



Alaska Climate Research Center
The Alaska State Climate Center

STATEWIDE CLIMATE SUMMARY JUNE 2024



The Riley Fire near the entrance to Denali Park on June 30, 2024. Photo: Telayna Wong.

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Alaska’s Statewide Climate Summary for June 2024 provides an overview of weather for the month based on data from selected weather stations throughout the state. “Departure from normal” refers to the climatological average over the 1991-2020 normal period. Here, we report on temperature, precipitation and drought conditions in the state, as well as the condition of the Arctic sea ice.

HIGHLIGHTS

Warm and dry June in most of Alaska

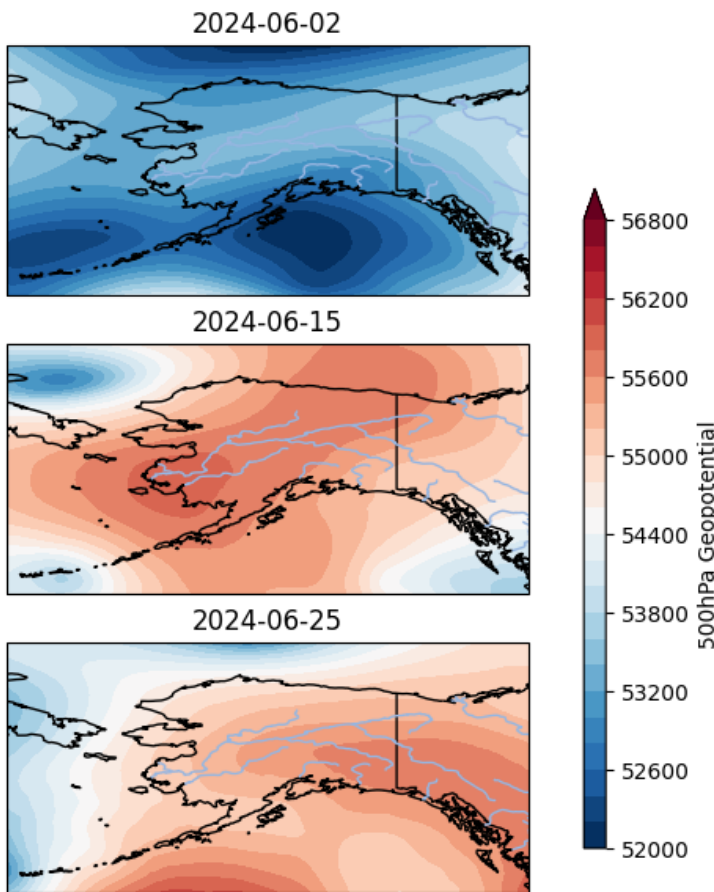
Fire season picking up with lightning activity and hot, dry conditions

Poor air quality due to wildfire smoke in Interior communities

Second warmest June on record in Bettles, third warmest in Fairbanks

Significant Weather Events and Synoptics

June started out with changeable weather in much of the state. In northern Alaska, an Arctic low-pressure system brought a few snow flurries to higher elevations, with a winter weather advisory in effect in the central Brooks Range during the first days of the month. Low pressure systems in the southern Bering Sea and the Gulf of Alaska brought rainy, windy conditions to the Gulf coast and southwestern AK (Fig. 1, top panel). Kodiak Island was particularly wet, with over three inches of rain in two days on June 1 and 2 and another round of similarly heavy precipitation a few days later. The Panhandle also saw unsettled conditions with thundery showers and high winds during the first week of the month. Strong thunderstorms prompted a “special marine warning” for Lynn Canal and Glacier Bay on June 4 and 5. Interior Alaska also started the month with a blustery episode of thunderstorms and scattered showers.



The second week of June brought rising temperatures as high pressure spread into Alaska from the east. For the Interior this brought an uptick in fire activity and red flag warnings. In the south it remained cooler and unsettled until the low over the Aleutians dissipated around June 12, allowing high pressure aloft to move across all of the state in the following days (Fig. 2, middle panel). This brought consistently above average temperatures in the following days and weeks. Only the northwest saw unusually cool conditions through mid-month due to advection of Arctic air masses by an upper level low in the Chukchi Sea (Fig. 2, middle panel, note low pressure in the northwest of the image).

Figure 1. 500hPa Geopotential over Alaska on June 2, 15, and 25. ERA5 reanalysis data courtesy of copernicus.eu

The general pattern of hot, dry weather and wide spread high pressure persisted for the rest of the month with few exceptions. Around June 25, low pressure returned to the Bering Sea (Fig. 2, bottom panel), causing high winds and stormy weather on the west coast with a high surf advisory issued for Kuskokwim Bay and very windy conditions across the Aleutians. The associated southerly flow in the upper atmospheric levels brought warmer temperatures for the previously cool northwest. Elsewhere conditions remained warm and dry except for scattered showers and thunderstorms with local bursts of precipitation.

Interior Alaska in particular experienced text book “fire weather” this month with increasingly dry fuels, high temperatures and convective storms with lightning activity that sparked numerous fires. Air quality in Fairbanks and the North Pole area deteriorated strongly during the last third of the month due to widespread smoke (Fig. 2). South-central Alaska has so far been less affected by wildfires and smoke than the Interior but red flag warnings were put in place for much of the region due to the same fire-prone combination of hot, dry, and windy conditions.

