Southern Plains to Northeast U.S. Christmas Storm
25-28 December, 2012
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Meteorological Overview: A vigorous upper-level shortwave crossed the Southern U.S. Rockies on Christmas Eve, and exited into the Southern Plains on Christmas Day. The shortwave interacted with a preexisting Arctic frontal zone draped in the lee of the Rockies, across central Texas, and into the Lower Mississippi River Valley. As this interaction occurred, a surface low developed along the Arctic frontal zone across southeastern Texas on Christmas morning. Snow and freezing rain began to fall north of the developing surface low across Oklahoma early on Christmas morning as the Arctic air pushed into the region on sustained northerly winds of 20 to 30 kt. Snow began falling as far south as the Dallas metropolitan area Christmas evening as the surface low moved into northern Louisiana. The storm system continued to intensify, and by 00 UTC on 26 December, the low pressure area became closed off below 500 hPa. The surface low tracked northeastward to the Tennessee River Valley by 12 UTC on 26 December (*Fig.* 1a), as it deepened to a pressure of 994 hPa and the cyclone began to occlude. By this time, snow and freezing rain had spread into much of the Ohio River Valley. Sustained winds of 30 knots or higher caused blowing snow, with blizzard conditions reported in many areas of the Middle Mississippi and Ohio River Valleys.

By the afternoon of 26 December, the surface low was centered over Kentucky. The frontal wave had fully occluded and the surface low began to weaken. At the same time, a new surface low developed and intensified over the coastal plain of North Carolina as the upper-level low interacted with a coastal frontal zone. By this time, snow and freezing rain began spreading into the Northeastern U.S. Through the evening of 26 December and into the morning of 27 December, this surface low tracked northeastward along the Mid-Atlantic coastline (*Fig.* 2) as it continued to deepen. By 12 UTC on 27 December (*Fig.* 1b) the central pressure of the surface low had deepened to 987 hPa, centered just south of eastern Long Island. The surface low continued to track along the New England coastline through the day, reaching the Gulf of Maine by 00 UTC on 28 December. A swath of moderate to heavy snow accompanied the system across most of New England, with rain along the southern New England coast.

The storm produced a large swath of 6 to 12 inches of snow from Texas to Maine (*Fig.* 2). Widespread 10 to 18 inch snowfall amounts occurred across northern Pennsylvania, Upstate New York, and northern New England. The highest reported snowfall total from the storm of 27.0 inches was reported in Woodford, VT. Freezing rain accumulations of up to 0.50 inch occurred over areas of Pennsylvania and West Virginia. Wind gusts in excess of 60 mph occurred across much of the coastal Mid-Atlantic region, with a hurricane force wind gust of 74 mph measured near Milton, MA. The high winds were a result of the intense pressure gradient between the deepening Mid-Atlantic/Northeast coastal low and an expansive area of high pressure across Ontario into the western Great Lakes. Additionally, the event was accompanied by a large severe weather and tornado outbreak across the Deep South on 25 December.

