Alaska Climate Research Center
The Alaska State Climate Center

STATEWIDE CLIMATE SUMMARY JULY 2024

Aerial view of a glacier southwest of Mount Hayes in early July. Photo: Martin Stuefer

IN THIS ISSUE

Monthly Highlights.....pg. 2
Significant Weather Events and Synoptics.....pg. 3
Statewide Temperatures.....pg. 4
Precipitation .....pg. 7
Wildfires.....pg. 10
Arctic Sea Ice.....pg. 12
Newsworthy Information.....pg. 15

GEOPHYSICAL INSTITUTE
University of Alaska Fairbanks

Alaska's Statewide Climate Summary for July 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

Cool and rainy July in most of Alaska

Wettest July on record in Juneau and McGrath

Heat wave with up to 90°F in the Interior

First snow at higher elevations during the last days of the month

Significant Weather Events and Synoptics

After a hot and smoky June, the first week of July brought cooler weather and welcome rains that dampened fire activity. A low-pressure system centered over the Aleutians along with low pressure over the Chukchi and Beaufort Sea produced changeable conditions with multiple rounds of precipitation moving across the state during the Independence Day week. In the following, the low over the Aleutians shifted south into the Gulf of Alaska and the Arctic low-pressure system extended its reach into mainland Alaska (Fig. 1, upper panel). This allowed colder, Arctic air masses to move south. Downstream (east) of the Gulf of Alaska low, ridging and warm air advection contributed to above average temperatures in Southeast Alaska while the rest of the state experienced cooler than normal weather.

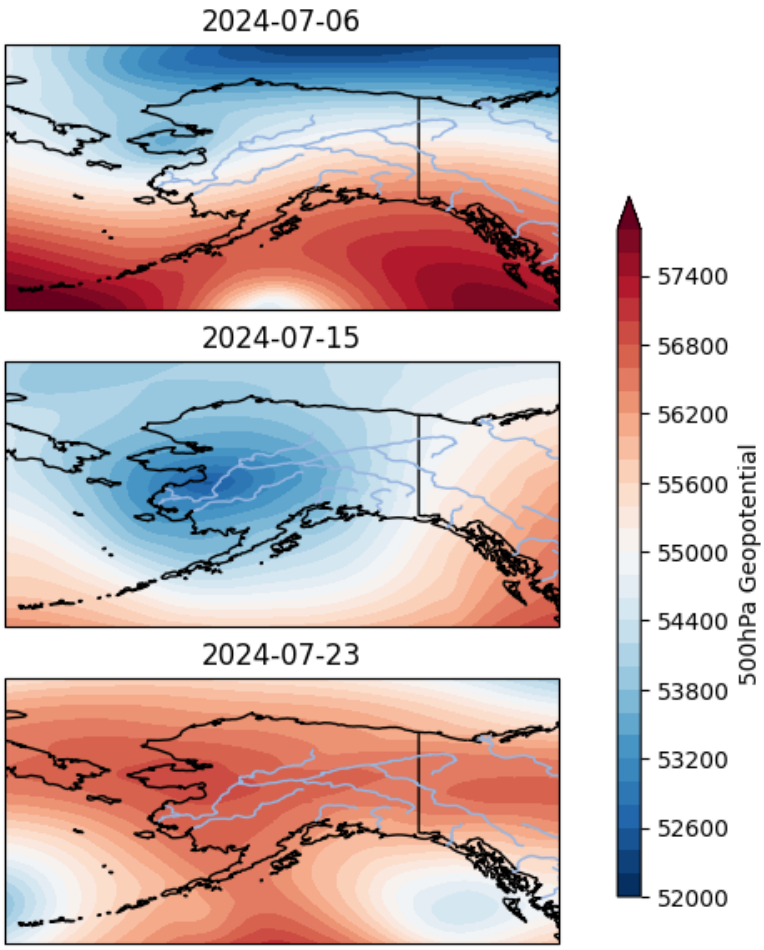

Figure 1. *500hPa Geopotential over Alaska on July 6, 15, and 23.* ERA5 reanalysis data courtesy of copernicus.eu

This general pattern persisted until around July 10th, when most regions returned to near average temperatures as the upper-level low moved east and the ridge over the Panhandle weakened. In the following days, a storm system in the Bering Sea intensified and brought very wet conditions across much the state. Flood advisories were issued for certain locations in the Southeast, where an atmospheric river brought even more rain. Multiple records for daily precipitation sums were set between July 10 and 18 in Juneau, Sitka, and Yakutat.

By mid-month, the Bering Sea low pressure had moved into mainland Alaska (Fig. 1, middle panel). Colder, Arctic air masses once again moved south and temperatures dropped

substantially in west, north, and Interior. The upper level troughing then gradually weakened and the centre of the low pressure system “retreated” to Arctic waters, while a cutoff low formed in the Gulf of Alaska.

This allowed high pressure to move into much of the state by around July 20. Temperatures rose to well above average values, particularly in the Interior (Fig 1, lower panel). Notably, McGrath set a daily temperature record (90°F!) as well as a daily precipitation record (1.23’’) on July 24th. The precipitation was due to a thunderstorm that rolled in after the daily maximum temperature was reached.

