

February 2021 Weather and Its Impacts on Missouri

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After what was appearing to be another mild winter for Missouri, Mother Nature had a different plan for February. Early in February, the polar vortex migrated from near the North Pole to southern Canada and the north central U.S. bringing exceptionally cold temperatures and wind chills to the central U.S., from North Dakota to Texas, Figure 1. Temperature departures in Missouri for the 2-week period, February 6-19, 2021, averaged more than 20 degrees below normal, Figure 2, with a statewide average temperature of 10.2°F, Figure 3. Preliminary data indicate it was the coldest 2-week period to impact Missouri in over 30-years.

The last time a colder 2-week period occurred in Missouri was 1989, between Dec 11-24. Statewide temperature departures during the 1989 cold wave were also more than 20 degrees below normal, Figure 4, and the statewide average temperature for the 2-week period was 8.5°F, Figure 5. The coldest 2-week period on record for Missouri occurred during an extreme cold wave in late January and February 1899, when the statewide average temperature for the 2-week period, Jan 31-Feb 13, was a bone-chilling 4.5°F, and chunks of ice were reported flowing from the Mississippi River into the Gulf of Mexico.

Minimum temperatures during the 2021 cold wave occurred during the morning of February 16th, with many locations reporting record-breaking double-digit temperatures below 0°F, especially across the western and northern half of the state, Figure 6. The core of the coldest air impacted western and northern Missouri where a fresh snowpack, clear skies and calm conditions resulted in an extremely cold morning, Table 1. Two locations in northwestern Missouri, Corning (Atchison Co.) and Smithville Lake (Clay Co.) reported morning low temperatures of -26°F on the morning of the 16th.

Seasonably mild days during the beginning and toward the end of February, Figure 7, slightly moderated the overall statewide average temperature for all of February, but it was still a much below average month. Preliminary data indicate a statewide average temperature of 23.5°F, or 10 degrees below the long-term average. It was the coldest February since 1979 and ranked as the 7th coldest February on record, Figure 8. The rankings could change if the month turns out to be slightly cooler than the current estimate.

Even though the two previous months, December and January, were mild, Figure 9, the extreme 2-week cold wave in February resulted in a below average meteorological winter for the Show Me State, and the first cooler than average winter in six years, Figure 10.

Preliminary precipitation data indicated a statewide average monthly total of 1.41 inches, or 0.64 inches below the long-term average. It was the first drier than average February in four years, Figure 11. Lightest monthly totals were generally between 0.5-1.0" and fell over the western half of the state. The precipitation gradient increased heading eastward and southeastward through the rest of the Missouri, ranging from 1-3 inches. Heaviest totals were in the Bootheel, from 3-4 inches. Winter precipitation (Dec-Jan-Feb) was slightly below average, with only January wetter than usual, Figure 12. It was also the first drier than average winter in four years, Figure 13.

The cold weather translated to most precipitation events falling in the form of snow, and above normal snowfall reported statewide, ranging from 6-14 inches for the month, Figure 14. A CoCoRaHS observer just south of Kirksville reported 15.9 inches for February. Visible satellite pictures taken on February 20, 2021, indicated all of Iowa, Illinois and Missouri under a blanket of snow, an unusual occurrence, Figure 15.

Impacts were numerous with the anomalously cold February temperatures not seen in more than a generation. Energy consumption was unusually high and reflected in consumer's home heating bills. Cold stress on outdoor workers, exposed livestock and pets was unrelenting, especially with wind chills dropping to -30°F. Ranchers were challenged with keeping newborn calves warm, feeding hay and routinely chopping ice-covered ponds for water. Dock damage

due to freezing and thawing of ice on lakes was also reported and the extended period of cold weather contributed toward a deeper frost line than usual in the soil with numerous instances of frozen and broken pipes reported.

With spring around the corner, farmers and gardeners are likely thinking about planting. University of Missouri Extension, in collaboration with MU Integrated Pest Management, developed a [Missouri Frost Freeze Probabilities Guide](#). Median dates for the last hard freeze in Missouri ($\leq 24^{\circ}\text{F}$) range from March 4 (extreme southeast Missouri) to April 3 (MO/IA border), Figure 16.

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Average Temperature (°F) Departure from Mean, February 6-19, 2021

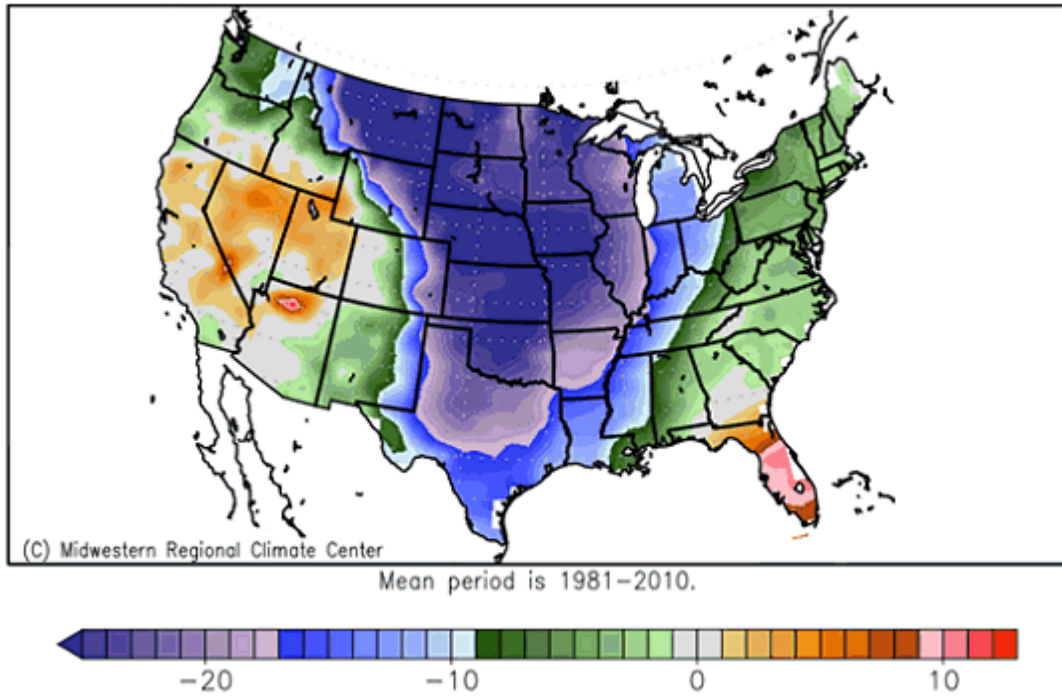


Figure 1.

Average Temperature (°F): Departure from Mean February 6, 2021 to February 19, 2021