The high temperatures also led to elevated water levels due to snow melt, resulting in local flooding along the Chilkat River. Despite the precipitation early in the month, abnormally dry conditions persist in the southern half of the Panhandle. Moderate drought conditions developed through the course of June in parts of the Interior, mainly in an area around Fort Yukon ([AK drought monitor](#)).



Figure 2. Dense smoke and strongly reduced visibility on June 30, 2024, as seen by the ACRC panorama camera at UAF’s West Ridge campus.

Temperature

June 2024 was a warmer than average month in much of Alaska. After a prolonged period of cooler than normal weather in May, June made up for it with extended high pressure and high temperatures, particularly in the Interior. The highest monthly deviations from the 1991-2020 climate normal were recorded in Bettles and Fairbanks with +4.6°F and +4.0°F, respectively. Other Interior stations (McGrath, Delta Junction) as well as Juneau, Gulkana, and Utqiagvik had positive deviations of around 2-3°F. The western and southwestern coastal regions were cooler with near normal monthly mean temperatures in Cold Bay and King Salmon and negative deviations of -1.5°C and -1.4°C in Kodiak and St. Paul Island. Kotzebue was the coldest of the selected First Order stations this month in relative terms with -2.2°F below normal. This shows the influence of a low-pressure system in the Chukchi Sea that pushed cool, Arctic air masses towards Alaska’s northwest coast (Fig. 1, middle panel) while the rest of the state experienced wide spread high pressure and warm temperatures.

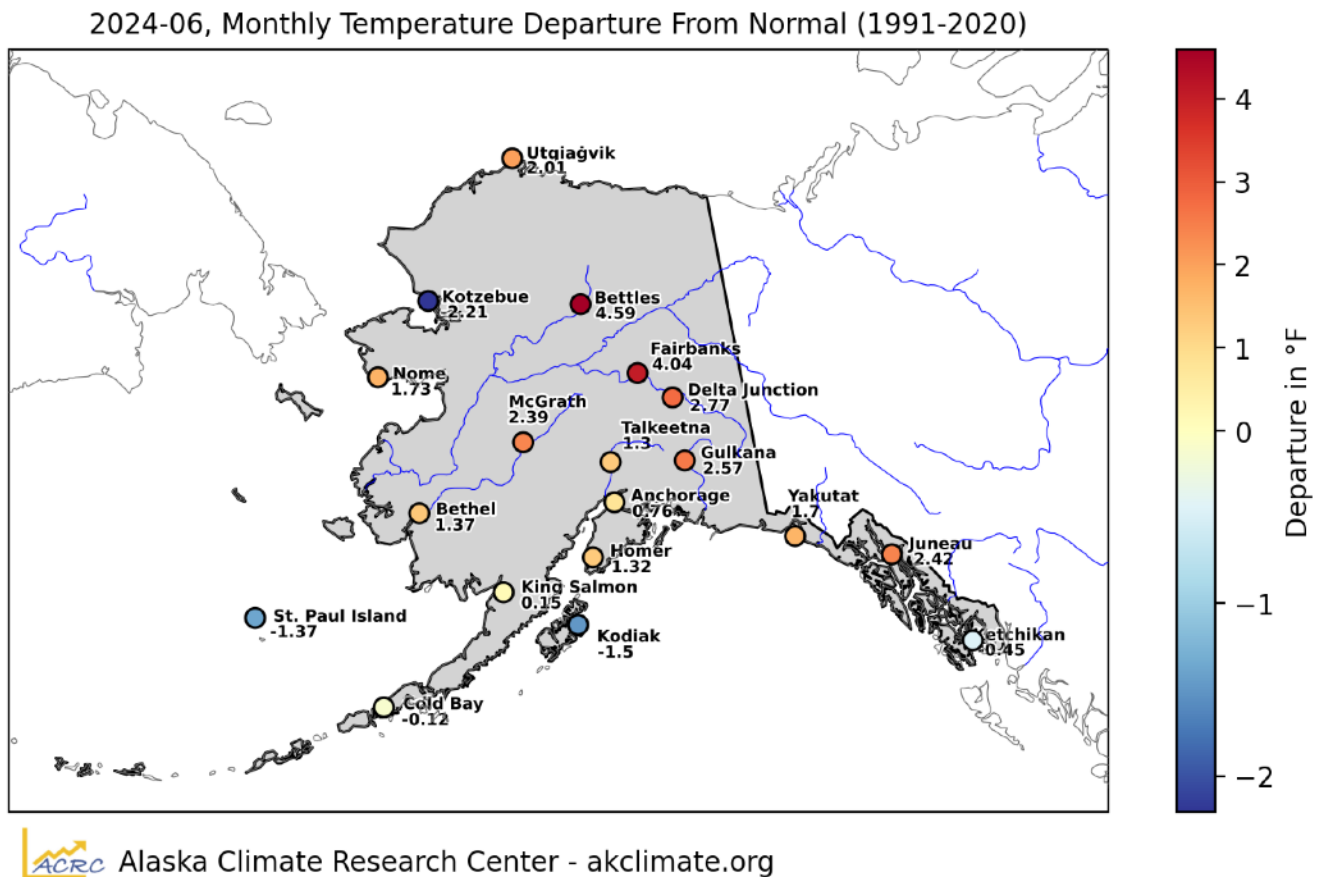


Figure 3 Monthly mean temperature departure from normal (°F), June, 2024, at the selected First Order stations in Alaska.