July ended with a return to cooler weather as low pressure spread into the state from the north and west, bringing much colder air masses. Higher elevations saw the first snowfalls of the season. However, summer is not over quite yet as the forecast calls for a return of warmer temperatures as we move into August.

Temperature

July was cooler than the 1991-2020 climate normal at most of the selected stations (Fig. 2, Table 1). Kotzebue was coldest in relative terms for the second month in a row with a deviation from normal of -4.3°F, followed by McGrath with -3.2°F. Bethel, King Salmon, Kodiak, Nome, and Talkeetna also had negative deviations of more than 2°F. Yakutat and Ketchikan were warmest with moderately positive deviations of +1.0 and +1.3°F, respectively. The low monthly mean temperature in Kotzebue is related to the prolonged cold spell early in the month. The warm period between about July 20 and July 26 (Fig. 1, lower panel) was less pronounced in Kotzebue than at other stations on the west coast, e.g. Nome and Bethel (Fig. 3), which were impacted by the warm air mass a few days earlier.

In general, the patterns of daily temperature anomalies (Fig. 3) are quite consistent across the selected stations this month. The warm period mentioned above stands out, as do the cool phases before and after. The magnitudes of the anomalies are greatest in the north and Interior, while the coastal areas further south show the more moderate anomalies typical of a maritime climate. Ketchikan is the only stations that substantially deviated from the regional pattern in July. Here, only a few days of below average temperatures

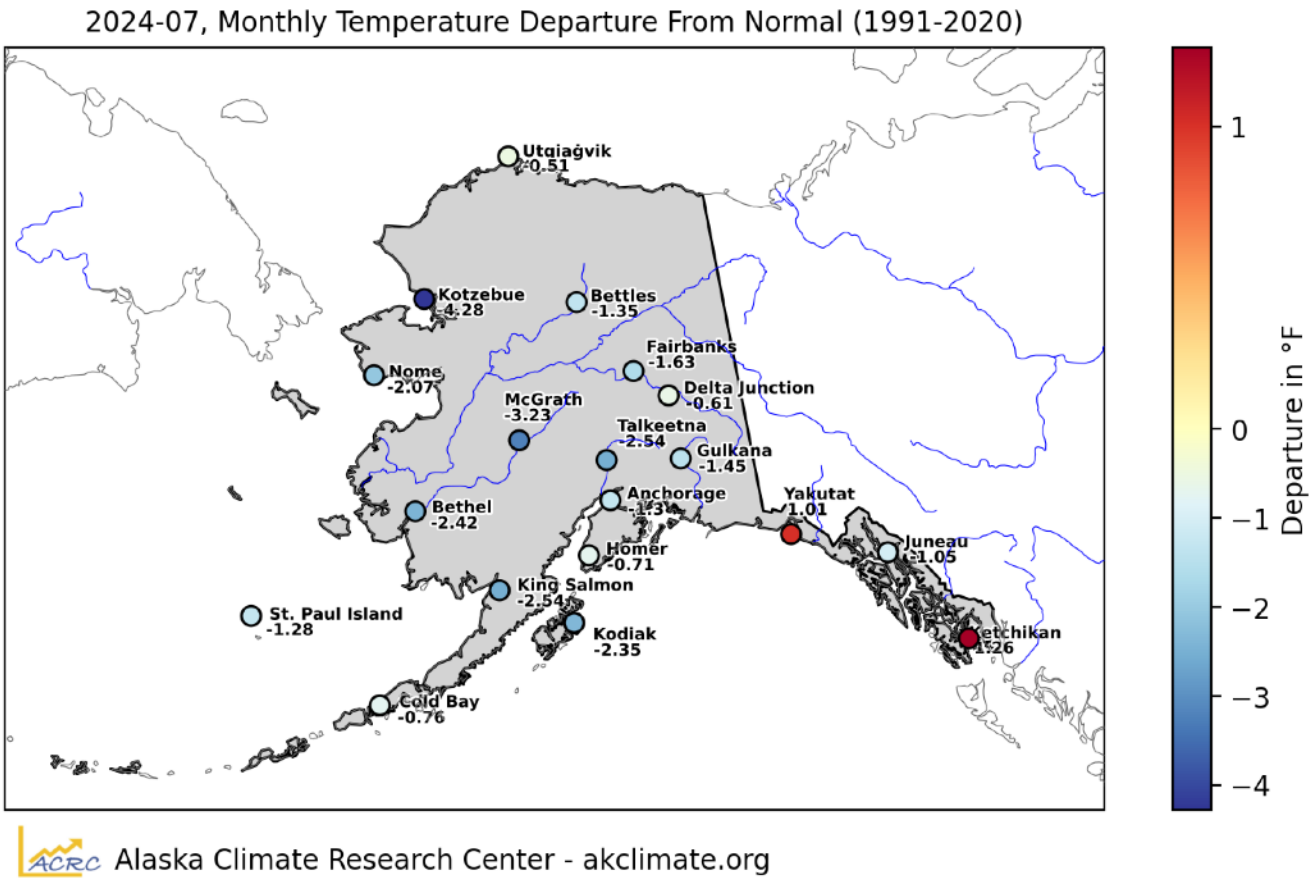

Figure 2 *Monthly mean temperature departure from normal (ºF), July, 2024, at the selected First Order stations in Alaska.*

were recorded and most of the month was moderately warmer than normal. Daily deviations of up to +8°F (July 7) were recorded during the first half of the month.

