Alaska Climate Research Center
The Alaska State Climate Center

STATEWIDE CLIMATE SUMMARY MARCH 2025

Off they go! A dog team during the start of the Iditarod in Fairbanks on March 3, 2025. Photo: Carl Schmitt

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GEOPHYSICAL INSTITUTE
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Alaska's Statewide Climate Summary for March 2025 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 on the west coast, warmer than average in the North and Interior

Mostly below average precipitation

Anchorage: more snow in March than during the 4 previous months

Seasonal sea ice maximum on March 22: Lowest extent of the satellite era.

Significant Weather Events and Synoptics

March was another warm and rather dry month for most of Alaska. Only the west coast saw cooler than normal conditions. At the synoptic scale, meteorological spring and the month of March began with a large upper-level low pressure system over the Bering Sea and western Alaska and a pronounced high pressure ridge extending from British Columbia into the eastern parts of the state (Fig. 1, upper panel). The ridge began to weaken around March 5 as low pressure pushed further into mainland Alaska from the west. After some unusually warm early spring days, this pattern shift brought a return of cooler temperatures and a bit of snow to the Interior.

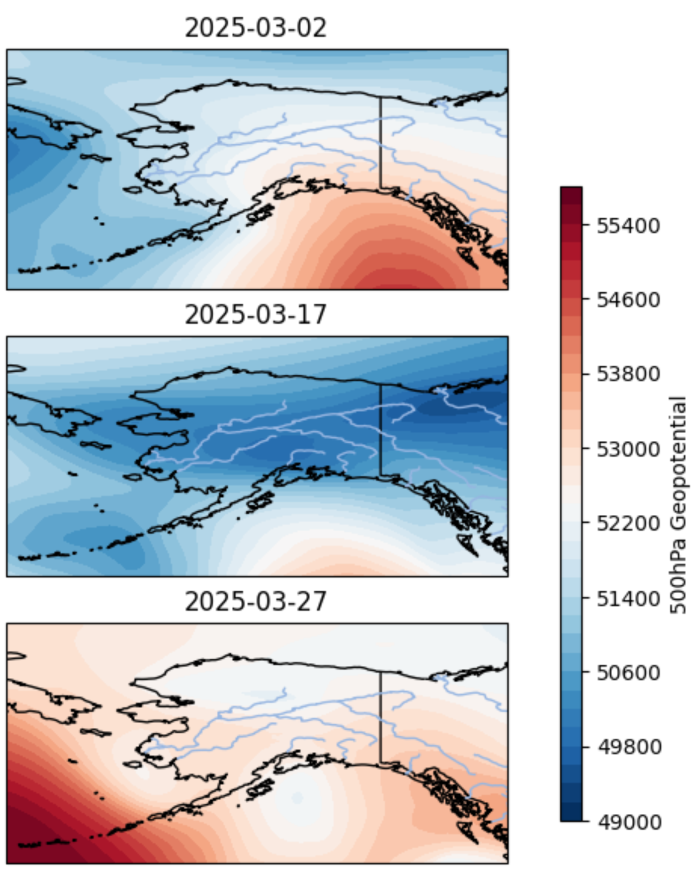

Figure 1. *Geopotential height at 500hPa on March 3, 17, and 27. Data: ERA5 reanalysis*

Moving into the second week of March, a series of storm systems in the southern Bering Sea and the Gulf of Alaska moved across southwest and southcentral AK. A number of winter storm watches and blizzard warnings were issued for the western coastal areas. Avalanche danger rose to considerable (level 3 of 5) in the western Chugach and Kenai mountains due to new snow and strong winds. Meanwhile, cold, Arctic air made its way south from the Chukchi into the Bering Sea and temperatures along the west coast dropped to well below average values (Fig. 1, middle panel).

Widespread upper-level troughing over Alaska persisted for the following 10 days to two weeks, well into the last third of the month. During the last days of March, high pressure built over the Bering Sea and pushed into western AK

(Fig. 1, lower panel). This put an end to the prolonged cold spell on the west coast and brought rising temperatures for much of the state.

A notable spring-time change in the large scale, upper-level weather features is the seasonal collapse of the stratospheric polar vortex. Typical storm systems that affect our day-to-day weather happen in the troposphere, about 6 to 10 km above ground. The stratosphere is the layer of our atmosphere above the troposphere. During boreal winter, the increasing temperature gradients between lower latitudes and the Arctic lead to the formation of a so called vortex in the stratosphere, which can be imagined as an area of strong winds rotating around the polar region about 15 to 50 km above the earth's surface. When the polar night ends and the sun returns, the vortex undergoes a seasonal collapse characterised by a strong rise in temperatures (sudden stratospheric warming - SSW) and a reversal of the wind direction. This year's stratospheric [vortex collapsed around mid-March](). This is likely the "final warming" of the 2024/25 season, marking the end of winter in the stratosphere. Fig. 2 shows stratospheric winds and temperature in early March and the forecasted breakdown of the vortex around mid-month.

