

Western U.S. to Midwest Winter Storm

January 21st-26th, 2017

By: Mary Beth Gerhardt, WPC meteorologist

Meteorological Overview:

A late January winter storm brought widespread winter weather impacts from California to the Great Lakes 21-26, January, 2017 (*Fig. 1*). An anomalously deep 500 hPa low approaching the west coast was the initial focus of the event as strong and persistent 850 hPa moisture transport ahead of the approaching low streamed into central and southern California (*Fig. 2a*). Enhanced lift from the moist air flowing perpendicular to the terrain brought 2 to 3 feet, with isolated totals near 60 inches, of snow to higher elevations of the Sierra Nevada range and heavy rains to locations below the snow level (*Fig. 3a*). A powerful 250 hPa jet aligned from central California to the central Great Basin also contributed to intense precipitation rates and high winds over California early in the event.

As the cold front and leading edge of height falls from the 500 hPa low progressed inland on 23 January, 2017, impacts from the storm spread to the central Great Basin, Arizona, New Mexico and much of the Rockies (*Fig. 2a-2b*). Despite the decrease in moisture transport off the Pacific Ocean, the combination of orographic lift, upper divergence within the left exit region of the powerful 250 hPa jet, and strong forcing with the cold front, caused high winds and 1-2 feet of snow over much of the Colorado Rockies, the Wasatch and Uinta ranges of Utah, the favored terrain of western Wyoming, and even portions of the Mogollon Rim and higher elevations of northeast Nevada (*Fig. 3a*).

On 00 UTC 24 January 2017, the 500 hPa trough began emerging out of the Rockies and helped strengthen a surface low in the lee of the Colorado Rockies (*Fig. 2b-2c*). Increasing moisture advection from southerly and southeasterly flow ahead of deepening surface low contributed to a swath of moderate to heavy snow north and northwest of the system as it tracked from the Central Plains to the Upper Mississippi Valley (*Fig. 1*). In addition, strong low to mid level frontogenesis allowed for banded areas of heavy snow and a narrow axis of accumulations greater than a foot extending from northwest Nebraska to southeast South Dakota (*Fig. 3b*). By 00 UTC 25 January 2017, impacts from the late January winter storm finally began to diminish as the surface low and 500 hPa trough lifted northeastward into southeastern Canada (*Fig. 1*).

Impacts:

Some of the greatest impacts from this late January storm were in California, where strong winds and heavy snow closed several schools and roadways in the higher elevations of the state, including a nearly 70 mile stretch of interstate 80 in the Sierra Nevada range. Mammoth Mountain broke their record for total snowfall in January with the additional accumulations from this storm, but the heavy snow also closed all lifts at the popular ski resort. Besides winter weather impacts, strong surf from the storm set a new wave height record of 34.12 feet in Monterey Bay, while intense rainfall led to numerous mudslides, evacuations, and traffic delays in the lower elevations of southern and central California. Rain and snow from this event, along with other western U.S. heavy precipitation events earlier in the

month, provided some relief from extreme drought conditions that were in place over California. Elsewhere, heavy snow and strong winds from this late January storm closed numerous schools and interstates across the central Great Basin, Rockies, central Plains, and Upper Mississippi Valley.

Images:

