



North Dakota Monthly Climate Summary

January 2024

Volume 18, No. 1

North Dakota State Climate Office: Your Resource for Climate Information

North Dakota State University
School of Natural Resource Sciences

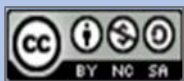
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Precipitation

Based on data from 149 stations* across the North Dakota Agricultural Weather Network (NDAWN) the statewide average precipitation in January 2024 was 0.13 inches. Normal precipitation in January is around 0.51 inches, leaving a 0.37 inch deficit. The greatest precipitation totals were in Southwestern North Dakota, with the highest amounting to 0.41 inches at the Poker Jim and Garrison (13NW) NDAWN stations. The least precipitation for the month of January occurred in LaMoure County at the Edgeley (4SW) NDAWN station with just 0.06 inches (Figure 1).

Maximum average January precipitation occurred in 1916 with 1.27 inches, and minimum precipitation in 1942 and 1973 tied with 0.09 inches. Historical climate data indicates a 0.05 inch decrease over a century long trend (NCEI) as the past decade has consistently been at or below average precipitation for the month of January (Figure 2).

Average January precipitation was 0.44 inches greater than the previous month and ranks as the 10th driest January over 129 years of precipitation data (NCEI).

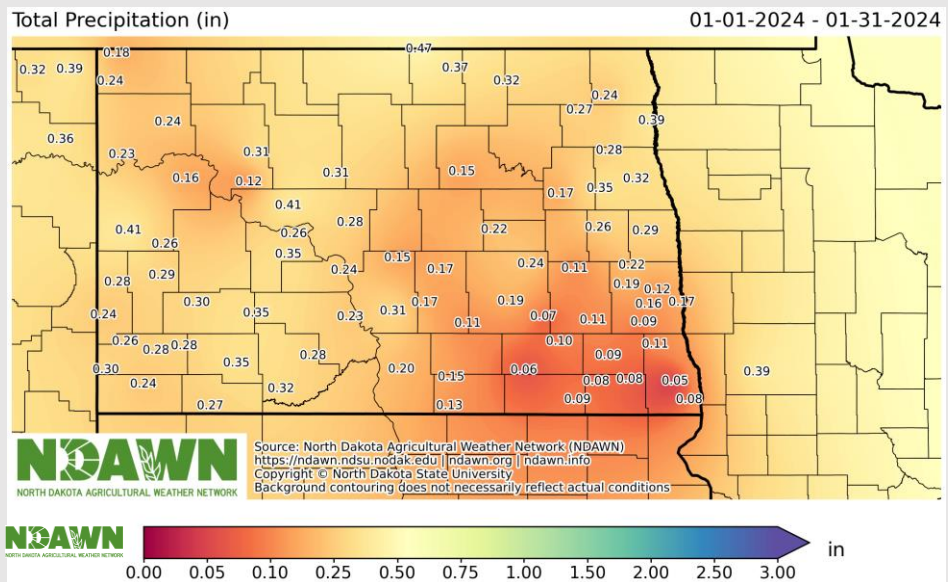


Figure 1: Total precipitation 1/1/2024 – 1/31/2024 at all NDAWN stations (NDAWN)

*Only North Dakota stations used for NDAWN data. All MN and MT stations omitted.