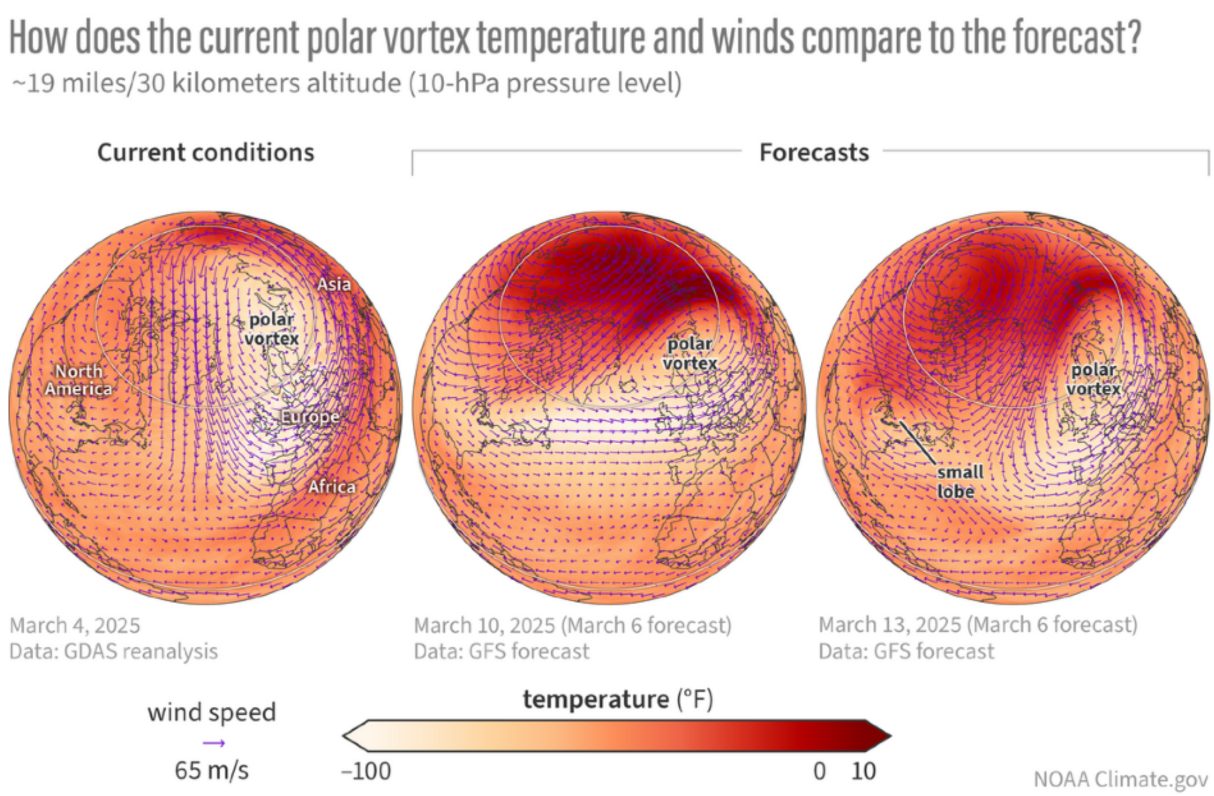

Figure 2. *Evolution and forecast of stratospheric conditions during the first half of March. The average winds around 60°N become east-to-west in the forecast, characterizing a sudden stratospheric warming. The stratospheric winds will probably not recover this spring and this event will be classified as a final warming instead of a mid-winter sudden stratospheric warming. [Figure and data: NOAA climate.gov image, based on Global Forecast System data provided by Laura Ciasto.]()*