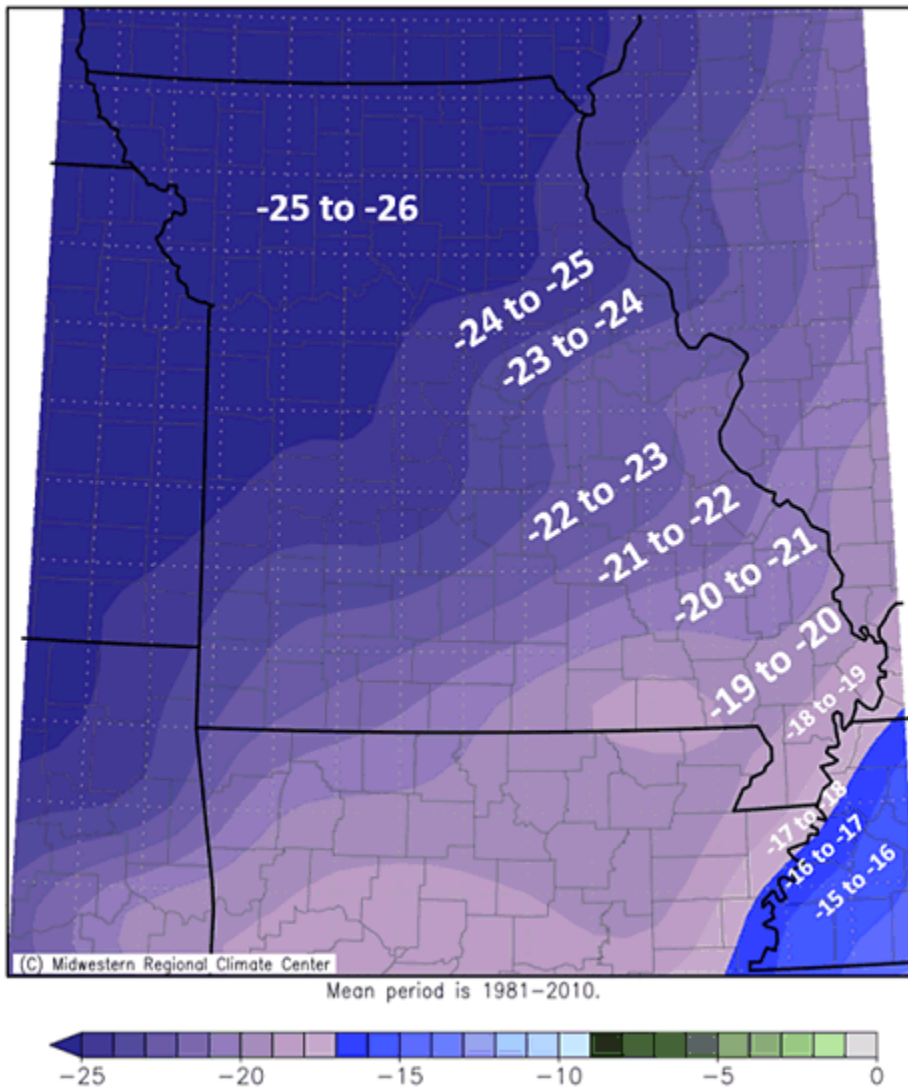


Figure 2.

Average Temperature (°F) February 6, 2021 to February 19, 2021

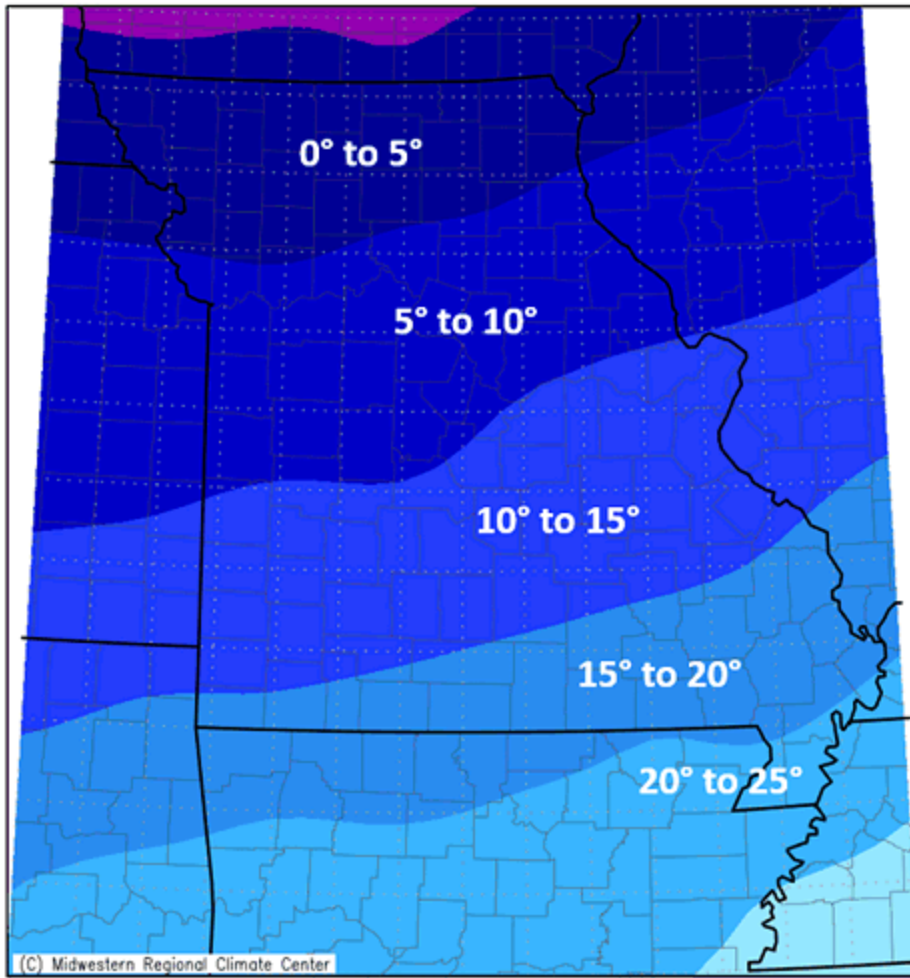


Figure 3.

Average Temperature (°F): Departure from Mean December 11, 1989 to December 24, 1989

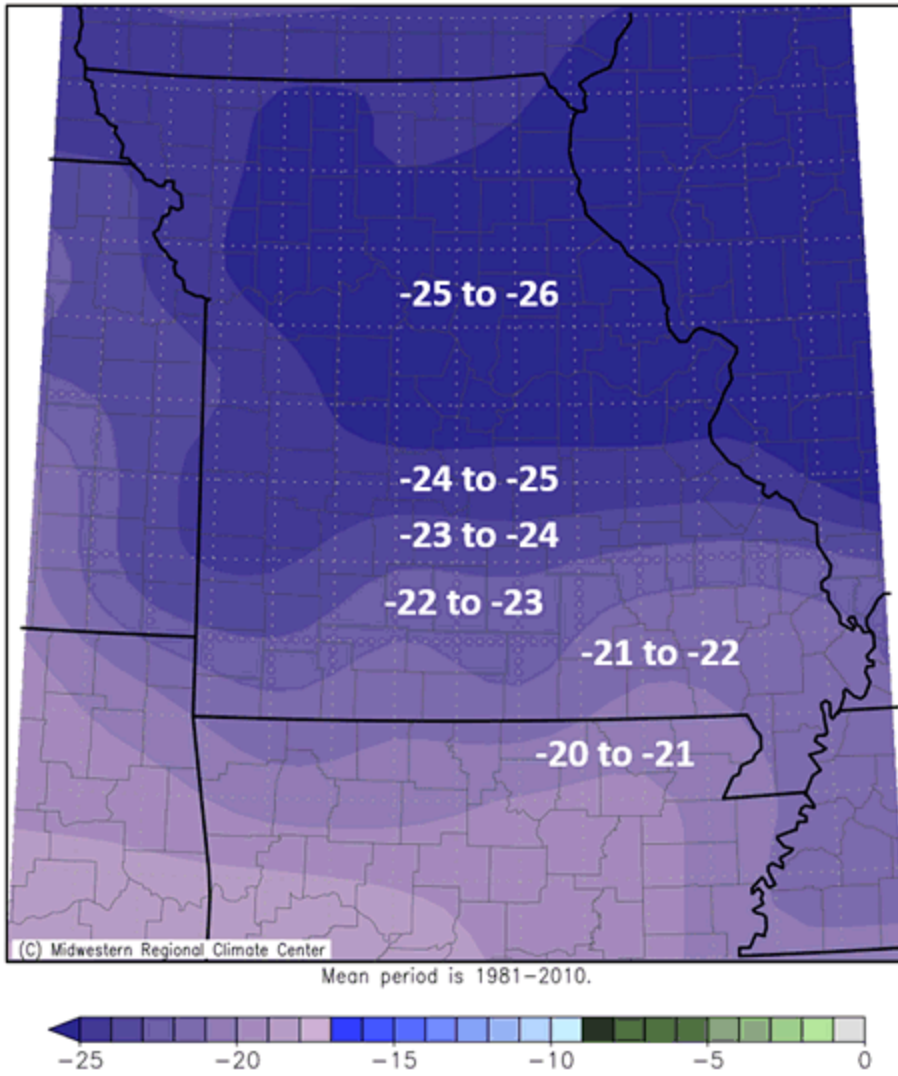


Figure 4.

