# Under the Big Sky e-Letter

## October & November 2023

Photo Credit: Angel Enriquez, Meteorologist at NWS Glasgow.

National Weather Service

Glasgow, MT

# A Peak Inside:



National Weather Service

Glasgow, MT

## Join CoCoRaHS Today!

CoCoRaHS is a grassroots organization with a network of highly committed observers who report daily precipitation such as rain, hail, or snow from all across the country. The data are used by meteorologists, insurance adjusters, mosquito control, those in academia, etc.

Participating in the CoCoRaHS program is a great way to make a difference in your community. Check out the **CoCoRaHS main page** to learn more! We are still accepting new observers so feel free to join through the main CoCoRaHS website today. All you'll need is a ruler and a rain gauge to get started!

**Need a refresher?:** Are you new to CoCoRaHS and need help getting started? Or, maybe you need help remembering how to take certain kinds of observations. The **CoCoRaHS webpage** has a number of available slide presentations that you can check out to learn more about these topics!

Are you looking to become a new CoCoRaHS observer?Then sign up to **join** today to get started! Just fill out the electronic form and the CoCoRaHS Coordinator from NWS Glasgow will follow up with you to help you get underway.

Upcoming Training: We'll be doing a facebook live style fall CoCoRaHS training for anyone interested in becoming a new weather observer. Please keep an eye out for coming announcements soon!

### Percent of Normal Precipitation (Montana)

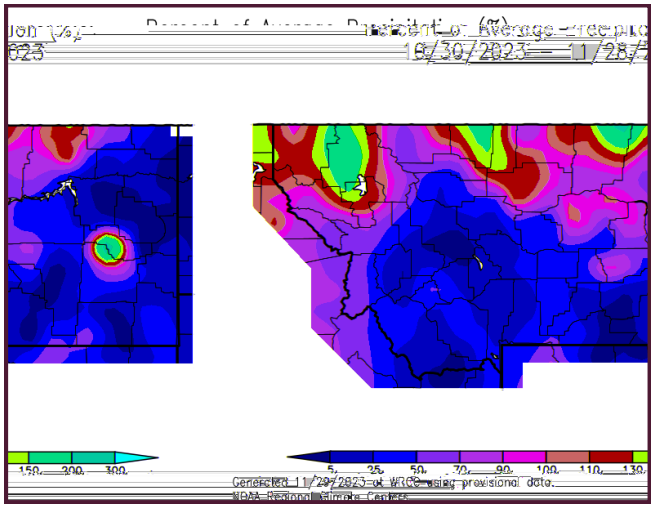

Figure 1: 30-day percent of normal precipitation across Montana.

### Avg. Temp Departure from Normal (Montana)

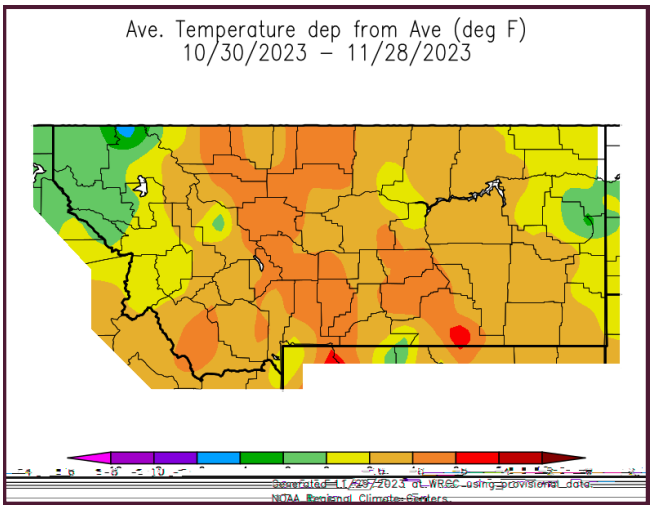


Figure 2: 30-day temperature anomalies across Montana.

**Summary:** During the last 30 days, much of Montana experienced conditions that were warmer than average and drier than average. Portions of North Central and Northwest Montana saw wetter than average conditions.

**Preliminary Hydrologic Summary for September 2023, By Greg Forrester ,Lead Forecaster at NWS Glasgow:**

September was a month with temperatures above normal. Temperatures were 1 degree above to 3 degrees above normal. Glasgow averaged 65.8 degrees which was 5.9 degrees above normal.

Precipitation amounts during September were variable across the region. The wet spots were Flatwillow with 2.19 inches, Zortman with 2.11 inches, and Glendive with 1.80 inches. The dry spots were Opheim 12SE with 0.04 inch, Bredette with 0.28 inch, and Scobey 4NW with 0.30 inch. Glasgow received 0.71 inch which was 67 percent of normal.

Drought expanded in areas north of the Missouri River in September. Most areas north of the Missouri had moderate to severe drought at the end of the month.

