**Rockies to Great Lakes Winter Storm**
**23-25 February, 2017**
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**Meteorological Overview:** A powerful winter storm brought heavy snow to a large region from the Great Basin to the upper Great Lakes over the period from 23 February to 25 February 2017 (Fig 2). Zonal flow across the nation was disrupted by a powerful mid level shortwave entering the western U.S. and reaching the northern Great Basin by 1200 UTC 23 February (Fig 1). Strong upper level divergence over the northern Rockies at this time promoted a broad area of rising motion. Deep southwesterly flow over the terrain began interacting with a low level arctic air mass and strong low-level north to northeasterly upslope flow east of the Rockies. A band of heavy snowfall developed along the 700 hPa temperature gradient, a zone of strong frontogenetical forcing, from eastern Wyoming into Nebraska and southern South Dakota.

With the upper level low swinging into the central plains the pattern became increasingly amplified across the central U.S. The surface low moved into the southern Plains by 0000 UTC 24 February (Fig 1) with heavy snow to the north, closely following the track of the 700 hPa low. Warm advection to the northeast of the surface low resulted in a broad region of precipitation beginning as mostly rain across the upper Midwest. At 1200 UTC 24 February the surface cyclone was centered over western Illinois (Fig 1). As the surface cyclone matured strong dynamic cooling changed rain to snow from Iowa to northern Michigan. A well defined band of heavy snow developed to the northwest of the surface low across eastern Nebraska and western Iowa. 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 of heavy snow slid eastward into central Iowa, southeastern Minnesota, and western Wisconsin before weakening toward 0000 UTC 25 February. Convection ahead of the surface cold front across the Ohio Valley likely limited the moisture transport. The surface cyclone accelerated to the northeast across the Great Lakes, reaching Ontario Canada by 1200 UTC 25 February (Fig 1). West to northwesterly winds behind the cold front resulted in some lake effect snow showers across Michigan and parts of the Ohio Valley.

**Impacts:** A powerful winter storm impacted a large swath of the nation with delays and closures from the Great Basin to the Great Lakes, dumping as much as two feet of snow across the central Plains. The hardest hit area was eastern Wyoming where 22 inches fell at Torrington, and western Nebraska where 22 inches fell at Alliance. A 200 mile stretch of

interstate 80 was closed in Wyoming as well as a 120 mile stretch of interstate 25. Four people were killed in traffic accidents in Utah due to snowy road conditions.