The daily temperature anomalies (Fig. 4) reflect the same general patterns, with almost entirely above average temperatures throughout June in Bettles, Fairbanks, Delta Junction and McGrath. In contrast, Kotzebue was mostly cooler than normal with brief warm episodes around June 8-9 and during the last week of the month. The coastal stations in the southwest had a mixed bag of slightly cooler and slightly warmer than normal temperatures. In the southeast, Ketchikan had a moderately cooler than average first half of the month before flipping to slightly warmer than average conditions. Juneau had a more pronounced warm period during the second half of June.

A number of new records for high daily temperatures were set throughout the state. Bettles set new records for daily mean and maximum temperature on June 27, Homer had two new records for daily mean temperature in a row on June 8 and 9, and additional high records were registered in Anchorage, Cold Bay, Kotzebue, Nome, St Paul Island, Talkeetna, and Yakutat. No new low records were set. Considering monthly temperatures, Bettles and Fairbanks had their second and third warmest June on record, respectively, and McGrath and Juneau had their sixth warmest.

Station	Observed (°F)	Normal (°F)	Departure (°F)
Anchorage	56.6	55.9	0.8
Bethel	54.7	53.3	1.4
Bettles	63.2	58.6	4.6
Cold Bay	46.9	47.1	-0.1
Delta Junction	61.1	58.4	2.8
Fairbanks	65.0	61.0	4.0
Gulkana	57.4	54.9	2.6
Homer	53.3	52.0	1.3
Juneau	57.0	54.6	2.4
Ketchikan	54.8	55.3	-0.5
King Salmon	53.0	52.8	0.2
Kodiak	49.8	51.4	-1.5

Station	Observed (°F)	Normal (°F)	Departure (°F)
Kotzebue	45.3	47.5	-2.2
McGrath	61.1	58.7	2.4
Nome	50.0	48.3	1.7
St. Paul Island	41.7	43.1	-1.4
Talkeetna	58.3	57.0	1.3
Utqiagvik	38.2	36.0	2.0
Yakutat	53.6	51.9	1.7

Table 1. Mean monthly air temperature, normal (1991-2020) and departure for selected stations throughout the state, June 2024. Color-coded to match Figure 2 (yellow-orange-red = warmer than usual; shades of blue = cooler than usual).

