

Central Rockies to Central Plains Winter Storm

29-31 March, 2016

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Meteorological Overview: A significant winter storm affected much of the interior West from the Great Basin to the northern Rockies with up to three feet of snow over the period of 29 March to 31 March 2016 (Fig 2). A deep upper level low moved south out of British Columbia sliding down the west coast of the United States, reaching central California by 0000 UTC 29 March (Fig 1). Rapidly falling heights over the region implied a strong cooling of the environment. At the same time, the 700 hPa temperature gradient increased across the Great Basin, extending into the Northern Rockies. Strong upper level divergence had become collocated with the frontogenetical forcing across the northern Great Basin and northern Rockies, leading to heavy snowfall across parts of northern Nevada, Idaho, Montana, Utah, and Wyoming. By 0000 UTC 30 March the surface cold front had crossed the Rockies and the main surface low was located in northeast Colorado (Fig 1). A period of light to moderate snowfall would continue across the northern Great Basin and northern Rockies into 31 March.

With the surface low shifting eastward across the continental divide the main mode of precipitation production was upslope along the eastern slopes of the Rockies in Wyoming. Strong north to northeast winds at the surface brought a surge of cold air down the eastern side of the Rockies and provided additional rising motion in vicinity of the terrain. Observing sites in eastern Wyoming that had reached high temperatures in the upper 60's on 29 March saw sharply falling temperatures to near freezing on 30 March. Additional cooling was generated dynamically by evaporative cooling within heavy banded precipitation that developed, as is typical of late season snowstorms. By 1200 UTC 30 March a well-defined band of heavy snow was affecting central and eastern Wyoming as well as western South Dakota and Nebraska. This band was a classic "trough of warm air aloft" (TROWAL) feature forming on the nose of a warm intrusion in the mid levels. This signifies the warm conveyor wrapping around the mature surface cyclone further intensifying the frontogenetical forcing and reducing stability in the layer. This band also formed in a zone of strong deformation with the upper level trough becoming highly stretched by the low stalling and weakening over the four corners region and a new wave of low pressure racing eastward. By 0000 UTC 31 March the surface low began accelerating eastward and precipitation was winding down (Fig 1).

Impacts: Heavy snow fell across much of the interior West from the Great Basin to the northern Rockies with up to three feet of snow (fig 2) causing significant travel delays and road closures. The hardest hit areas were from northern Nevada to western Wyoming with 35 inches near Lamoille Nevada, 27 inches at Powder Mountain Utah, and 28 inches near Lander Wyoming. Nearly 350 miles of interstate 80, from Cheyenne to the Utah state line, had to be closed in Wyoming due to heavy snow and wind. 2,000 people lost power in Billings Montana due to the storm. Winds gusted to at least 70 miles per hour across much of the Great Basin and Rockies with the strongest winds across the higher elevations of Colorado. Mount Abrams recorded a wind gust of 95 miles per hour.