Streamflow on the Missouri, Milk, Yellowstone, and Poplar Rivers were near normal for the entire month.

The Fort Peck Reservoir elevation fell to 2228.8 feet during the month. The reservoir was at 74 percent of capacity and 93 percent of the mean pool.

**Preliminary Hydrologic Summary for October 2023, By Greg Forrester, Lead Forecaster at NWS Glasgow:**

October was a month with temperatures near to slightly below normal. Temperatures were from 1 degree above normal to 3 degrees below normal. Glasgow averaged 44.3 degrees which was 0.9 degrees below normal.

Precipitation amounts during October were above normal across most of the region. The wet spots were Plentywood with 3.49 inches, Sidney with 2.83 inches, and Lindsay with 2.79 inches. The dry spots were Port of Morgan with 0.39 inch, Opheim 12SE with 0.40 inch, and Malta 7E with 0.57 inch. Glasgow received 1.62 inches which was 176 percent of normal.

Heavy rain in the northwest corner of Valley County on October 1 brought some flooding along Rock Creek near the Canadian border. Heavy rain between Fairview, Sidney, and Savage in eastern Richland County on October 3 brought minor flooding to that area.

There was modest improvement in the drought situation in October. Areas north of Zortman, Glasgow, and Plentywood had moderate to severe drought at the end of the month.

Streamflow on the Poplar River was near normal for the entire month. The Milk and Yellowstone Rivers had above normal stream flow most of the time in October while the Missouri River had below normal stream flow.

The Fort Peck Reservoir elevation rose slightly to 2228.9 feet during the month. The reservoir was at 74 percent of capacity and 93 percent of the mean pool.

## Is This Fall-like Weather Going To Continue? A Look At When The Last 50 Degree Temperature Occurs Across The Area

*By Ted Jamba, Lead Forecaster/Climate Focal Point*

Our weather has been and is expected to remain quiet into December. On November 28th, temperatures reached 50 degrees in many areas south of the Missouri River (see Figure 1 below). We haven't seen the characteristics of Winter too much lately and we were wondering if this is normal.

Fifty degree high temperatures can be rare this time of year in northeast Montana, but can be more common without a snow cover. The last 50 degree high temperature typically occurs in late November roughly north and east of a line from Glasgow to Sidney, but closer to mid and late December toward south-central Montana.