Daily mean temperature, departure from normal (1991-2020), 2024-06

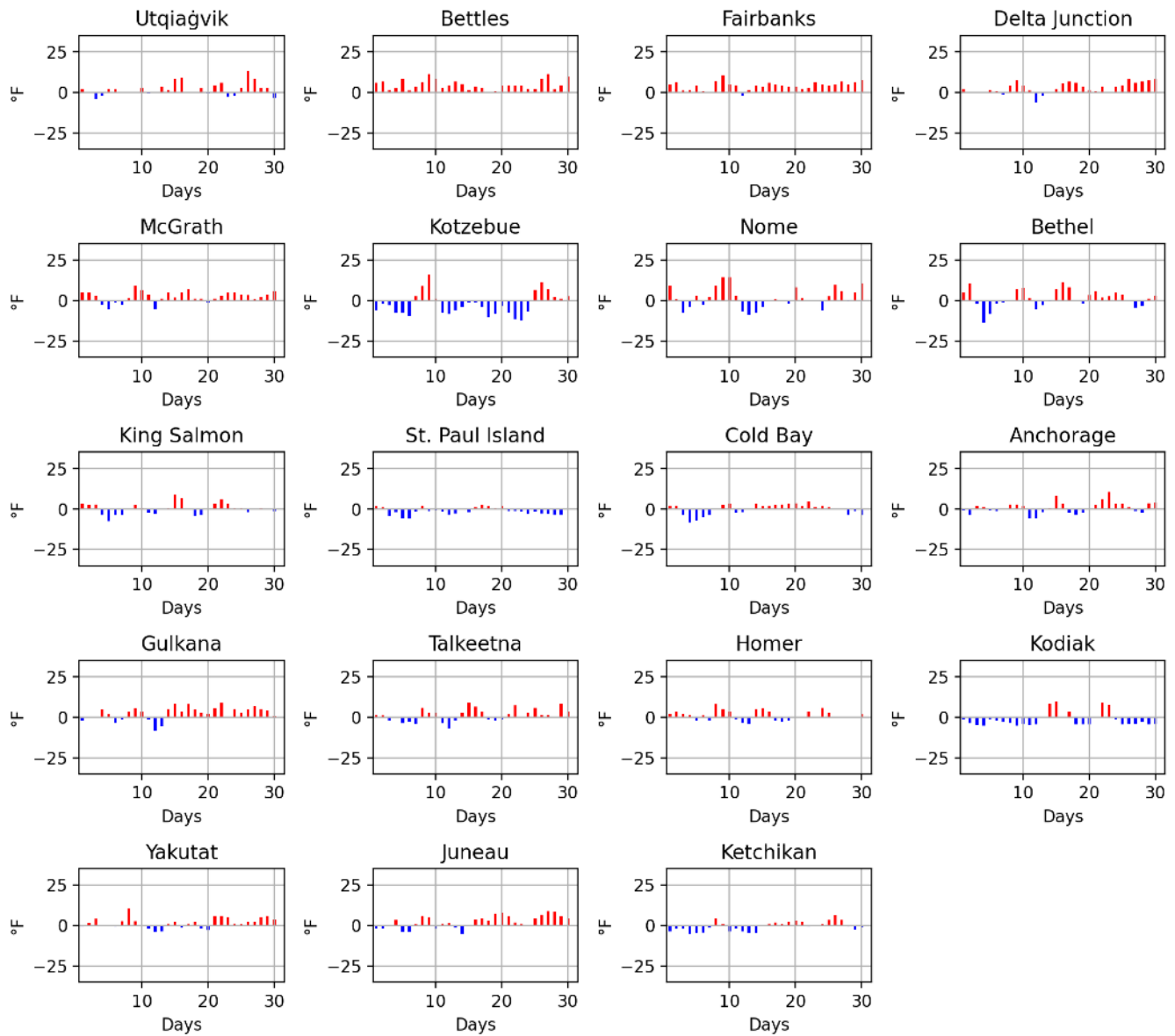


Figure 4. Daily mean temperature departures for each day in June 2024 at the selected stations.

Precipitation

June was a very dry month at the First Order stations (Fig. 5 & 6, Table 2). Kodiak presents the only notable exception to this. Kodiak’s monthly total was 138%, making it the only wetter than average station this month. Most of the precipitation in Kodiak fell during two very wet storms early in the month on June 1 and 2 and June 8 and 9. All other selected

First Order stations recorded drier than average conditions. Homer and Utqiagvik were driest in relative terms with only 9% and 7% of normal, respectively. King Salmon, Bethel, Nome, and Kotzebue all had under 30% of normal. Delta Junction, Bettles, Gulkana, McGrath, Ketchikan, and St. Paul Island were among the “wetter” stations this month with between 68% (Delta Junction) and 92% of normal (McGrath).

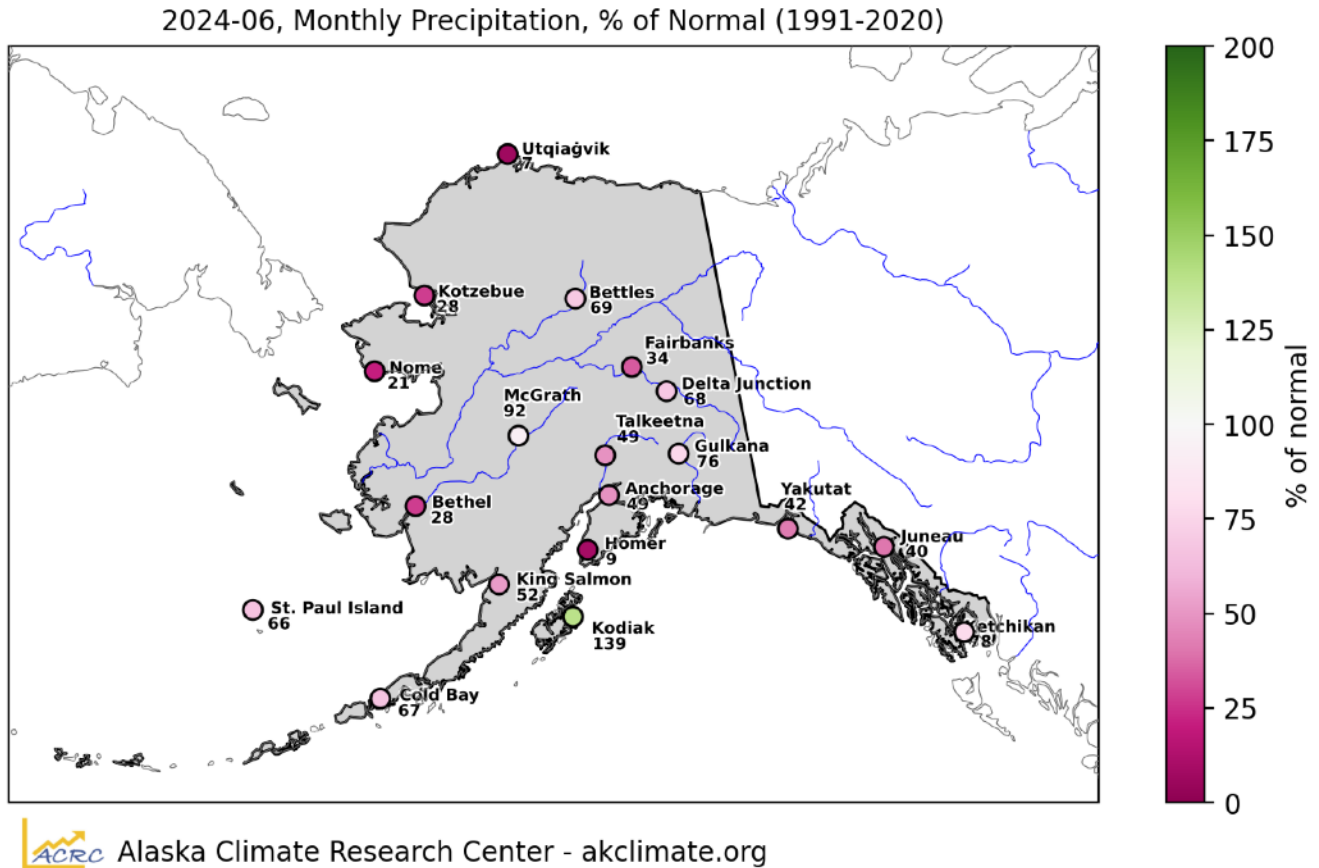


Figure 5. Monthly precipitation in percentage of normal (°F, 1991-2020 reference period), June, 2024, at the selected First Order stations in Alaska.

