



Weather & Climate Summary Denali National Park & Preserve Summer 2023

Eielson Visitor Center climate station June 2023. NPS Photo/Pam Sousanes

Denali Summer 2023 Weather Summary

Weather observations have been recorded at Denali Park headquarters since August of 1925. We'll look at the 2023 summer conditions (June, July, August) compared to the latest climate normal period, 1991-2020, and highlight data from a few of the Central Alaska Inventory and Monitoring Network (CAKN) climate sites.

Summer

Summer 2023 was much warmer and much drier than normal at park headquarters. Weather highlights for the season include one of the driest summers on record, unusually warm August nights, and a late start to the fire season. The average temperature for the 2023 summer season was 2.2°F warmer than the 1991-2020 normal at 55.3°F. July and August were much warmer than normal, while June was cooler than normal. It was the driest summer since 1940 and the third driest on record (since 1926). The total summer rainfall was only 45% of normal with 3.83 inches of rain falling between June 1 and August 31. Each month of the summer was much drier than normal. (Table 1 and 2; Figures 1 and 2).

June

June was cool and dry. The average monthly temperature was 1.5°F cooler than normal. Mid-June was particularly cool. The daily temperatures averaged about 9°F colder than normal with several days where the low temperatures dropped below freezing. A rare late freezing temperature was recorded on June 25th just a few days after summer solstice. It was the second coldest temperature ever recorded for that day. The June rainfall total was only 0.50 inches compared to the normal 2.42 inches. It was the sixth driest June on record and the driest June since 1976.

July

The rain held off, but the temperatures warmed in July. July was warmer and drier than normal. The average temperature

for the month was 58.9°F. It was the fifth warmest July on record, 3.4°F above the 1991-2020 normal. It was especially warm between July 23 and 29. During this period the daily temperatures averaged 11°F warmer than normal. The high temperature of 84°F on July 24 was a new daily record. Total rainfall was only 49% of normal with 1.54 inches for July. Most of the rain fell during the third week of June with the highest one day total occurring on July 20th with 0.89 inches.

August

The warm, dry summer conditions continued into August. It was the 4th warmest August on record and the warmest since 2004. For most of the month the daily minimum temperatures did not drop as low as normal, which resulted in unusually warm nights. The rainfall total for the month was 1.79 inches, 60% of normal.

Table 1. Summer 2023 average monthly temperatures compared to the 1991-2020 normal

Summer 2023	Average Monthly Temp (°F)	1991-2020 Normal (°F)	Departure from Normal (°F)
June	51.5	53.0	-1.5
July	58.9	55.5	+3.4
August	55.5	50.9	+4.6

Summer Temperature Departure from normal: +2.2°F

Table 2. Summer 2023 monthly precipitation totals compared to normal.

Summer 2023	Total Monthly Precip. (in.)	1991-2020 Normal (in.)	Departure from Normal (in.)
June	0.50	2.42	-1.92
July	1.54	3.12	-1.58
August	1.79	3.01	-1.22

Summer Precipitation Departure from normal: -4.72 in. (45%)

