



Alaska Climate Research Center
The Alaska State Climate Center

2024-03-01 18:23:52



STATEWIDE CLIMATE SUMMARY MARCH 2024

IN THIS ISSUE

| | |
|--|--------|
| Monthly Highlights..... | pg. 2 |
| Significant Weather Events and Synoptics..... | pg. 3 |
| Statewide Temperatures..... | pg. 5 |
| Precipitation and snow..... | pg. 8 |
| Arctic Sea Ice..... | pg. 12 |
| Newsworthy Information..... | pg. 14 |

Polar bears out for a stroll near Utqiagvik on March 1, 2024. Webcam image from the DOE Atmospheric Radiation Measurement research facility. Photo courtesy Telayna Wong, ACRC.



Alaska’s Statewide Climate Summary for March 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

Slightly cooler than average March in the southwest, warm elsewhere

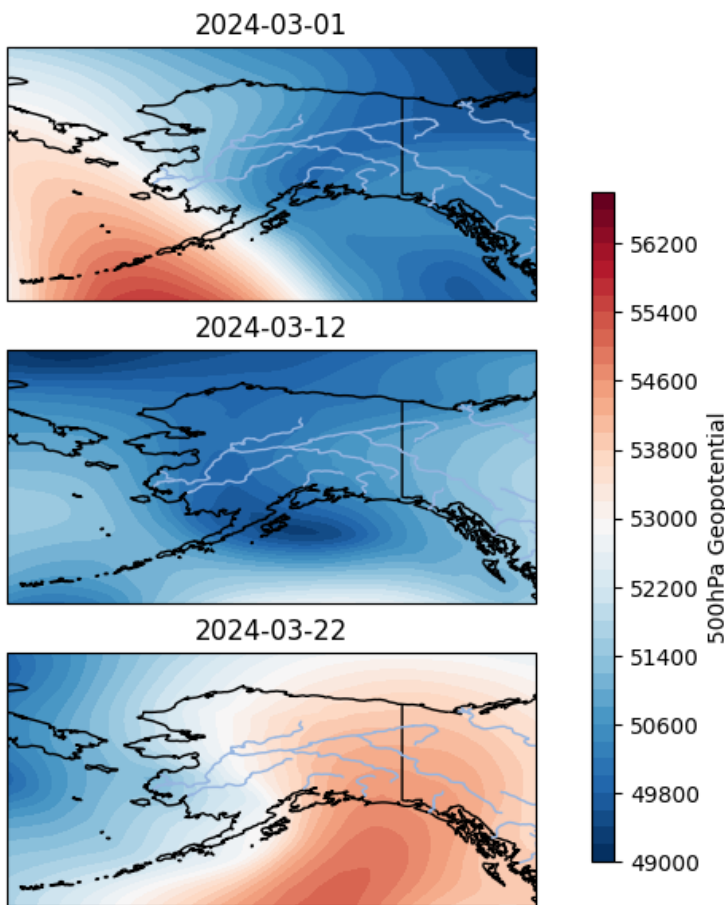
Very high temperatures during the last third of the month

Precipitation: Dry month in the Interior, wet on the West Coast

Sea ice has likely reached the seasonal maximum

Significant Weather Events and Synoptics

March started out with pronounced ridging in the Bering Sea and upper level troughing over Alaska and the Gulf of Alaska. The first days of the month saw warm temperatures in the west due to the influence of the high pressure system in the Bering Sea and colder than average weather in southern and Interior Alaska (Fig. 1, top panel). The Panhandle in particular had a notable cold spell that lasted until about March 5. Further west, the high pressure system brought a few days of warmer temperatures as it gradually moved from the Bering Sea into Alaska. Meanwhile, new storm systems built over eastern Russia and made their way into the Bering Sea.



These systems reached the AK coast towards the end of the first week of March. Winter weather advisories were issued for the parts of the Chukchi coast and in the Interior. Southwestern Alaska and South-central saw high winds, some snow flurries and a return of much colder temperatures. Cold, Arctic air masses moved into much of the state in the following days as upper level troughing spread over mainland Alaska. Temperatures dropped to well below the seasonal average in the north, the western coastal areas and most of the Interior for the second week of the month (Fig. 1, middle panel). The Panhandle remained warmer than usual during this period due to its location downstream of the main trough and associated warm air advection in the upper levels.

Figure 1. 500hPa Geopotential over Alaska on March 1, 12, and 22. ERA5 reanalysis data courtesy of copernicus.eu

Around mid month, the large scale pattern shifted to a more meridional

constellation, with troughing over the Aleutians flanked by ridging over parts of the Bering Sea as well as along the coastline of the Pacific Northwest and British Columbia. This brought rising temperatures throughout the state along with high winds and snow fall at higher elevations.

Moving into the last third of the month, high pressure expanded from the Gulf of Alaska over much of the state while an upper level trough formed in the Bering Sea (Fig. 1, bottom panel). This combination allowed warm air masses to flow towards the Arctic. Northern Alaska experienced much warmer than average conditions with up to 30°F recorded in Utqiagvik. The weather on west coast remained unsettled and stormy during this period.