Average Temperature (°F) December 11, 1989 to December 24, 1989

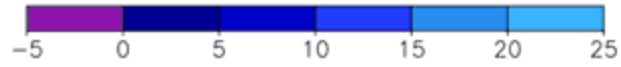
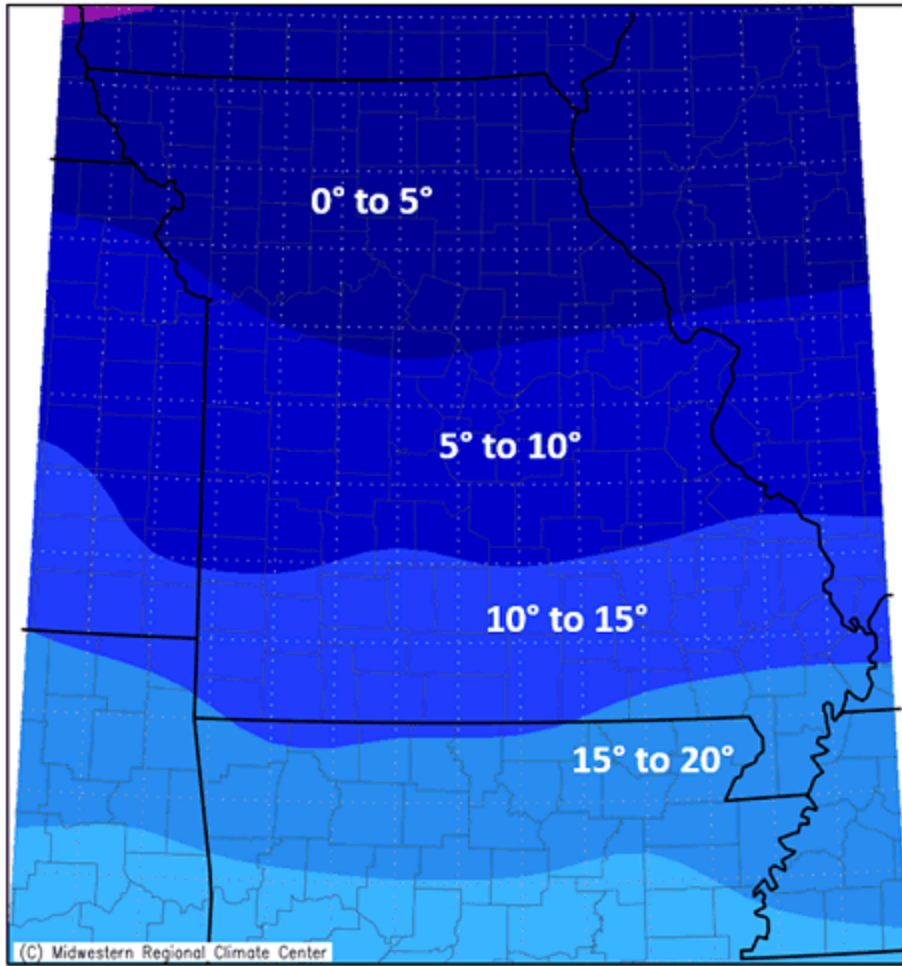


Figure 5.

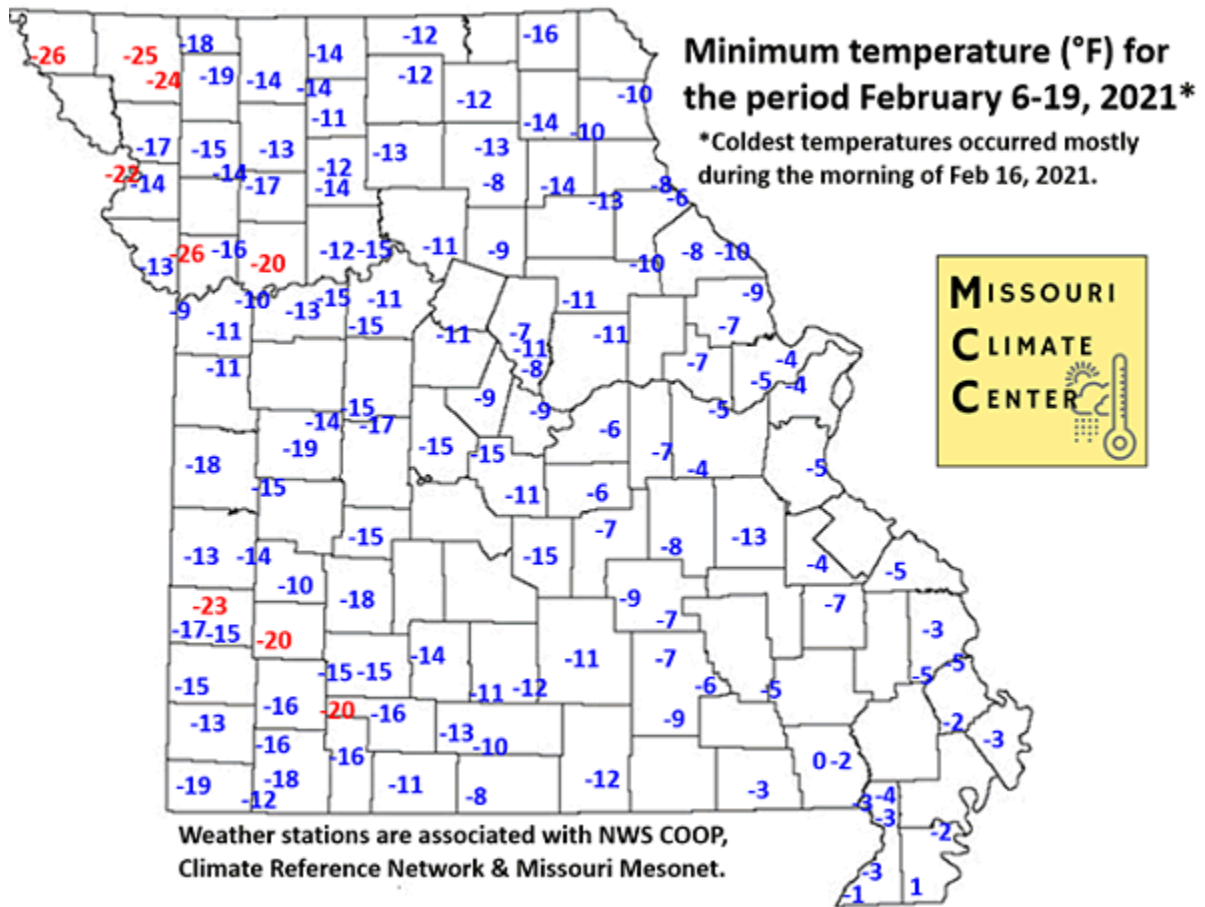


Figure 6.

February 2021 Minimum Temperature Extremes*

<u>Station Name*</u>	<u>County</u>	<u>Min-Temp (°F)</u>	<u>Date</u>
Corning	Atchison	-26	2/16
Smithville Lake	Clay	-26	2/16
Maryville 2E	Nodaway	-25	2/16
Conception	Nodaway	-24	2/17
Lamar 7N	Barton	-23	2/16
St. Joseph Airport	Buchanan	-22	2/16
Billings 1SW	Christian	-20	2/16
Lockwood	Dade	-20	2/16
Richmond	Ray	-20	2/16

*Reports are from the NWS Cooperative Network and Missouri Mesonet

Table 1.