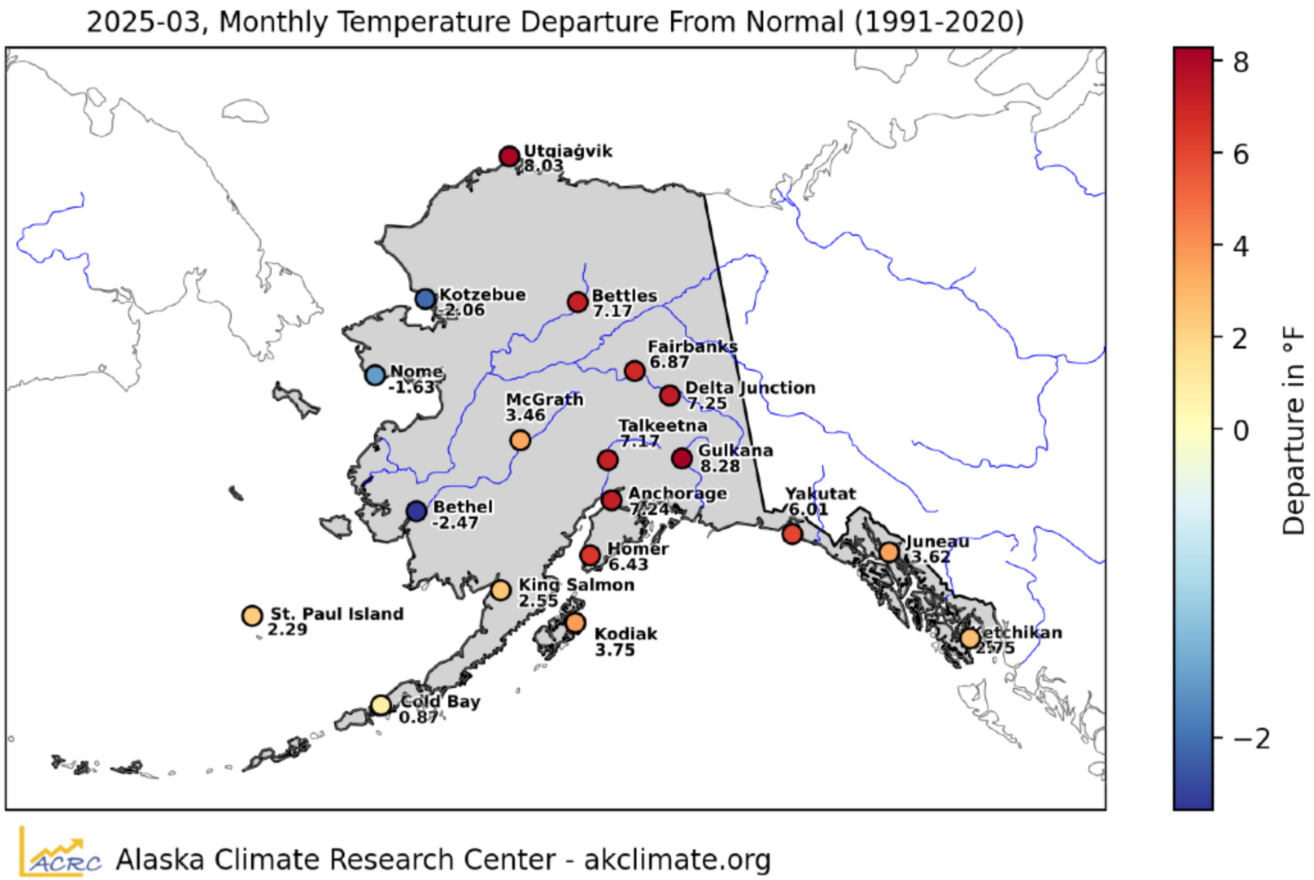

Figure 3. *Monthly mean temperature departure from normal (ºF), March 2025, at the selected First Order stations in Alaska.*

Temperature

Monthly mean temperatures in March were characterised by a pronounced west-east gradient (Fig. 3, Table 1). The First Order stations on the west coast had lower than normal monthly means, while the North, Interior, and Southcentral AK had a substantially warmer than average month. Bethel was the coldest station in relative terms with a deviation of -2.5°F from the 1991-2020 climate normal, followed by Kotzebue (-2.1°F) and Nome (-1.6°F). The Southwest stations mostly had moderately above normal monthly means (0.9°F in Cold Bay, +2.3°F in St. Paul Island). Gulkana had the highest deviation from normal this month with +8.3°F followed by Utqiaġvik with +8.0°F. Delta Junction, Bettles, Talkeetna, and Anchorage all were more than 7°F above the climatological normal.

The daily temperature anomalies (Fig. 4) highlight the cold spell in Kotzebue, Nome, and Bethel, which contributed to the low monthly means at these stations. From March 12 through March 28, daily temperatures were persistently below normal due to the influence of cold, Arctic air pushing south. The notable contrast between St. Paul Island (above normal monthly mean temperature) and Bethel (below normal) provides an indication of the general position of the boundary between the Arctic air mass and the warmer, Pacific air mass during this period. Southcentral AK and much of the Gulf coast had almost continuously warmer than average weather this month, with only a short episode of cooler temperatures around mid March. In the North and Interior, the month started out with about a week of far above average temperatures. Daily deviations then dropped to near normal levels (e.g., Fairbanks, Delta Junction in Fig. 4). In Utqiaġvik, the influence of warmer air masses during the last days of the month is evident in substantially above average daily temperatures on March 30 and 31.

The tables in the Appendix list all daily temperature records set in March at the selected stations. Records were set mainly during the warm periods early and late in the month. For example, multiple new records for daily mean temperature were set in Juneau and Homer between March 1 and 6 and again on March 26 and 27.

Station	Observed (ºF)	Normal (ºF)	Departure (ºF)
Anchorage	33.0	25.8	7.2
Bethel	12.0	14.5	-2.5
Bettles	10.8	3.7	7.2
Cold Bay	30.8	29.9	0.9
Delta Junction	21.4	14.1	7.3
Fairbanks	17.6	10.7	6.9
Gulkana	23.0	14.7	8.3
Homer	36.5	30.1	6.4
Juneau	36.5	32.9	3.6
Ketchikan	40.7	38.0	2.7
King Salmon*	26.6	23.5	2.5
Kodiak	36.9	33.2	3.7
Kotzebue	-0.5	1.5	-2.1
McGrath	15.4	11.9	3.5

Station	Observed (ºF)	Normal (ºF)	Departure (ºF)
Nome	8.0	9.6	-1.6
St. Paul Island	27.4	25.2	2.3
Talkeetna	30.5	23.5	7.2
Utqiaġvik	-2.5	-10.5	8.0
Yakutat	37.9	31.9	6.0

Table 1. *Mean monthly air temperature, normal (1991-2020) and departure for selected stations throughout the state, March 2025. Color-coded to match Figure 3. *King Salmon had an approximately week-long data outage this month.*