Multiple daily temperature records were set during the very warm episode between July 21 and 25 in southern half of the state and in the Interior. The record setting 90°F in McGrath on July 24 beat the previous record set in 1968 by 4°F. The only high record outside of this timeframe was set on July 2 in Utqiaġvik. Anchorage recorded their coldest 14th of July since the start of the time series with a daily mean temperature of 52°F. See the tables in the appendix for a full list of daily temperature records set this month.

Station	Observed (ºF)	Normal (ºF)	Departure (ºF)
Anchorage	58.3	59.6	-1.3
Bethel	53.9	56.3	-2.4
Bettles	58.5	59.8	-1.3
Cold Bay	50.8	51.6	-0.8
Delta Junction	60.1	60.7	-0.6
Fairbanks	61.3	62.9	-1.6
Gulkana	56.5	57.9	-1.4
Homer	55.4	56.1	-0.7
Juneau	56.0	57.0	-1.0
Ketchikan	60.1	58.8	1.3
King Salmon	54.2	56.8	-2.5
Kodiak	53.8	56.2	-2.3
Kotzebue	51.0	55.3	-4.3
McGrath	57.6	60.8	-3.2
Nome	49.9	52.0	-2.1
St. Paul Island	46.6	47.9	-1.3
Talkeetna	57.5	60.1	-2.5
Utqiaġvik	41.1	41.7	-0.5
Yakutat	56.4	55.4	1.0

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

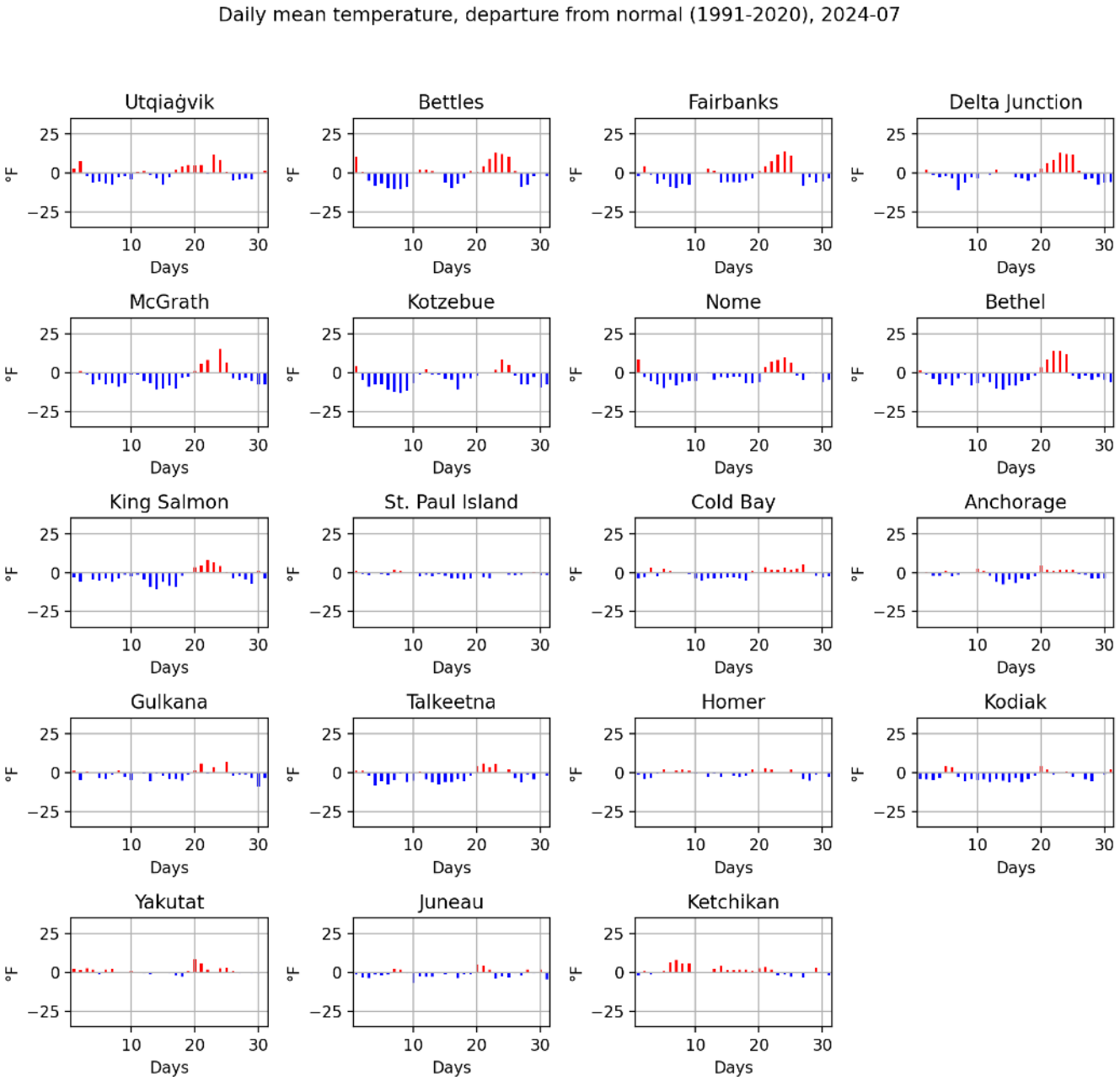

Figure 3. *Daily mean temperature departures for each day in July 2024 at the selected stations.*