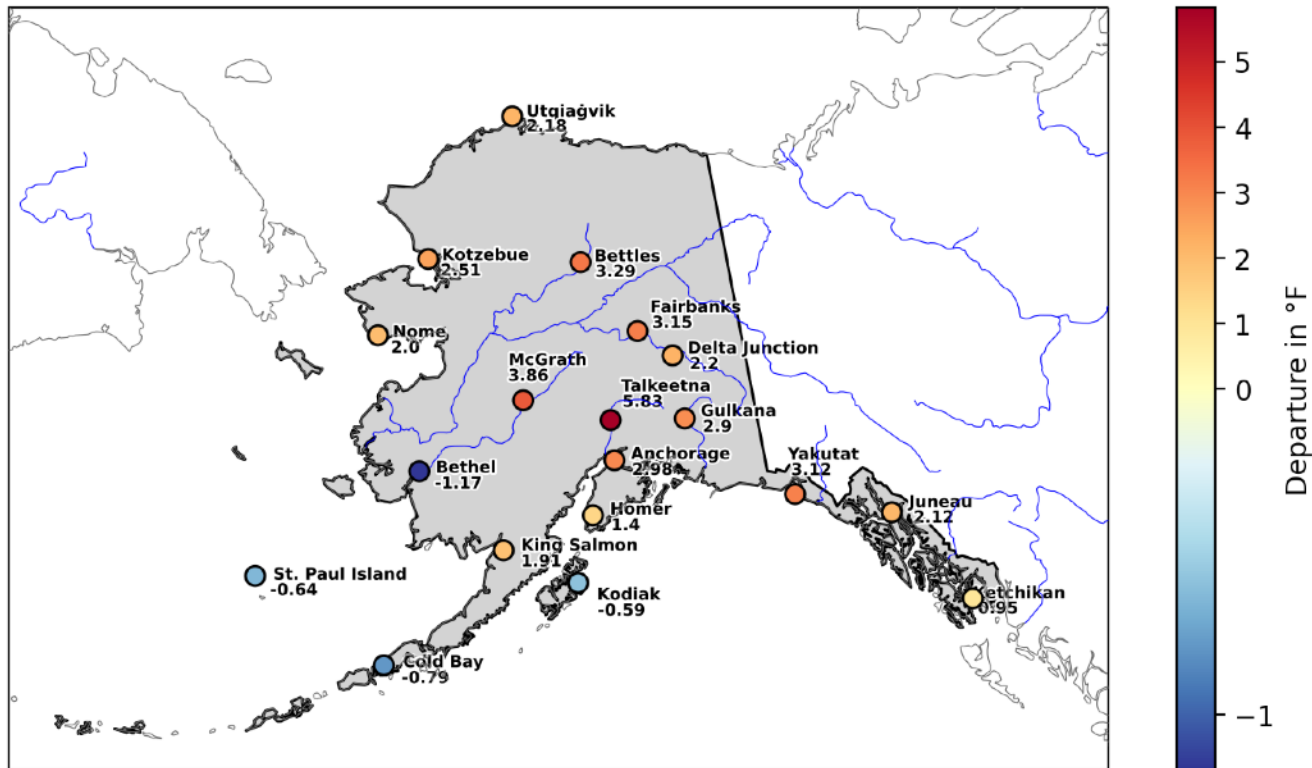
Winter returned to many parts of the state for the last few days of March and the Easter weekend as another round of Bering Sea storms pushed into mainland Alaska. Temperatures dropped from “unusually warm” to near normal levels and precipitation spread into the Interior and to the southern parts of the state. Snow fall and high winds caused hazardous driving conditions in many regions.



Figure 2. Another visitor at the DOE Atmospheric Radiation Measurement station in Utqiagvik on March 14. Photo courtesy Telayna Wong, ACRC.

Temperature

2024-03, Monthly Temperature Departure From Normal (1991-2020)




 Alaska Climate Research Center - akclimate.org

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

Most of Alaska had a warmer than average March. The southwest deviates from this pattern with monthly mean temperatures slightly below the 1991-2020 average. Bethel was the coldest of the First Order stations in relative terms this month with -1.2°F below normal. St. Paul Island, Kodiak, and Cold Bay also had slightly below normal monthly temperatures. All other First Order stations were warmer than average. McGrath and Talkeetna were warmest in relative terms with deviations of $+3.9^{\circ}\text{F}$ and $+5.8^{\circ}\text{F}$, respectively. Most of the Interior and South-central stations recorded deviations in the range of $2\text{-}3^{\circ}\text{F}$ above normal.

As usual, the relatively moderate monthly mean deviations “hide” substantial temperature swings (Fig. 4). The first third of March saw colder than normal temperatures in many regions, followed by a few warmer days and a renewed cold spell in the west, Interior, and north. The First Order stations on the Panhandle and in South-central Alaska up to Talkeetna did not experience the over a week long cold spell around mid month and remained consistently warmer than normal until the end of the month. The last third of March was much warmer than the climatological reference period (1991-2020) in the Interior and northwest. Fairbanks had its first day of the year with a daily maximum of over 50°F on March 22, about 3 weeks earlier than usual as per the NWS Fairbanks office.