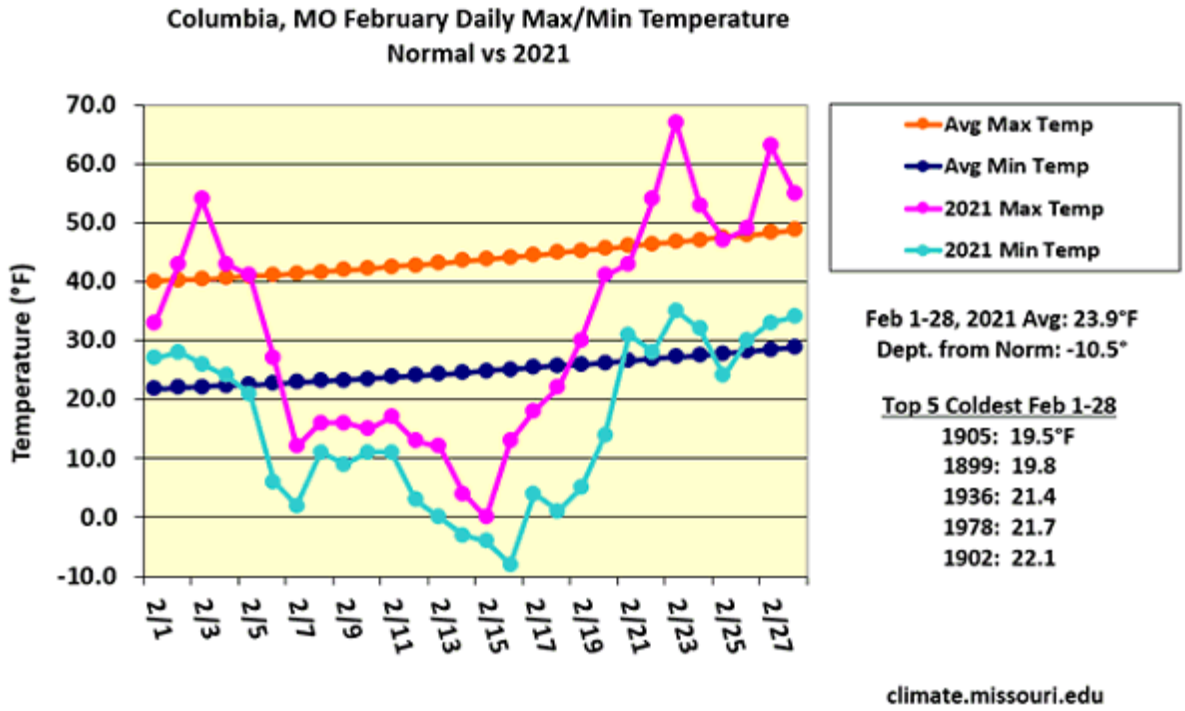


Figure 7.

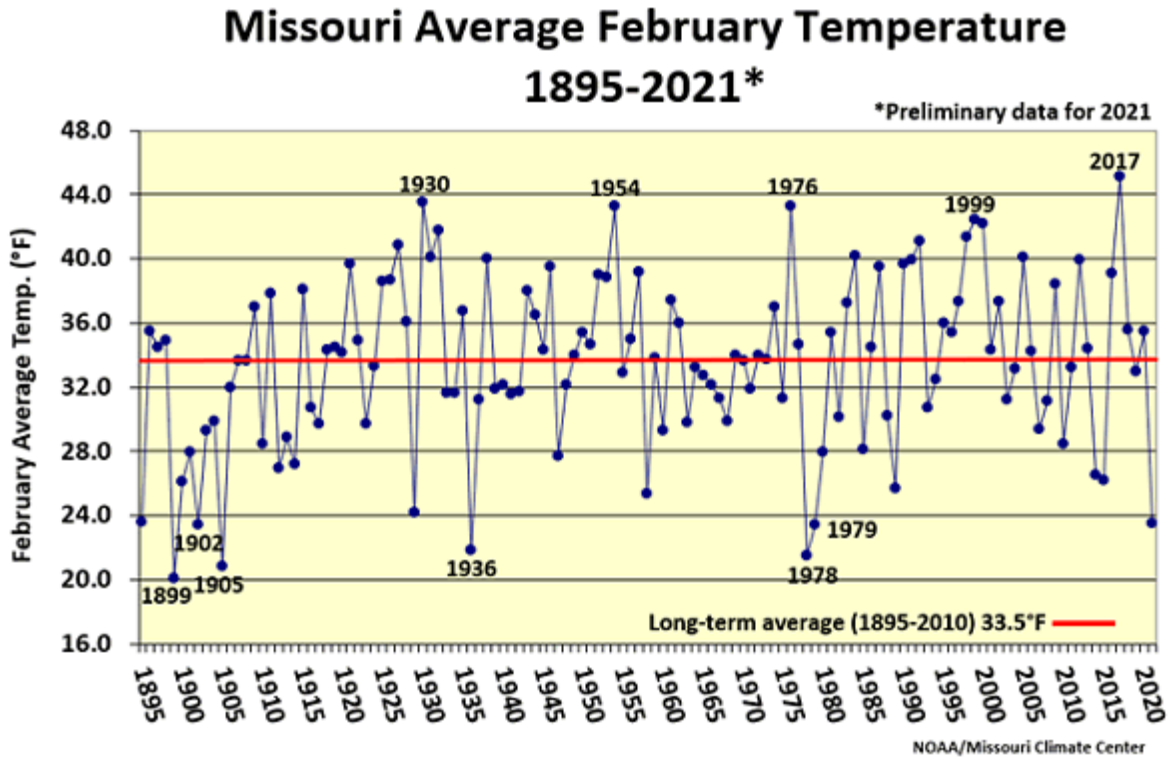


Figure 8.

Missouri Monthly Temperature Departure from Average January 2020-February 2021**

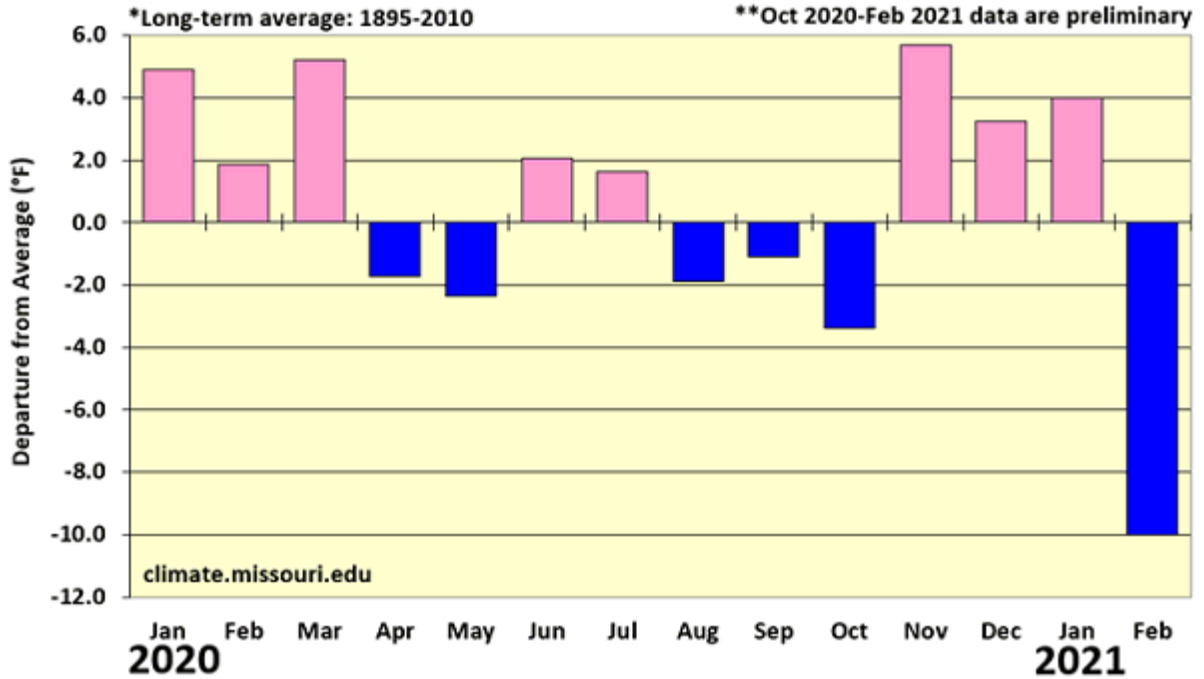


Figure 9.