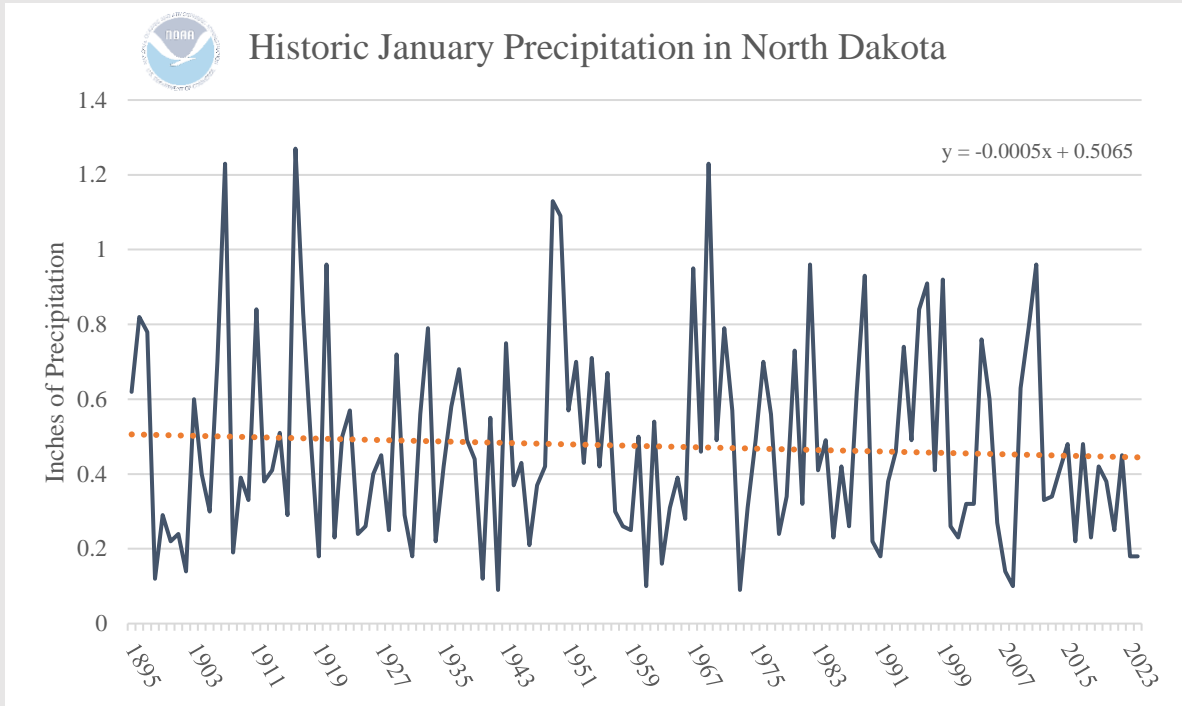


Figure 2: Historic average January precipitation 1895-2024 (NCEI, NOAA) with trendline representing average change per century.

North Dakota January Precipitation Summary

	Precipitation	Normal	Anomaly	Rank	Wettest/Driest Since	Record Year
January 2024	0.13"	0.51"	-0.37"	121 st Wettest	Wettest since 2023	1916
				10 th Driest	Driest since 2023	1942, 1973

Table 1: Ranking from NCEI NOAA based on data from January 1885-2024. Precipitation amounts averaged from records at NDAWN stations in North Dakota.



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Temperature

The average temperature in North Dakota for the month of January was 12.6°F making it the 36th warmest January within the period of record (129 years) (NCEI). Normal January temperatures average 10.1°F; making January 2024 a +2.5°F departure from normal (NDAWN, Figure 7). January appears only slightly warmer than average, despite weeks of mild temperatures in the 30, 40, and 50s, but was disparaged by a week of bone-chilling arctic air. The maximum temperature recorded by NDAWN was 65°F at the Bowman (4W) station in Bowman County, 55°F warmer than the statewide average. The minimum temperature recorded in North Dakota in January was -36°F at the Grenora (8N) NDAWN station in Divide County (Figure 4). This is a substantial 101°F temperature swing in January! It is easy to see why an average temperature would be highly skewed with large temperature outliers (Figure 3). 18 days in January at the Grenora station were above its respective daily normal temperature, often by much more than 10°F, which was a common trend across the state.