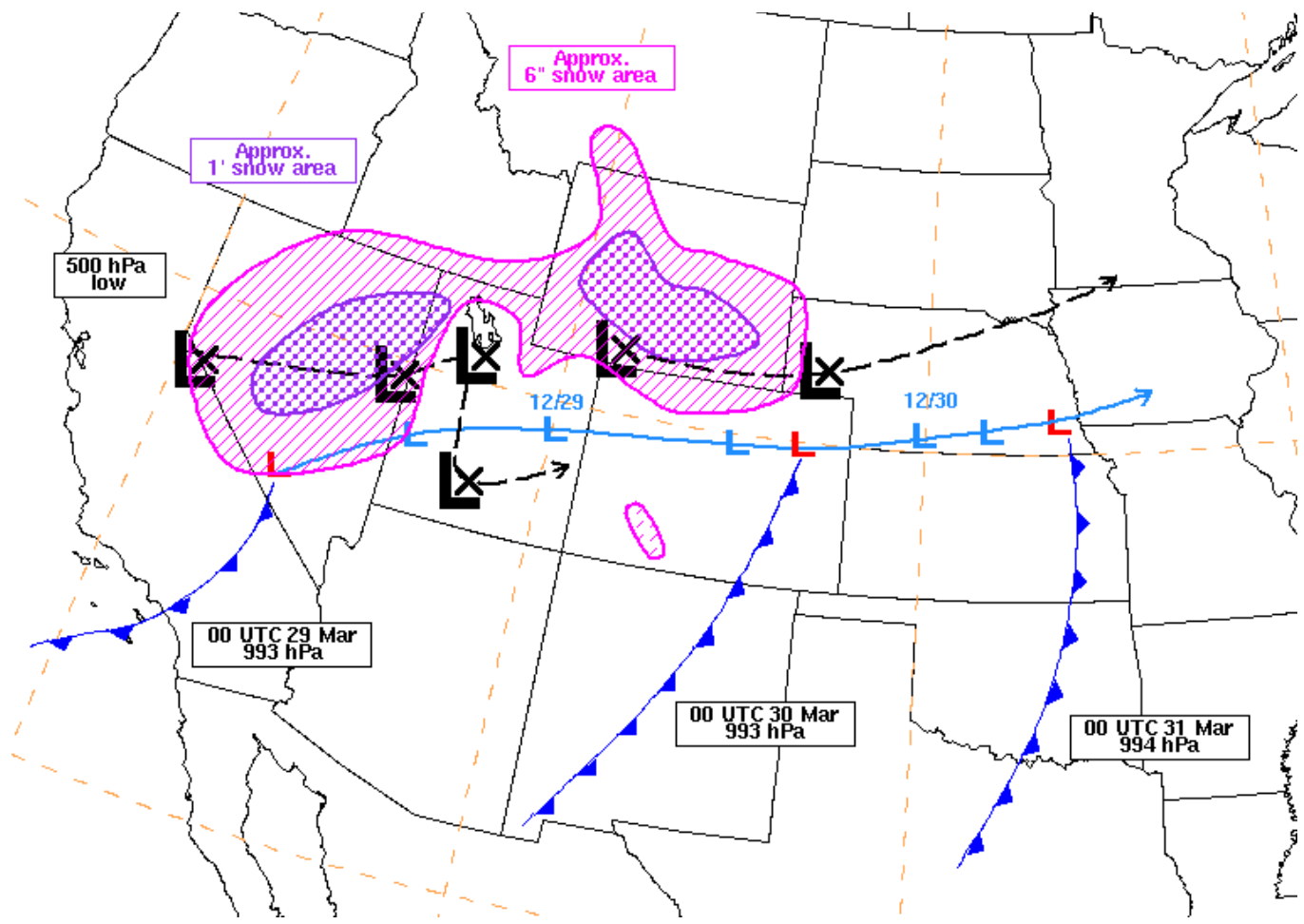


Figure 1. Surface low track (blue), 500 hPa low track (black), approximate 6" snow areas (pink), and approximate 1' snow areas (purple). Frontal positions are valid at 0000 UTC on 29, 30, and 31 March.

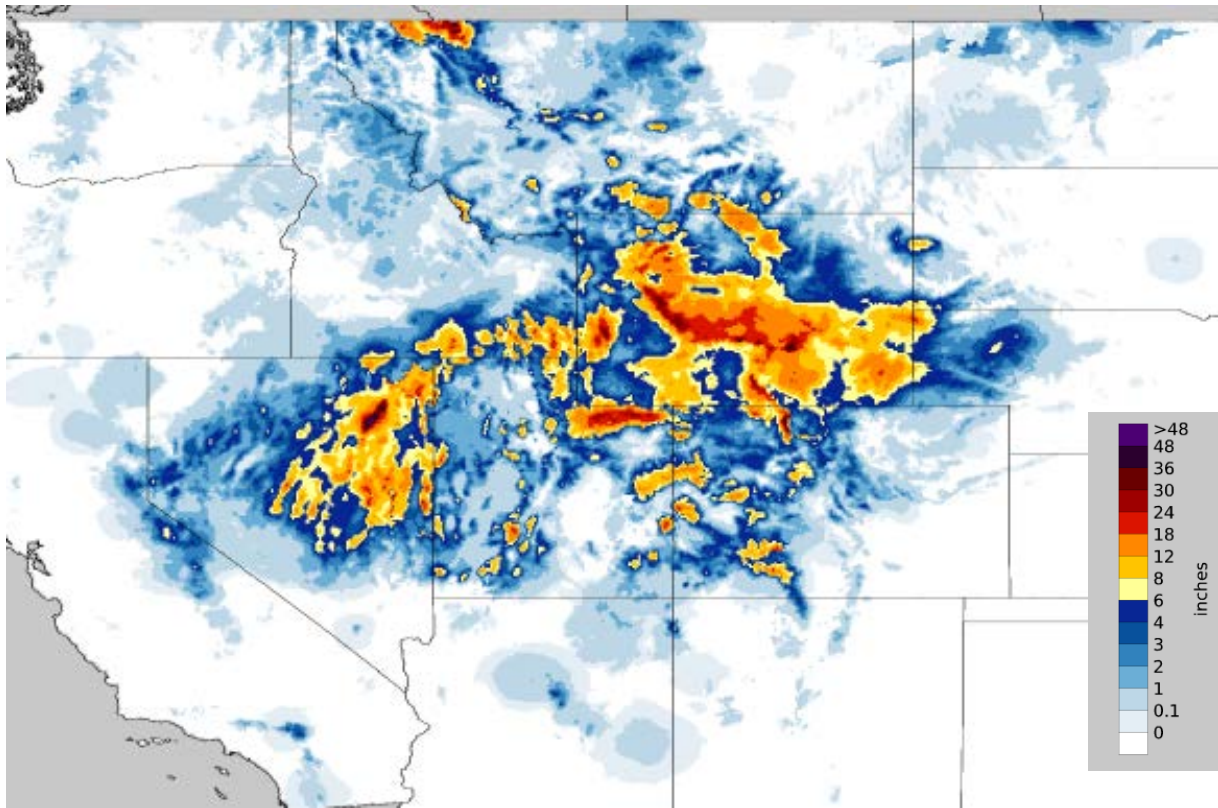


Figure 2. Accumulated snowfall over a 72 hour period from 1200 UTC 29 March to 1200 UTC 31 March 2016. (Image courtesy of NOHRSC)