Missouri Average Winter Temperature Dec-Jan-Feb, 1895-2021*

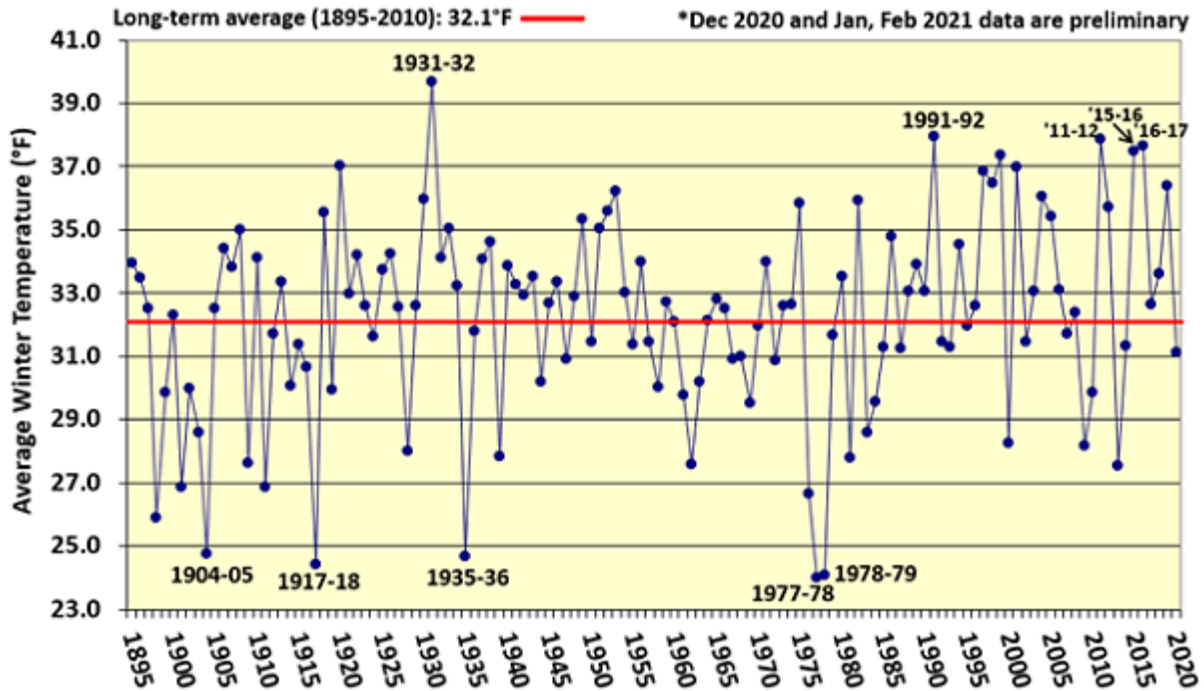


Figure 10.

Missouri Average February Precipitation 1895-2021*

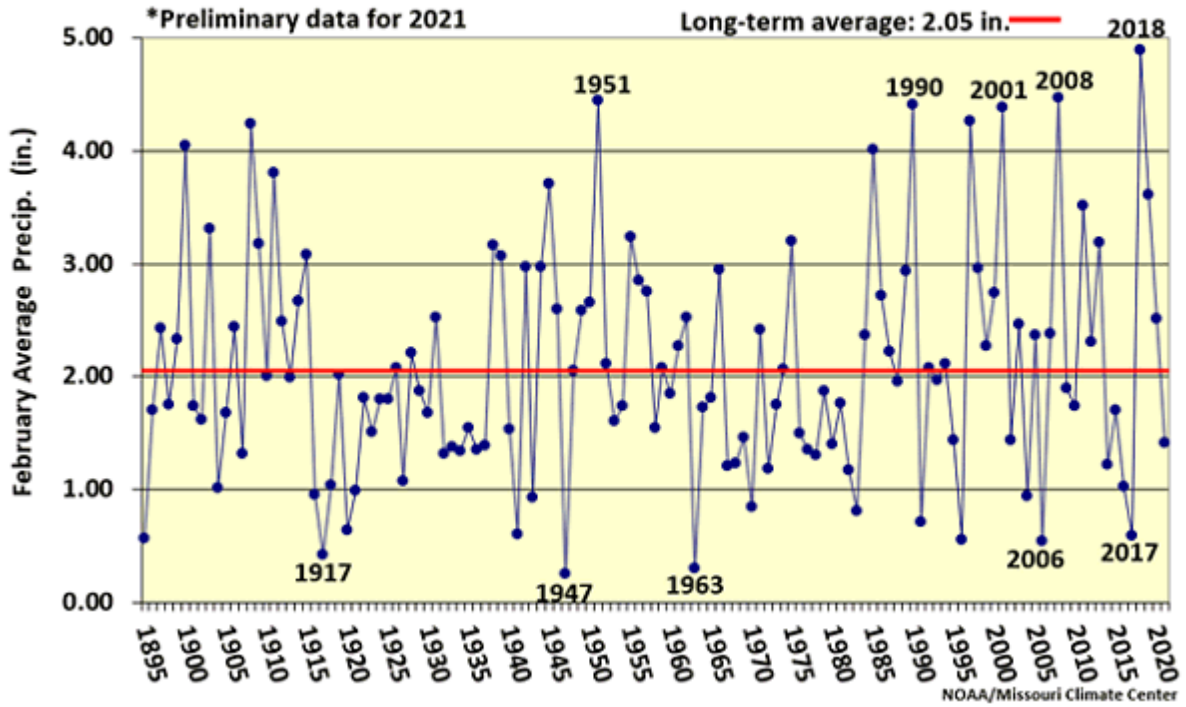


Figure 11.

Missouri Monthly Precip. Departure from Average* January 2020-February 2021**

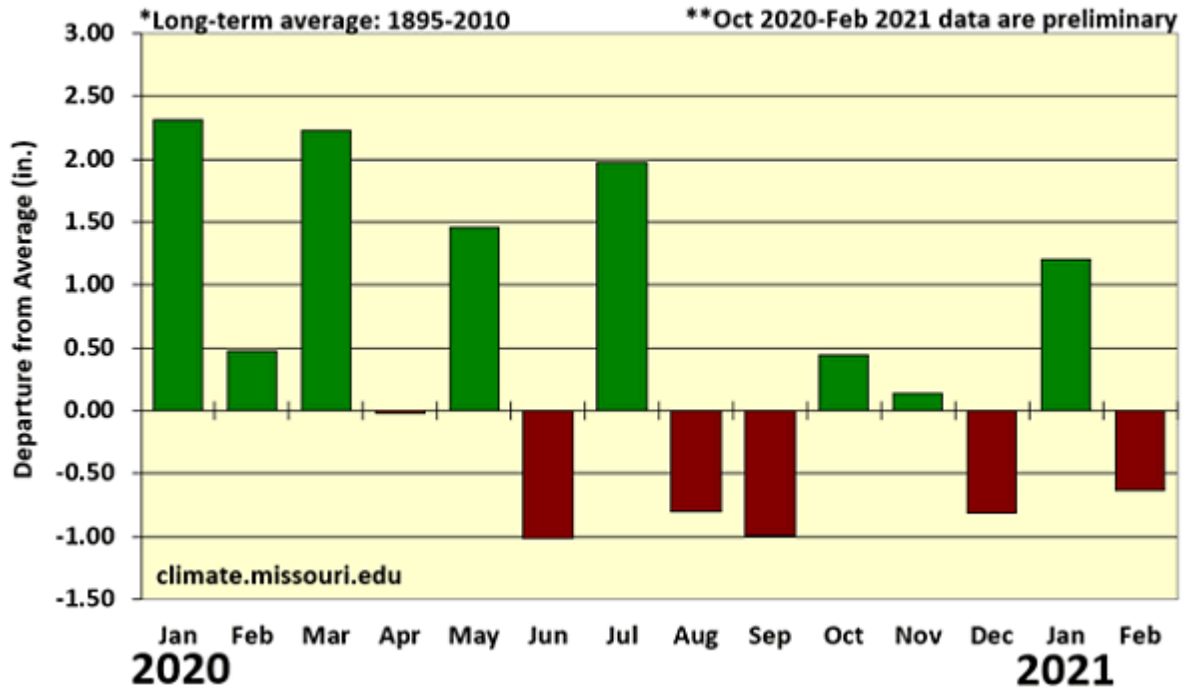


Figure 12.