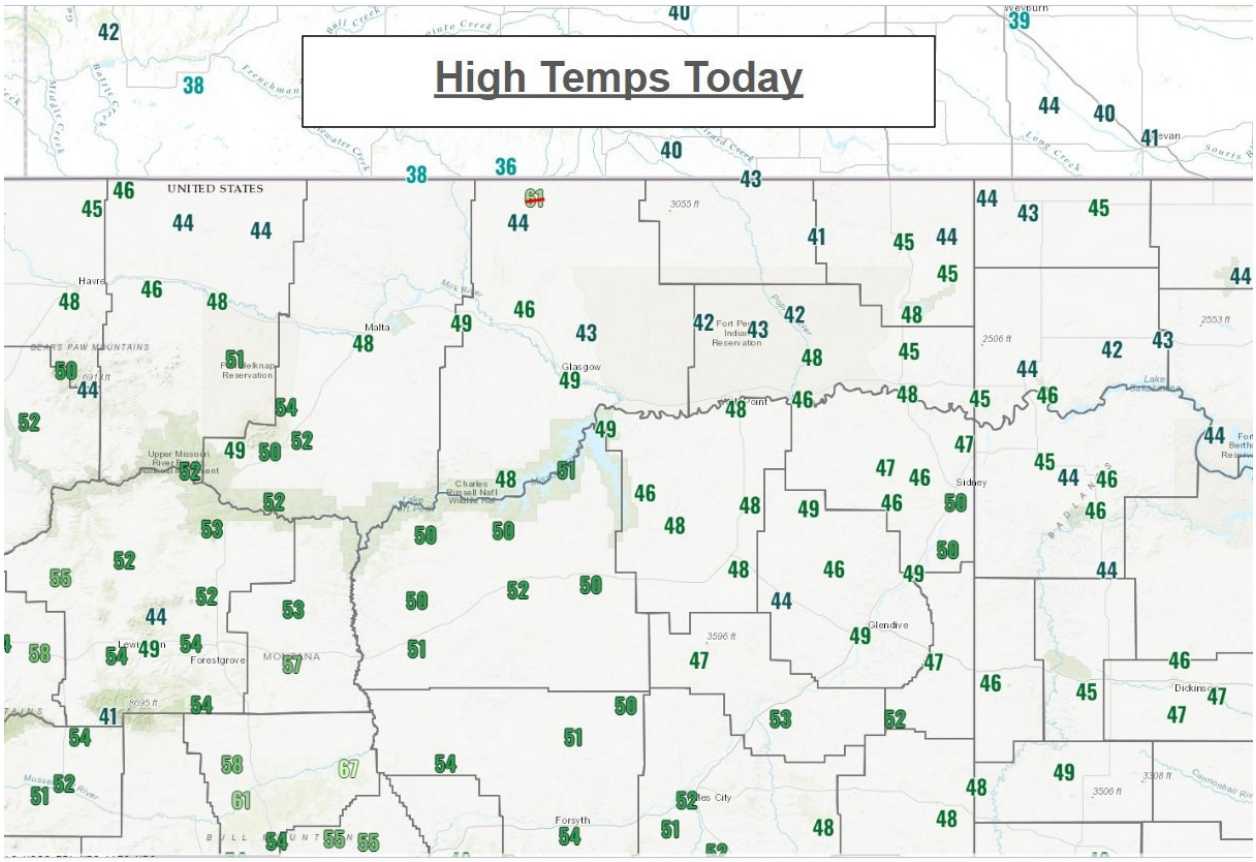


Figure 3: High temperatures on November 28, 2023.

## Is This Fall-like Weather Going To Continue? A Look At When The Last 50 Degree Temperature Occurs Across The Area (Continued)

*By Ted Jamba, Lead Forecaster/Climate Focal Point*

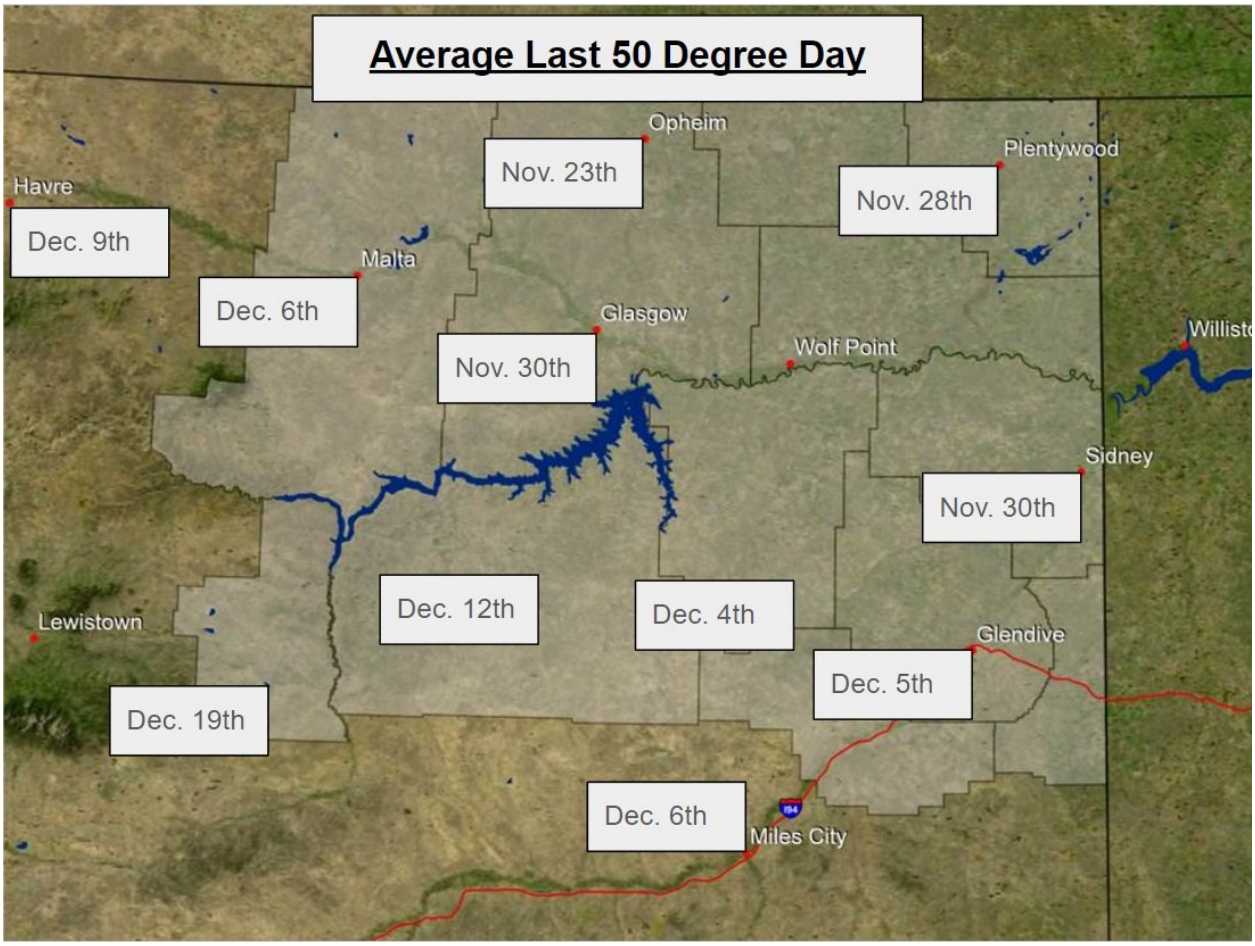


Figure 4: High temperatures on November 28, 2023.

