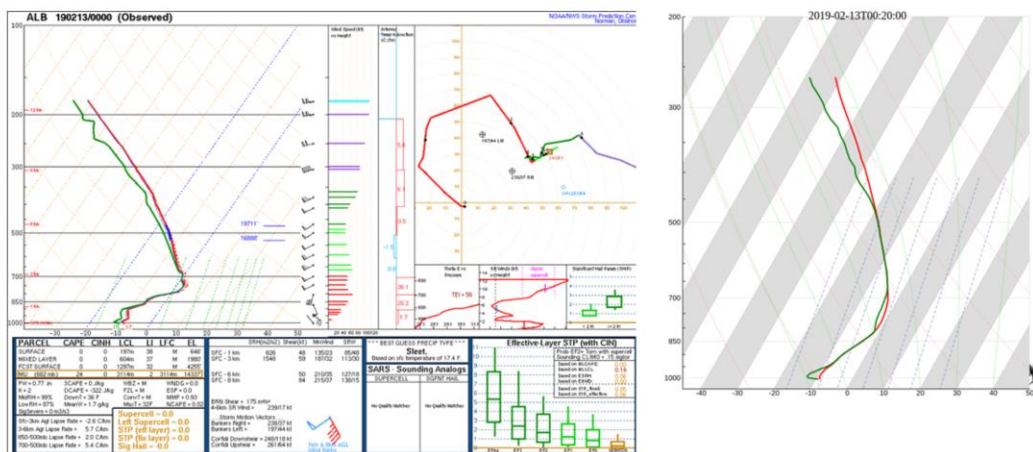
## Surface observations – 18z 2/12 and 00z 2/13



Surface observations indicated that secondary low pressure did develop over the Del Marva area late on the 12<sup>th</sup>, while a period of moderate to heavy snow lifted northward up the Hudson Valley. A wintry mix of precipitation was being reported at Poughkeepsie and Albany by 00z on the 13<sup>th</sup>.

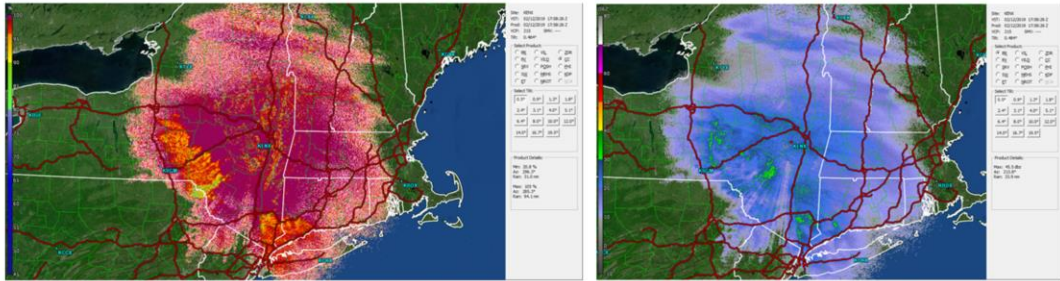


## Observed ALB sounding and profiler at 00z 2/13



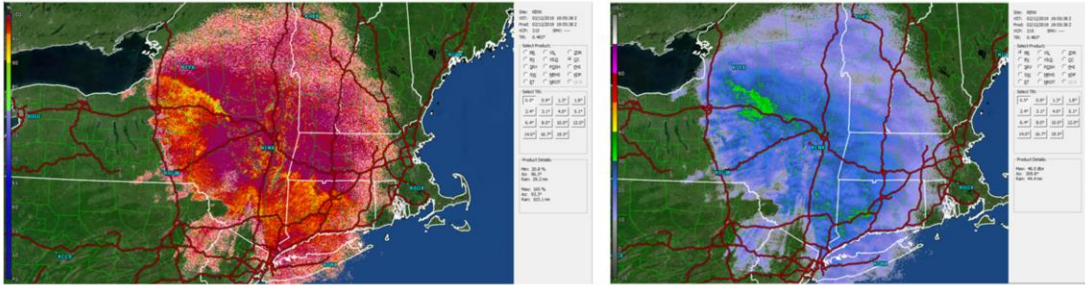
The observed sounding at Albany indicated that the NAM had an excellent forecast of the thermal profile, as a shallow warm nose was observed just below 700 mb. Southerly flow at 850 mb was around 40 kts.