Starting with the pattern change around mid-month, numerous new daily temperature records were set. The First Order stations on the Panhandle had a very warm few days between March 14 and 16 with multiple new daily temperature records. In the west, Interior and northern Alaska, most daily records occurred later in the month. The daily maximum in Fairbanks reached 51°F on March 24 and Utqiagvik recorded an impressive 30°F on March 22. The only new low record for daily temperatures this month was set in Ketchikan on March 5 on the tail end of the southeast Alaska cold spell early in the month.

| Station | Observed (°F) | Normal (°F) | Departure (°F) |
|----------------|---------------|-------------|----------------|
| Anchorage | 28.8 | 25.8 | 3.0 |
| Bethel | 13.3 | 14.5 | -1.2 |
| Bettles | 7.0 | 3.7 | 3.3 |
| Cold Bay | 29.1 | 29.9 | -0.8 |
| Delta Junction | 16.4 | 14.1 | 2.2 |
| Fairbanks | 13.9 | 10.7 | 3.1 |
| Gulkana | 17.6 | 14.7 | 2.9 |
| Homer | 31.5 | 30.1 | 1.4 |
| Juneau | 35.0 | 32.9 | 2.1 |
| Ketchikan | 39.0 | 38.0 | 1.0 |
| King Salmon | 25.4 | 23.5 | 1.9 |

| Station | Observed (°F) | Normal (°F) | Departure (°F) |
|-----------------|---------------|-------------|----------------|
| Kodiak | 32.6 | 33.2 | -0.6 |
| Kotzebue | 4.0 | 1.5 | 2.5 |
| McGrath | 15.8 | 11.9 | 3.9 |
| Nome | 11.6 | 9.6 | 2.0 |
| St. Paul Island | 24.5 | 25.2 | -0.6 |
| Talkeetna | 29.6 | 23.5 | 5.8 |
| Utqiagvik | -8.3 | -10.5 | 2.2 |
| Yakutat | 35.0 | 31.9 | 3.1 |

Table 1. Mean monthly air temperature, normal (1991-2020) and departure for selected stations throughout the state, March 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), 2024-03

