

Late Season New England Winter Storm

19-20 March, 2013

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Meteorological Overview:

A split flow upper-level pattern was in place across the contiguous U.S. in mid-March 2013. On 18 March, a vigorous upper-level trough in the Polar jet and the associated occluded surface low pressure system were moving across the Great Lakes. Meanwhile, a coastal “Miller-B” low-pressure system developed along the Mid-Atlantic coastline late on 18 March as a shortwave in the Subtropical jet interacted with a coastal baroclinic zone associated with cold air damming east of the Appalachians. At 12 UTC on 19 March the strengthening coastal surface low was centered just south of Long Island, NY with a central pressure of 1004 hPa. By this time, snow was already falling across much of southern and central New England. The most intense snow fell during the day on 19 March as the surface low moved northward and continued to deepen as the Polar and Subtropical systems partially phased. By 00 UTC on 20 March, the low had moved northward to near Provincetown, MA with a central pressure of 998 hPa. During the initial development of the surface low, deepening may have been inhibited by unfavorable upper-level jet dynamics. Through late in the day on 19 March, the surface cyclone remained in the right exit region of the 300-hPa jet. However, by the early morning hours of 20 March, the surface cyclone was positioned in the divergent left exit region of the upper-level jet. After deepening 11 hPa in the 24 hours prior to 00 UTC on 20 March, the surface low deepened an additional 13 hPa in the following 12 hours by 12 UTC on 20 March, presumably aided by the enhanced upper-level divergence.

The heaviest snow fell within a band of strong 850 hPa frontogenetic forcing (Fig. 1). This frontogenetic band slowly shifted north across New England from the early morning hours of 20 March through much of the day as moderate to heavy snow fell. The frontogenetic band persisted across Maine into the day on 20 March, much longer than southern New England, as the cyclone strengthened offshore and a well-defined ‘comma-head’ feature developed.

Impacts:

Snowfall totals of greater than 4 inches were numerous across New England with the event (Fig. 2). The heaviest snow fell across an area including portions of northern Vermont, New Hampshire, and Maine where snowfall amounts averaged to 10 to 18 inches. Additionally, freezing rain glaze of up to 0.30” occurred over portions of northeastern Pennsylvania. The most significant impacts of the storm remained north of Boston, which only received 1 to 3 inches of snow. Nonetheless, Boston public schools were closed during the event. Numerous flights were cancelled at airports across the northeastern U.S.