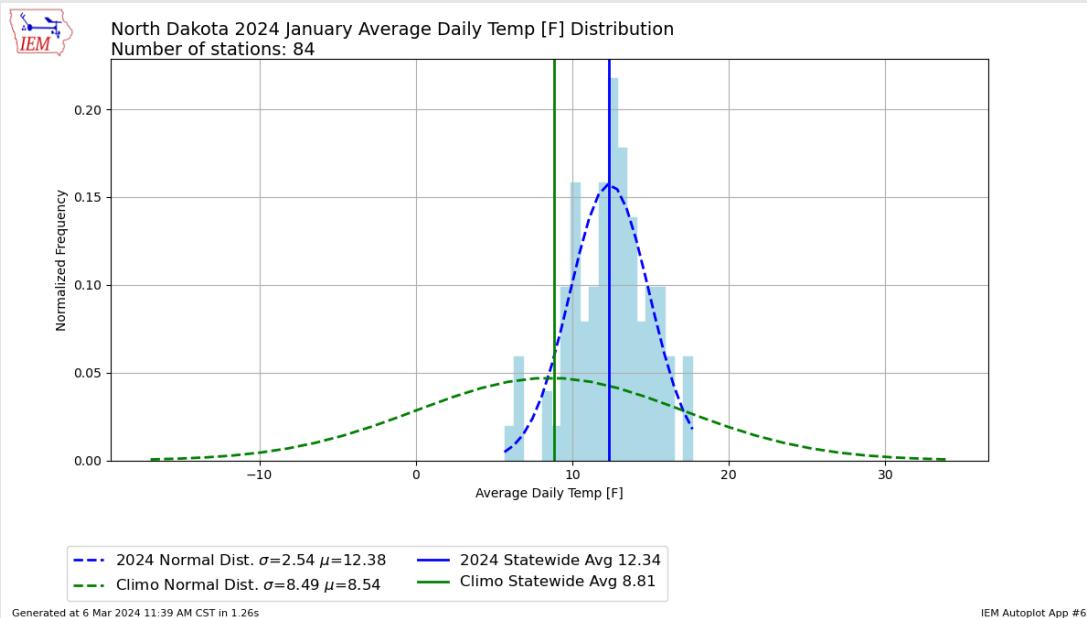


Figure 3: January 2024 temperature distribution showing the standard deviation of daily temperatures (blue) compared to long term daily climatological records for January (green) (IEM)

*Only North Dakota stations used for NDAWN data. All MN and MT stations omitted.