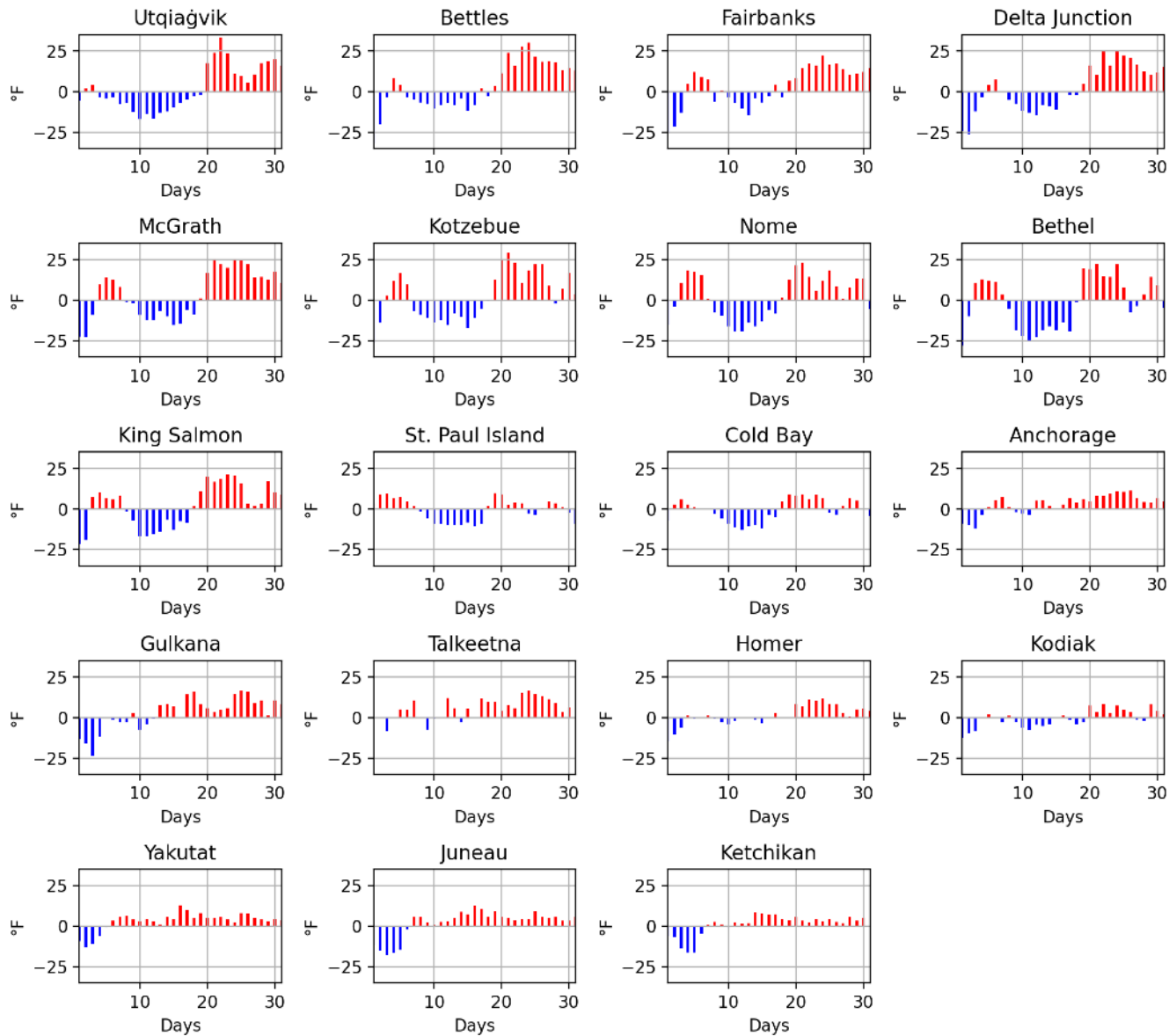


Figure 4. Daily mean temperature departures for each day in March 2024 at the selected stations.

Precipitation and snow

March was relatively wet along Alaska’s west coast and drier than normal in the Interior. South-central and the Panhandle were mostly close to normal or moderately drier than average. Delta Junction had a very dry month with zero accumulated precipitation. The station recorded trace values on a few days, which means that there was a little bit of

2024-03, Monthly Precipitation, % of Normal (1991-2020)

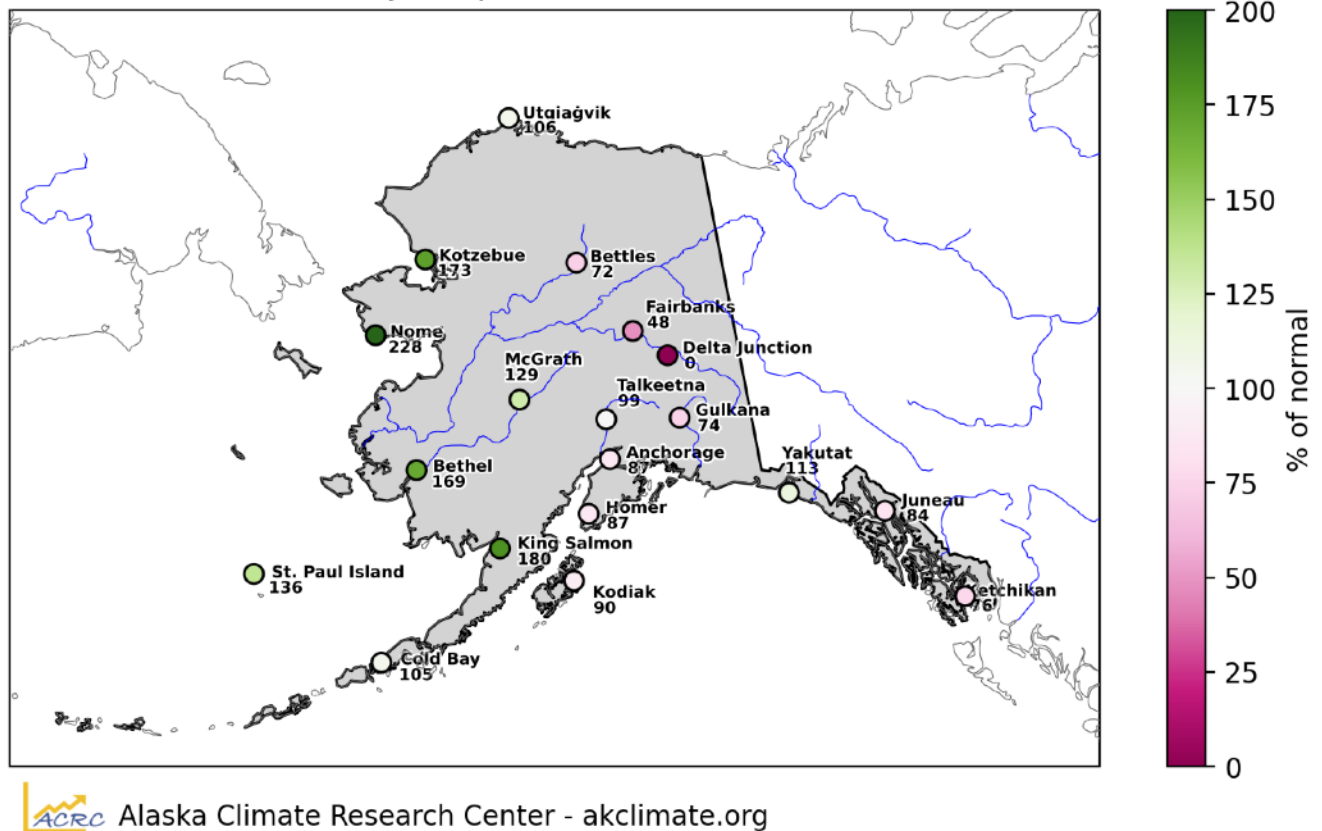


Figure 5. Monthly precipitation in percentage of normal (°F, 1991-2020 reference period), March, 2024, at the selected First Order stations in Alaska.