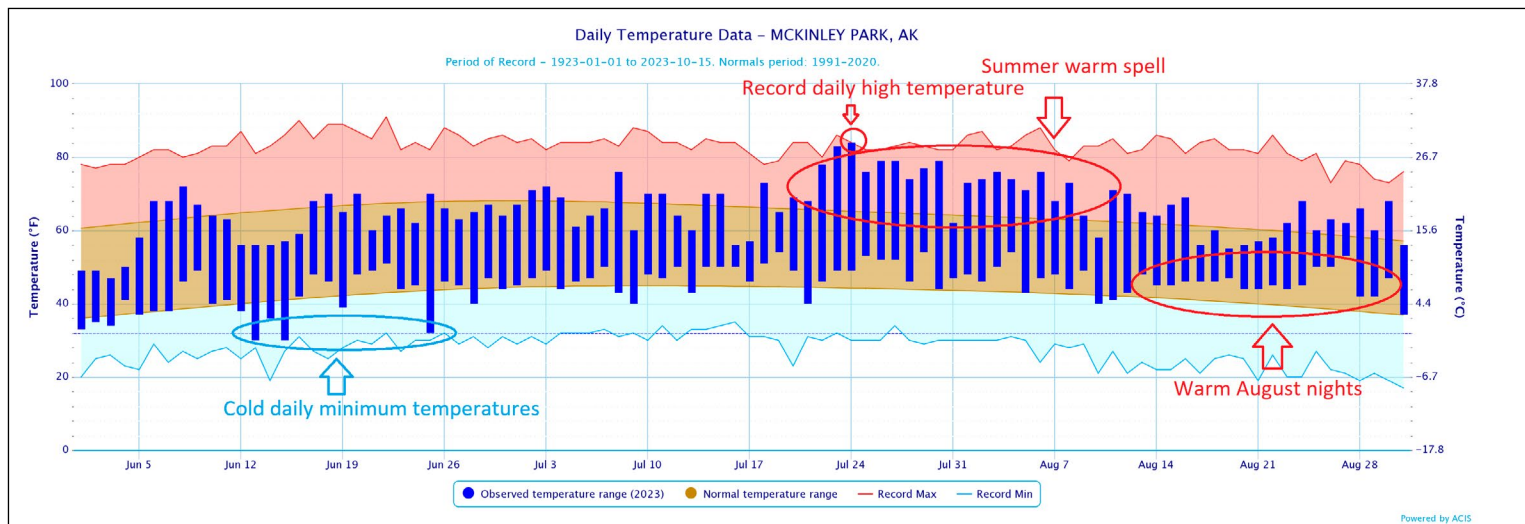


Figure 1. Summer 2023 daily temperatures at Denali Park HQ showing record maximum (red), record minimum (blue), normal (brown) and observed range (blue bars).

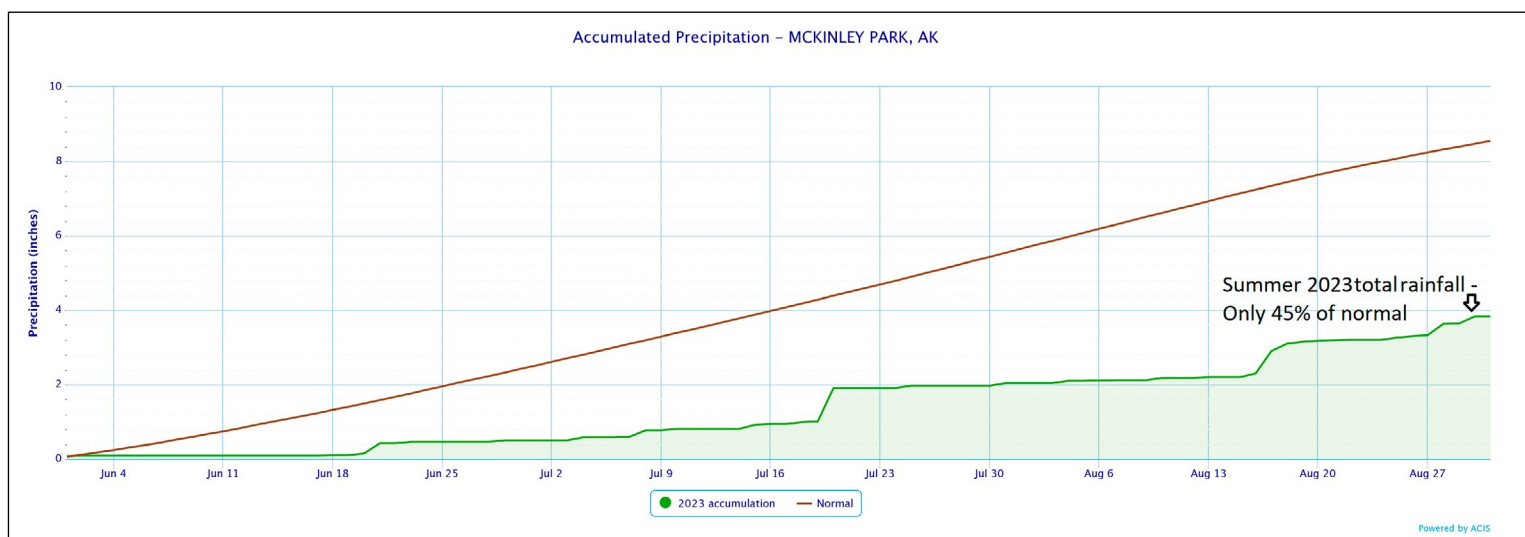


Figure 2. Summer 2023 accumulated precipitation (melted snow and rain) at Denali Park HQ (green) compared to normal (brown line).



Denali's Wet and Dry Summer

While Denali Park headquarters had less than half the average summer rainfall, Talkeetna had twice as much rain as normal. Talkeetna had its third wettest summer on record with almost 18 inches of rain. This summer was wetter than normal for most of the state (green shading on map), with record breaking and persistent rainfall in the northwest region of Alaska (blue shading). The anomaly was the central Interior, including the north side of Denali, where summer rainfall totals were low (orange shading). Drier than normal conditions extended into the Yukon, Northwest Territories, and British Columbia in Canada and down through Southeast Alaska (Figure 3).

