

Mid-Atlantic to Northeast Major Winter Storm 26-28 January, 2015

By: Rich Otto, WPC Meteorologist

Meteorological Overview:

A severe winter storm impacted the northeastern United States between 26-28 January, 2015, producing snowfall accumulations of one to three feet and blizzard conditions from Long Island to New England (Fig. 1 and Fig. 2). Although prepared for the worst, including unprecedented preparations leading up to the event, Philadelphia and New York City were spared the brunt of the storm.

The storm began as a mid-upper level trough approached the Ohio valley from the west around 1200 UTC 25 January, within a meridional upper flow pattern in place across the lower 48, featuring ridging over the West and troughing over the eastern U.S. The trough was accompanied at the surface by a progressive surface low, ranging in strength between 1001 hPa and 1004 hPa, which tracked just south of a cold front extending from the northern Mid-Atlantic into the central plains. The snowfall that accompanied this early phase of the storm was light to locally moderate in nature, affecting portions of the Ohio valley into the central Appalachians.

Between 1200 UTC 26 January and 0000 UTC 27 January, the mid-upper level trough axis acquired a negative tilt as it reached the East Coast, allowing a shift in energy to low pressure organizing just off of the Mid-Atlantic coast. As a 500 hPa closed low developed and strengthened over the next 24 hours near the New England coastline, the surface low near the Mid-Atlantic coast rapidly deepened and tracked north northeastward. Enhanced vertical ascent developed as coupled jet entrance and exit regions formed at 300 hPa while the surface low deepened over the western Atlantic. Bands of moderate to heavy snow spread inland across Long Island and eastern New England as the surface low tracked about 80 miles off of Cape Cod. The heaviest snow fell between 0000 and 1800 UTC 27 January with numerous daily maximum snowfall records being set between Long Island and Maine. Most of the heaviest snow developed beneath a deep-layered axis of frontogenesis (Fig. 3) which was oriented from southwest to northeast, occurring with recorded hourly snowfall rates of 3 and 4 inches per hour from Long Island to eastern New England. The surface low weakened as the upper level low began to fill through 1200 UTC 28 January and snowfall intensity reduced to light and scattered nature.

Impacts:

The storm was preceded by widespread publicity with forecasts of a “potentially historic” snow storm for the Northeast, including New York City. Seven states of emergencies were declared from Pennsylvania to New Hampshire with travel bans issued on major highways throughout the region. Between 26 and 27 January, nearly 7,000 flights were cancelled due to the blizzard. Businesses and schools were closed and public transit was shut down or sharply limited. In fact, the New York City subway system shut down for the first time in its history due to an impending snow storm. However, a shift in the expected storm track by 50 to 100 miles to the east resulted in western locations receiving far less snow than expected.

Locations in eastern New England received record-breaking snowfall, severe beach erosion and coastal flooding. Worcester, Massachusetts, recorded 34.5 inches, its heaviest snowfall on records that date back to 1892. Islip, New York recorded its second greatest snowfall on record while many other locations throughout the Northeast broke daily maximum snowfall records. Structural damage from

four to five feet of coastal flooding and winds gusting to hurricane force occurred in eastern Massachusetts, with Nantucket observing a peak wind gust of 78 mph. Over 25,000 power outages were reported throughout the Northeast, many of which came from Nantucket as virtually the entire island lost power due to the storm. There were two fatalities attributed to the storm, both on Long Island.