precipitation but it was below the amount that the instrument can accurately measure. Fairbanks was next driest in relative terms with 48% of normal precipitation. Nome was the wettest station this month in relative terms and recorded more than twice their normal precipitation (228%). King Salmon, Kotzebue, and Bethel also had a wet month with 180%, 173% and 169% of normal, respectively (Fig. 5 & 6, Table 2). Snow depth looks to have begun its seasonal decline in Fairbanks and Anchorage during the very warm period starting in the third week of the March (Fig. 7). The Anchorage snow pack is still well above normal but dropped substantially during the second half of March. Fairbanks saw a similar drop and is now slightly below normal. The snow depth in Bettles is still at mid-winter levels and close to normal. Juneau had their last few days with substantial snow at the airport station during the cold spell in early March. All of the four stations with long term snow records had less than average snowfall in March. Fairbanks was snowiest in relative terms but only received 54% of their normal snowfall. Anchorage, Bettles, and Juneau received 41%, 27%, and 21%, respectively.

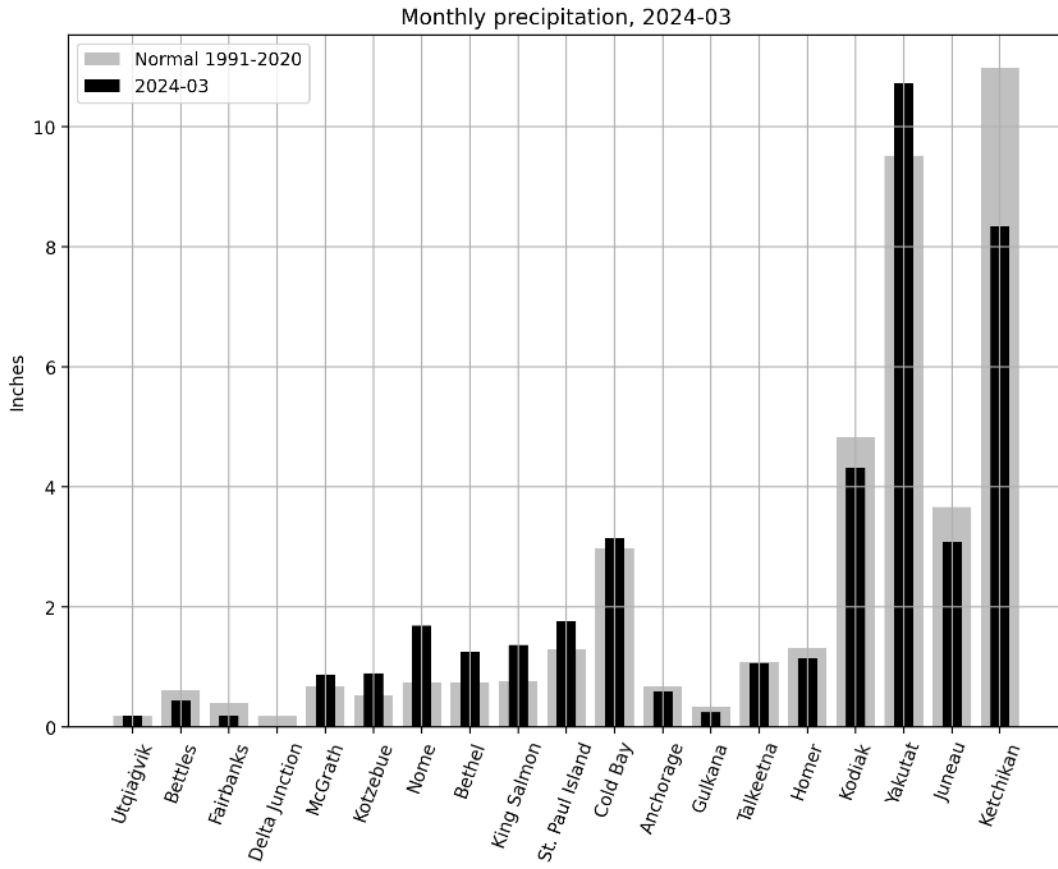


Figure 6. Monthly precipitation sum (black bars) compared to the 1991-2020 normal (grey bars) at the First Order stations.