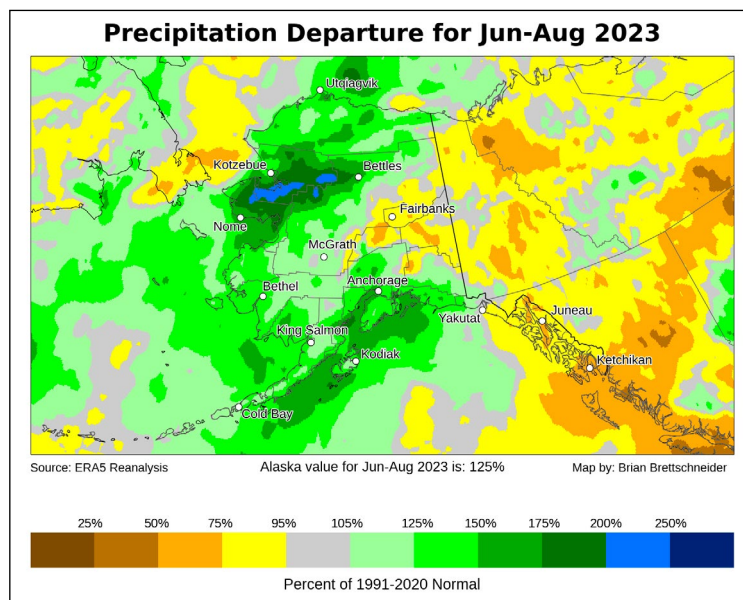


Figure 3. Map showing summer rainfall percent of normal. Denali and other Interior locations were much drier than normal (orange). Data Source: ERA5 Departure Maps courtesy of Brian Brettschneider.

Alaska's Late Fire Season

The 2023 fire season was unusually late, and the total number of acres burned statewide was lower than normal. We

Wildfire burned 298,000 acres across Alaska, less than half the average. More than 99 percent of that burned after July 24th, which is late in the season. Thunderstorm activity was light in June and July. Fewer lightning strikes meant the chance of fire ignition was low. That changed abruptly on July 24-25 when more than 20,000 lightning strikes were recorded in a 24-hour period, the highest one day total since 2010 (Figure 4). Typically, any fire starts in late July would be short lived with the onset of August 'season ending' rains. But the warm and dry conditions continued into August, giving the late July fires an opportunity to grow. Two of the larger fires were on Denali's northern boundary. A total of 1,082 acres burned in the park along the southern extent of the Clear Fire that burned a total of 53,289 acres.

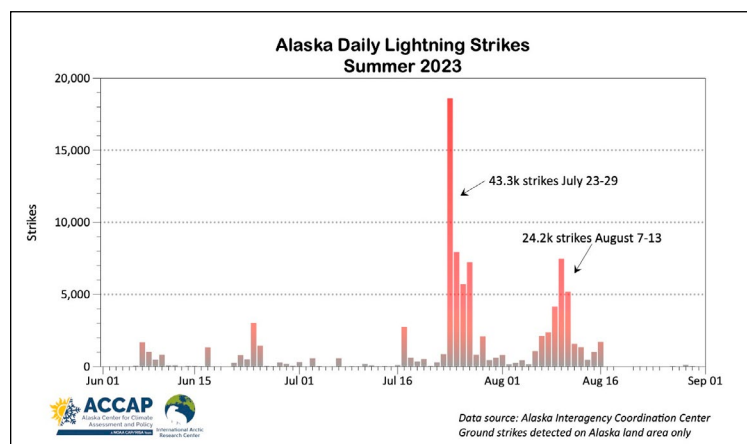


Figure 4. Number of lightning strikes per day for June, July, and August 2023. Graph courtesy of [Rick Thoman /Alaska and Arctic Climate Newsletter](#).

The Canadian wildfire season was a much different story. The season started early and ended late, and the fires were large and widespread. An area roughly the size of North Dakota burned, 45.6 million acres, culminating in Canada's most extreme fire season on record (Figure 5).