November was warmer and drier than normal for the area and little if any snow is expected for the area for the foreseeable future. We are in an El Niño climate pattern this Winter that often gives us mild and dry conditions.

But we live in northeast Montana and a snowstorm can still happen along with arctic air masses that will pass through. We suggest that if you haven't done so, **prepare for winter weather now!** Have your vehicle winterized, follow the latest forecast and allow extra time to reach your destination when we have winter precipitation.

**Follow these links for more information on:**

Current El Niño status:
https://www.climate.gov/enso

Typical snowfall with an El Niño:
https://www.climate.gov/news-features/blogs/snow-pain-snow-gain-how-does-el-nino-affect-snowfall-over-north-america

## CPC Outlook:

The Climate Prediction Center released its latest three month outlook for temperature and precipitation for December 2023 through February 2024 on November 16, 2023. The outlook calls for increased probabilities for above normal temperatures across the state of Montana along with below normal precipitation over the three month time period. This is in line with what would be expected during a typical El Niño pattern.

The latest outlook is always available **here**. In addition, you can check out the Climate Prediction Center **Interactive site**! You can zoom in on our area, and navigate to see the climate outlook for your specific location.

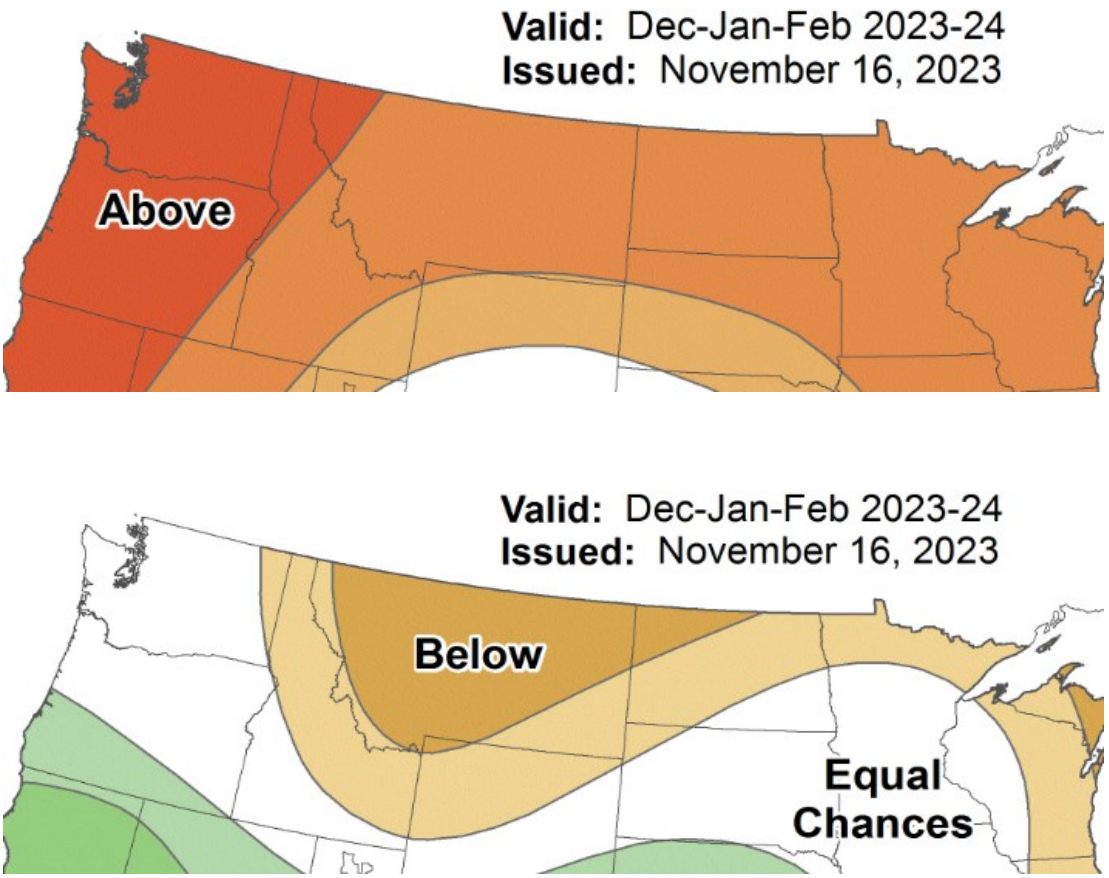


Figure 5: Climate Prediction Center three month outlook (December 2023 through February 2024) for temperature (top) and precipitation (bottom).