Precipitation

July was considerably wetter than average in most of Alaska, making up for the unusually dry June. Nome, which had only 21% of the normal precipitation last month, tops the list this time with 262% of normal. Juneau, McGrath, Kotzebue, Talkeetna, and Anchorage

also had more than 200% of the 1991-2020 average (Fig. 4 & 5, Table 2). Juneau and McGrath both had their wettest July on record with totals of 12.2'' and 6.2'', respectively. Delta Junction and Kodiak were the driest stations in relative terms with 48% and 45% of normal, respectively. Gulkana and Ketchikan were also drier than normal with 64% and 63% of normal.

The contrast between the record breaking rain in Juneau and the dry conditions in Ketchikan is quite striking this month. The southern-most part of the Panhandle was updated from abnormally dry to moderate drought conditions in early July (Alaska drought monitor). Drought in this region of Alaska can impact hydropower operations and fisheries.

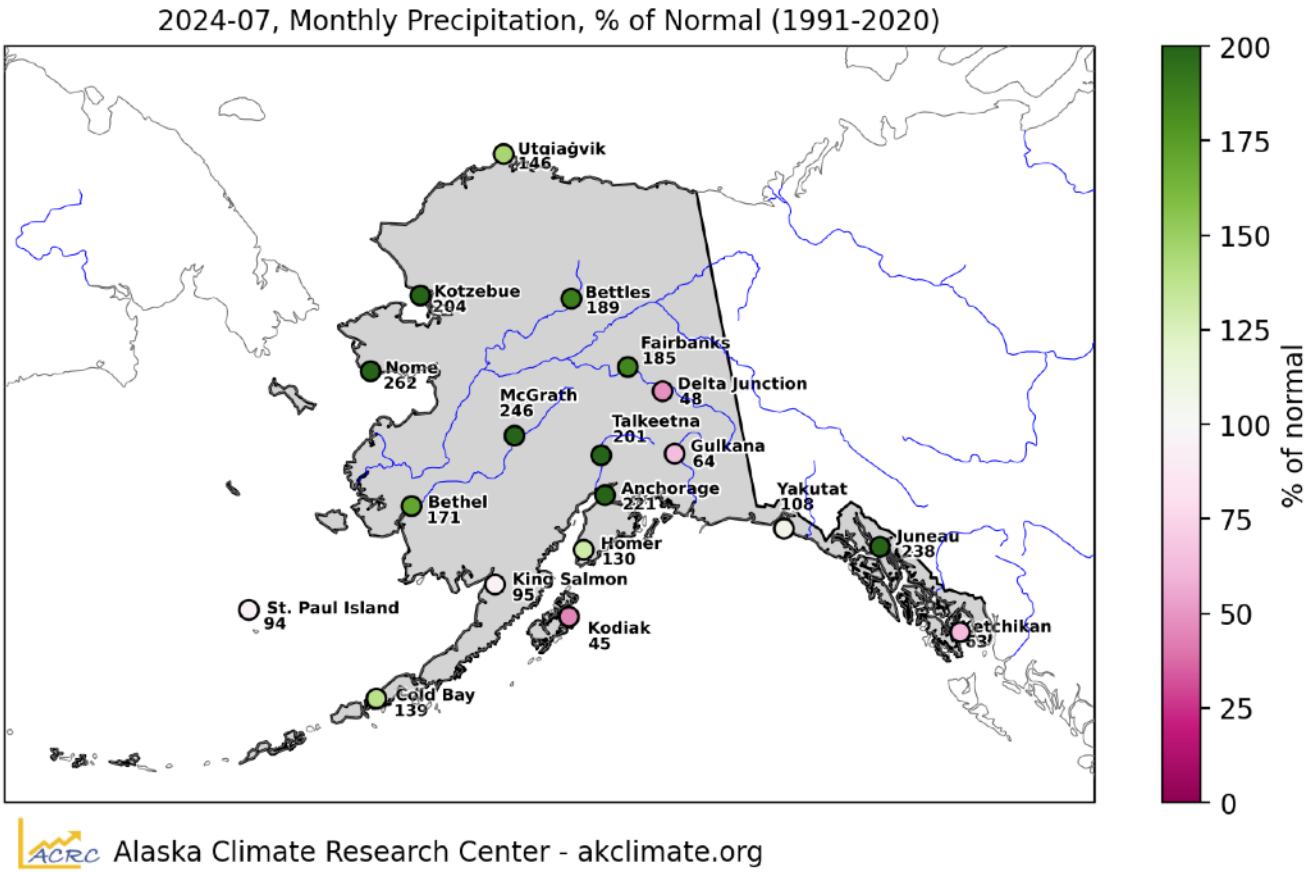

Figure 4. *Monthly precipitation in percentage of normal (ºF, 1991-2020 reference period), July, 2024, at the selected First Order stations in Alaska.*