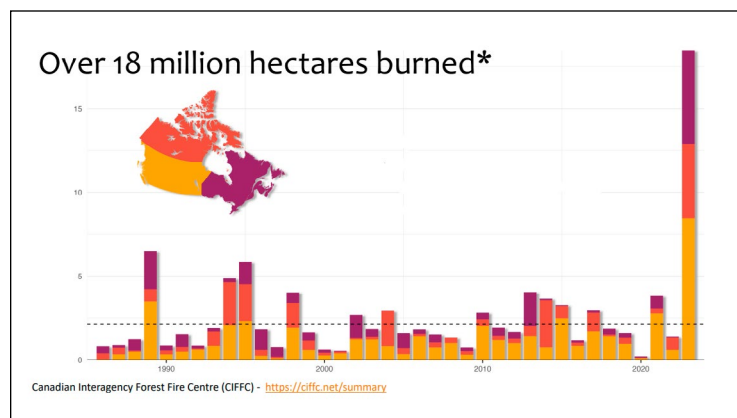


Figure 5. Graphic showing number of hectares burned in Canada in 2023 compared to previous years. Graphic courtesy of Piyush Jain with the Canadian Forest Service [The 2023 Wildfire Season in the North: A Tale of Two Extremes](#)

Central Alaska Inventory and Monitoring Network Climate Stations

We record weather data at additional sites in Denali to help understand daily, monthly, and seasonal weather patterns and shifting climate averages (Figure 6). We track the weather extremes that cause disturbance such as drought, floods, heat waves, cold snaps, and high winds. The data are collected and analyzed along with other park 'vital signs' to provide a holistic view of how these high latitude park lands are changing. Here are a few summer highlights from the Denali 27N Climate Reference Network site and the Toklat site:

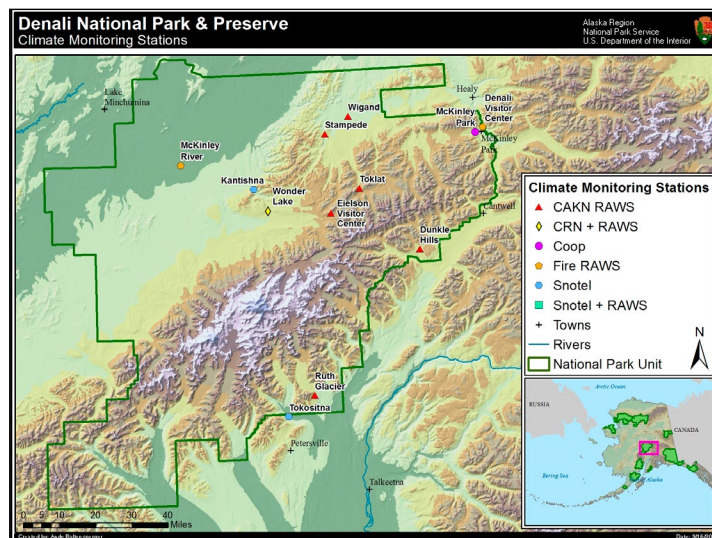


Figure 6. Central Alaska Inventory and Monitoring Network climate stations in Denali.

Wonder Lake - Denali 27N

The 'AK Denali 27N' Climate Reference Network weather station above the Wonder Lake campground is one of nearly 140 sites around the U.S. that are being used to place current climate anomalies into an historical perspective. These sites have aspirated fans to increase the accuracy of air temperature measurements and a heated rain gauge that enables year-round measurements of precipitation. They take more power to operate and are typically connected to line power. This site uses a combination of solar panels and a fuel cell to keep the batteries charged and the site running year-round (Figure 7).



Figure 7. Denali 27N Climate Reference Network Site near the Wonder Lake Campground. The fuel cell and solar panels (center left) power the site throughout the year.

The site has been operating for six years. This summer the rainfall total for June through August was just over 10 inches, drier than average for this site. Rainfall amounts increased from east to west along the Denali Park Road this summer (Figure 8). Eielson Visitor Center, normally one of the wetter locations where we measure rain, had less than half the normal amount of rain this summer.

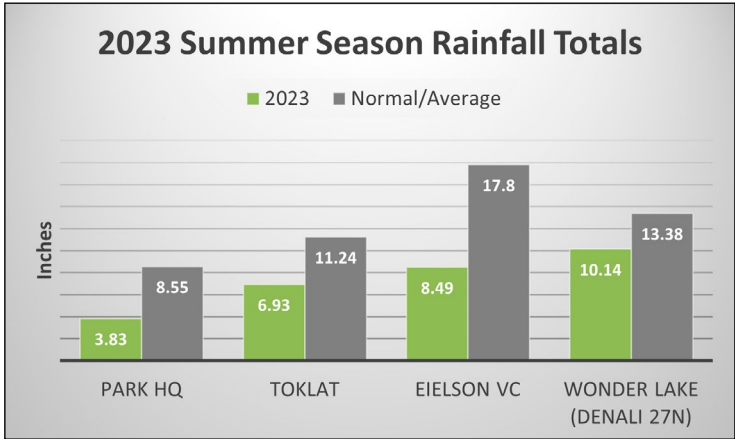


Figure 8. Summer 2023 rainfall totals along the Denali Park Road (green bars) compared to normal (grey bars).