## U.S. Drought Monitor:

The latest U.S. Drought Monitor was released on Thursday November 30, 2023. There has been some improvement in the drought across portions of Montana since recent outlooks with much of the Hi-Line now featuring abnormally dry conditions (D0). Northwest Montana is under moderate to severe drought, while southern parts of the state are currently void of drought concerns.

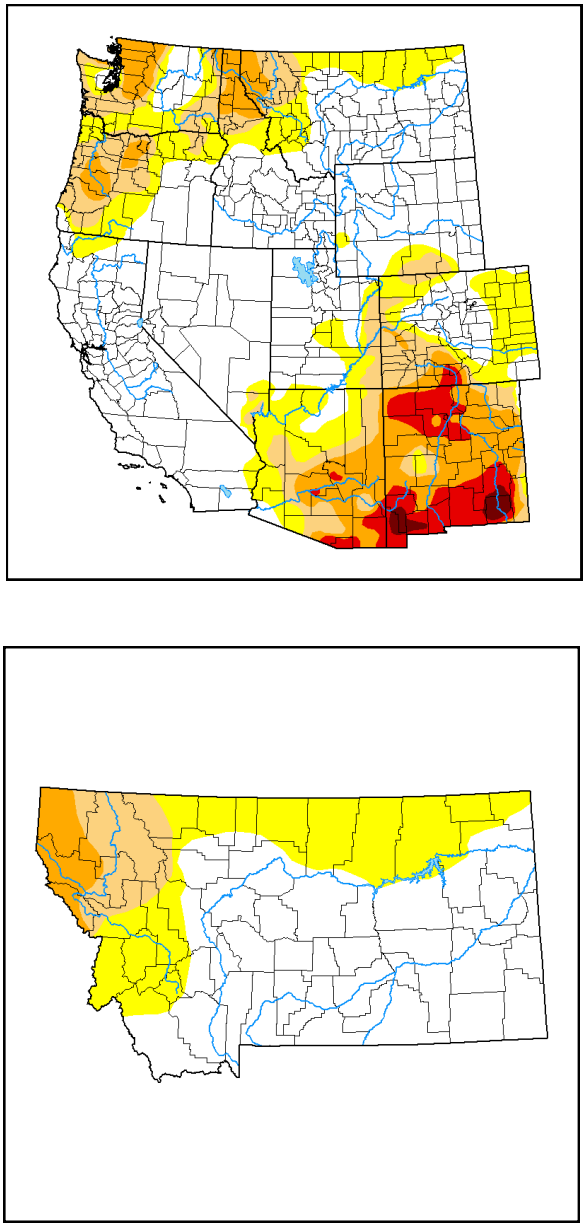


Figure 6: U.S. Drought Monitor updated November 30, 2023.

**U.S. & Global Climate Highlights (October):** The U.S. & Global climate highlights for October 2023 have been released, the latest month for which data was available. A few points for you to take home are provided below.