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	4.0	1.8	221.4
Bethel	4.4	2.6	170.8
Bettles	4.4	2.3	189.2
Cold Bay	3.5	2.5	139.0
Delta Junction	1.1	2.4	48.1
Fairbanks	4.2	2.3	185.0
Gulkana	1.1	1.7	63.8
Homer	1.9	1.5	130.3
Juneau	12.2	5.1	237.5
Ketchikan	4.6	7.3	63.3
King Salmon	2.3	2.5	94.7
Kodiak	2.0	4.5	45.2
Kotzebue	3.3	1.6	203.7
McGrath	6.2	2.5	246.4
Nome	6.2	2.4	262.1
St. Paul Island	1.9	2.0	93.9
Talkeetna	5.8	2.9	201.4
Utqiaġvik	1.4	1.0	145.9
Yakutat	8.2	7.6	108.0

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, July 2024. Colors match the color scale in Figure 4.*

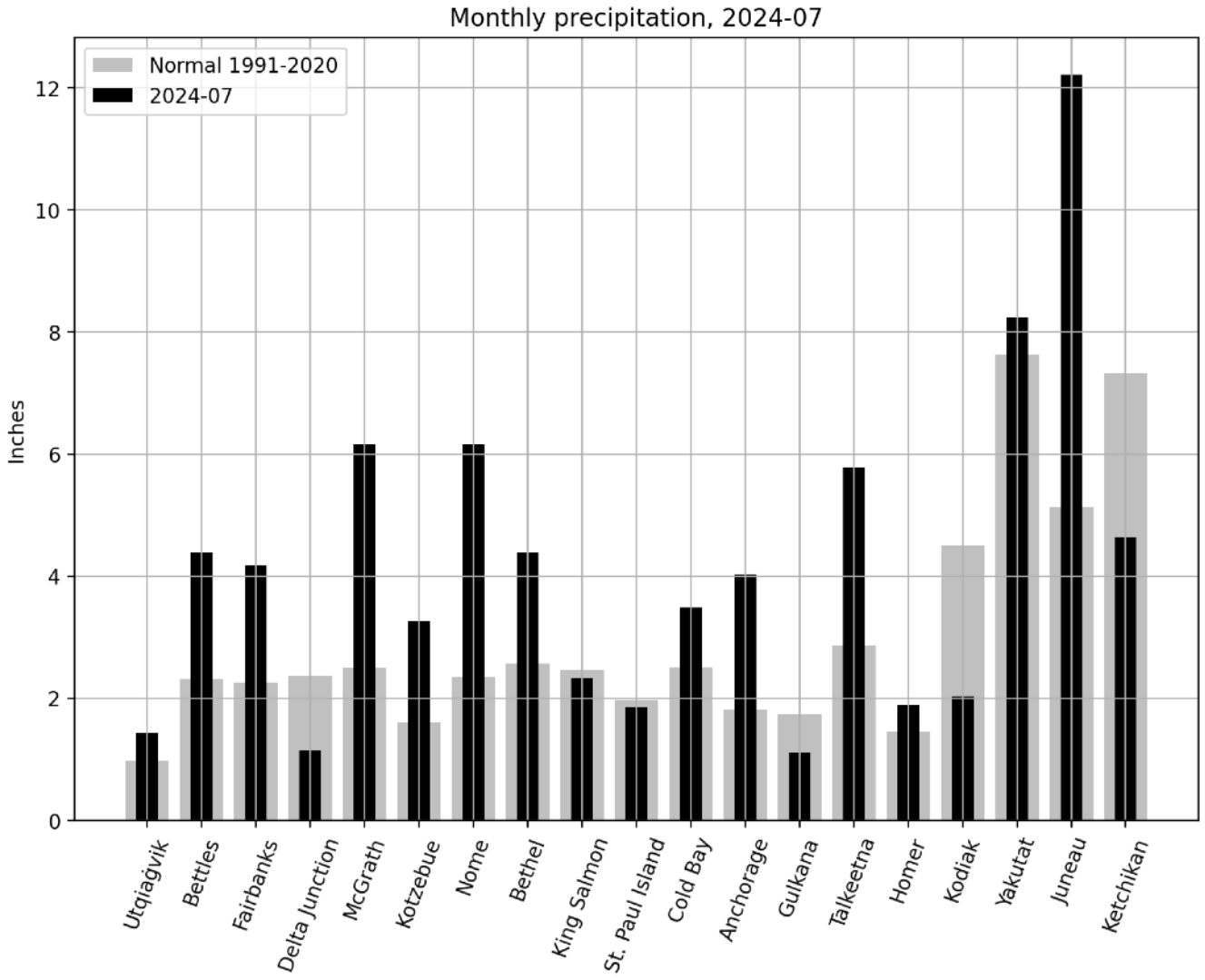

Figure 5. *Monthly precipitation sum (black bars) compared to the 1991-2020 normal (grey bars) at the First Order stations.*

Wildfires

Starting into July, numerous fires were active in the Interior and western Alaska impacting air quality and threatening several roads and settlements. As the rainy, cooler weather set in, fire activity dampened quickly. The heatwave from about July 21 to July 26 caused a renewed increase fire danger and new fires popped up near Eagle, Tok, and Venetie. Firefighters took active measures to protect properties from the Sinnott Fire northwest of Eagle before the wetter weather during the last days of the month reduced the fire activity. The T'eedriinjik Fire near Venetie was subdued using water dropping aircraft.