Figure 4. *Daily mean temperature departures for each day in March 2025 at the selected stations.*

Precipitation and snow

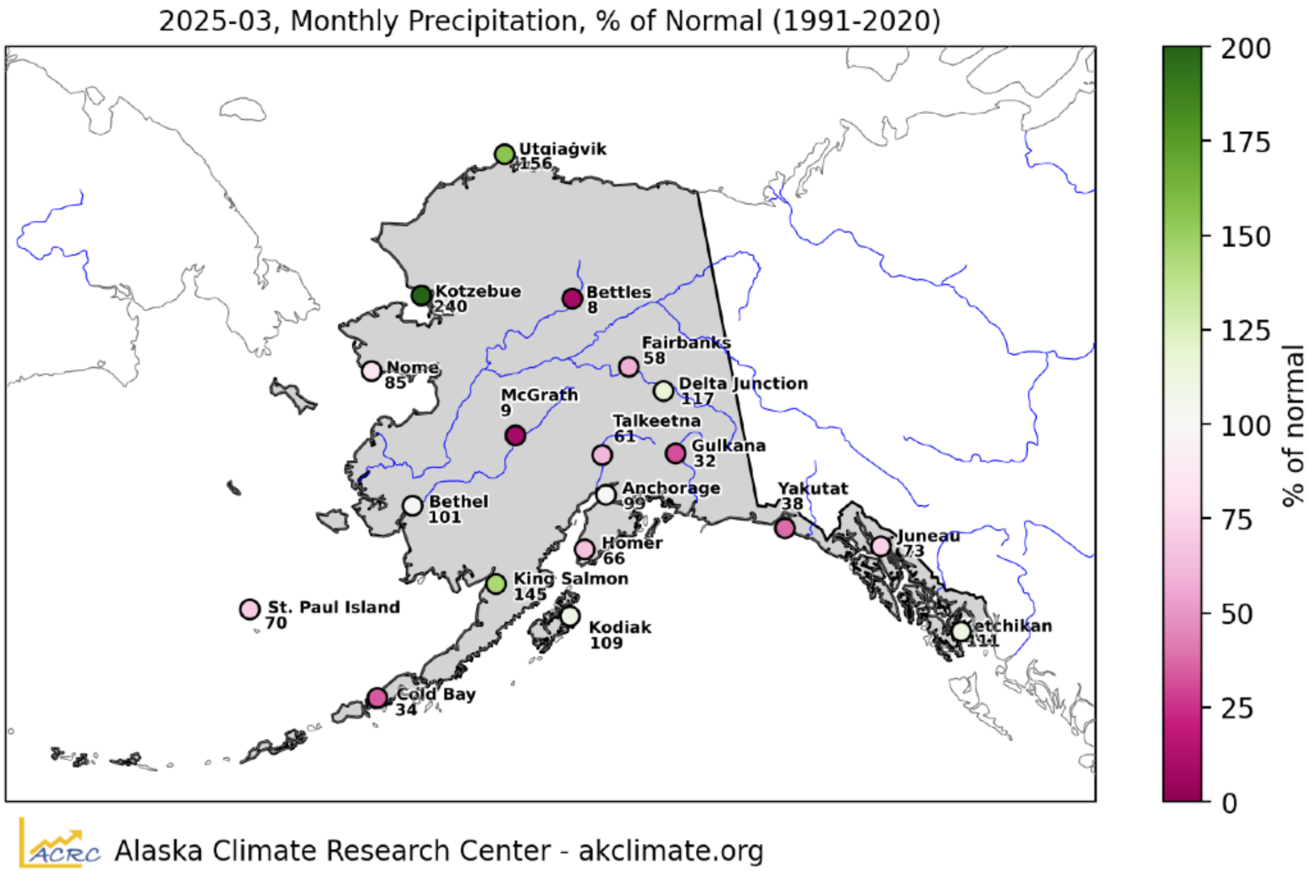

Figure 5. *Monthly precipitation in percentage of normal (ºF, 1991-2020 reference period), March 2025, at the selected First Order stations in Alaska.*

March was another unusually dry month in much of Alaska (Fig. 5, 6, 7, Tab. 2). Exceptions are found in the North and on the west coast: Kotzebue received more than twice their average amount of monthly precipitation (240%). Utqiaġvik and King Salmon came in at 156% and 145% of normal. The Interior and the northern Panhandle largely had a drier than average month. Bettles and McGrath recorded only 8% and 9% of their normal monthly precipitation, respectively. These very low values may in part be due to undercatch of solid precipitation at the precipitation gauges. Parts of the Bristol Bay region, the Kenai peninsula, and the Panhandle are under "abnormally dry" conditions as per the Alaska drought monitor (Fig. 6).