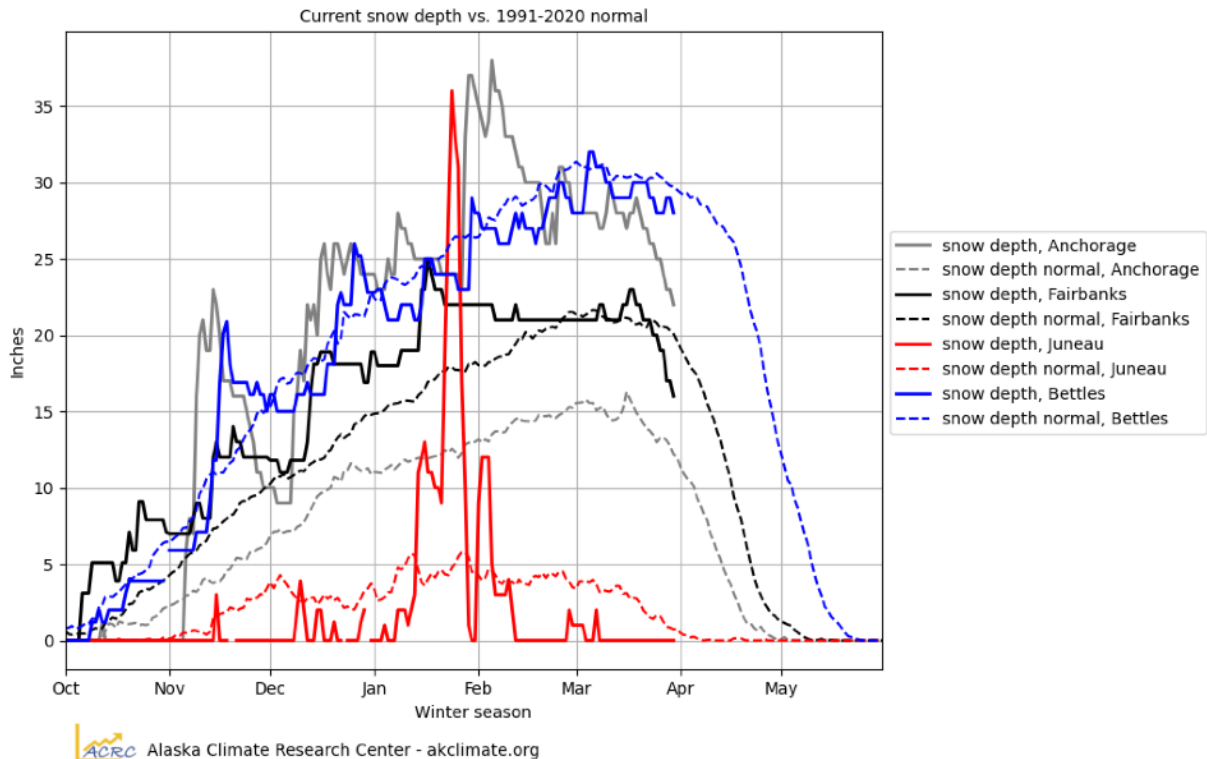


Figure 7. Current snow depth (as of March 30, 2024) compared to the 1991-2020 climatological mean in Anchorage (grey), Fairbanks (black), Juneau (red) and Bettles (blue).

| Station | Precipitation (in) | Normal (in) | % of Normal |
|-----------------|--------------------|-------------|-------------|
| Anchorage | 0.6 | 0.7 | 87.0 |
| Bethel | 1.3 | 0.7 | 168.9 |
| Bettles | 0.4 | 0.6 | 72.1 |
| Cold Bay | 3.1 | 3.0 | 105.4 |
| Delta Junction | 0.0 | 0.2 | 0.0 |
| Fairbanks | 0.2 | 0.4 | 47.5 |
| Gulkana | 0.2 | 0.3 | 73.5 |
| Homer | 1.2 | 1.3 | 87.1 |
| Juneau | 3.1 | 3.7 | 83.9 |
| Ketchikan | 8.3 | 11.0 | 76.0 |
| King Salmon | 1.4 | 0.8 | 180.3 |
| Kodiak | 4.3 | 4.8 | 89.6 |
| Kotzebue | 0.9 | 0.5 | 173.1 |
| McGrath | 0.9 | 0.7 | 129.4 |
| Nome | 1.7 | 0.7 | 228.4 |
| St. Paul Island | 1.8 | 1.3 | 136.4 |
| Talkeetna | 1.1 | 1.1 | 99.1 |
| Utqiagvik | 0.2 | 0.2 | 105.6 |
| Yakutat | 10.7 | 9.5 | 112.7 |

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, March 2024. Colors match the color scale in Figure 4.

Arctic Sea Ice

Arctic sea ice extent has been alternating between low growth rates and minor decreases since late February. The first week of March saw hardly any change in sea ice extent. Growth rates then picked up again a bit with a weekly increase of 1.28% for the second week of the month. This was followed by a weekly decrease of -0.61% and a slight weekly increase of 0.36% during the second half of the month. As of March 28, Arctic sea ice extent was 14.885 M km² and near the long term average for the time of year. [The NSIDC reports that this year's maximum extent was likely reached on March 25 with 15.01 M km².](#)

Figure 8 shows time series of sea ice extent while Figures 9 A and B show the Arctic sea ice extent and concentrations for March 30, 2024, compared to the average for the period 1981-2010.