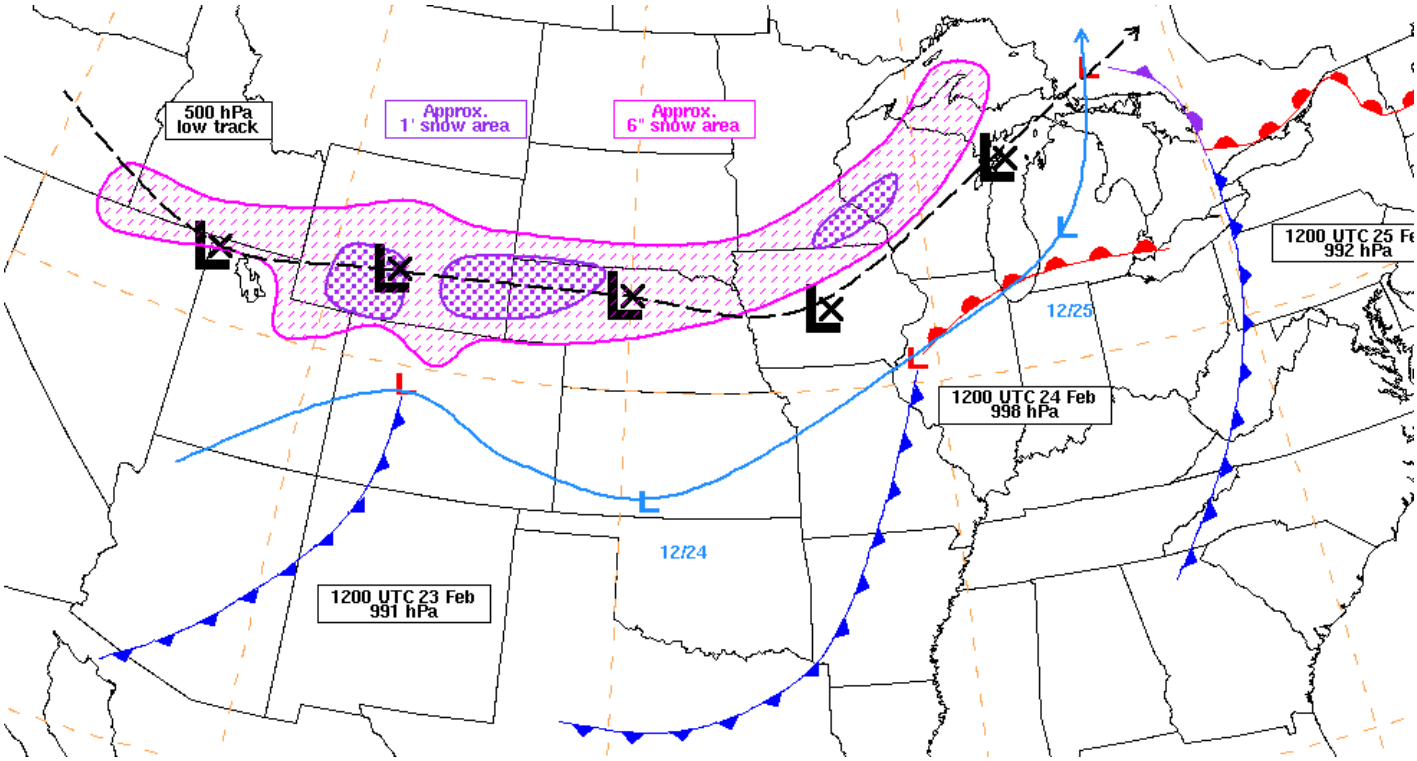


Figure 1. Surface low track (blue), 500 hPa low track (black), approximate 6” snow areas (pink), and approximate 1’ snow areas (purple). Frontal positions are valid at 1200 UTC on 23, 24, and 25 February.

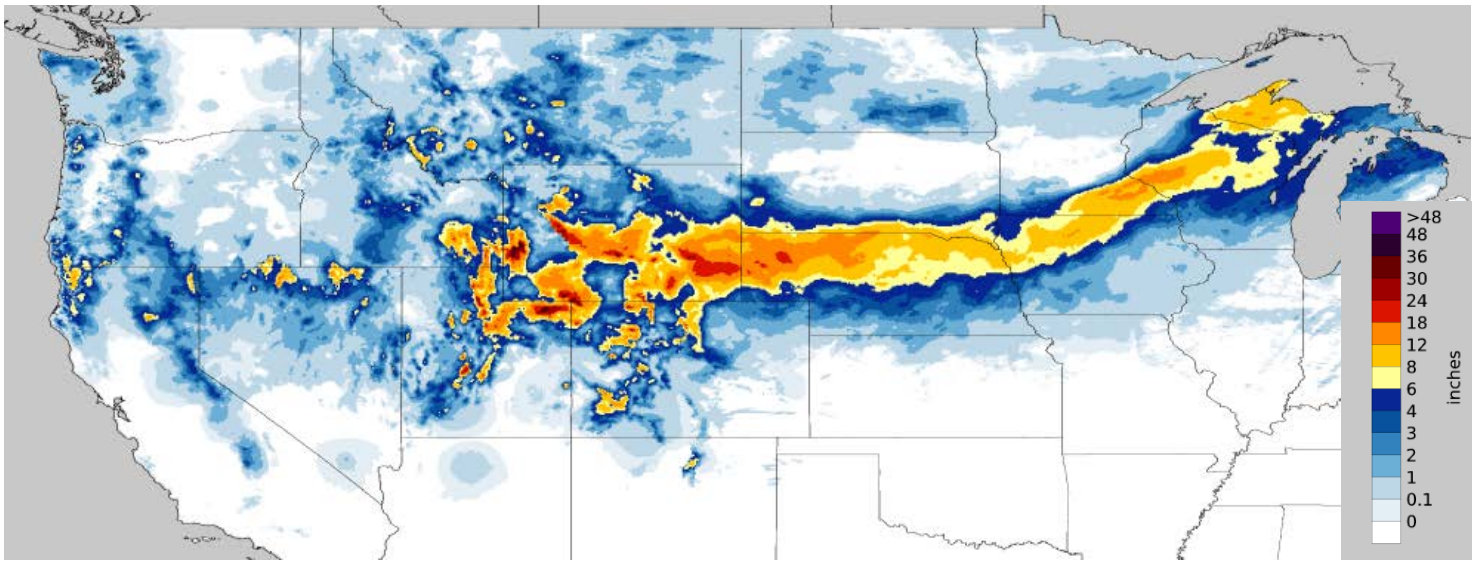


Figure 2. Accumulated snowfall over a 72 hour period from 1200 UTC 22 February to 1200 UTC 25 February 2017. (Image courtesy of NOHRSC)