February 1, 2008 Winter "Mixed" Storm

A potent winter storm moved across New York and New England on February 1st and delivered a wide variety of winter weather to the North Country. This storm originated on the lee side of the southern Rockies and southern Plains on the night of January 30th, moved across the central United States into the Ohio river Valley on January 31st and across New York and New England on February 1st.
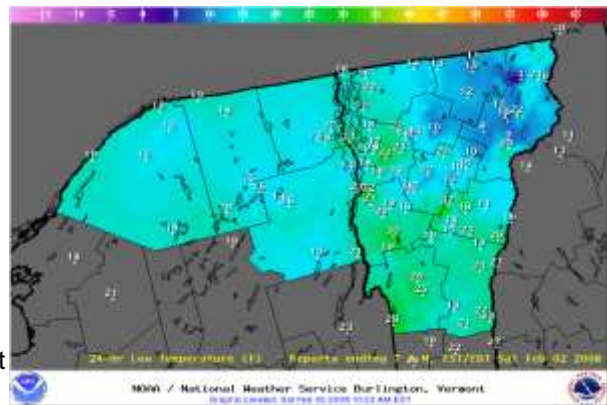
A secondary storm developed in the Delaware Basin on the 1st and moved across southern New England. Although temperatures started well below freezing across the entire region, the storm track largely dictates the type of precipitation that will occur.

Climatologically, inland storm tracks that traverse across New York and New England typically bring a wintry mix of precipitation. The type of precipitation, duration and magnitude are highly dependent on the established cold air across the region and the strength of the storm and its accompanied warmer air. Storm tracks that move across the St. Lawrence River Valley and points north and west typically occur when a marginally cold air mass is located across New England, thus the warm air accompanying the storm easily modifies the air mass. Meanwhile, coastal storms track south of the region and place the North Country on the cold side of the storm.

On the morning of February 1st, strong high pressure was centered across New Brunswick, Canada which has supplied cold air across the Northeast. Meanwhile, strengthening low pressure across the Ohio River Valley and associated frontal boundary into the Gulf of Mexico was tapping into abundant warmth and moisture.

Minimum temperatures ending at 7 am EST Friday (2/1/2008) showed readings mainly in the teens across northern New York, teens and lower 20s across the Champlain Valley and southern Vermont with upper single digits to lower teens across north central and northeast Vermont. (Please note that there are a few outlier readings within this graphic, like the lower 30s in western Vermont, 20s in northeast Vermont)

The main storm continued to lift across the eastern Great Lakes, New York and across northern New England during the afternoon and nighttime hours. In addition, a secondary storm system developed Friday afternoon in the Delaware/Maryland/Virginia tidewater region and moved across southern New England.
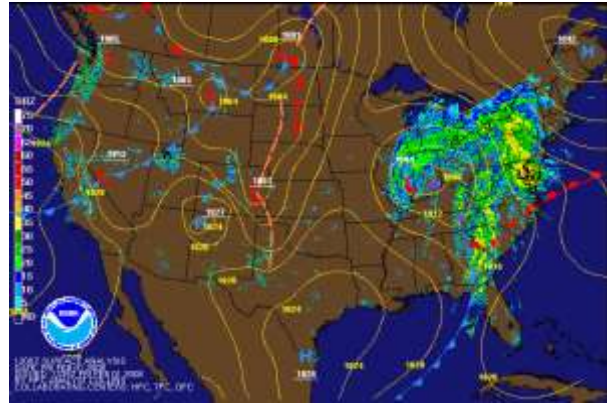
Snow overspread northern New York by mid to late morning and then quickly moved across Vermont by early afternoon. Snow fell heavy at times during the first few hours, but then milder air approximately 6000 to 8000 feet above the surface changed the snow into super-cooled water droplets aloft, but still had time to re-freeze before reaching the surface, thus falling as sleet.