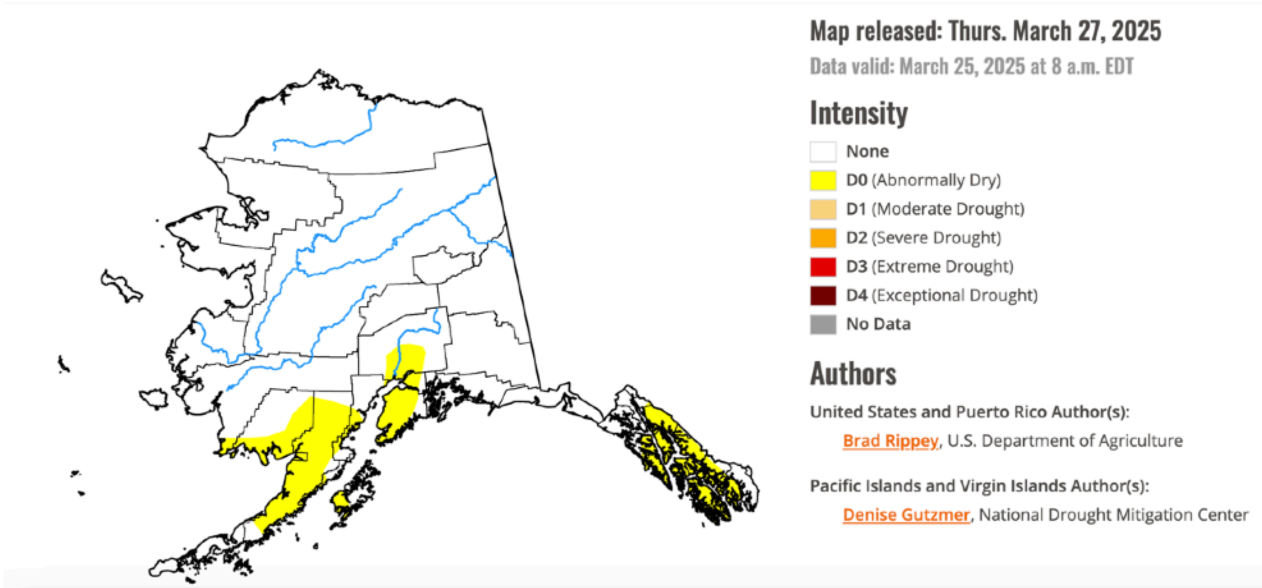

Figure 6. *Alaska drought monitor on March 27, 2025. Source: https://droughtmonitor.unl.edu/*

With a monthly snowfall sum of 16.9 inches (154% of normal), Anchorage got more snow in March than over the four previous months combined. The snowfall sum for November 2024 to February 2025 was only 9.9 inches. The late season snow slightly improved the dismal snow statistics in Anchorage, but snow depth remains far below average (Fig. 8). At the airport station, the March snow lasted only for about 10 days and the ground was largely bare again at the end of the month.

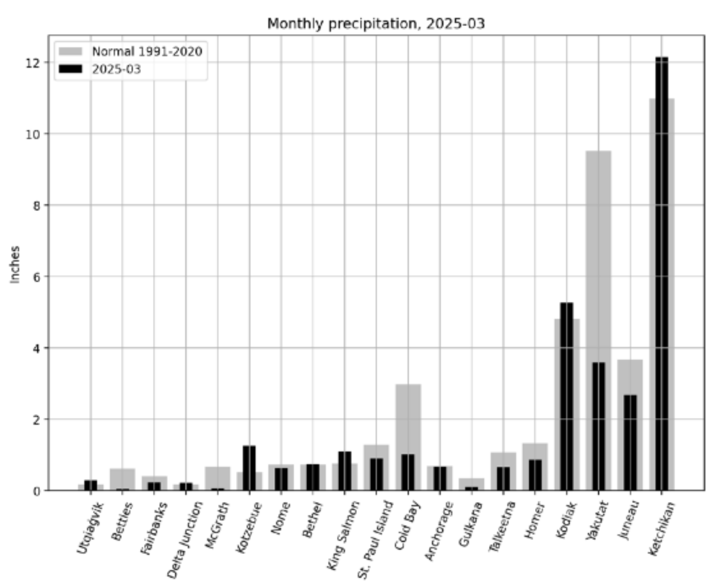

Figure 7. *Monthly precipitation sum (black bars) compared to the 1991-2020 normal (grey bars) at the First Order stations.*

At the other three First Order stations with long term snow records, snowfall in March was below average. Bettles and Fairbanks had 62% and 48% of normal, respectively. Juneau only recorded 13% of their normal March snowfall. Overall precipitation in Juneau was also somewhat below normal, but the very low snowfall value is due to most precipitation falling as rain.