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	0.5	1.0	49.0
Bethel	0.5	1.8	27.7
Bettles	1.0	1.5	69.2

Station	Precipitation (in)	Normal (in)	% of Normal
Cold Bay	1.8	2.7	67.2
Delta Junction	1.5	2.2	68.3
Fairbanks	0.5	1.5	34.5
Gulkana	1.0	1.4	75.7
Homer	0.1	0.9	9.2
Juneau	1.5	3.8	40.3
Ketchikan	5.5	7.0	77.9
King Salmon	1.0	1.8	52.5
Kodiak	7.2	5.2	139.1
Kotzebue	0.2	0.6	28.3
McGrath	1.5	1.7	91.6
Nome	0.2	1.0	21.2
St. Paul Island	0.9	1.3	65.6
Talkeetna	0.8	1.7	48.5
Utqiagvik	0.0	0.4	7.0
Yakutat	2.3	5.4	42.3

Table 2. Monthly precipitation sum, normal (1991-2020) and departure expressed as a percentage of the normal (1991-2020) for selected stations throughout the state, June 2024. Colors match the color scale in Figure 5.

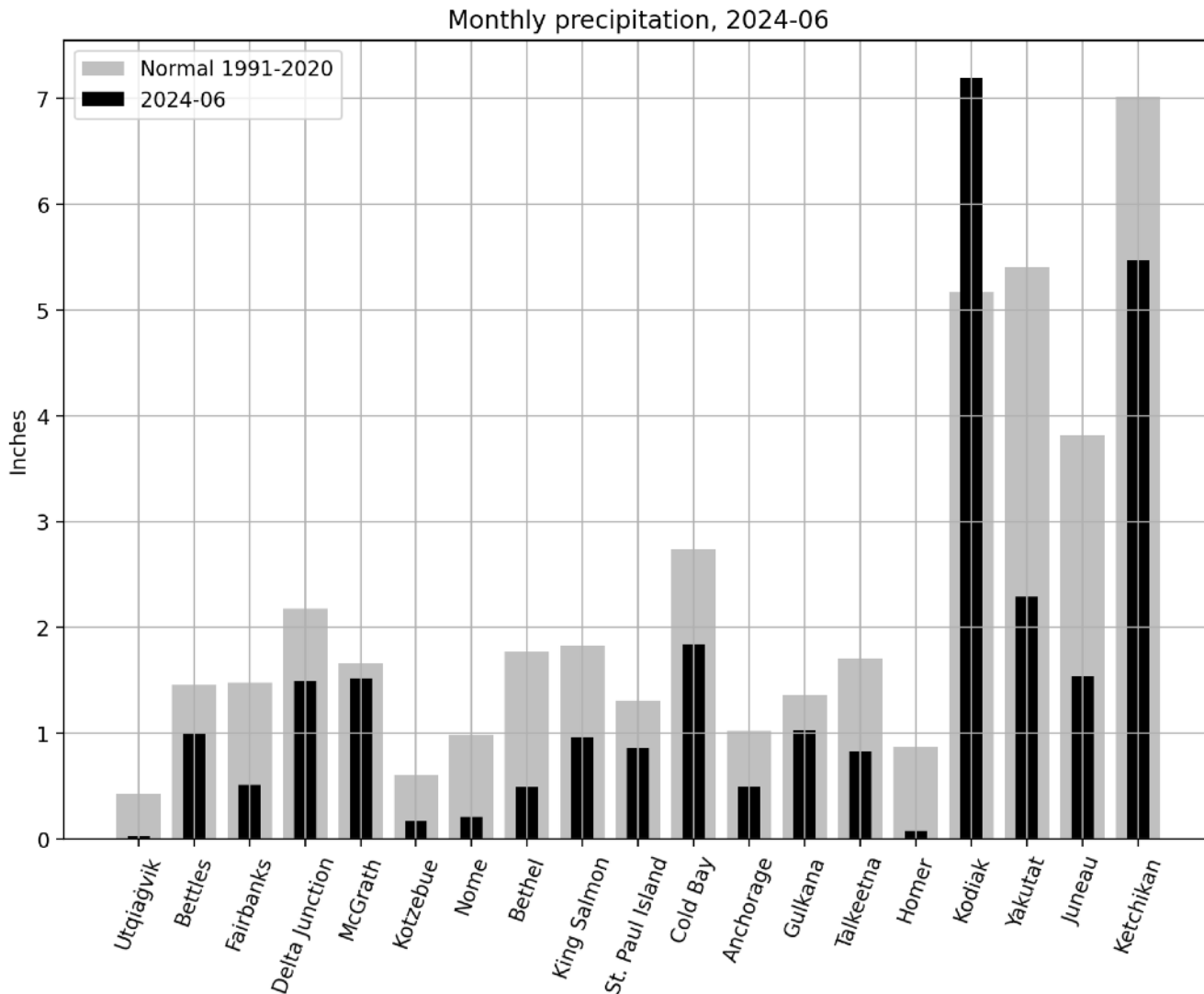


Figure 6. Monthly precipitation sum (black bars) compared to the 1991-2020 normal (grey bars) at the First Order stations.