Statewide Maximum and Minimum Air Temperature

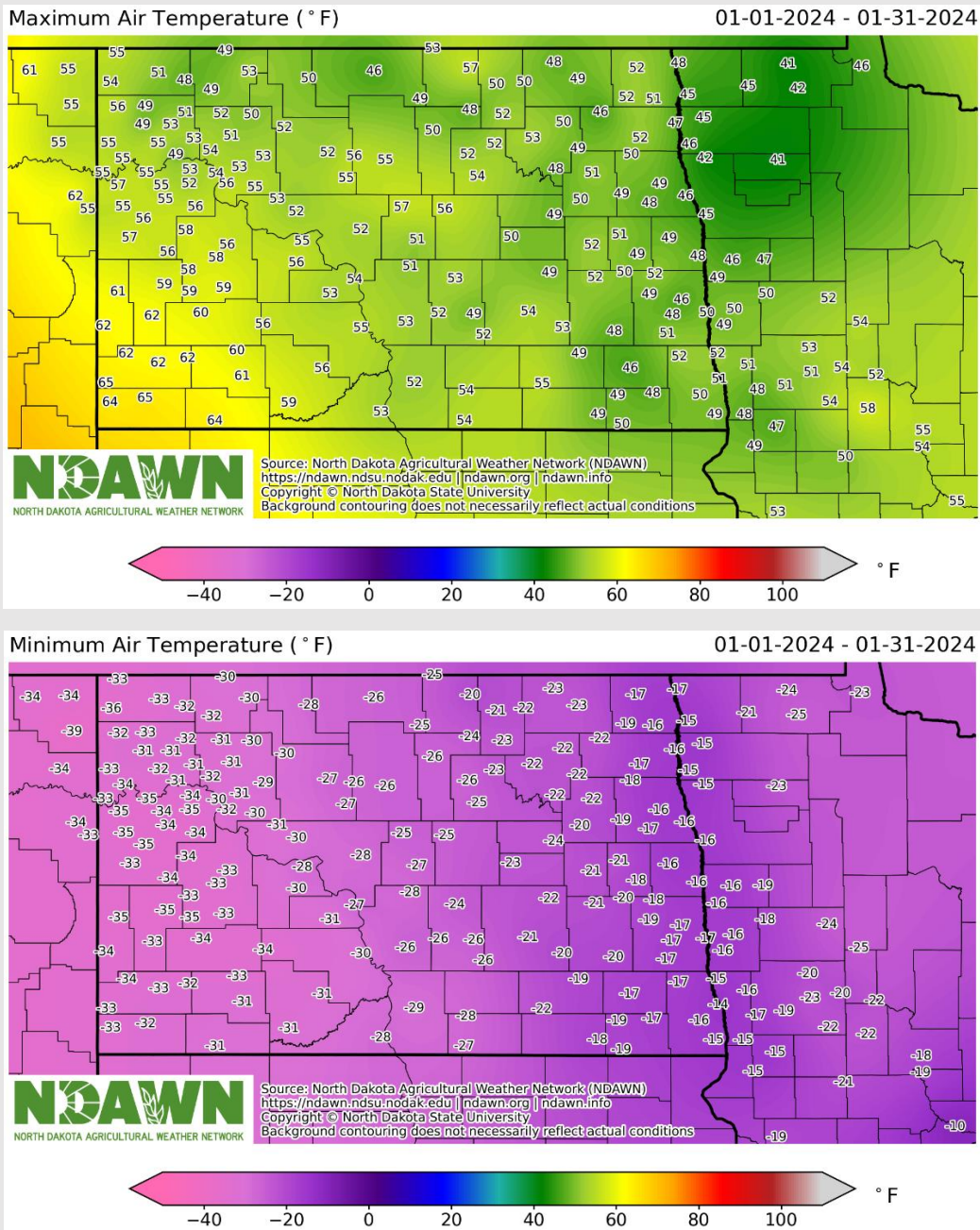


Figure 4: Maximum (Top) and Minimum (Bottom) air temperatures (°F) for January 2024 at all NDAWN Stations

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Maximum temperatures in January varied greatly, from well into the negatives to record highs across the state. The mid-month chill ensured that average max temperatures stayed around normal. Average maximum temperature for January was found to be 20.2°F, just above normal average maximum temperature at 19.8°F. Minimum temperatures had less of an effect from the cold, where the normal average minimum temperature is 0.4°F and January 2024 came in at 5.0°F, a 4.6°F deficit. This is likely from a lack of snow exposing the ground which is able to absorb more solar radiation, keeping nighttime temperatures warmer than normal (Figure 6). According to historical temperature records maintained by NCEI, the average temperature change per century is increasing by 0.5°F (NCEI) (Figure 5).

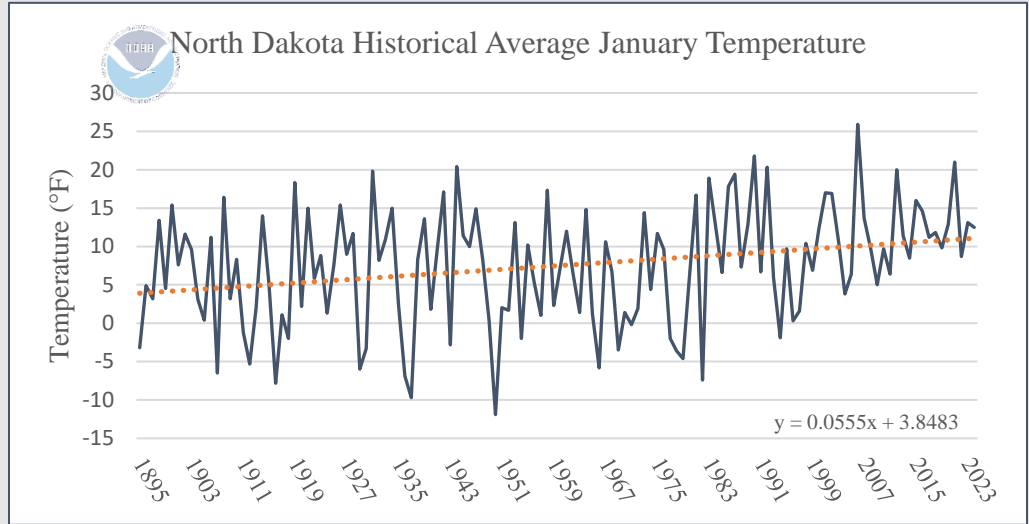


Figure 5: January historic average temperatures in North Dakota with trendline representing change per century increasing by 0.5°F. (NCEI)