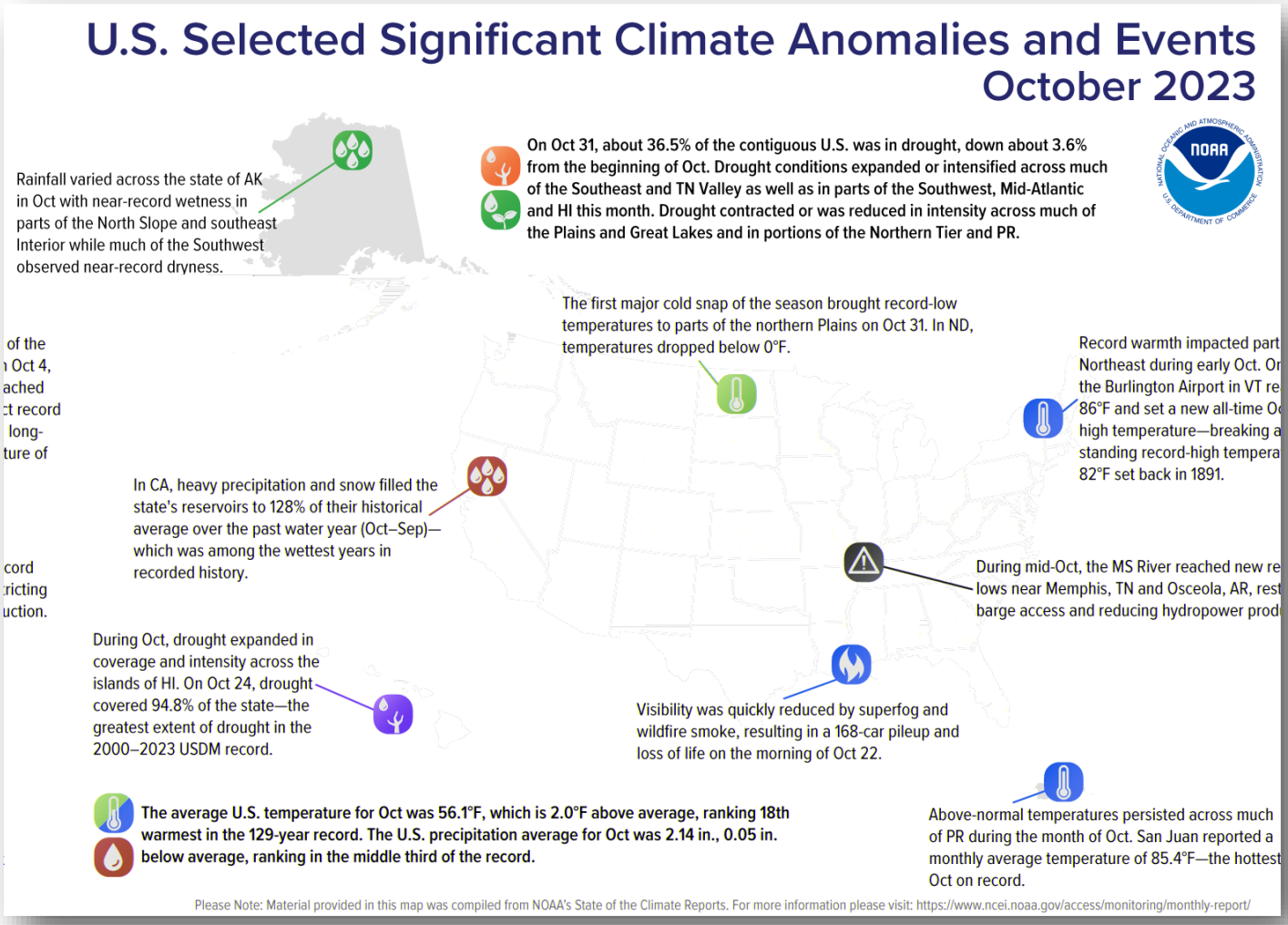


Figure 7: Significant Climate anomalies and events in October 2023.

U.S. Highlights for October 2023

1) The contiguous U.S. average temperature for October 2023 was 56.1 °F, ranking as the 18th warmest on record.
2) The average October 2023 precipitation was 2.14 inches, ranking within the middle third on record.

Global Highlights for October 2023

1) The October 2023 global surface temperature was the hottest on record for October since records have been kept in 1850.
2) El Niño conditions continued during the month of October with an 80 percent probability that they will continue through the Northern Hemisphere spring.

## October Breaks Records

- An unusual early season snow storm in October (24-26) brought upwards of 14.0 inches of snowfall to Glasgow, MT and several inches stacked up in surrounding areas. This means that 2023 will be the snowiest October on record for Glasgow, surpassing the 13.6 inches that occurred in October 2008.

**Maximum 1-Month Total Snowfall for Glasgow Area, MT (ThreadEx)**

| Rank | Value | Ending Date | Missing Days |
|---|---|---|---|
| 1 | 14.0 | 2023-10-31 | 5 |
| 2 | 13.6 | 2008-10-31 | 0 |
| 3 | 11.5 | 1924-10-31 | 0 |
| 4 | 8.6 | 2020-10-31 | 0 |
| 5 | 8.3 | 1951-10-31 | 0 |
| - | 8.3 | 1913-10-31 | 0 |
| 7 | 7.0 | 1975-10-31 | 0 |
| 8 | 5.4 | 2006-10-31 | 0 |
| - | 5.4 | 1959-10-31 | 0 |
| 10 | 5.0 | 1961-10-31 | 0 |

Last value also occurred in one or more previous years

Period of record: 1894-01-27 to 2023-10-26

Figure 8: Ranking Maximum 1 month snowfall for Glasgow, MT for October.