Wildfires

After several weeks of warm and very dry weather, fire season is well underway. Smoke from nearby fires has been strongly affecting air quality in Fairbanks and other Interior communities. The rapid growth of the [Globe Fire](#) on the western edge of the White Mountains National Recreation Area led to evacuation orders along the Elliott Highway. The fire is in a full response area and as of June 28, multiple hotshot and smoke jumper crews were engaged in protecting structures along the highway. An emergency closure of the western section of the White Mountains recreation area has been issued by the BLM. The Elliott Highway was temporarily closed to traffic. The [McDonald fire](#) about 35

miles southeast of Fairbanks in the vicinity of the Blair Lakes slowed down slightly late in

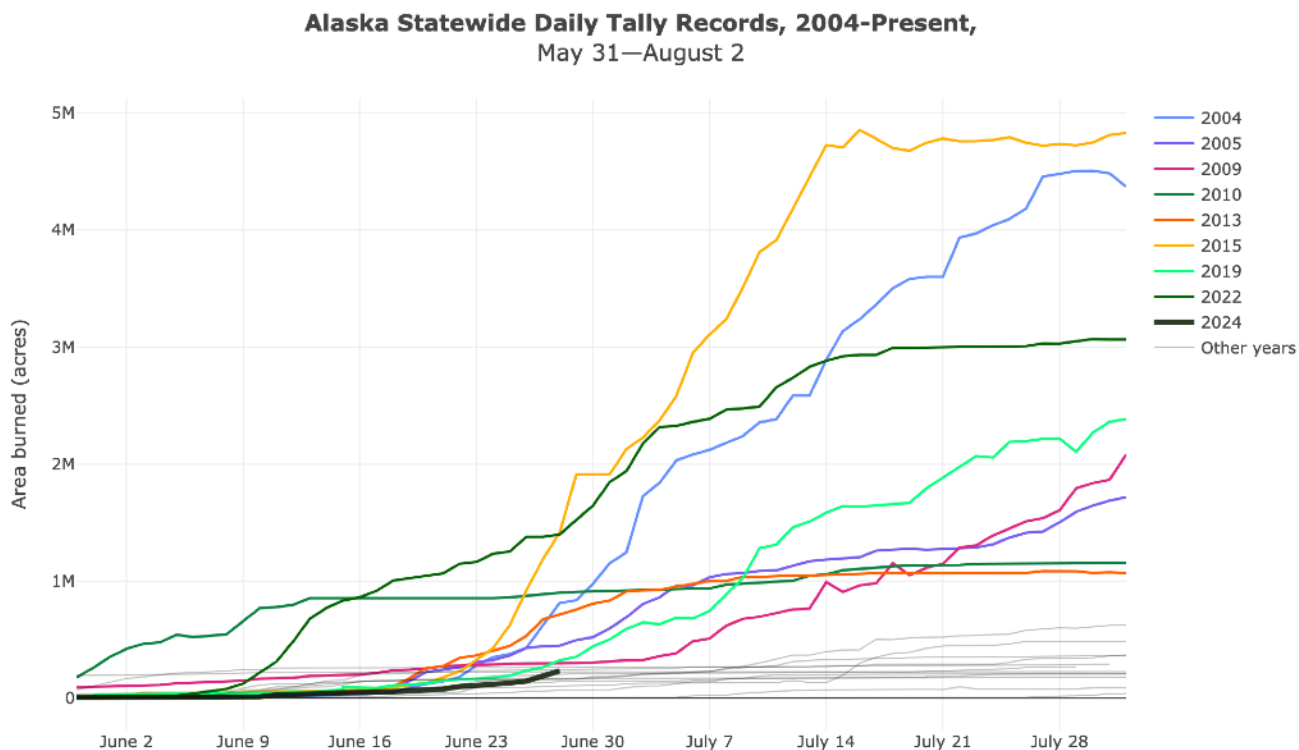


Figure 7. Daily tally of total burned area in Alaska for 2024 (bold black line) and significant prior fire seasons. Visualisation courtesy of UAF SNAP (<https://snap.uaf.edu/tools/daily-fire-tally>)

the month as it reached old burn scars but continued to impact the area with multiple locations along the Tanana River and Richardson Highway placed under “READY” evacuation status. The McDonald and Clear fires [have merged](#) and are currently the largest fire in the state.

The 2024 fire season has been picking up steadily through June but is still relatively moderate in terms of state-wide burned area compared to previous, impactful fire years (Fig. 7). In total, 280 fires have burned 234,151.8 acres as of June 28, up from less than 7000 acres burned on May 31 ([AICC situation report](#)). 133 lightning caused fires burned 230,800.5 acres. The remaining burned acreage is associated with human caused fires or fires with as yet undetermined cause.

2024 fire activity has so far been concentrated mainly in Interior Alaska, with the Military Zone, the Galena Zone, and the Southwest Area seeing the majority of burned acreage. Fires picked up in the Upper Yukon and Tanana Zones during the last week of June. See here for a [map of AK Fire Management Zones](#). With continued dry weather and potential for lightning strikes and strong winds, fire activity is expected to increase as we head into July.