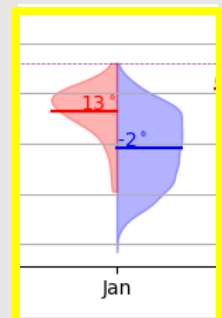
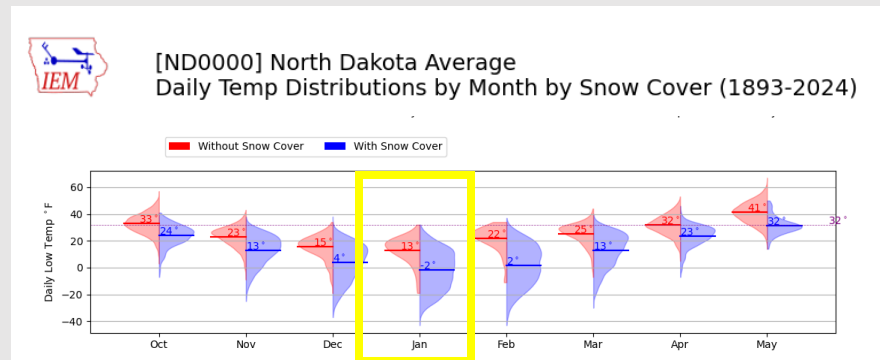


Figure 6: Average low temperatures for January in North Dakota with (blue) and without (red) snow on the ground. The average temperature difference is 15°F in January (IEM)

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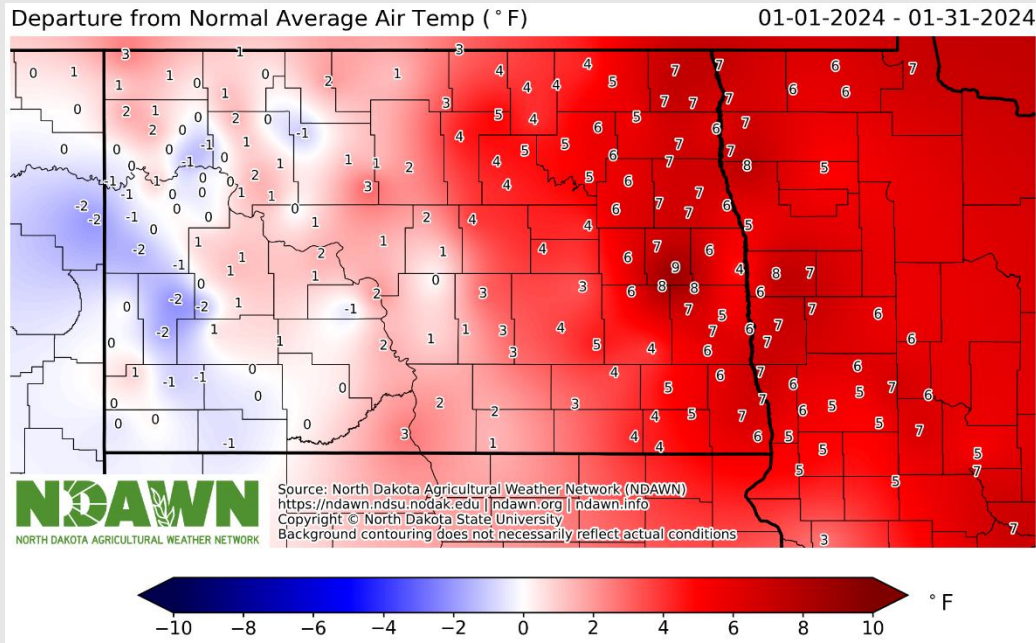


Figure 7: Departure from normal average air temperature for January 2024 at all NDAWN stations.