There has been only very little growth in total burned area since July 5th. Upticks in fire activity during August are not unheard of - see for example 2004 and 2005 in Fig. 6 - but it looks like the 2024 fire season may have come to a relatively early close.

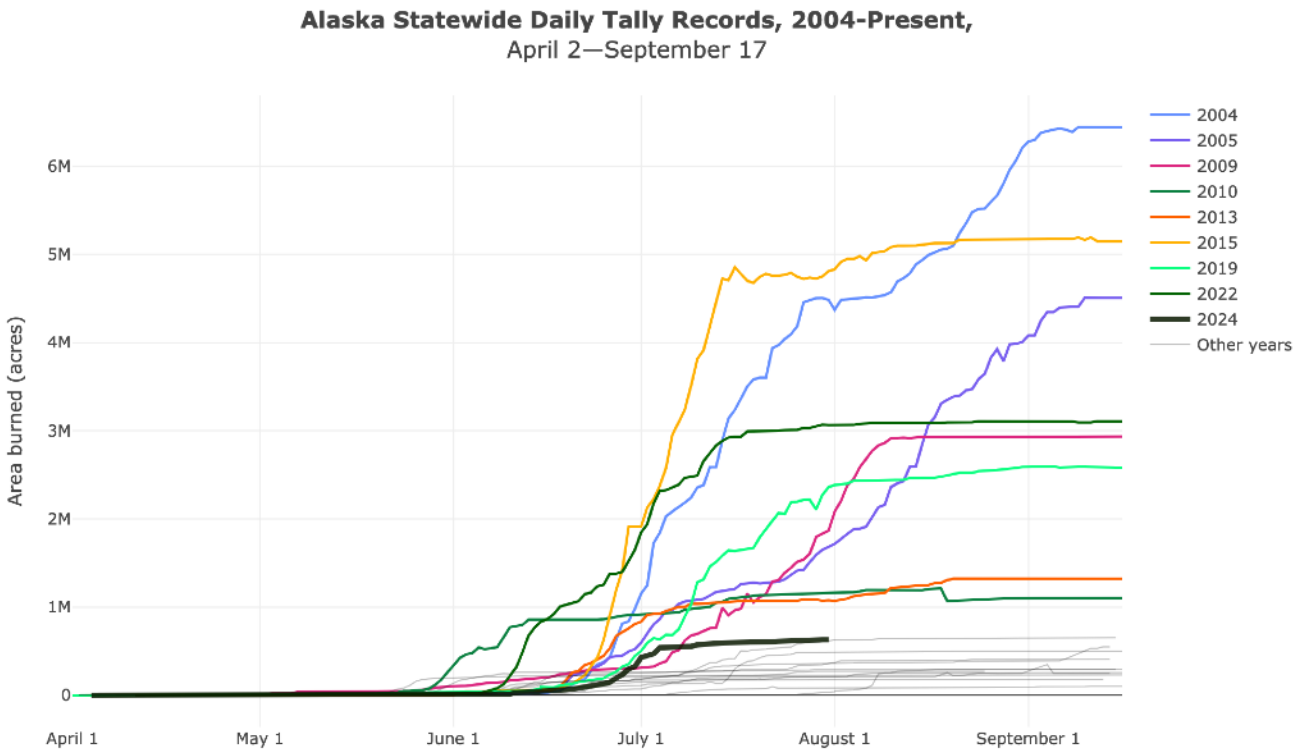

Figure 6. *Daily tally of burned area in Alaska for selected years. Plot courtesy of UAF SNAP (https://snap.uaf.edu/tools/daily-fire-tally)*

Arctic Sea Ice

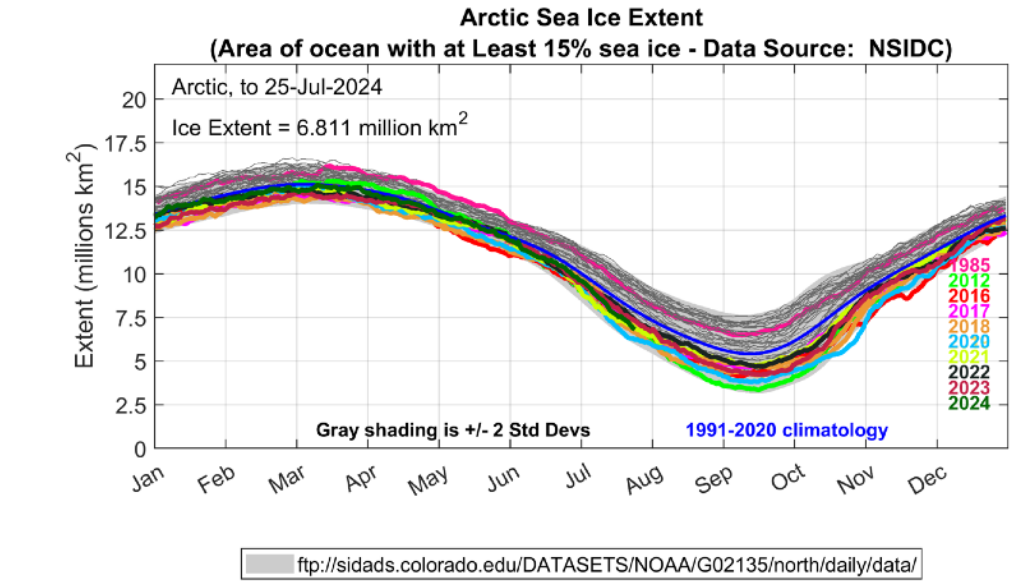

Figure 8. *Time series of daily Arctic sea ice extent. This year's data (dark red) are updated until July 25, 2024. The median sea ice extent for the 1991-2020 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (nsidc.org/)*