## WSR-88D correlation coefficient and reflectivity at 18z



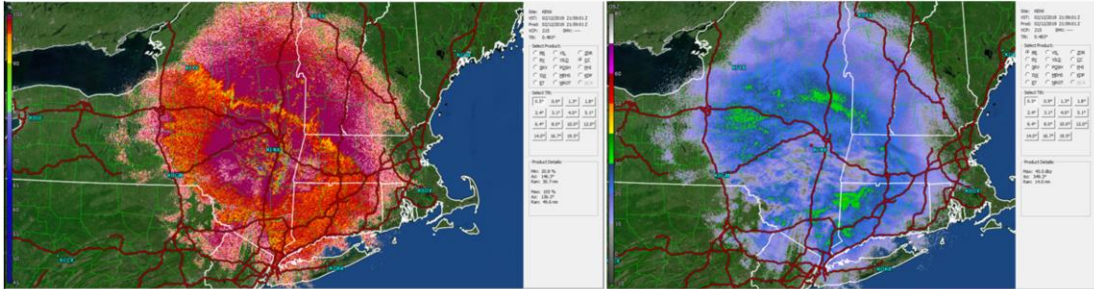
Observations from the WSR-88D indicated a large area of moderate snow overspreading the area around the Albany radar by 18z. Lower values in the correlation coefficient on the left indicated that some mixed precipitation may have been occurring over far southern and parts of south central New York.

## WSR-88D correlation coefficient and reflectivity at 20z



High correlation coefficient values can be seen moving north across Connecticut and the mid-Hudson Valley by 20z as a large area of moderate precipitation moves across the region. This was around the time of heaviest snowfall in the Albany area, while snow was changing to sleet and freezing rain in the mid-Hudson Valley and northwest Connecticut.

## WSR-88D correlation coefficient and reflectivity at 22z



At 22z, the heaviest precipitation was located along and north of I-90 over the Mohawk Valley and into the upper Hudson Valley and southern Vermont. A band of high correlation coefficient can be seen over this area, indicating mixed precipitation.

# Observed 1 inch snow depth change – 18z

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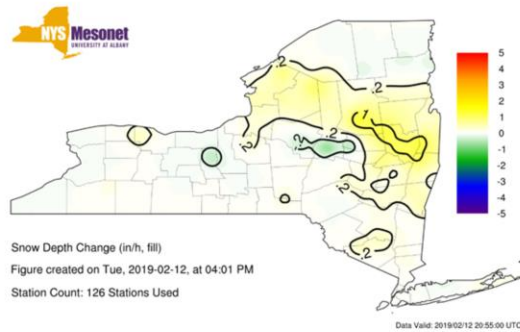


Observed snow depth change from the New York Mesonet shows the most rapid snowfall accumulations occurring over the Catskills at 18z.

# Observed snow depth change – 21z

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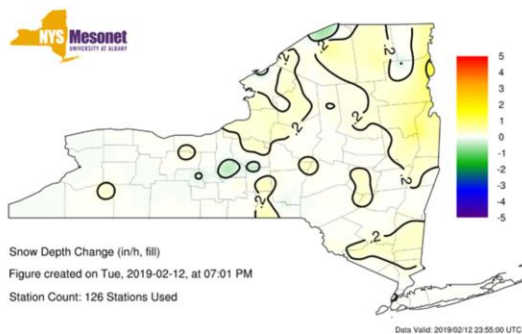


By 21z, the heaviest snowfall was occurring along and just north of I-90, centered over Saratoga county.

# Observed snow depth change – 00z

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By 00z, rapid snowfall accumulations were not occurring anywhere in NY state. Some light to perhaps moderate rates were occurring over the upper Hudson Valley toward central Vermont.