## Links You May Like:

[Fifth National Climate Assessment]

[Earth's Hottest Days]

[Tracking Wildfire Smoke]

[November ENSO Update]

[The Antarctic Ozone Hole]

# COOP Precipitation Totals for September 2023 (Preliminary)

| Station | Precipitation | Location |
|---|---|---|
| BAYM8 | 0.30 | Baylor |
| BRDM8 | 0.28 | Bredette |
| BTNM8 | M | Brockton 17 N |
| BKNM8 | 1.40 | Brockton 20 S |
| BKYM8 | 0.94 | Brockway 3 WSW |
| BRSM8 | 1.86 | Brusette |
| CLLM8 | 1.36 | Carlyle 13 NW |
| CIRM8 | 1.10 | Circle |
| CHNM8 | 2.20 | Cohagen |
| COM8 | 1.60 | Cohagen 22 SE |
| CNTM8 | 1.07 | Content 3 SSE |
| CULM8 | 0.89 | Culbertson |
| DSNM8 | 1.45 | Dodson 11 N |
| FLTM8 | 2.19 | Flatwillow 4 ENE |
| FPKM8 | 1.05 | Fort Peck PP |
| GLAM8 | 0.54 | Glasgow 14 NW |
| GGWM8 | 0.71 | Glasgow WFO |
| GGSM8 | 1.65 | Glasgow 46 SW |
| GNDM8 | 1.80 | Glendive WTP |
| HRBM8 | M | Harb |
| HINM8 | 0.59 | Hinsdale 4 SW |
| HNSM8 | 1.49 | Hinsdale 21 SW |
| HOMM8 | 0.60 | Homestead 5 SE |
| HOYM8 | 0.72 | Hoyt |
| JORM8 | M | Jordan |
| LNDM8 | 1.36 | Lindsay |
| MLAM8 | 1.16 | Malta |
| MLTM8 | 0.88 | Malta 7 E |
| MTAM8 | 1.49 | Malta 35 S |

| Station | Precipitation | Location |
|---|---|---|
| MDCM8 | 0.41 | Medicine Lake 3 SE |
| MLDM8 | 0.78 | Mildred 5 N |
| MSBM8 | M | Mosby 4 ENE |
| OPNM8 | 0.24 | Opheim 10 N |
| OPMM8 | 0.32 | Opheim 12 SSE |
| PTYM8 | M | Plentywood |
| PTWM8 | 0.42 | Plentywood 1 NE |
| POGM8 | 0.48 | Port of Morgan |
| RAYM8 | 0.21 | Raymond Border Station |
| SAOM8 | 0.73 | Saco 1 NNW |
| SMIM8 | 0.44 | St. Marie |
| SAVM8 | M | Savage |
| SCOM8 | 0.30 | Scobey 4 NW |
| SDYM8 | 1.11 | Sidney |
| SIDM8 | 1.25 | Sidney 2S |
| TERM8 | 0.83 | Terry |
| TYNM8 | M | Terry 21 NNW |
| VIDM8 | M | Vida 6 NE |
| WSBM8 | 0.44 | Westby |
| WTRM8 | 0.83 | Whitewater |
| WHIM8 | M | Whitewater 18 NE |
| WBXM8 | M | Wibaux 2 E |
| WTTM8 | 1.39 | Winnett |
| WNEM8 | 1.39 | Winnett 6 NNE |
| WNTM8 | 1.93 | Winnett 8 ESE |
| WITM8 | 1.56 | Winnett 12 SW |
| WLFM8 | 1.40 | Wolf Point |
| ZRTM8 | 2.11 | Zortman |

# COOP Precipitation Totals for October 2023 (Preliminary)

| Station | Precipitation | Location |
|---|---|---|
| BAYM8 | 0.62 | Baylor |
| BRDM8 | 0.97 | Bredette |
| BTNM8 | M | Brockton 17 N |
| BKNM8 | 2.12 | Brockton 20 S |
| BKYM8 | 1.92 | Brockway 3 WSW |
| BRSM8 | 1.48 | Brusette |
| CLLM8 | 1.63 | Carlyle 13 NW |
| CIRM8 | 2.36 | Circle |
| CHNM8 | 0.82 | Cohagen |
| COM8 | 1.99 | Cohagen 22 SE |
| CNTM8 | 0.87 | Content 3 SSE |
| CULM8 | 2.36 | Culbertson |
| DSNM8 | 0.53 | Dodson 11 N |
| FLTM8 | 1.32 | Flatwillow 4 ENE |
| FPKM8 | 1.18 | Fort Peck PP |
| GLAM8 | 1.39 | Glasgow 14 NW |
| GGWM8 | 1.62 | Glasgow WFO |
| GGSM8 | 2.15 | Glasgow 46 SW |
| GNDM8 | 2.17 | Glendive WTP |
| HRBM8 | M | Harb |
| HINM8 | 0.79 | Hinsdale 4 SW |
| HNSM8 | 0.78 | Hinsdale 21 SW |
| HOMM8 | 1.53 | Homestead 5 SE |
| HOYM8 | 1.74 | Hoyt |
| JORM8 | M | Jordan |
| LNDM8 | 2.79 | Lindsay |
| MLAM8 | 0.73 | Malta |
| MLTM8 | 0.57 | Malta 7 E |
| MTAM8 | 1.38 | Malta 35 S |