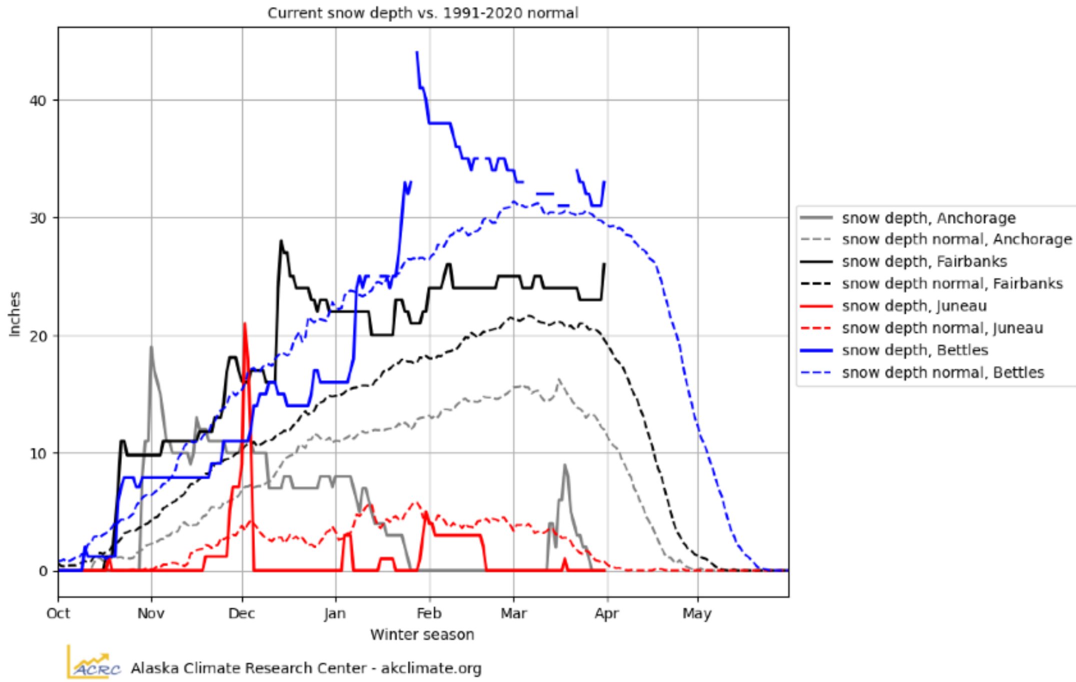

Figure 8. *Current snow depth at the four first order stations with long term records compared to the climatological normal.*

Figure 9. *An aerial view of Muldrow Glacier (Alaska Range) on March 30 exemplifies the unusually low snow cover at higher elevations. Photo: Martin Stuefer.*

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	0.7	0.7	98.6
Bethel	0.8	0.7	101.4
Bettles	0.0	0.6	8.2
Cold Bay	1.0	3.0	34.2
Delta Junction	0.2	0.2	116.7
Fairbanks	0.2	0.4	57.5
Gulkana	0.1	0.3	32.4
Homer	0.9	1.3	65.9
Juneau	2.7	3.7	73.0
Ketchikan	12.2	11.0	110.7
King Salmon	1.1	0.8	144.7
Kodiak	5.3	4.8	109.3
Kotzebue	1.2	0.5	240.4
McGrath	0.1	0.7	8.8
Nome	0.6	0.7	85.1
St. Paul Island	0.9	1.3	69.8
Talkeetna	0.7	1.1	61.1
Utqiaġvik	0.3	0.2	155.6
Yakutat	3.6	9.5	37.7

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 2025. Colors match the color scale in Figure 4.*

Arctic Sea Ice

Arctic sea ice likely reached its seasonal maximum on March 22 (source: NSIDC) at 14.33 M km^2. This is the lowest value in the satellite record and comes on the heels of record low Arctic sea ice extent for much of February. See the blog post on our website for additional graphics. Weekly change rates of sea ice extent in March have alternated between decreases of up to -2.1% per week and slight increases (highest weekly rate: 1.9% in the week of March 6) and are now trending towards a consistent seasonal decrease. With changing weather and wave patterns, sea ice can shift around and minor increases are not unusual early in the melt season. Total sea ice extent as of March 27 was 14.028 compared to 13.815 M km^2 on February 27.

Figures 9 A and B show Arctic sea ice extent and concentration on April 1, respectively. Fig. 10 shows the current Arctic sea ice extent compared to climatology and previous notable years.