Impacts: At least seven people were killed in weather-related traffic accidents across Ohio, Indiana, Arkansas, and Oklahoma during the winter storm. The storm left hundreds of thousands of residents without power for several days in the swath of heavy snow. Some of the worst power outages occurred in Arkansas where over 100 thousand residents were without power for days due to heavy snow and freezing rain. Additionally, thousands of flights were delayed or cancelled due to the extreme winter weather conditions.
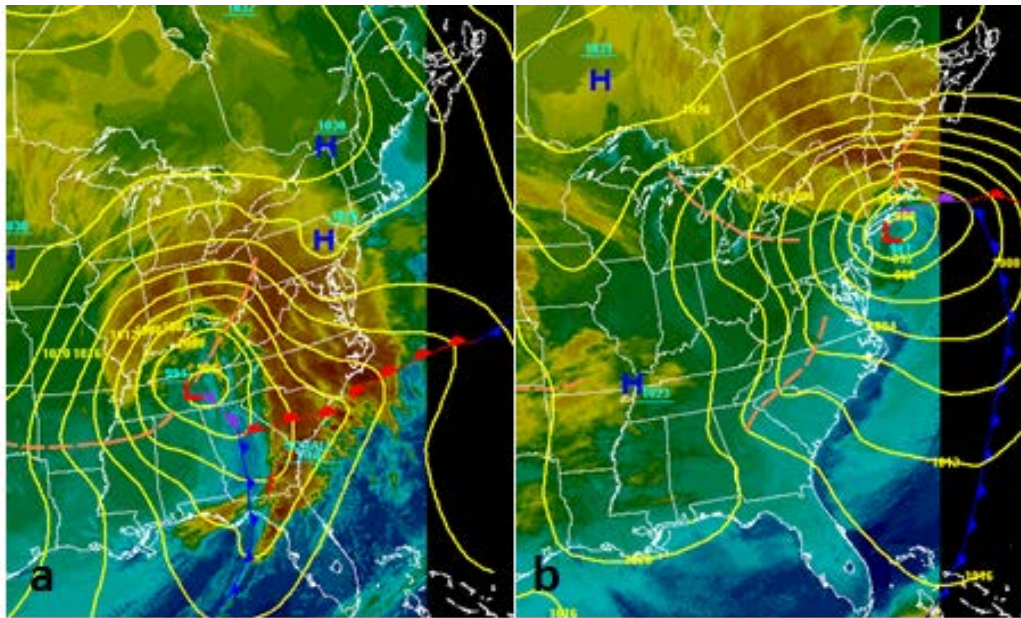
Figure 1: Surface analysis overlaid on infrared satellite imagery from 12 UTC on (a) 26 December and (b) 27 December, 2012.
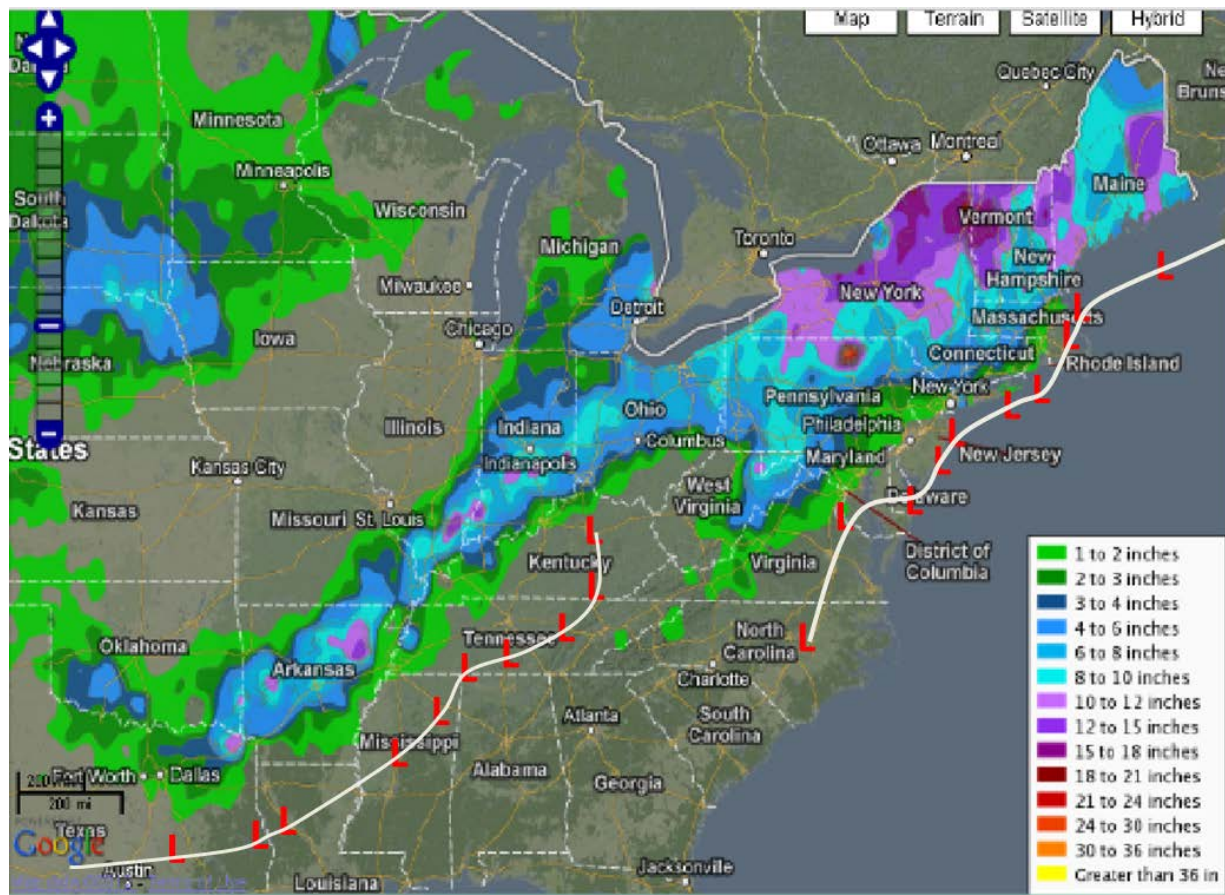

Figure 2: Snowfall totals from 25-28 December, 2012, with the tracks of the primary low and coastal low shown.