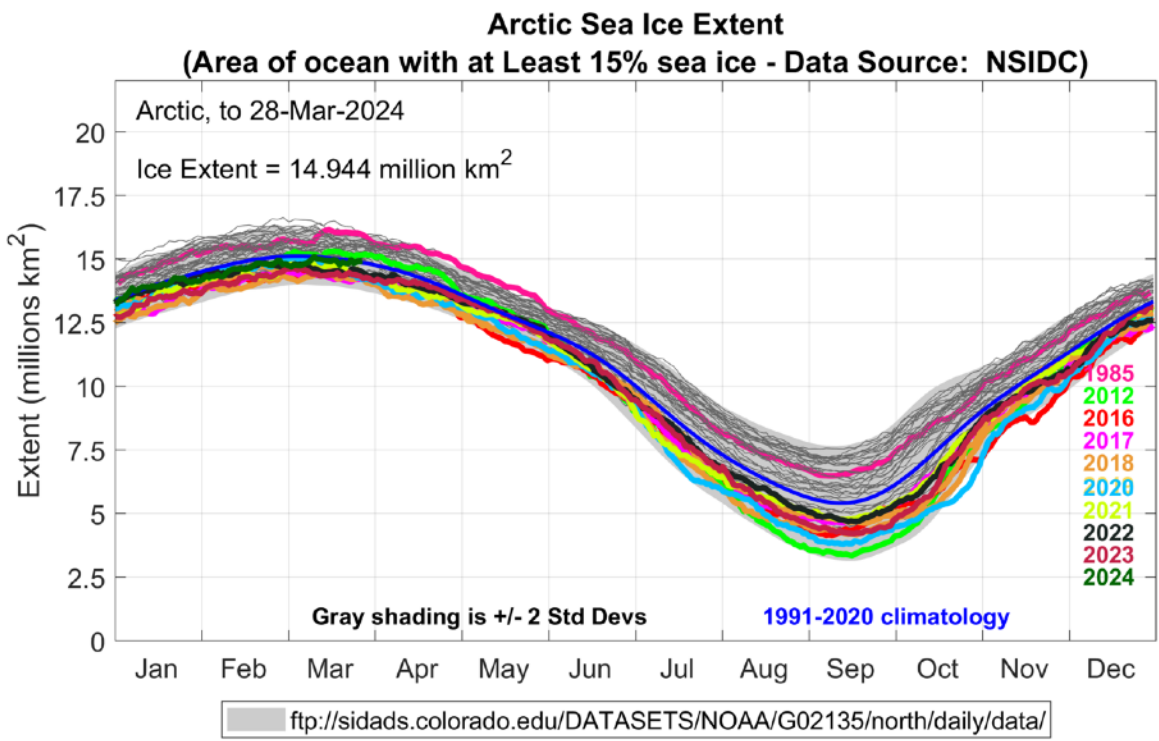


Figure 8. Time series of daily Arctic sea ice extent. This year's data (dark red) are updated until March 28, 2024. The median sea ice extent for the 1991-2020 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (nsidc.org/)