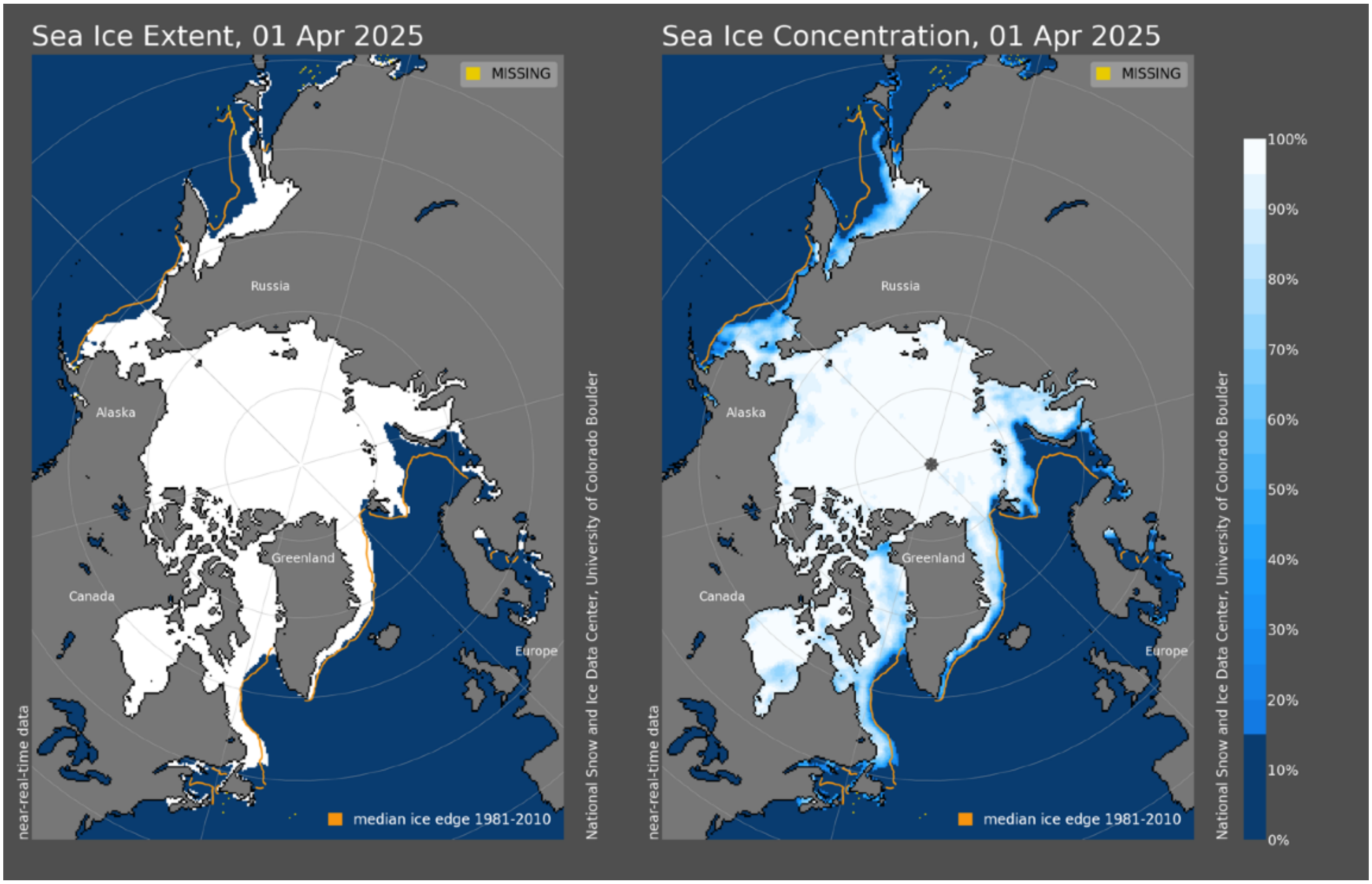

Figure 9. *A (left) Arctic sea ice extent and B (right concentrations as of April 1, 2025 compared to the average from 1981-2010 (Data and images: NSIDC)*

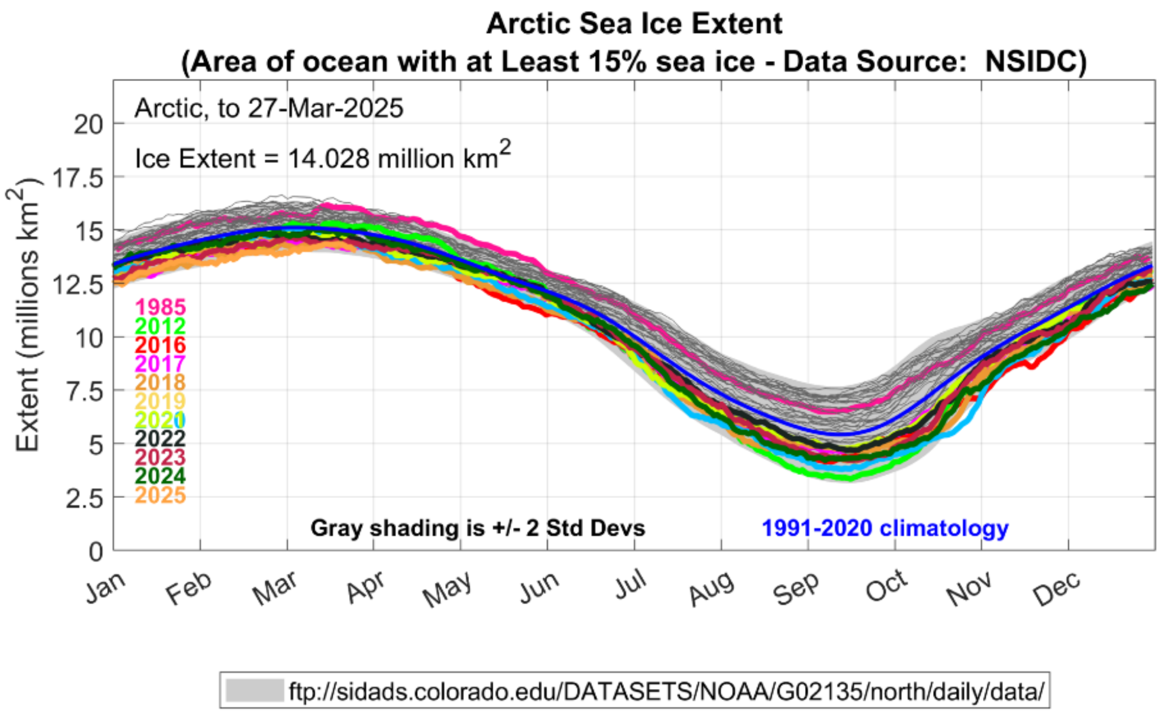

Figure 10. *Time series of daily Arctic sea ice extent. This year's data (dark red) are updated until March 27, 2025. The median sea ice extent for the 1991-2020 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (nsidc.org/)*