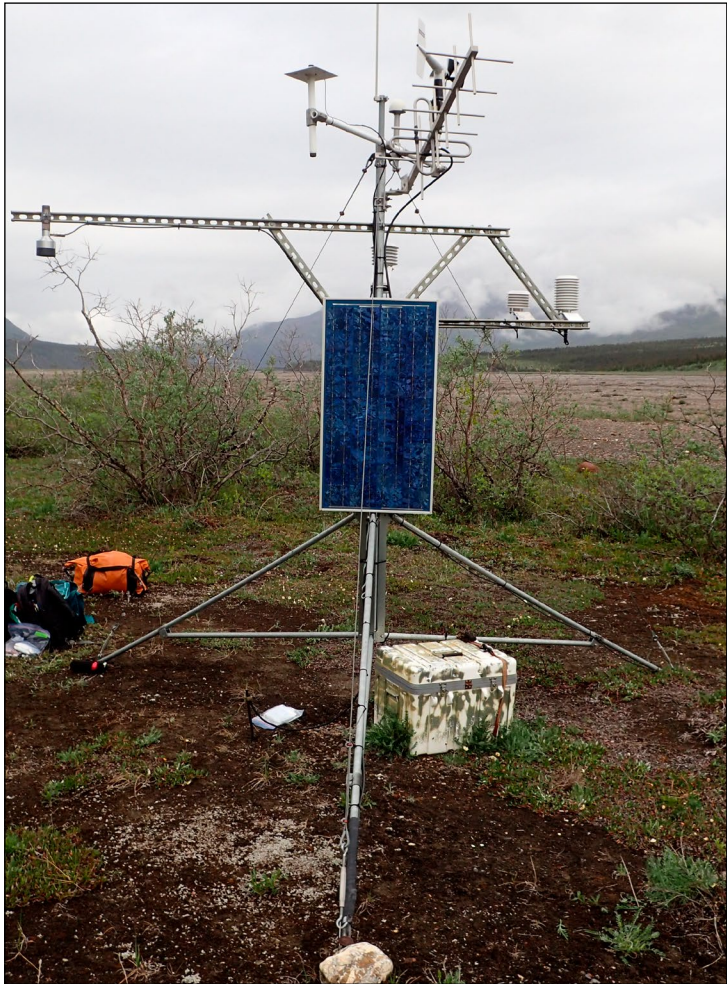


Figure 9. The Toklat weather station in Denali National Park.

Toklat

The Toklat weather station sits on the bank of the Toklat River near the NPS road camp at an elevation of 3,036 feet (Figure 9). We started continuous year-round measurements at this site in 2005 and this past summer was one of the warmer summers on record. The average temperature between June 1 and August 31 was 53.1°F, the third warmest behind 2013 (53.5°F) and 2019 (53.4°F) (Figure 10). August was the warmest month of the summer compared to average, followed by July. June temperatures were just 0.2°F below average. The average summer temperature has warmed a significant 1.8°F at the Toklat site over the past 18 years.

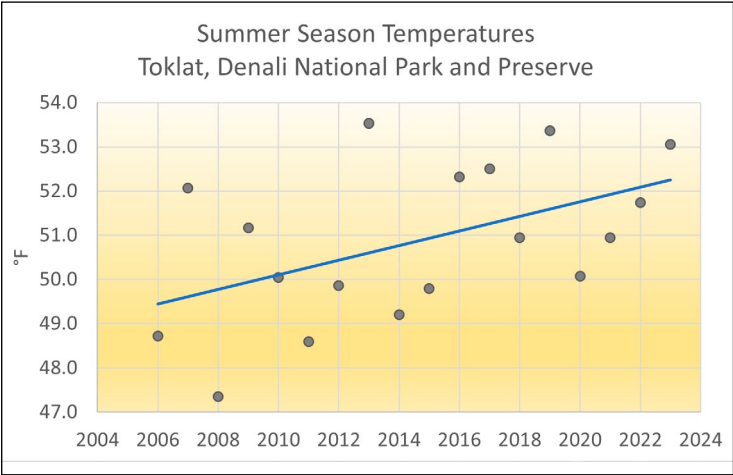


Figure 10. Summer season average temperatures at Toklat 2006-2023. There has been a significant increase in summer temperatures over the past 18 years (blue trend line).



More Information

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<https://www.nps.gov/im/cakn/climate.htm>

[Current weather in Denali](#)

Data disclaimer: Please note that the near-real time data used to generate these reports is subject to change. QA/QC data from the NPS CAKN climate stations are available at [NPS Data Store](#)