Up-to-date Alaska wildfire locations and forecasts of the dispersion of smoke are available at the UAF Smoke webpage: <http://smoke.alaska.edu/>. See our blog post for an animation of a [pyrocumulus cloud over the McDonald fire](#).

Arctic Sea Ice

Arctic sea ice extent continues to decline as summer progresses. Weekly decrease rates ranged from around 3% to over 5% during June. As of June 27, Arctic sea ice extent was 10.097 M km², down from 12.097 M km² on May 30. Figure 8 shows time series of sea ice extent while Figures 9 A and B show the Arctic sea ice extent and concentrations for June 27, 2024, compared to the average for the period 1981-2010.

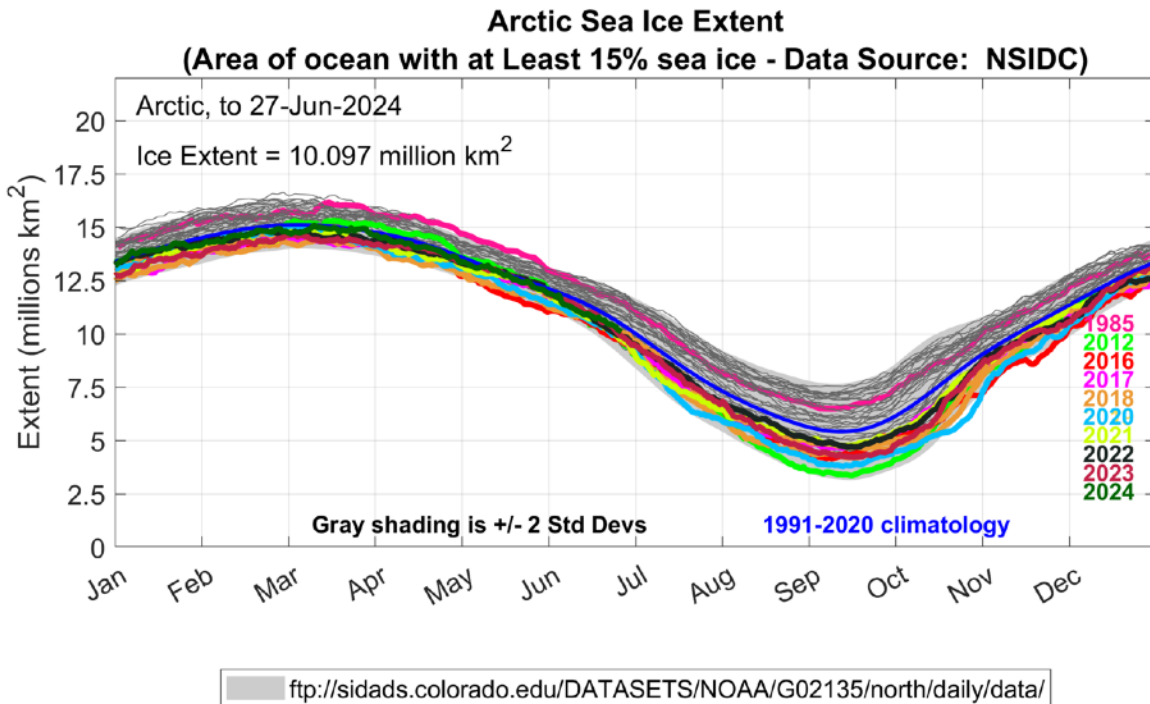


Figure 8. Time series of daily Arctic sea ice extent. This year's data (dark red) are updated until June 27, 2024. The median sea ice extent for the 1991-2020 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (nsidc.org/)