However, within just a few hours, this lower column of air became mild enough that the water droplets remained in a liquid form and reached the surface, but then quickly refroze on contact due to surface temperatures that remained below freezing, thus freezing rain. Eventually toward the late afternoon and evening hours, enough mild air worked its way to the surface to change any freezing rain into rain. As the storm passed the North Country during the night of the 1st into the early morning hours of the 2nd, rain and mixed precipitation changed back to snow with additional snowfall accumulation.
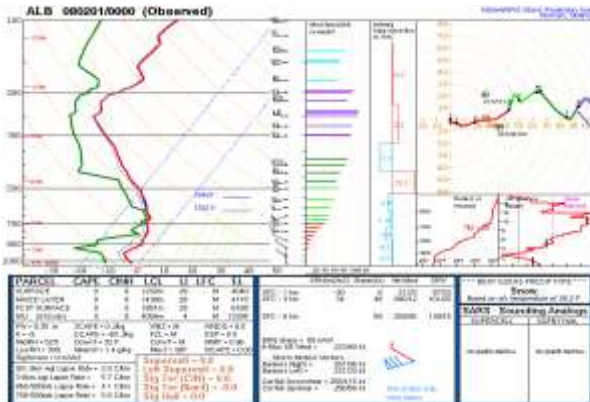
Sounding data is a vertical profile of temperature, moisture and wind as recorded by a weather balloon released into the atmosphere at pre-selected times. Albany, NY is the closest facility to Burlington that conducts such information gathering. The top left portion of these graphs is called the "sounding". The red line represents temperature, the green line represents dewpoint and the black barbed lines to the right represent wind speed at various elevations. The diagonal dashed blue lines represent the -20 degree (left) and 0 degree (right) Celsius temperature.

The first timeframe (080201/0000) represents 7 pm EST on Thursday, 1/31/2008 and shows that the temperature is much colder than the freezing line (left of 0 degrees Celsius) and that the temperature and dewpoint lines in the lower levels are far apart, meaning dry air and no precipitation. Meanwhile just above 700 mb, the temperature and dewpoint lines meet, indicating cloud cover around 12,000 feet.

At 7 am EST on Friday, 2/1/2008 (080201/1200), clouds still exist around 12,000 feet with another layer developing around 8000 feet. The temperature aloft has risen slightly, but still remains well below freezing, thus any precipitation that develops should be in the form of snow. There is evidence of warm air advection taking place which promotes the development of precipitation and warms the air.

Warm air advection is an atmospheric process of delivering warmer air from one location to another. On a sounding, evidence of this process is two-fold; the temperature increases, generally aloft first and the wind veers with height (east/southeast near the ground and then turn clockwise with height).
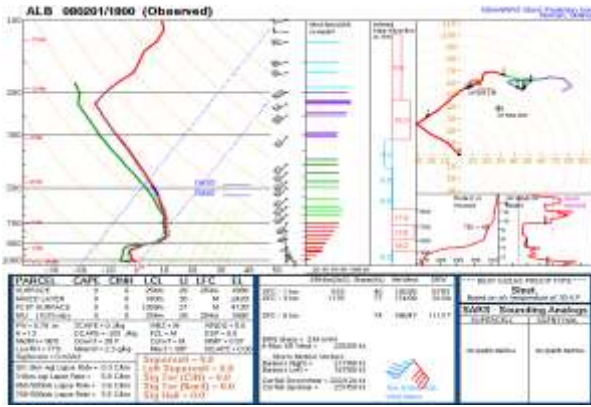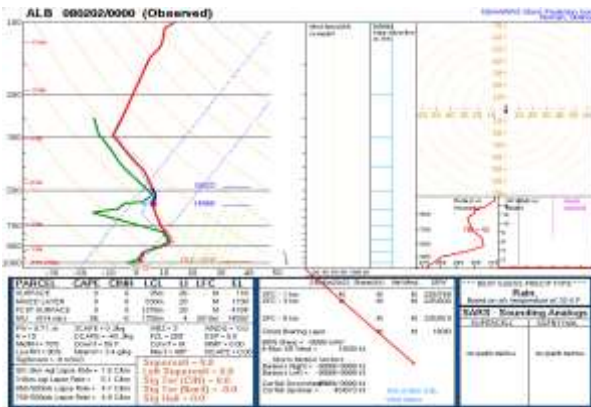
By 1pm on Friday, 2/1/2008 (080201/1800), the sounding is nearly saturated from 15,000 feet down to the surface. Precipitation began as snow across Albany and the Capital District of New York around mid-morning and overspread the rest of northern New York and Vermont by noon. The strong warm air advection pattern continues with a southerly wind of 50 knots at 6000 feet and 75 knots at 10,000 feet delivering milder air.