North Dakota January Temperature Summary

January 2024 Temperature Summary	Average T	Avg max T	Avg min T	Maximum	Minimum
	12.6°F	20.2°F	5.0°F	65°F	-36°F
Anomaly	+2.5°F	+0.38°F	+4.7°F		
Rank					
Warmest	36 th Warmest	49 th warmest	20 th warmest		
Coolest	95 th Coolest	82 nd coolest	111 th coolest		
Record					
Warmest	25.9°F (2006)	33.1°F (2006)	18.7°F (2006)	70°F (Medora, 1900)	
Coolest	-11.9°F (1950)	-2.8°F (1950)	-21.0°F (1950)		-55°F (Minnewaukan, 1899)

Table 2: January temperature summary for North Dakota. 2024 statistics from NDAWN station data. Ranking and records based on NCEI climate data (1885-2024) (NOAA).

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Storm Reports

There was very little snow during the month of January. A small amount fell statewide around January 11th, with the highest totals in Northeastern North Dakota that measured around 2 inches (Figure 8). This event was paired with strong winds that caused near blizzard conditions, reported in Cavalier and Pembina Counties, and one report in Barnes County (Figure 9). Light snow continued into January 13th, as did the extreme temperatures, creating hazardous conditions for traveling and livestock. At this time, the highest snow totals occurred in Grand Forks and the Devils Lake Basin (NWS, Figure 8).

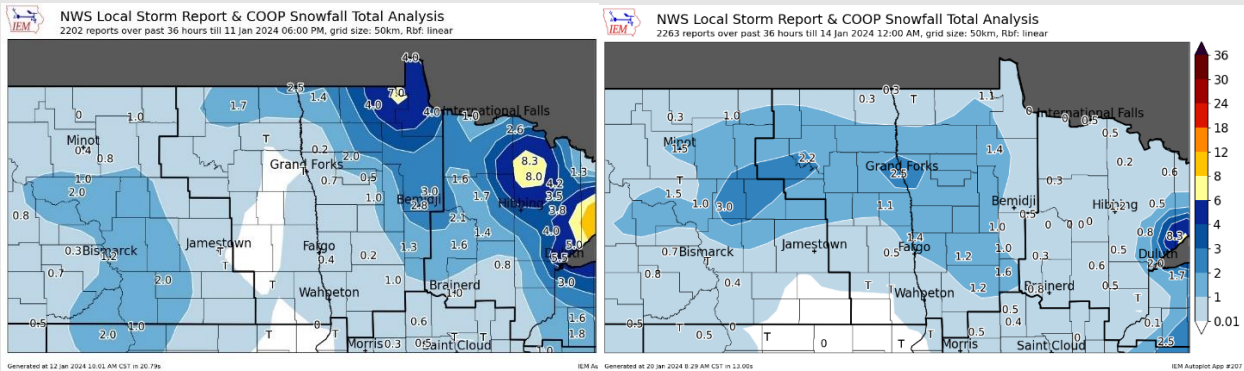


Figure 8: NWS Grand Forks Snow totals from a windy snow event from January 11 (left) to January 13th (right) (NWS)

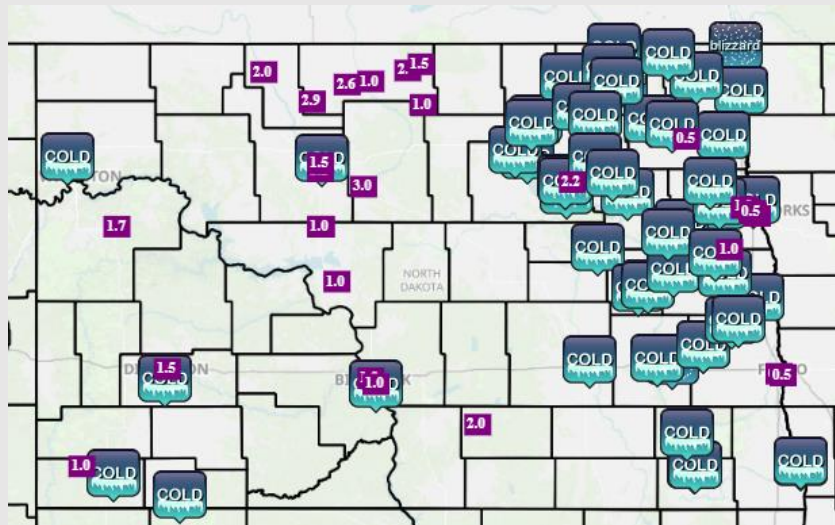


Figure 9: Local Storm Reports for January 2024, highlighting the frigid temperatures during the January 11-13 system that brought down Arctic air to North Dakota. Purple numbers are snow measurements. (IEM)

*Only North Dakota stations used for NDAWN data. All MN and MT stations omitted.