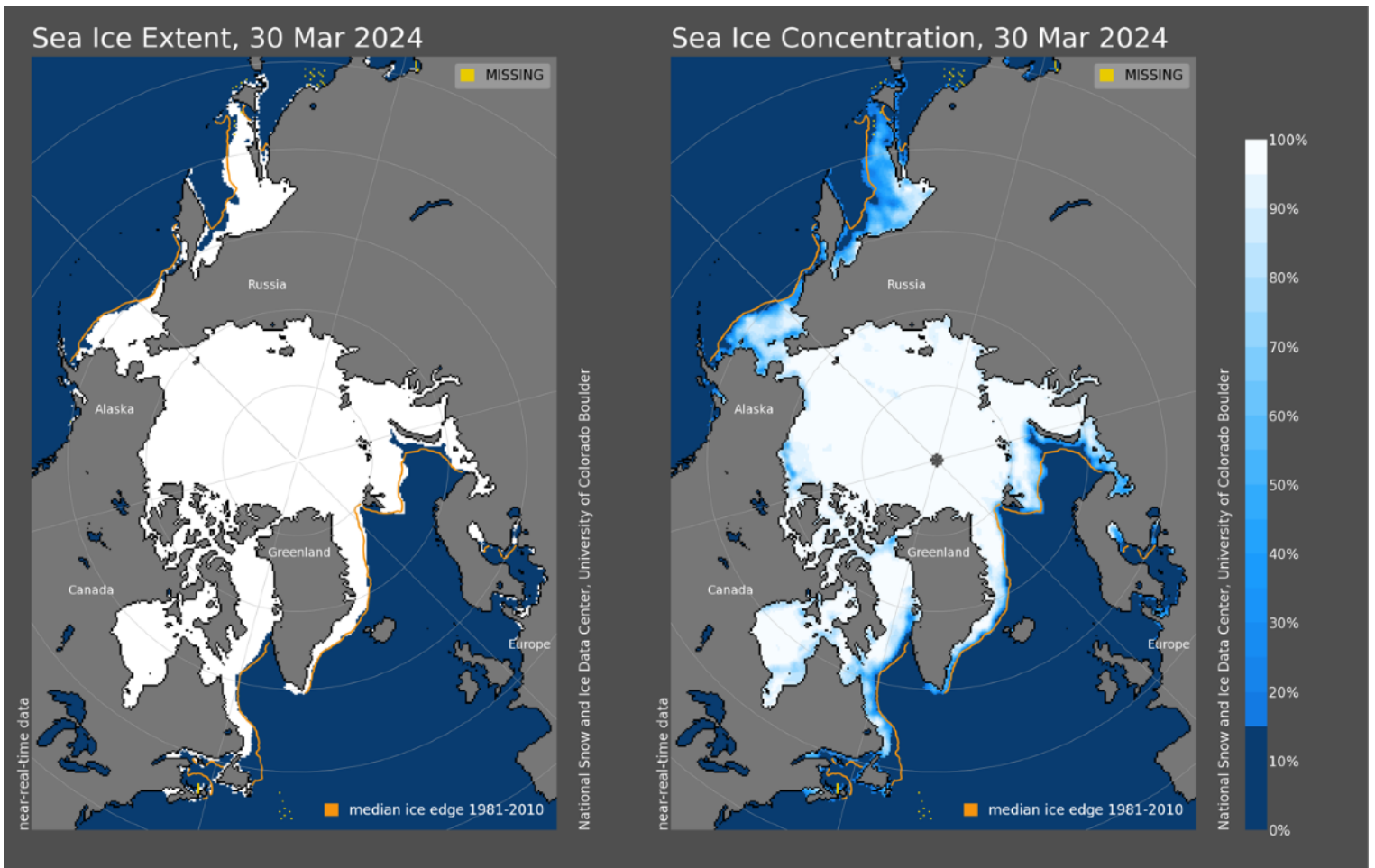


Figure 9. A (left) Arctic sea ice extent and B (right) concentrations as of March 30, 2024 compared to the average from 1981-2010 (Data and images: NSIDC)

Newsorthy Information

60 year anniversary of the Great Alaska Earthquake

On March 27, 1964, the second-largest earthquake ever recorded shook Alaska, causing widespread damage and permanently changing the landscape of south-central Alaska. More information on the historic Earthquake can be found in this [UAF GI news item](#) and in a detailed [story map created by the Alaska Earthquake Center](#).

UAF researchers help identify location for US military sea ice exercise

The US military trains the operation of submarines and other equipment in sea ice conditions in a biennial exercise called Operation Ice Camp. UAF sea ice researchers Andy Mahoney and Joshua Jones supported the exercise by assessing the sea ice conditions and potential ice-related hazards relevant for to the submarines ([more information](#)).

Appendix

| Highest Mean Daily Temperature on Record | | | | |
|---|-------------|------------------------|---------------------------|------------------------|
| Station | Date | New Record (°F) | Year of Old Record | Old Record (°F) |
| Bettles | 2024-03-23 | 33.5 | 1965 | 31.5 |
| Bettles | 2024-03-24 | 36.5 | 1998 | 34.0 |
| Juneau | 2024-03-16 | 45.0 | 2019 | 41.5 |
| King Salmon | 2024-03-20 | 43.0 | 1979 | 41.5 |
| King Salmon | 2024-03-23 | 45.5 | 2016 | 43.0 |
| King Salmon | 2024-03-24 | 45.0 | 1974 | 44.0 |
| King Salmon | 2024-03-29 | 44.0 | 1970 | 42.0 |
| McGrath | 2024-03-24 | 40.0 | 1965 | 38.5 |
| Talkeetna | 2024-03-24 | 42.0 | 2019 | 40.0 |
| Talkeetna | 2024-03-25 | 40.5 | 2022 | 40.0 |
| Yakutat | 2024-03-16 | 44.5 | 2019 | 41.5 |

Table A1: March 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. 111 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) |
| Fairbanks | 2024-03-24 | 51.0 | 1998 | 50.0 |
| Juneau | 2024-03-14 | 48.0 | 1947 | 47.0 |
| Juneau | 2024-03-23 | 52.0 | 2016 | 51.0 |
| Ketchikan | 2024-03-16 | 56.0 | 1966 | 55.0 |

| | | | | |
|-----------|------------|------|------|------|
| Utqiagvik | 2024-03-22 | 30.0 | 2002 | 27.0 |
|-----------|------------|------|------|------|

Table A2: March 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 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) |
| Bethel | 2024-03-21 | 35.0 | 1965 | 34.0 |
| Bettles | 2024-03-23 | 26.0 | 1965 | 23.0 |
| Juneau | 2024-03-16 | 41.0 | 2022 | 39.0 |
| King Salmon | 2024-03-20 | 41.0 | 1979 | 38.0 |
| King Salmon | 2024-03-23 | 42.0 | 2016 | 37.0 |
| Talkeetna | 2024-03-24 | 35.0 | 1989 | 32.0 |
| Talkeetna | 2024-03-26 | 34.0 | 1965 | 33.0 |
| Yakutat | 2024-03-16 | 42.0 | 2019 | 39.0 |
| Lowest Minimum Daily Temperature Record | | | | |
| Ketchikan | 2024-03-05 | 8.0 | 1951 | 9.0 |

Table A3: March 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. Eight new records for highest minimum daily temperature were set. One was 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.