A closer look at the sounding profile shows the temperature and dewpoint exceeding the freezing line (0 degree Celsius) between 850mb and 700 mb (~6,000 and 10,000 feet), while the surface temperature remains below freezing. Snow changed over to sleet and freezing rain within hours of the onset of precipitation across New England and New York.

At 7 pm EST on Friday, 2/1/2008 (080202/0000), the sounding shows a very saturated layer from 10,000 feet to the surface with temperature that had risen to above freezing, including down to the surface.

Mixed snow, sleet and freezing rain that occurred during the early afternoon hours changed to rain across much of the region except for deeper valleys where the surface temperature remained at or just below freezing.

Precipitation amounts across the North Country were generally three quarters to one inch. There were some slightly lower amounts of an half inch to three quarters of an inch along the western slopes of the Green Mountains and Champlain Valley due to downsloping conditions. Meanwhile, the lower reports in the St. Lawrence River Valley appear to be problems due to frozen rain gauges and the two reports of less than an half inch in the Champlain Valley are erroneous. Snowfall reports were generally 2 to 5 inches with localized amounts up to 7 inches. In addition, one quarter to one half of ice accumulation (accretion) occurred as well. Finally, strong south to southeast winds around 3000 feet and above transferred to a few hilltops along the western slopes and produced wind gusts in excess of 50 mph.
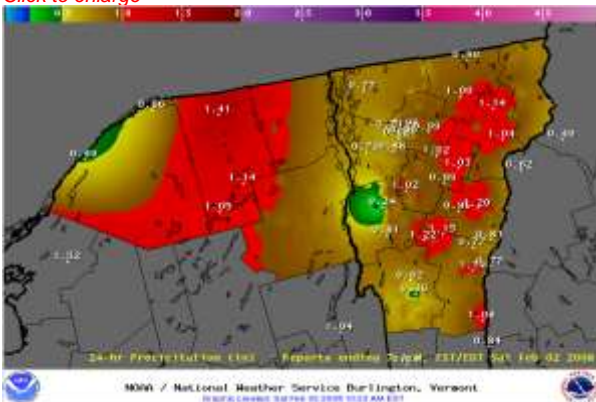
PUBLIC INFORMATION STATEMENT
SPOTTER REPORTS
NATIONAL WEATHER SERVICE BURLINGTON VT
1248 PM EST SAT FEB 2 2008

THE FOLLOWING ARE UNOFFICIAL OBSERVATIONS TAKEN DURING THE PAST 17 HOURS FOR THE STORM THAT HAS BEEN AFFECTING OUR REGION. APPRECIATION IS EXTENDED TO HIGHWAY DEPARTMENTS...COOPERATIVE OBSERVERS...SKYWARN SPOTTERS AND MEDIA FOR THESE REPORTS. THIS SUMMARY IS ALSO AVAILABLE ON OUR HOME PAGE AT WEATHER.GOV/BURLINGTON

************************STORM TOTAL SNOWFALL************************

LOCATION	STORM TOTAL SNOWFALL (INCHES)	TIME/DATE OF MEASUREMENT		COMMENTS
NEW YORK				
...CLINTON COUNTY...				
PERU	2.7	736 AM	2/2	SKYWARN
...FRANKLIN COUNTY...				
MALONE	2.5	736 AM	2/2	COOP
VERMONT				
...ADDISON COUNTY...				
SOUTH LINCOLN	2.5	805 AM	2/2	COOP

There were numerous reports of motor vehicle accidents throughout the region, but it could have been much worse as many schools cancelled classes or closed early, as well as many businesses, state

and local government offices to avoid a hazardous evening commute.