Newsworthy Information

Fatal avalanche near Girdwood

Three skiers lost their lives in an avalanche near Girdwood on March 4th. They were part of a heli-skiing group with Chugach Powder Guides and were swept away in a massive avalanche while descending. Due to dangerous conditions, challenging terrain and reportedly very deep burials, efforts to recover the bodies were initially put on hold (statement by the state troopers' public information office) and were to be reassessed when conditions improve. The guide and one other member of the group were not caught in the avalanche and were rescued from the mountain side. The accident was covered by numerous Alaskan and national news outlets (e.g., Alaska Public Media, ADN, New York Times, CNN)

Heightened concerns about eruption of Mount Spurr

The Alaska Volcano Observatory announced that an eruption of Mount Spurr in the near future is "likely" after aircraft recently detected increased gas emissions from the volcano, which has been under advisory status since October. Mount Spurr is in a remote area about 80 miles west of Anchorage. Governor Dunleavy issued a statement on March 27 reaffirming that the state is "fully prepared for any potential eruption of Mount Spurr". More information: Alaska Volcano Observatory (with recent updates), AK Public Media

NOAA: Tsunami Awareness Week March 21-27
NOAA announced the first Tsunami Awareness Week this month. The Alaska NWS offices launched informational campaigns on their social media accounts and the state's tsunami warning coordinator Dave Snider raised awareness in media interviews. Notably, the 61st anniversary of the Great Alaska Earthquake on March 27, 1964, falls into the Tsunami Awareness Week. The 1964 event is the most powerful earthquake recorded in US history. It caused multiple damaging tsunamis that impacted the Pacific coastline from Alaska to as far south as California.

NWS Anchorage updates forecast zones
The NWS Anchorage implemented substantial changes to their forecast zones. The changes came into effect on March 19. From the NWS statement:
"The NWS issues messages for geographical areas that Weather Forecast Offices (WFOs) pre-determine, called forecast zones. For land-based forecast zones, these are referred to as "public forecast zones." In the past, NWS WFO Anchorage has hosted 17 public forecast zones that grouped numerous microclimates together, combined alerting needs, and crossed Borough and Census Boundaries. This led to a blending of forecast needs and impacts, and to overalerting of regions to impacts not realized in some local communities. In an effort to redefine our public forecast zones, and be more in-tune with regional and local forecast needs, our forecast office worked closely with local community leadership and incorporated climatology and alert needs in the implementation of our new public forecast areas. With this March's forecast zone upgrade, NWS WFO Anchorage will host 51 forecast zones, more than double the number of zones previously forecast for. We believe this will provide a vast improvement to those who live across Southern Alaska."
More information: NWS Story Map

Appendix

Highest Average Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Bettles	2025-03-05	29.0	1965	25.5
Homer	2025-03-01	41.0	1958	40.5
Homer	2025-03-02	43.5	2003	43.0
Homer	2025-03-04	44.0	1984	41.5
Homer	2025-03-27	43.5	2015	42.5
Juneau	2025-03-06	41.5	1984	40.0
Juneau	2025-03-26	44.0	1994	43.5
Juneau	2025-03-27	44.0	1943	43.0
Ketchikan	2025-03-27	48.5	1926	47.5
Kodiak	2025-03-31	45.0	2016	43.5
Talkeetna	2025-03-02	38.5	2003	37.0
Talkeetna	2025-03-04	37.5	2015	36.0
Yakutat	2025-03-01	42.0	2010	41.0
Yakutat	2025-03-27	43.5	1926	43.0
Yakutat	2025-03-28	43.5	1926	41.5

Table A1: March 2025 daily records of average daily temperature, i.e. highest/lowest values of average daily temperature ever recorded on specific days. Records are computed since the beginning of the respective time series. 15 new highest daily temperature records were set.

Highest Maximum Daily Temperature Record				
Station	**Date**	**New Record (°F)**	**Year of Old Record**	**Old Record (°F)**
Anchorage	2025-03-02	46.0	1958	45.0
Bettles	2025-03-05	39.0	1965	32.0
Bettles	2025-03-06	36.0	1965	34.0
Homer	2025-03-01	47.0	1943	46.0
Homer	2025-03-02	50.0	2003	49.0
Homer	2025-03-04	49.0	1984	47.0
Homer	2025-03-27	50.0	1934	49.0
Kodiak	2025-03-31	53.0	1970	51.0
McGrath	2025-03-05	42.0	1943	41.0
Yakutat	2025-03-27	58.0	2019	53.0
Yakutat	2025-03-28	57.0	2011	52.0

Table A2: March 2025 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. 11 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)**
Bettles	2025-03-07	21.0	2015	19.0
Homer	2025-03-04	39.0	2008	37.0
King Salmon	2025-03-03	35.0	1945	34.0
Kodiak	2025-03-03	40.0	1945	39.0

Utqiaġvik	2025-03-04	7.0	1995	2.0

Table A3: March 2025 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. 5 new highest and no new lowest minimum daily temperature records were set.

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.