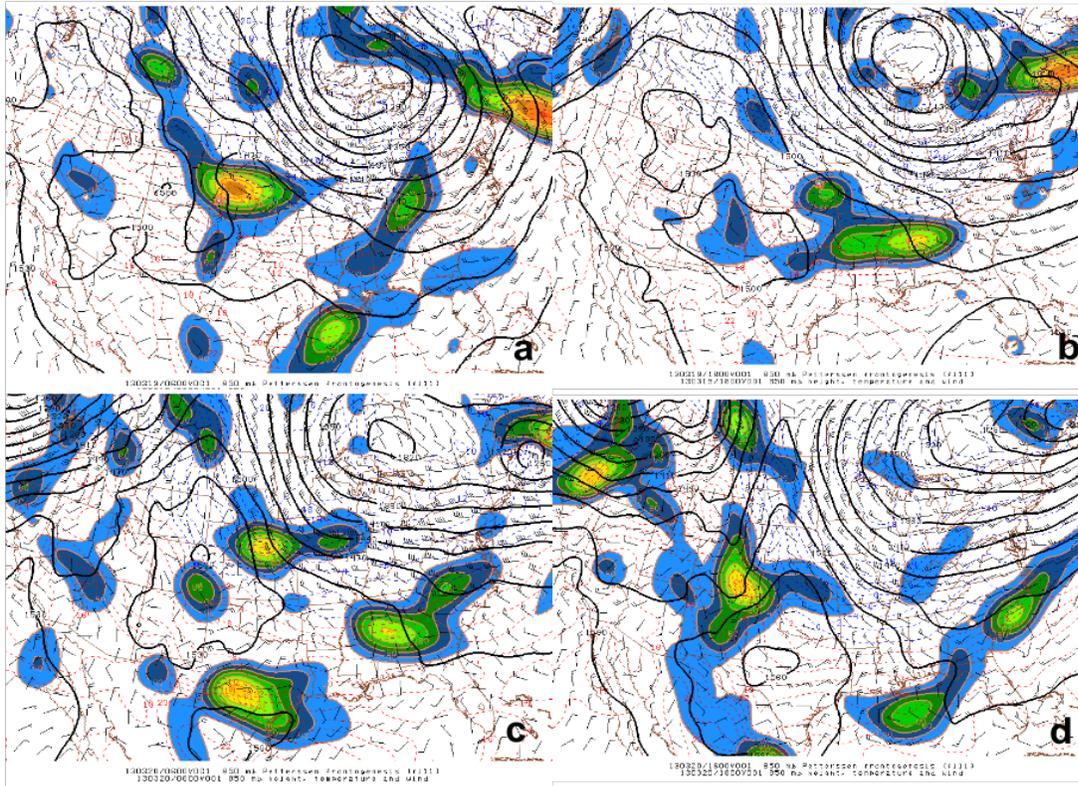


Figure 1: 850 hPa heights (contours), winds (barbs) and Petterssen frontogenesis (shaded) for 06 UTC on 19 March (a), 18 UTC on 19 March (b), 06 UTC on 20 March, and 18 UTC on 20 March.

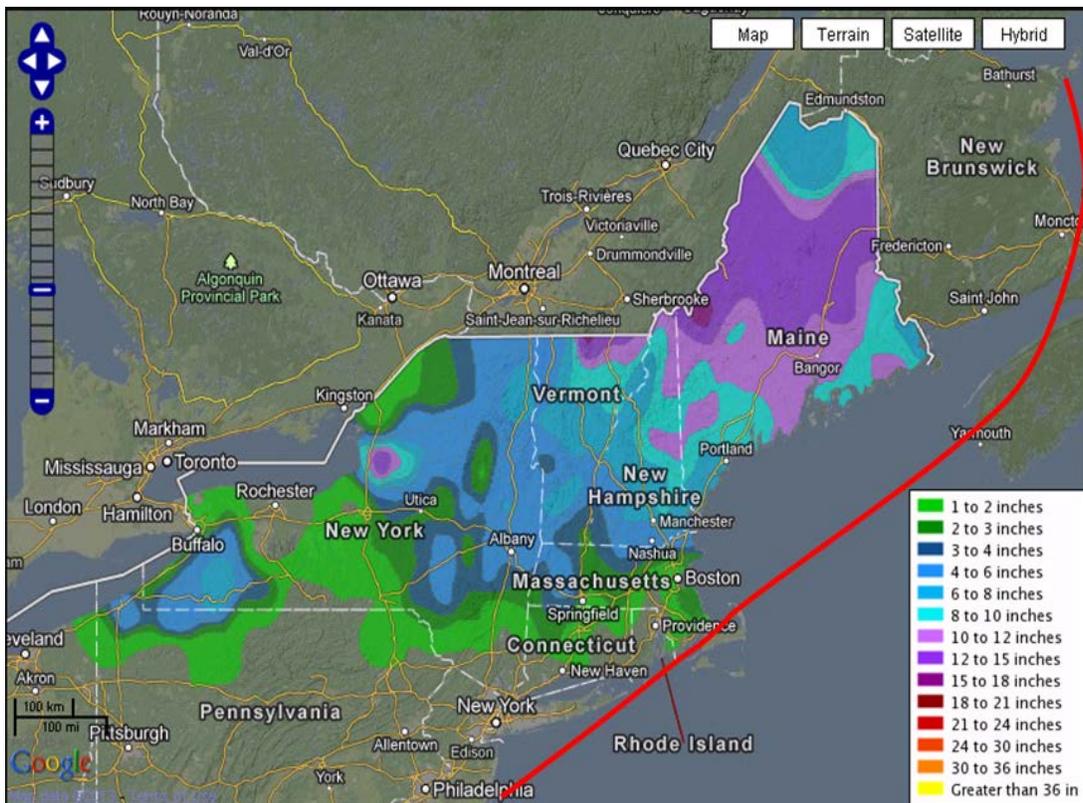


Figure 2: Storm total snowfall accumulation; red line indicates the track of the surface low.