# Observations from Albany

9:51 AM	17 °F	-1 °F	45 %	NNE	6 mph	0 mph	30.10 in	0.0 in	Cloudy										
10:51 AM	17 °F	1 °F	50 %	CALM	0 mph	0 mph	30.07 in	0.0 in	Light Snow										
10:52 AM	17 °F	3 °F	54 %	CALM	0 mph	0 mph	30.07 in	0.0 in	Light Snow										
11:07 AM	16 °F	5 °F	62 %	CALM	0 mph	0 mph	30.08 in	0.0 in	Light Snow										
11:28 AM	16 °F	8 °F	71 %	CALM	0 mph	0 mph	30.08 in	0.0 in	Light Snow										
11:45 AM	16 °F	9 °F	73 %	CALM	0 mph	0 mph	30.04 in	0.0 in	Heavy Snow										
11:51 AM	16 °F	9 °F	74 %	CALM	0 mph	0 mph	30.03 in	0.0 in	Heavy Snow										
11:58 AM	16 °F	10 °F	77 %	CALM	0 mph	0 mph	30.03 in	0.0 in	Heavy Snow										
12:05 PM	16 °F	10 °F	77 %	CALM	0 mph	0 mph	30.03 in	0.0 in	Heavy Snow										
12:35 PM	17 °F	10 °F	74 %	CALM	0 mph	0 mph	30.01 in	0.1 in	Snow										
12:51 PM	17 °F	11 °F	77 %	CALM	0 mph	0 mph	30.00 in	0.1 in	Snow										
1:28 PM	17 °F	11 °F	77 %	NE	6 mph	0 mph	29.97 in	0.1 in	Snow										
1:42 PM	17 °F	11 °F	77 %	ENE	5 mph	0 mph	29.95 in	0.1 in	Heavy Snow										
1:51 PM	17 °F	11 °F	77 %	ENE	6 mph	0 mph	29.94 in	0.1 in	Heavy Snow										
2:06 PM	17 °F	11 °F	77 %	ENE	6 mph	0 mph	29.93 in	0.0 in	Heavy Snow										
2:14 PM	17 °F	11 °F	77 %	E	5 mph	0 mph	29.93 in	0.1 in	Heavy Snow										
3:18 PM	17 °F	12 °F	81 %	E	3 mph	0 mph	29.87 in	0.0 in	Snow										
3:44 PM	16 °F	12 °F	78 %	ENE	5 mph	0 mph	29.86 in	0.1 in	Light Snow										
3:51 PM	16 °F	12 °F	78 %	NE	3 mph	0 mph	29.85 in	0.1 in	Light Snow										
4:05 PM	16 °F	12 °F	78 %	E	3 mph	0 mph	29.84 in	0.0 in	Snow and Sleet										
4:51 PM	17 °F	11 °F	77 %	NNE	5 mph	0 mph	29.81 in	0.1 in	Snow and Sleet										
5:02 PM	17 °F	11 °F	77 %	NNE	3 mph	0 mph	29.79 in	0.0 in	Sleet										
5:22 PM	16 °F	12 °F	78 %	NE	5 mph	0 mph	29.78 in	0.1 in	Sleet										
5:51 PM	17 °F	12 °F	81 %	NNE	7 mph	0 mph	29.77 in	0.1 in	Sleet										
5:58 PM	17 °F	12 °F	81 %	NNE	5 mph	0 mph	29.77 in	0.0 in	Sleet										
6:43 PM	16 °F	12 °F	78 %	NNE	5 mph	0 mph	29.74 in	0.1 in	Snow and Sleet										
6:51 PM	16 °F	13 °F	81 %	NOV	3 mph	0 mph	29.76 in	0.1 in	Snow and Sleet										
6:58 PM	16 °F	13 °F	81 %	N	5 mph	0 mph	29.74 in	0.0 in	Snow and Sleet										
7:26 PM	16 °F	13 °F	81 %	CALM	0 mph	0 mph	29.73 in	0.1 in	Snow and Sleet										
7:51 PM	16 °F	13 °F	81 %	N	3 mph	0 mph	29.71 in	0.1 in	Snow and Sleet										
8:10 PM	16 °F	13 °F	81 %	N	3 mph	0 mph	29.69 in	0.0 in	Snow and Sleet										
8:30 PM	16 °F	13 °F	81 %	NNE	3 mph	0 mph	29.67 in	0.1 in	Snow and Sleet										
8:37 PM	16 °F	13 °F	81 %	CALM	0 mph	0 mph	29.66 in	0.1 in	Snow and Sleet										
8:51 PM	16 °F	13 °F	81 %	CALM	0 mph	0 mph	29.65 in	0.1 in	Snow and Sleet										
9:21 PM	16 °F	13 °F	81 %	NOV	3 mph	0 mph	29.62 in	0.0 in	Light Snow										
9:44 PM	16 °F	14 °F	81 %	NOV	3 mph	0 mph	29.60 in	0.0 in	Light Snow										
9:51 PM	16 °F	14 °F	81 %	NNE	3 mph	0 mph	29.58 in	0.0 in	Light Snow										
9:58 PM	16 °F	14 °F	81 %	CALM	0 mph	0 mph	29.57 in	0.0 in	Light Snow										
10:20 PM	16 °F	15 °F	85 %	N	3 mph	0 mph	29.56 in	0.0 in	Windy Mix										
10:44 PM	16 °F	15 °F	85 %	CALM	0 mph	0 mph	29.52 in	0.0 in	Windy Mix										
10:51 PM	20 °F	15 °F	81 %	ENE	3 mph	0 mph	29.52 in	0.0 in	Windy Mix										
11:22 PM	20 °F	15 °F	81 %	E	3 mph	0 mph	29.47 in	0.0 in	Snow and Sleet										
11:51 PM	21 °F	16 °F	81 %	ENE	6 mph	0 mph	29.42 in	0.0 in	Snow and Sleet										

Observations at the Albany area airport indicated snow starting around 16z, quickly becoming heavy by 17z, then mixing with sleet by 21z. Periods of sleet, freezing rain and light snow continued overnight. Heaviest sleet accumulations, up to 2 inches, were observed just north of the airport during the evening hours.