| Station | Precipitation | Location |
|---|---|---|
| MDCM8 | 1.90 | Medicine Lake 3 SE |
| MLDM8 | 1.76 | Mildred 5 N |
| MSBM8 | M | Mosby 4 ENE |
| OPNM8 | 0.58 | Opheim 10 N |
| OPMM8 | 0.40 | Opheim 12 SSE |
| PTYM8 | M | Plentywood |
| PTWM8 | M | Plentywood 1 NE |
| POGM8 | 0.39 | Port of Morgan |
| RAYM8 | 1.27 | Raymond Border Station |
| SAOM8 | 0.83 | Saco 1 NNW |
| SMIM8 | 0.97 | St. Marie |
| SAVM8 | M | Savage |
| SCOM8 | 1.10 | Scobey 4 NW |
| SDYM8 | 4.00 | Sidney |
| SIDM8 | 2.01 | Sidney 2S |
| TERM8 | 2.28 | Terry |
| TYNM8 | M | Terry 21 NNW |
| VIDM8 | M | Vida 6 NE |
| WSBM8 | 2.10 | Westby |
| WTRM8 | 1.22 | Whitewater |
| WHIM8 | M | Whitewater 18 NE |
| WBXM8 | M | Wibaux 2 E |
| WTTM8 | 1.05 | Winnett |
| WNEM8 | 1.06 | Winnett 6 NNE |
| WNTM8 | 1.63 | Winnett 8 ESE |
| WITM8 | 1.45 | Winnett 12 SW |
| WLFM8 | 1.24 | Wolf Point |
| ZRTM8 | 1.91 | Zortman |

## Monthly Trivia:

Last time we asked…

Winter is approaching, and that means the potential for mixed precipitation. Why is it that sometimes during the colder months, precipitation falls as snow versus sleet or freezing rain? Next month we'll cover the science of mixed precipitation!

**Answer:** The type of precipitation that falls largely depends on the depth of a warm layer in the atmosphere. If absent, snow will fall. If temperatures are above freezing aloft snow may melt and refreeze and fall as ice pellets (sleet) on the way down to the ground. Meanwhile, if temperatures are below freezing near the surface but a thick warm layer exists aloft, rain will fall but freeze on contact—we call this freezing rain. See the graphic below for more details.

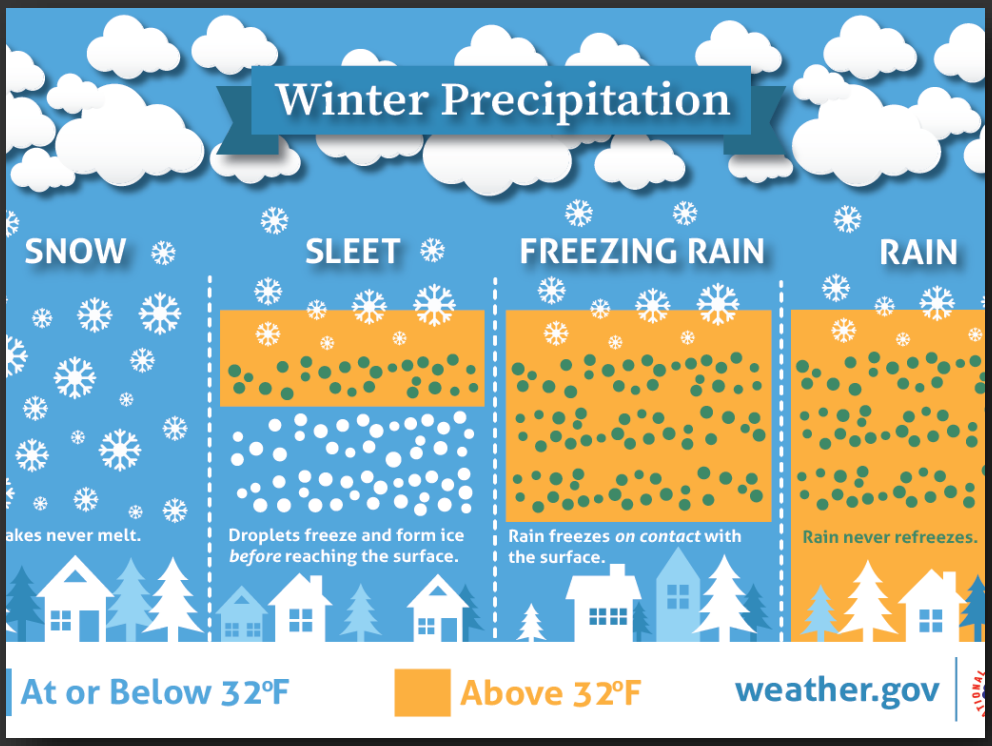


Figure 9: NWS Winter Graphic depicting the science of mixed precipitation.

**New Question:** Why is snow white? We'll have an in-depth look at the science here in the next newsletter!

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