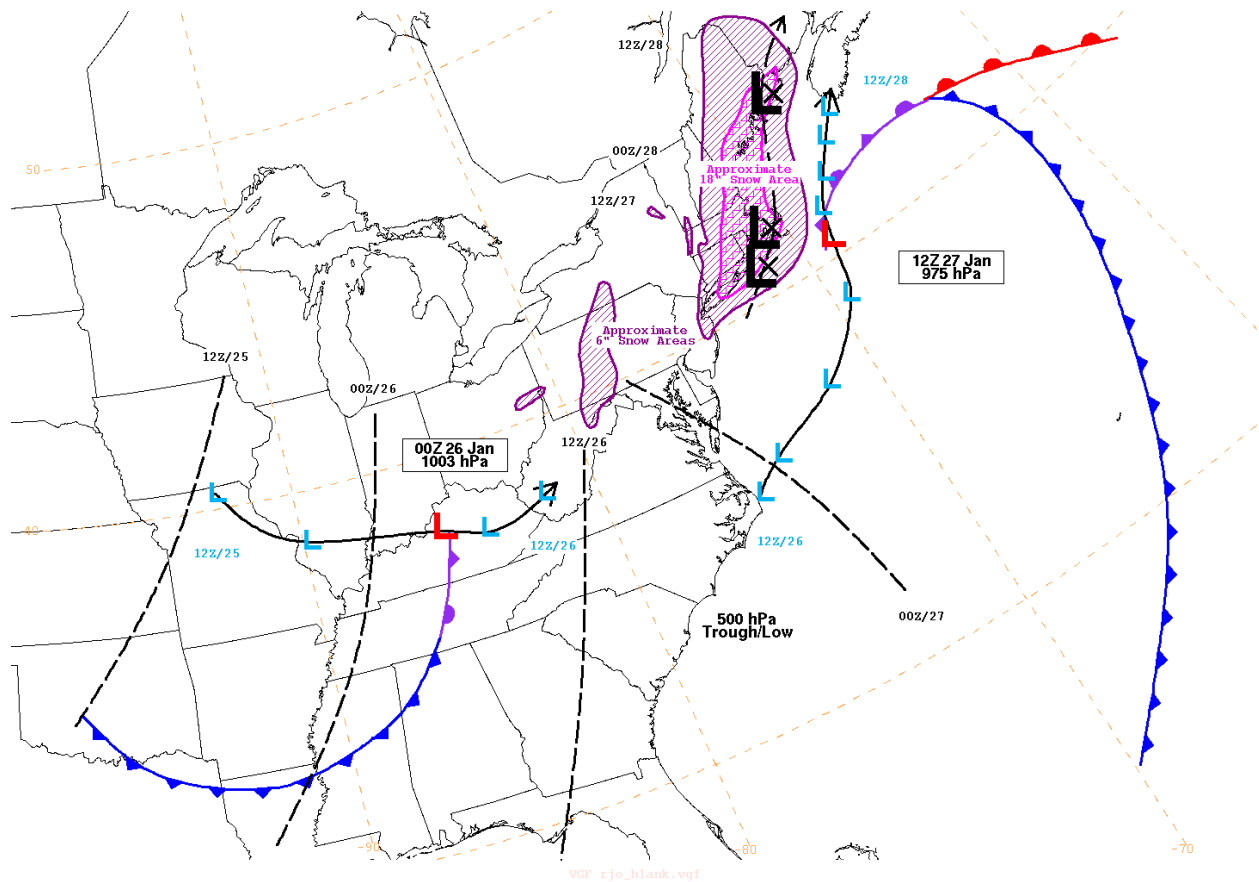


Figure 1: Figure 1: 500 hPa trough axes and low centers every twelve hours starting 1200 UTC 25 January (dashed), surface low tracks every six hours (light blue), surface analyses as the surface lows neared peak intensity (0000 UTC 26 January and 1200 UTC 27 January), approximate areal coverage of locations receiving 6 inches of snow (purple) and 18 inches of snow (pink).