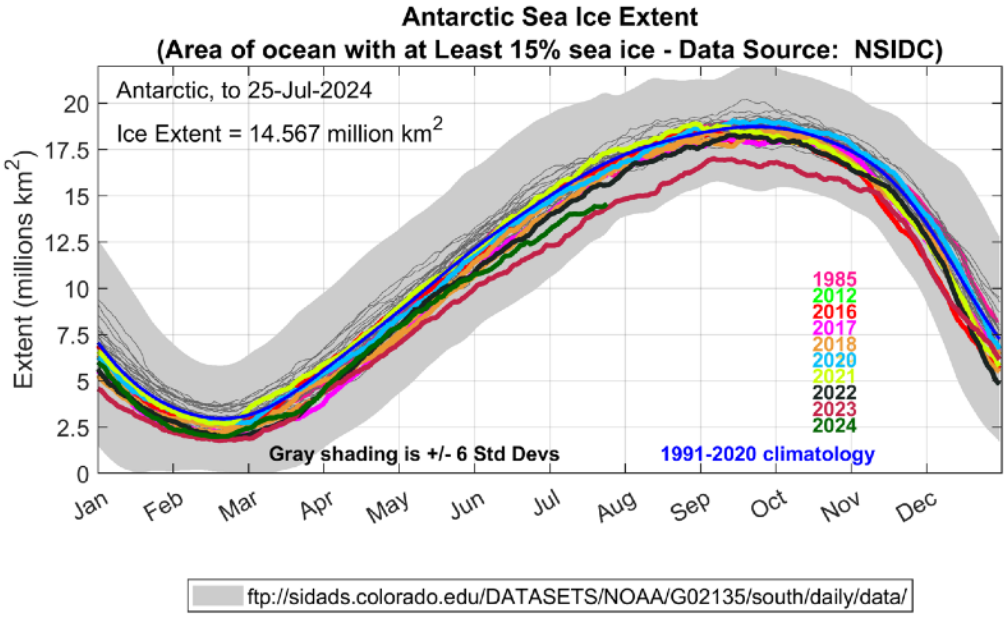

Figure 9. *Time series of daily Antarctic sea ice extent. This year's data (dark red) are updated until July 25, 2024. The median sea ice extent for the 1991-2020 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (nsidc.org/)*

Arctic sea ice extent has been decreasing at relatively large weekly rates of 9-10% since mid-July. As of July 25, the sea ice extent was 6.811 km2, down from 10.097 m km2 on June 27. This is comparable to 2018 and 2020 and the third lowest extent on record for the time of year. Fig. 8 shows the development of Arctic sea ice extent for the current season compared to prior years.

Globally, sea ice extent is currently at record setting low values. This is due to very low sea ice extent in the waters around Antarctica, where sea ice has dropped to levels similar to and even below the extremely low values reached during the southern winter season of 2023 (Fig. 9). Note that the grey shading in Fig. 9 indicates 6 standard deviations.