Missouri Average Winter Precipitation Dec-Jan-Feb, 1895-2021*

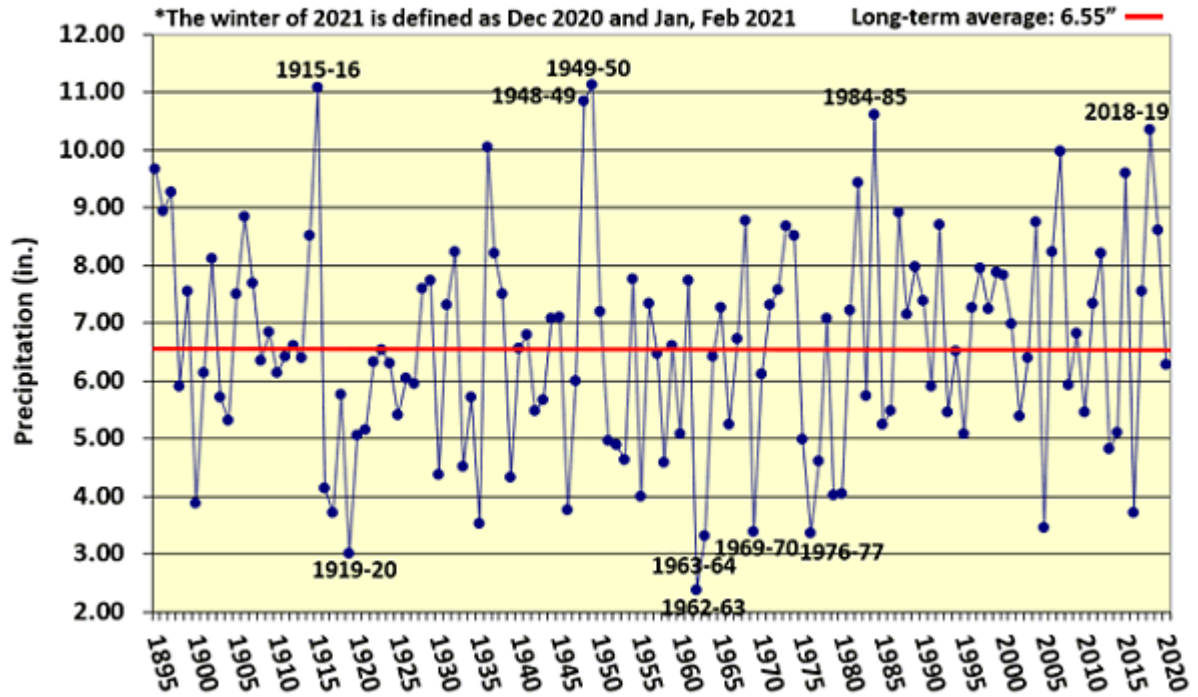


Figure 13.

Accumulated Snowfall (in) February 1, 2021 to February 28, 2021

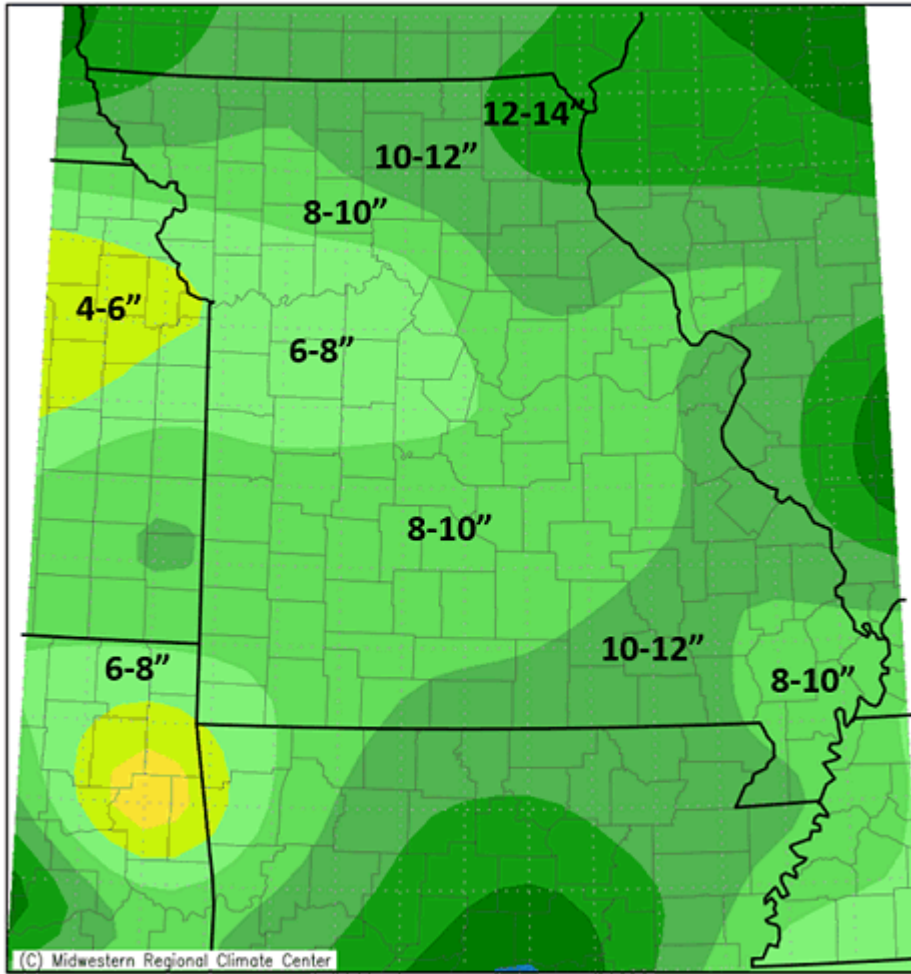


Figure 14.