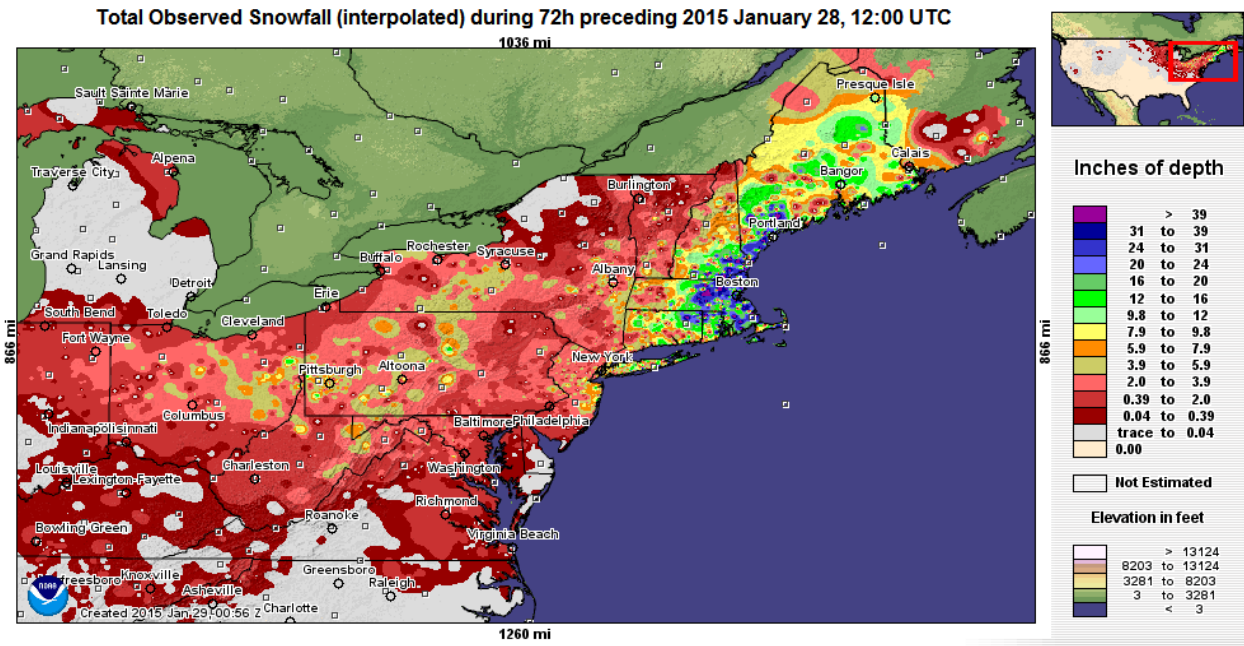


Figure 2: 72 hr snowfall accumulation ending 1200 UTC 28 January, 2015 (National Operational Hydrologic Remote Sensing Center)

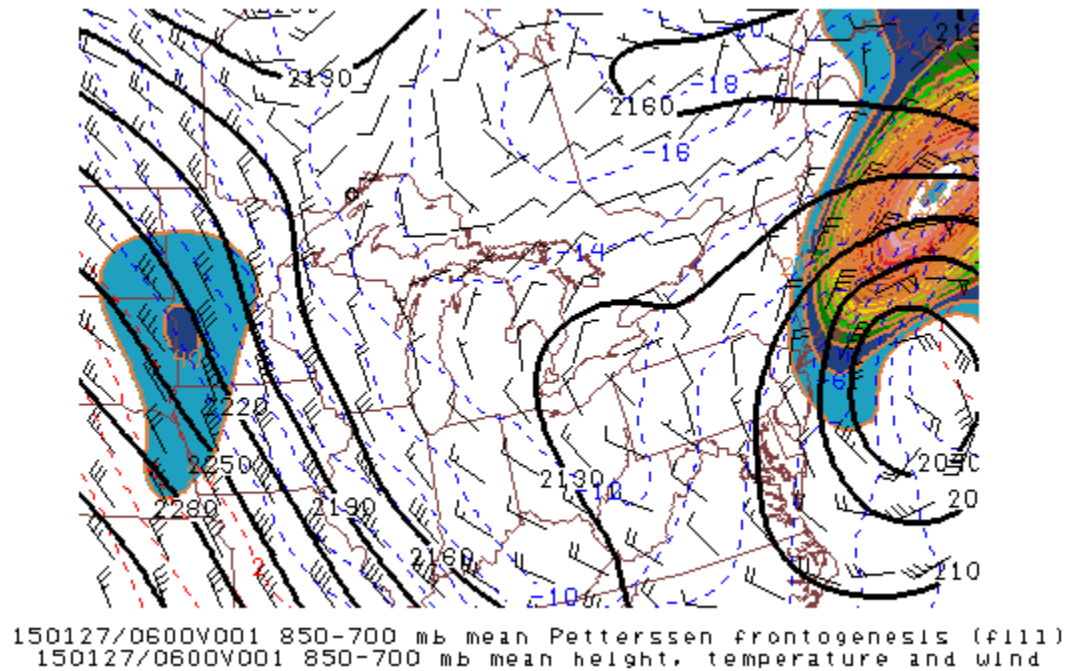


Figure 3: 800-700 hPa mean height (m) (solid lines), wind (kt), temperature (C) (dashed lines), and Petterssen frontogenesis (K / 100 km / 3hr) (shaded) valid 0600 UTC 27 January. (Storm Prediction Center)