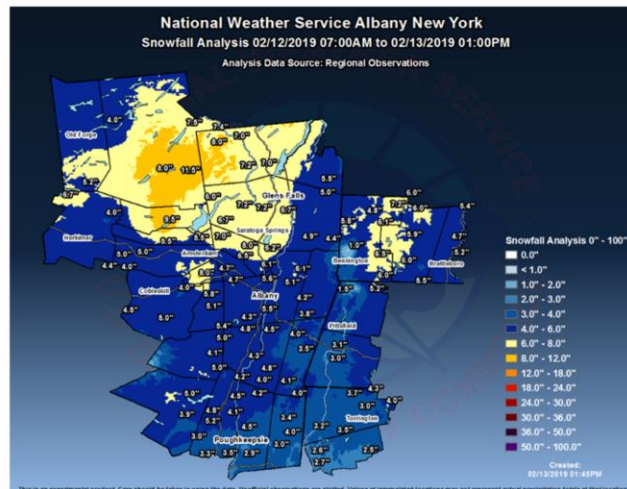


## Observations from Poughkeepsie

7:45 AM	F	9 °F	63 %	ENE	7 mph	0 mph	29.66 in	0.0 in	Cloudy
8:45 AM	F	9 °F	63 %	E	7 mph	0 mph	29.66 in	0.0 in	Light Snow
9:00 AM	F	12 °F	74 %	ENE	9 mph	0 mph	29.66 in	0.0 in	Light Snow
9:45 AM	F	16 °F	93 %	ENE	9 mph	0 mph	29.68 in	0.0 in	Light Snow
10:05 AM	F	16 °F	93 %	ENE	9 mph	0 mph	29.66 in	0.0 in	Light Snow
10:45 AM	F	16 °F	93 %	ENE	9 mph	0 mph	29.66 in	0.0 in	Light Snow
11:45 AM	F	18 °F	100 %	ENE	9 mph	0 mph	29.84 in	0.0 in	Snow
12:45 PM	F	18 °F	93 %	ENE	9 mph	0 mph	29.76 in	0.0 in	Light Snow
1:45 PM	F	18 °F	93 %	E	9 mph	0 mph	29.71 in	0.0 in	Light Snow
2:45 PM	F	18 °F	93 %	E	9 mph	0 mph	29.65 in	0.0 in	Snow and Sleet
3:45 PM	F	19 °F	93 %	E	9 mph	0 mph	29.58 in	0.0 in	Fog
4:45 PM	F	21 °F	100 %	NE	8 mph	0 mph	29.56 in	0.0 in	Cloudy
5:45 PM	F	21 °F	100 %	NE	9 mph	0 mph	29.49 in	0.0 in	Snow and Sleet
6:45 PM	F	21 °F	93 %	NE	9 mph	0 mph	29.47 in	0.0 in	Snow and Sleet
7:45 PM	F	23 °F	100 %	NE	9 mph	0 mph	29.45 in	0.0 in	Snow and Sleet
8:45 PM	F	25 °F	100 %	NE	9 mph	0 mph	29.39 in	0.0 in	Snow and Sleet
9:45 PM	F	27 °F	100 %	NE	9 mph	0 mph	29.35 in	0.0 in	Snow and Sleet
10:45 PM	F	27 °F	100 %	NE	9 mph	0 mph	29.29 in	0.0 in	Light Freezing Rain
11:45 PM	F	27 °F	100 %	NNE	9 mph	0 mph	29.20 in	0.0 in	Wetly Mix.

Snow began in Poughkeepsie by around 14z, and became moderate around 17z. Snow mixed with and changed to sleet and freezing rain by around 20z.

# Observed snowfall



Total observed snowfall indicated that the mean snowfall from the HREF was perhaps a little too high in most places, but reasonably close. Snow amounts of 8 to 12 inches occurred over the southern Adirondacks, 4 to 6 inches fell in the Capital District, and 3 to 5 inches fell in the mid-Hudson Valley, northwest Connecticut and the Catskills.

## Summary

- Low pressure over the southern Great Lakes with secondary development over southern New England produced a wintry mix of precipitation over eastern NY and western New England on February 12-13, 2019.
- Higher resolution model forecasts correctly indicated the potential for a significant amount of sleet in the Capital District.
- Observations indicated heaviest snow over the southern Adirondacks, with lighter snowfall and up to 2 inches of sleet in the Capital District.