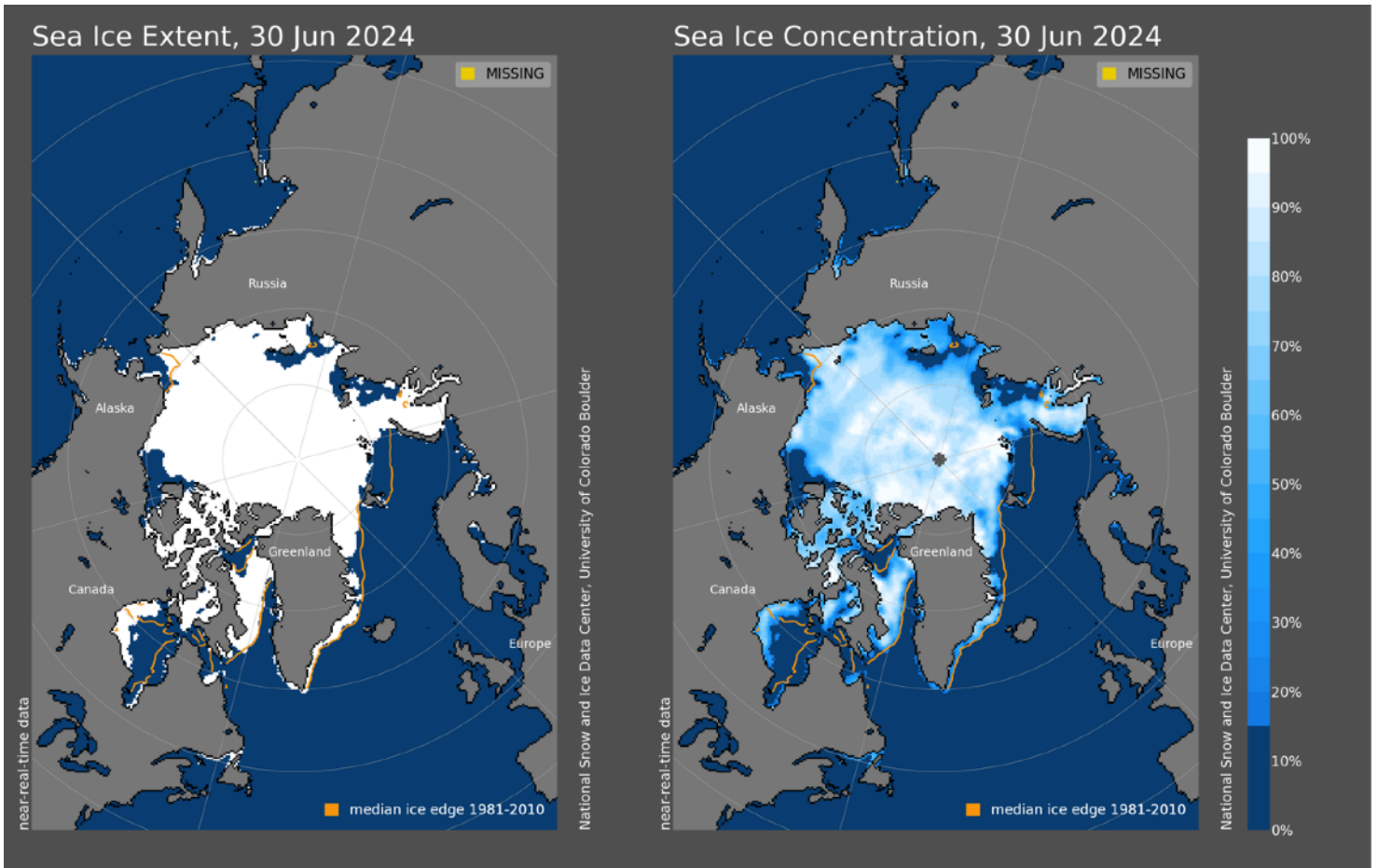


Figure 9. A (left) Arctic sea ice extent and B (right) concentrations as of June 30, 2024 compared to the average from 1981-2010 (Data and images: NSIDC)

Newsworthy Information

Fire and hazardous smoke in the Interior

As discussed above, wildfires and smoke impacted Interior Alaska from about mid-June through the end of the month. The fires and smoke received wide spread coverage in Alaskan news media, e.g.: ["Hot, dry weather generates lightning-sparked wildfires across Interior Alaska" \(AKP\)](#), ["Wildfire activity grows, with nearly 250K acres burned this year" \(ANS\)](#), ["Hospital opens air respite rooms as fires and smoke grow" \(Newsminer\)](#). Detailed updates on individual fires are provided by the [Alaska Wildland Fire Information](#) platform.

UAF research identifies beetle-killed spruce

A recent [study](#) by UAF researchers presents a new method for automated detection of trees killed by spruce beetles. The beetles can kill large numbers of trees, which has impacts on the ecosystem and implications for fuel availability and fire prevention and response.

Appendix

Highest Mean Daily Temperature on Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Anchorage	2024-06-23	68.0	2019	65.5
Bettles	2024-06-27	73.0	1983	72.5
Homer	2024-06-08	58.5	2022	58.0
Homer	2024-06-09	56.0	1936	55.5
Kotzebue	2024-06-09	60.0	1954	59.5
Nome	2024-06-10	61.0	1928	60.0

Table A1: June 2024 daily records of mean daily temperature, i.e. highest/lowest values of mean daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. Six new high records and no new low records were set.

Highest Maximum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Bettles	2024-06-27	86.0	1982	85.0
Cold Bay	2024-06-22	61.0	2002	60.0
Homer	2024-06-08	69.0	1957	68.0
Kotzebue	2024-06-09	70.0	1954	69.0
Nome	2024-06-10	77.0	1928	74.0

St. Paul Island	2024-06-17	57.0	2001	56.0
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Table A2: June 2024 daily records of maximum daily temperature, i.e. highest/lowest values of maximum daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. Six new highest and no new lowest maximum daily temperature records were set.

Highest Minimum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Anchorage	2024-06-23	59.0	1984	57.0
Homer	2024-06-09	52.0	2017	51.0
Talkeetna	2024-06-29	59.0	2019	58.0
Utqiagvik	2024-06-16	41.0	2000	39.0
Yakutat	2024-06-23	55.0	1994	52.0

Table A3: June 2024 daily records of minimum daily temperature, i.e. highest/lowest values of minimum daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. Five new record for highest minimum daily temperature was set. None were set for lowest minimum daily temperature.

ALASKA CLIMATE RESEARCH CENTER

This information consists of climatological data compiled by the Alaska Climate Research Center, Geophysical Institute, University of Alaska Fairbanks. For more information on weather and climatology, visit the center website at <http://akclimate.org>. Please report any comments, ideas or errors to uaf-climate@alaska.edu.