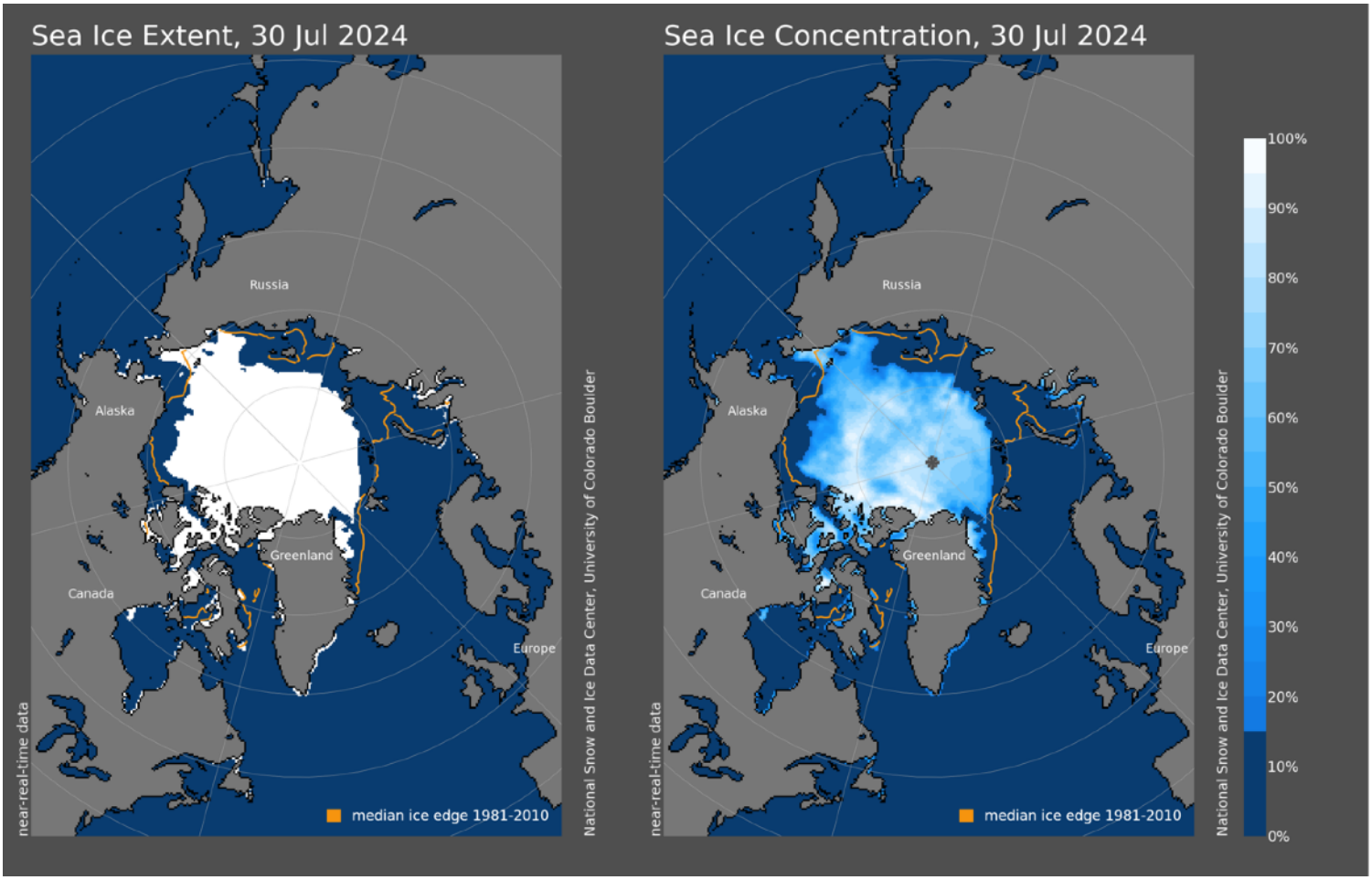

Figure 10. *A (left) Arctic sea ice extent and B (right concentrations as of July 30, 2024 compared to the average from 1981-2010 (Data and images: NSIDC)*

Newsworthy Information

Glacier dam release on the Salmon River, concerns about Suicide Basin

The Juneau NWS office reported that a glacier dam has released near the Salmon Glacier, leading to a spike in water levels on the Salmon River near Hyder along the border between AK and British Columbia.

Suicide Basin, known to produce periodic glacial lake outburst floods (GLOFs) that impact communities along the Mendenhall River, has been filling up due to the copious amount of rain this month. If and when a release and subsequent flood might happen is difficult to predict, but the basin still had some remaining capacity in late July. Suicide Basin is equipped with cameras and other monitoring instrumentation, which can be viewed at: https://www.weather.gov/ajk/suicidebasin

More information: Article in the Juneau Empire.

90°F in Alaska

The heatwave in late July made headlines in the Scientific American: It's Going to Hit 90 Degrees in Alaska This Week

Appendix

Highest Mean Daily Temperature on Record				
Station	**Date**	**New Record (ºF)**	**Year of Old Record**	**Old Record (ºF)**
Bethel	2024-07-22	70.0	1980	66.5
Bethel	2024-07-23	70.0	1966	67.5
Delta Junction	2024-07-23	73.0	1968	71.5
McGrath	2024-07-24	75.0	2018	71.0
Yakutat	2024-07-20	64.5	1990	62.0
Lowest Mean Daily Temperature on Record				
Anchorage	2024-07-14	52.0	1955	53.0

Table A1: July 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. Five new high records and one new low record were set.

Highest Maximum Daily Temperature Record				
Station	**Date**	**New Record (ºF)**	**Year of Old Record**	**Old Record (ºF)**
Bethel	2024-07-22	84.0	1980	79.0
Bethel	2024-07-23	85.0	1966	81.0
Cold Bay	2024-07-03	66.0	1980	63.0
King Salmon	2024-07-22	81.0	2017	80.0
McGrath	2024-07-24	90.0	1968	86.0
Lowest Maximum Daily Temperature Record				

Anchorage	2024-07-14	54.0	1955	56.0

Table A2: July 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. Five new highest and one new lowest maximum daily temperature records were set.

Highest Minimum Daily Temperature Record				
Station	**Date**	**New Record (ºF)**	**Year of Old Record**	**Old Record (ºF)**
Bethel	2024-07-24	56.0	1985	55.0
Delta Junction	2024-07-23	62.0	1968	59.0
Fairbanks	2024-07-25	63.0	2023	62.0
McGrath	2024-07-25	60.0	2023	59.0
Utqiaġvik	2024-07-02	44.0	2019	43.0
Yakutat	2024-07-21	58.0	1981	55.0

Table A3: July 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. Six new records for highest minimum daily temperature were set. None were set for lowest minimum daily temperature.

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.