The big story in January was bitterly cold temperatures paired with a strong wind that dropped windchill values into the -60s in Western North Dakota, and -40 to -50s in Eastern North Dakota. The most extreme winds occurred in South Central North Dakota, but the air temperatures in Western North Dakota were cold enough that the less intense winds caused colder wind chill values (Figure 10). The coldest reported wind chill by the National Weather Service was -69°F measured at the Dickinson Airport (NWS).

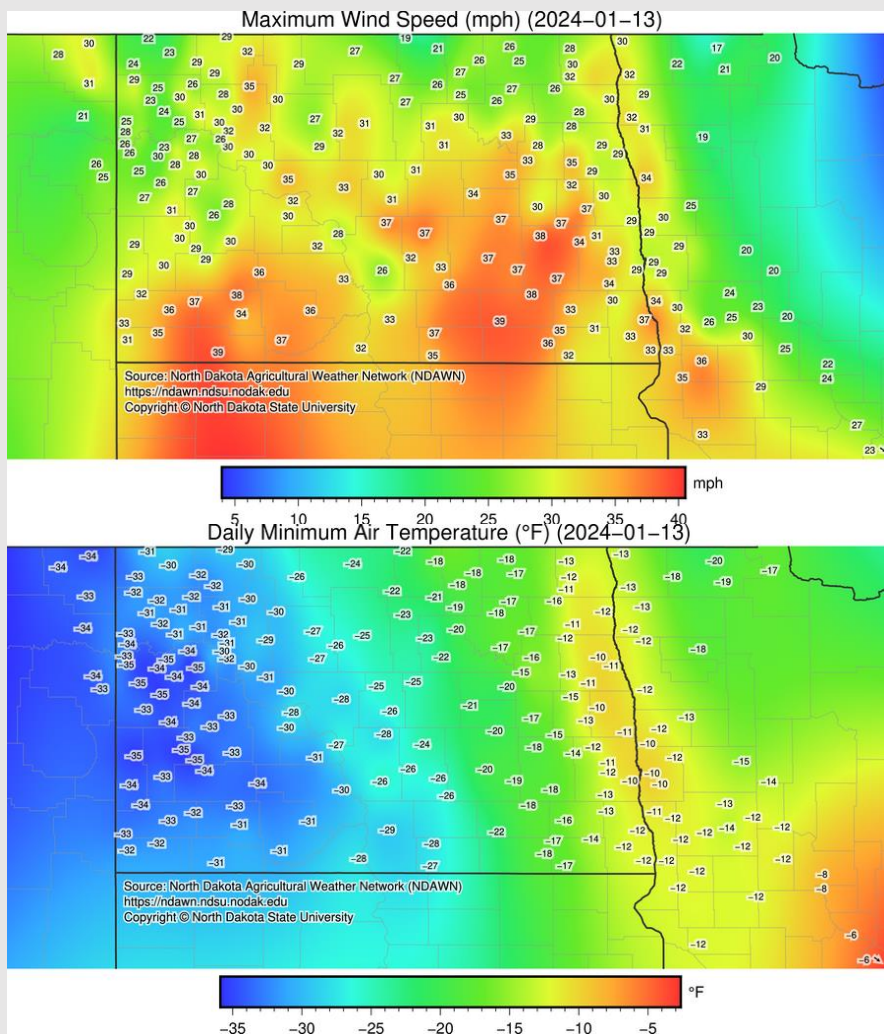


Figure 10: Map of maximum wind speed (top) and minimum temperature (bottom) from January 13th 2024, the coldest and windiest day of the event. This brought wind chills to very dangerous levels, and affected all of the state of North Dakota.

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Image/Data Sources

Climate at a Glance | National Centers for Environmental Information (NCEI).

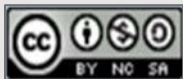
NDAWN current conditions

NDAWN Weather

SPC Storm Reports

NCEI Storm Events Database

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