NOAA GOES-16 Visible Satellite Picture taken Feb 20, 2021 at 11:47:20 a.m. CST

GOES-16 RGB (channels 1, 2, and 3) visible image

2021-02-20 17:47:20

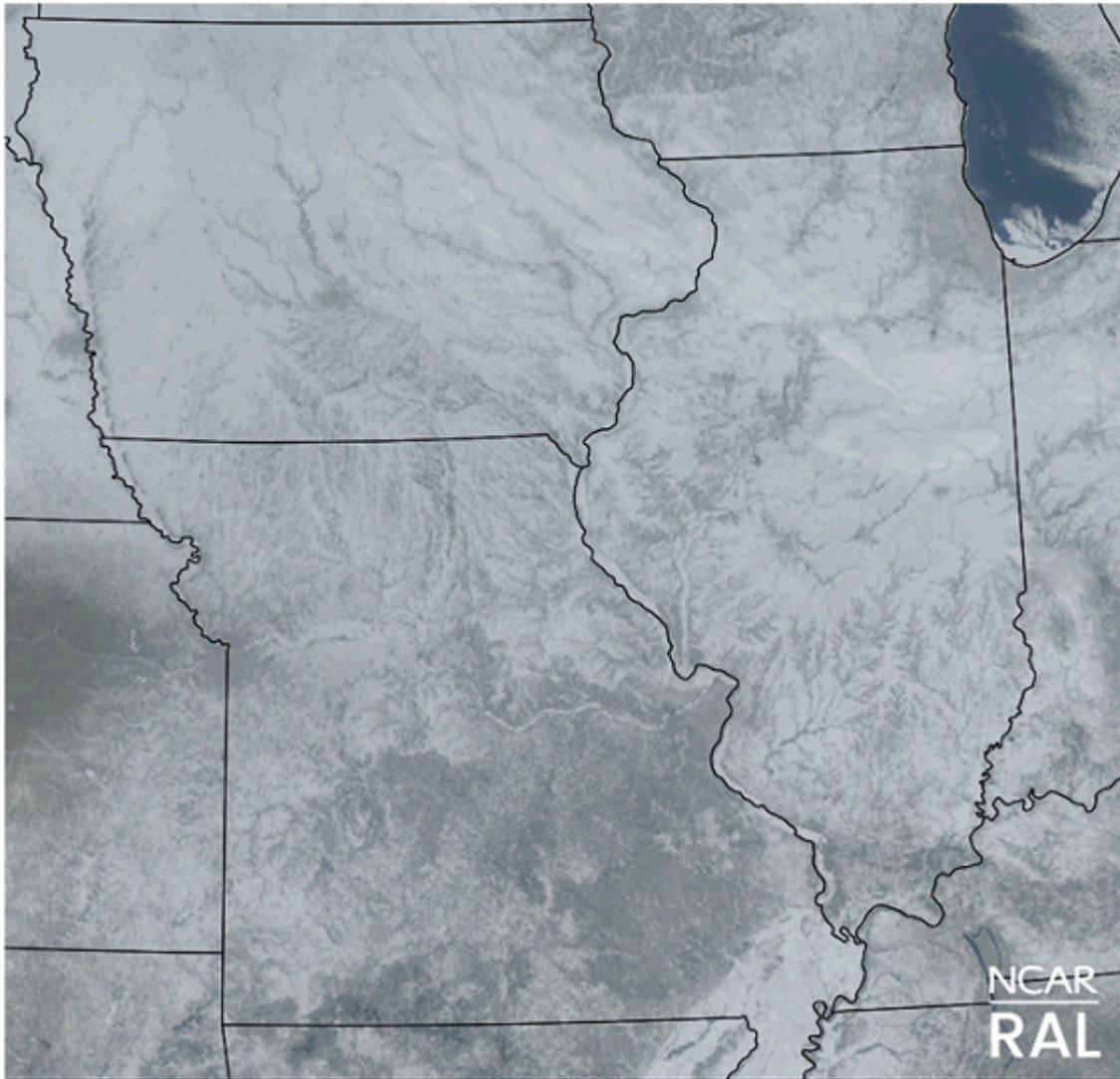
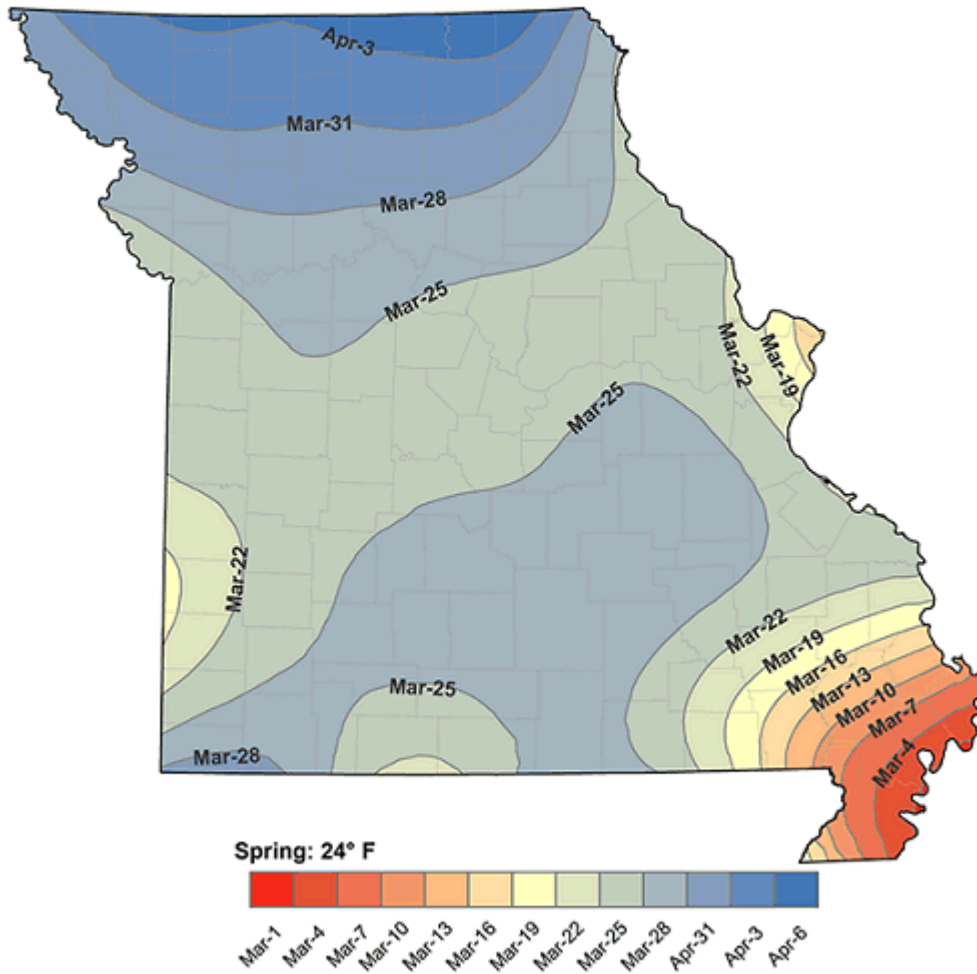


Figure 15. Snow covers all of Iowa, Illinois and Missouri

Median Date Temperature $\leq 24^{\circ}\text{F}$

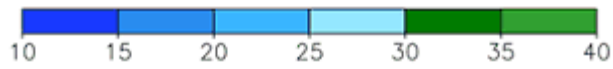
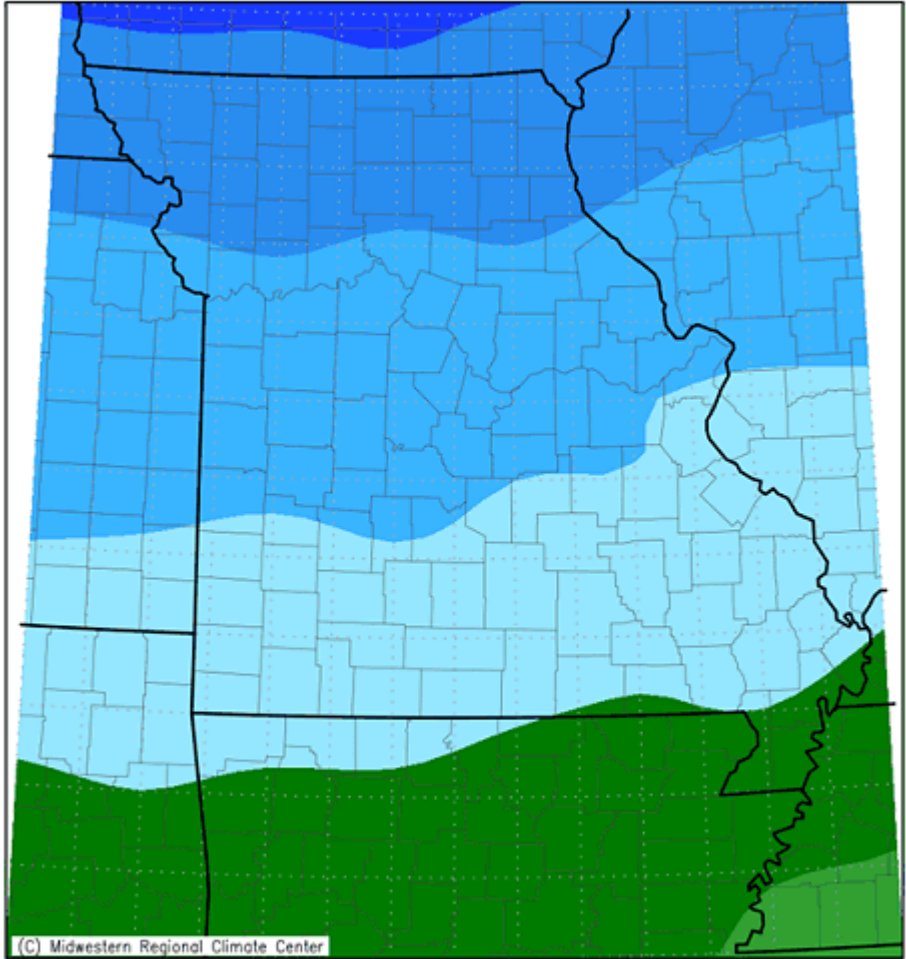
Period of record: 1981-2010



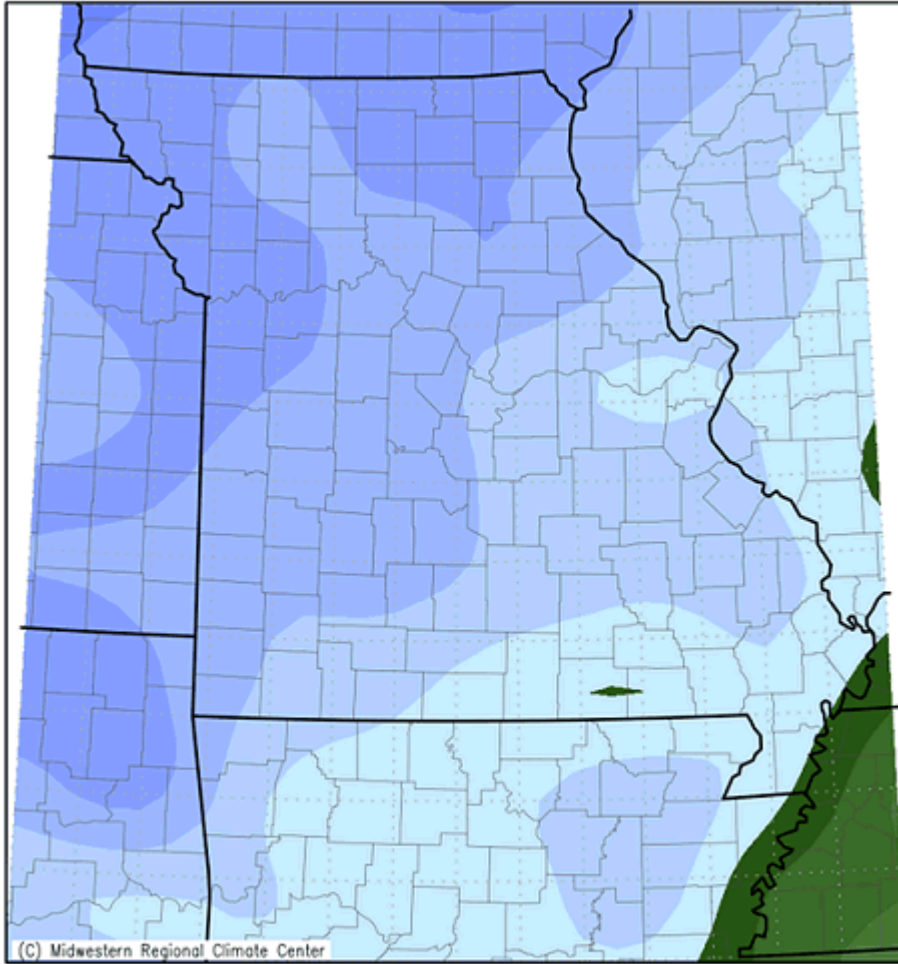
Source: MU IPM Program / Missouri Climate Center / NOAA-NCEI

