

Northern Plains/Upper Midwest Snowstorm
9-10 December, 2012
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Meteorological Overview:

An ideal weather pattern became established over much of South Dakota, Minnesota, and Wisconsin for a significant winter storm. A vigorous 500mb shortwave moved from the Northern Plains into the Upper Midwest on the morning of December 9 (Fig. 3), along with significant positive vorticity advection and deep layer ascent. At the surface, a 1035mb arctic high from Canada moved over the Dakotas by the afternoon of December 9, 2012 (Fig. 2). This provided the cold air necessary for heavy snowfall. To the southeast of this ridge, a developing surface low began to form in western South Dakota during the evening of December 8th. This low moved northeastward into extreme southern Minnesota with a surface pressure of 1008mb by 18Z on December 9th. Most of the snow fell north and east of the surface low before the low reached MN. By 18Z on December 10th, the low had moved to southern Quebec and strengthened to 997mb, with a rain event for the East Coast.

Event Overview/Impacts:

Heavy snow fell over much of South Dakota and the Upper Midwest on the 9th and 10th of December, 2012, as warm, moist air east of a developing low pressure system collided with very cold air from Canada (Fig. 1). The greatest snow amount occurred in the town of Sacred Heart, MN, where 17.3 inches of snow fell. A swath of greater than 10 inches occurred in eastern SD, southern MN, and western WI, including Minneapolis with 10.5 inches and East Farmington, WI, with 14.0 inches. In addition to the heavy snow that fell with this system, there were also numerous reports of high wind gusts, including 53 mph at Kimball, NE, 52 mph at Ellsworth Air Force Base, SD, and 50 mph at Huron, SD. The National Weather Service issued blizzard warnings for eastern South Dakota and southwestern Minnesota and winter storm warnings for eastern Minnesota and western Wisconsin. The heavy snowfall affected transportation throughout the Upper Midwest. There were about 150 flight cancellations at the Minneapolis-St. Paul International Airport. Also in Minnesota, there were about 600 automobile accidents throughout the state during the event, according to the Minnesota State Patrol. In South Dakota, blizzard conditions resulted in the closure of sections of Interstates 29 and 90.

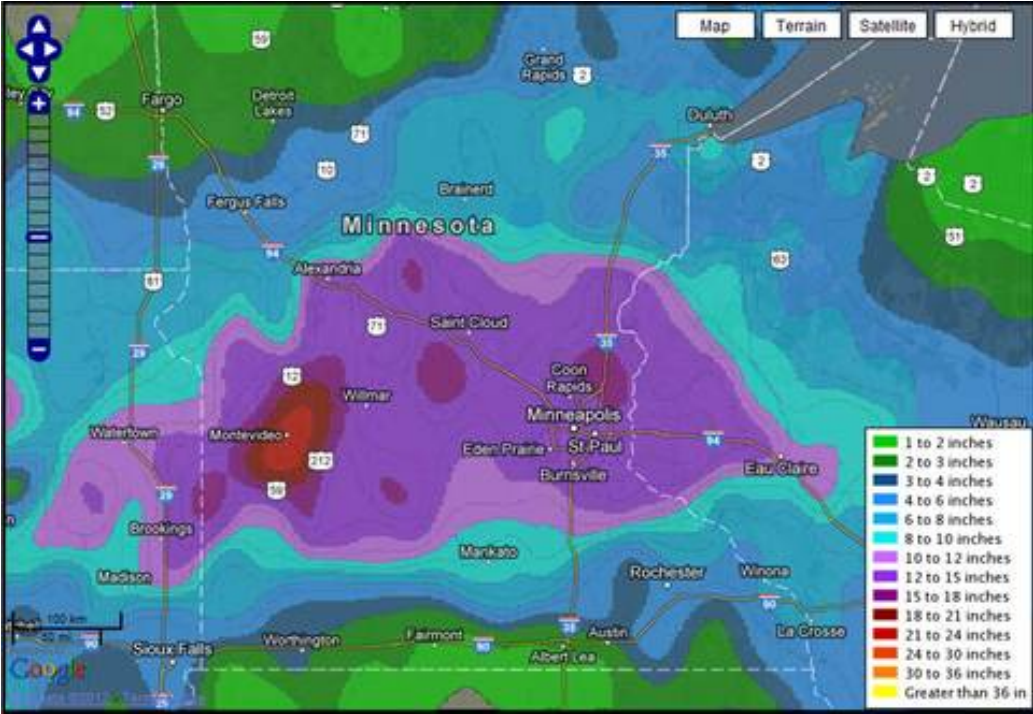


Figure 1: Snowfall accumulations across the Upper Midwest and eastern Dakotas on 9-10 December 2012.