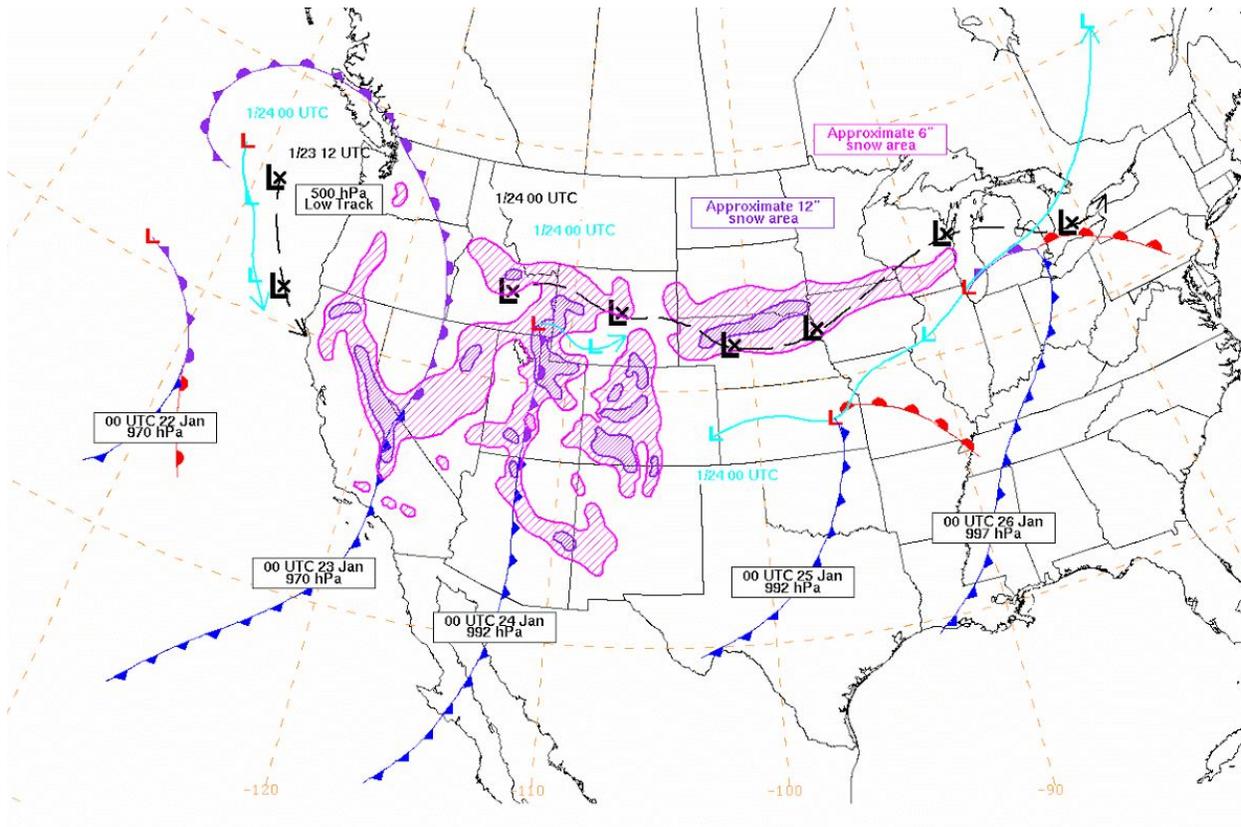


Figure 1: Summary of the Western U.S. to Midwest winter storm (21-26 January, 2017) depicting the 500 hPa low track at every 12 hours (dashed black), the surface low tracks at every 12 hours (cyan), approximate area of greater than 6 inches of snow (magenta), approximate area of greater than 12 inches of snow (purple), and select 00 UTC surface analysis during the storm.

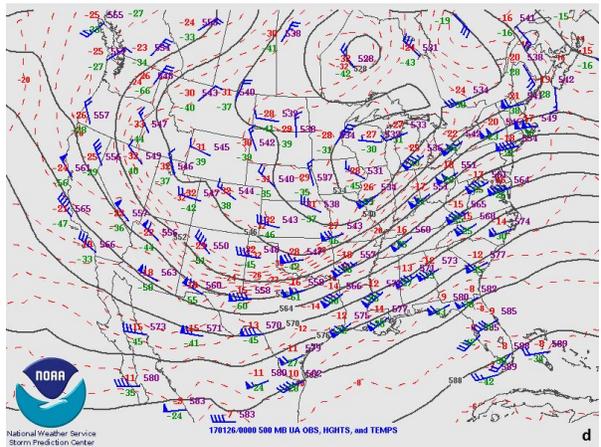
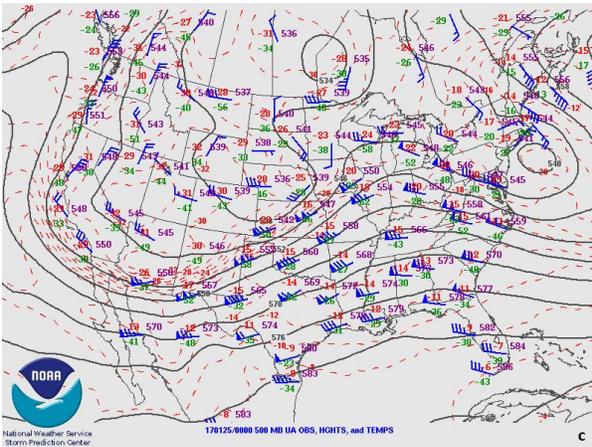
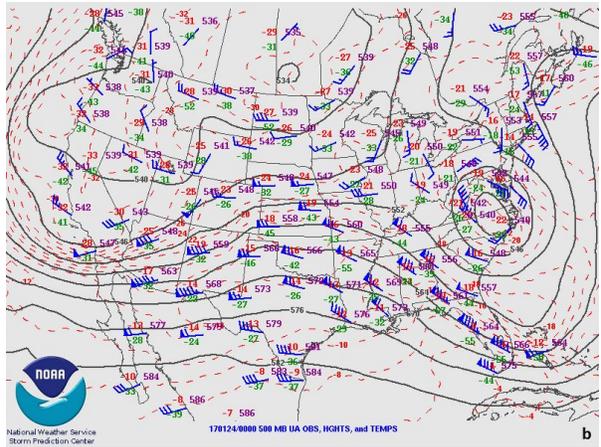
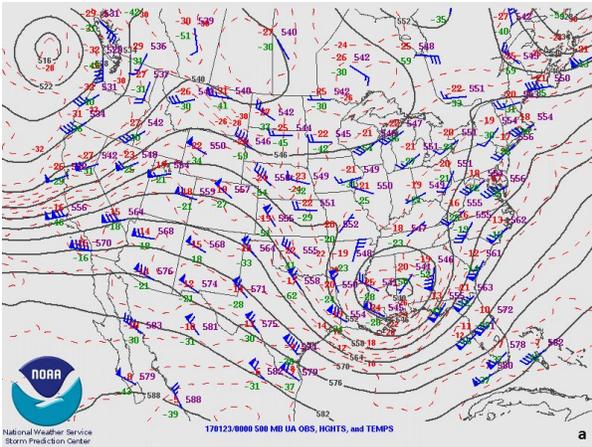


Figure 2: 500 hPa geopotential height (black), temperatures (deg C, red dashed), and upper air observations for 00 UTC on 23 Jan (a), 24 Jan (b), 25 Jan (c), and 26 Jan (d) (*images courtesy of SPC*).