Figure 16.

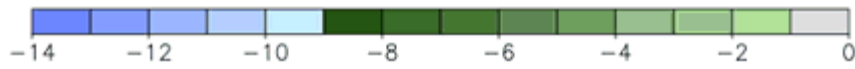
Average Temperature (°F) February 1, 2021 to February 28, 2021



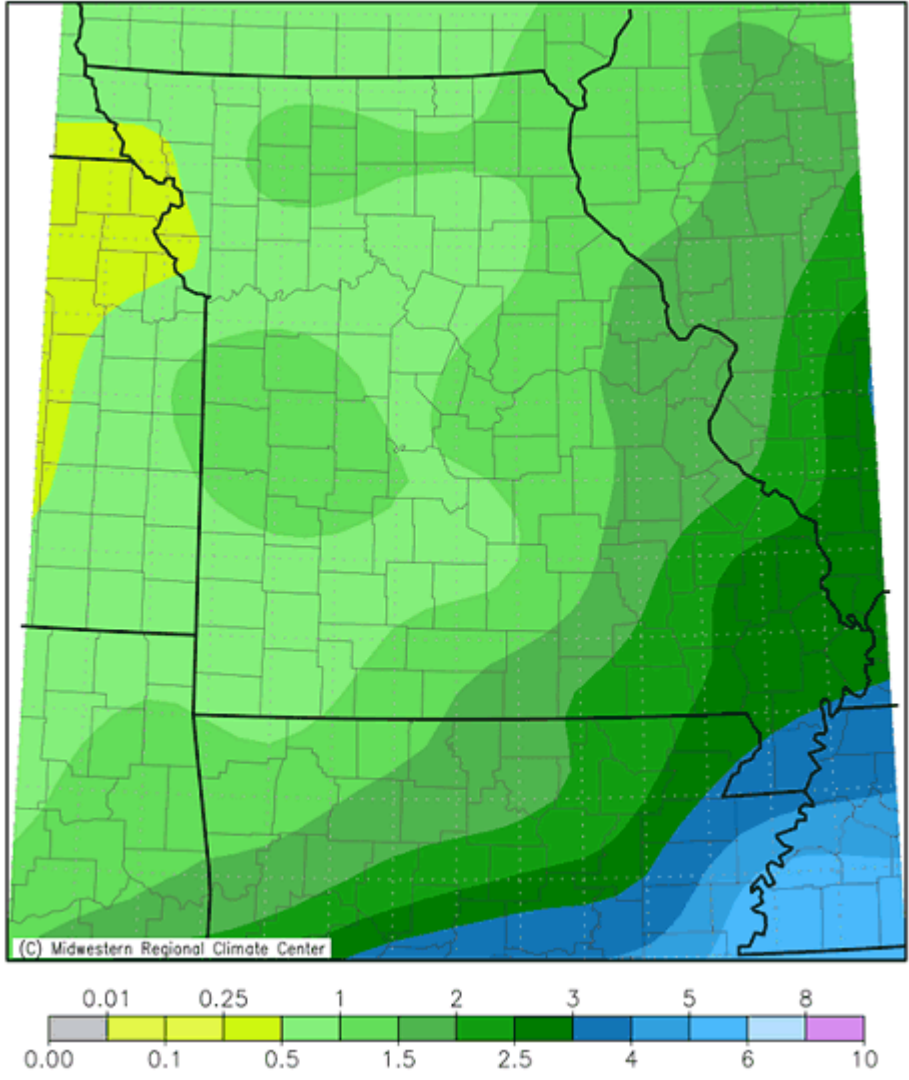
Average Temperature (°F): Departure from Mean February 1, 2021 to February 28, 2021



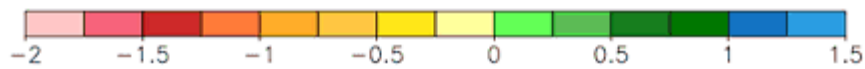
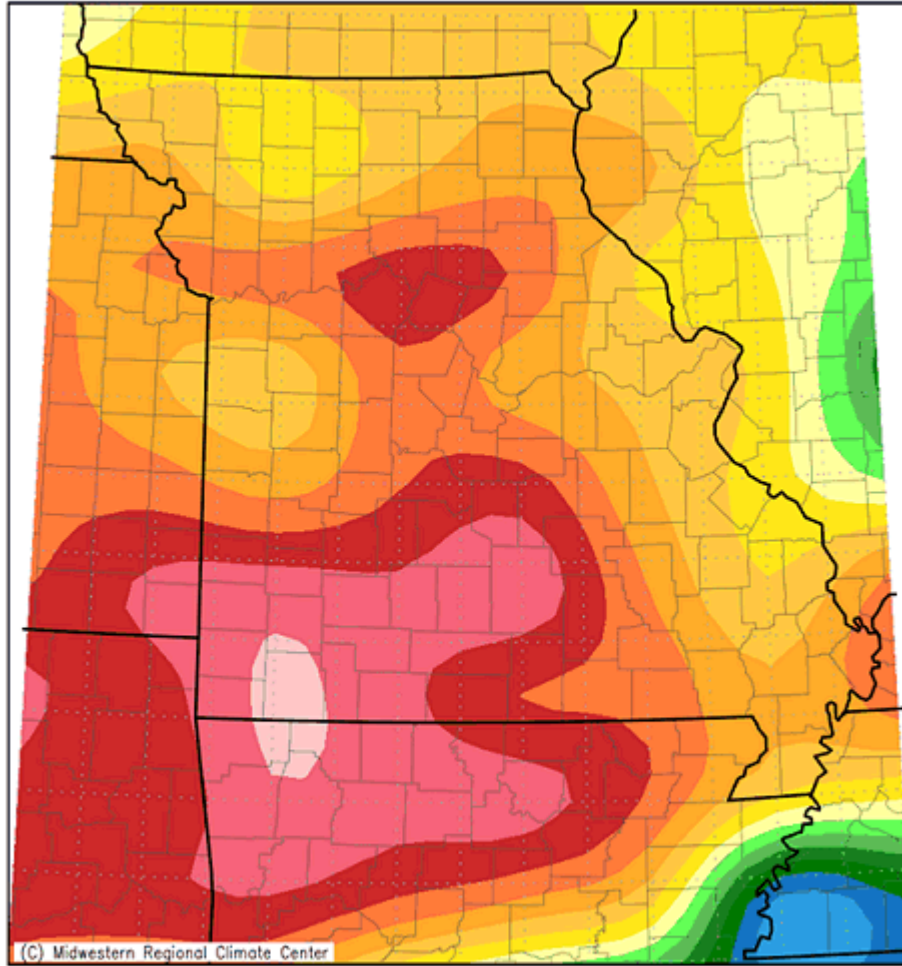
Mean period is 1981-2010.



Accumulated Precipitation (in) February 1, 2021 to February 28, 2021



Accumulated Precipitation (in): Departure from Mean February 1, 2021 to February 28, 2021



Source: Pat Guinan, 573-882-5908