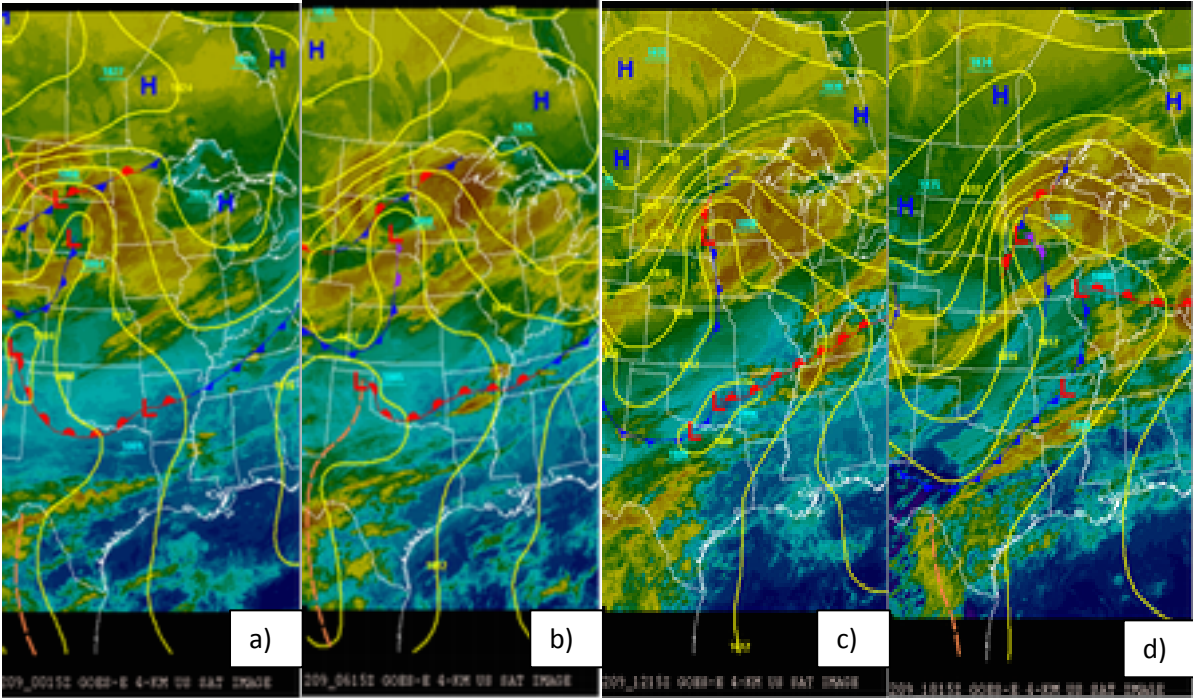


Figure 2: Surface analyses and infrared satellite imagery at a) 00 UTC December 9, 2012, b) 6 UTC December 9, 2012, c) 12 UTC December 9, 2012, and d) 18 UTC December 9, 2012.

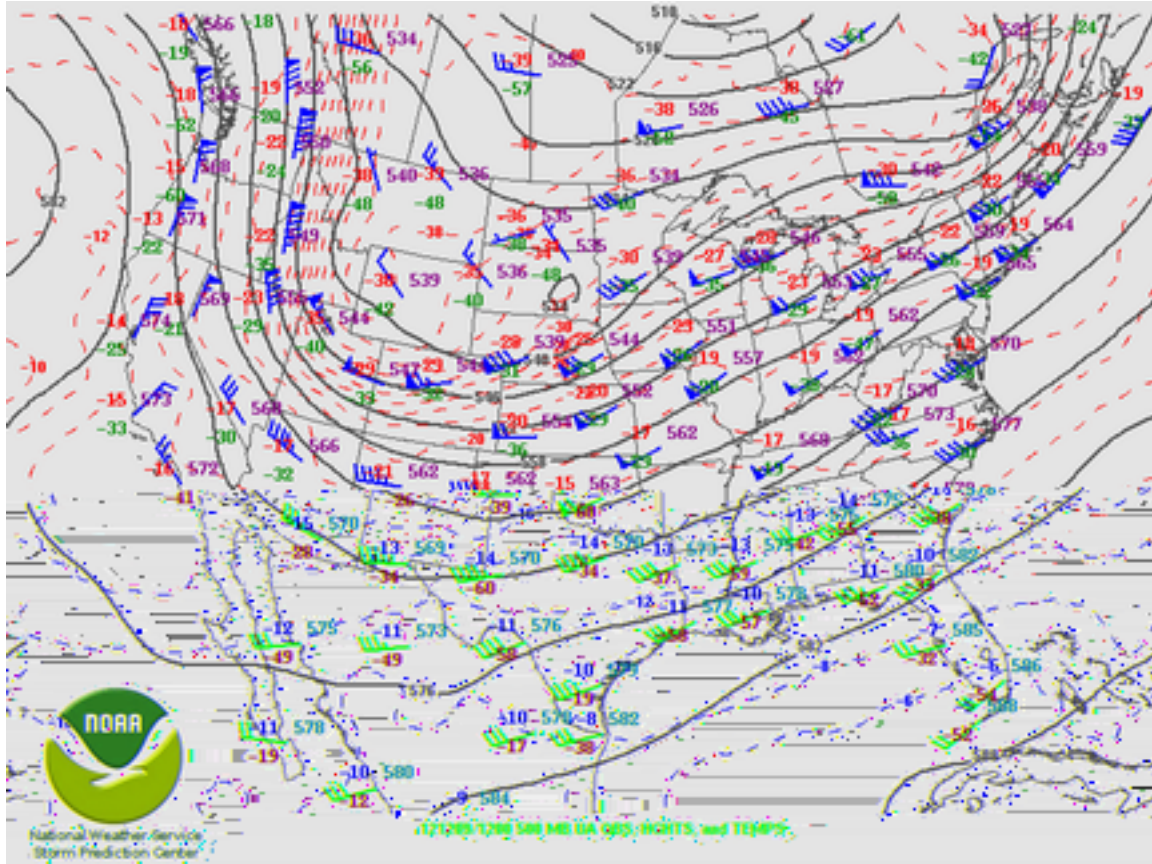


Figure 3: 500 mb observations and height analysis for 12 UTC December 9, 2012.