Alaska Climate Research Center
The Alaska State Climate Center

ANNUAL REPORT 2024

The McDonald fire southeast of Fairbanks as seen during an aerial fire survey on June 9, 2024
Photo source: Alaska Climate Research Center, Martin Stuefer

GEOPHYSICAL INSTITUTE
University of Alaska Fairbanks

KEY OBSERVATIONS

Temperature

Alaska as a whole was moderately warmer than the 1991-2020 normal with a deviation of 0.9°F. All of the Alaska climate divisions were also above average, with highest positive deviations on the North Slope. Utqiaġvik was once again the warmest of the selected First Order stations in relative terms with an annual deviation of almost 3.3°F.

Precipitation

Precipitation was regionally variable. The North Slope had the highest precipitation anomalies and continued a streak of wetter than average years, as did the Interior. The southern regions of the Panhandle had an unusually dry summer and experienced moderate drought conditions between July and September.

Snowfall

2023/24 was another very snowy season in Anchorage with 171% of normal snowfall. In contrast, the start to the current winter season (2024/25) in Anchorage has been relatively dry. Fairbanks has had an above average snow season so far in 2024/25 with substantial snow falls in October and December. In Juneau, January was exceptionally snowy with over 300% of normal monthly snowfall.

Wildfire season

Wildfires burned just over 667,000 acres in Alaska in 2024. This is close to the average value for the satellite record, i.e. a “normal” season by the numbers. Looking at the timing of the 2024 fire season, most of the acreage burned in June. Rainy weather dampened fire activity in July and August. Despite the fairly condensed and overall moderate season, individual fires proved disruptive due to hazardous air quality in Interior communities and impacts on tourism in Denali National Park.

Sea ice extent

Arctic sea ice reached its minimum extent for 2024 on September 11 at 1.65 million square miles. This was the seventh lowest minimum extent in the satellite record.

General overview and significant weather events

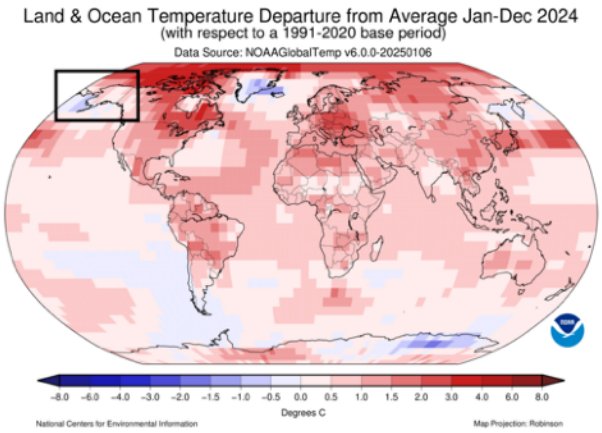

Figure 1. *NOAA GlobalTEMP annual temperature for 2024, deviation from the 1991-2020 base period. Black rectangle indicates Alaska.*

At the global scale, 2024 was the warmest year on record in the ERA5 reanalysis (Copernicus Climate Change Service) and the National Oceanic and Atmospheric Administration (NOAA) GlobalTemp dataset, breaking the previous global record from 2023. In Alaska, the mean annual air temperature in 2024 was slightly above average but not record breaking at +0.9°F above the 1991-2020 climatological normal. The warmest year in Alaska to date as per the NOAA NCEI statewide time series was 2019 with +4.2.°F above normal. The 2024 deviation is in a similar range as 2022 and 2023, when Alaska also had a relatively moderate positive temperature deviation compared to many other regions of the world.

Considering the map of global temperatures (Fig. 1; NOAAGlobalTemp data, Vose et al., (2021)), parts of Alaska represent some of very few relatively cool (blue) areas on the globe in 2024. For the third year in a row, a "blob" of cooler temperatures over the Bering Sea and parts of western Alaska is apparent in the GlobalTEMP map (Fig. 1). Northern Alaska and parts of the Interior and South Central were much warmer. The ERA5 reanalysis data (Hersbach et al., 2020) and the First Order weather stations around the state show a similar pattern (Fig. 2, Table 1). Of the First Order stations, Utqiaġvik once again had the highest positive annual deviation with +3.3°F above the 1991-2020 normal. Kodiak was coldest with -0.9°F below normal.

Precipitation in 2024 was regionally variable. It was a wetter than average year on the North Slope, in the Interior, and on the West Coast. The Cook Inlet and Bristol Bay region

and the Panhandle had slightly below average annual precipitation. The southern regions of the Panhandle experienced moderate drought between July and September.

In early August, a glacial lake outburst flood (GLOF) originating in Suicide Basin, a side drainage of the Mendenhall glacier, inundated Juneau neighborhoods near the Mendenhall River. The 2024 GLOF broke the water level record set during the previous year's flood by more than a foot. The Mendenhall River peaked at 15.99 ft in the early morning hours of August 6. GLOFs occur when lakes contained by glacier ice or moraines suddenly drain. The Mendenhall GLOF has been a near-annual occurrence for over a decade but the 2023 and 2024 events were unprecedented in terms of water levels and destructiveness. Compared to 2023, the 2024 event caused less river bank erosion but water spread further inland, impacting previously unaffected homes in the Mendenhall Valley. A second full release of Suicide Basin occurred between October 19 to 21, 2024. This event was minor compared to the very impactful GLOF in August.

On August 25th, one person lost their life due to a landslide in Ketchikan. Three other people were injured and multiple homes were destroyed. The landslide originated from a forested slope above the town and was preceded by heavy rains. This was the latest in a series of deadly landslides in Southeast Alaska in recent years; in 2015, three people were killed in a landslide in Sitka. In 2020, a landslide in Haines destroyed several homes and two people were killed. In 2023, six people died in a landslide in Wrangell. These events have been linked to atmospheric rivers that cause excessive precipitation.

During the second half of October, a strong storm system developed over eastern Siberia and began moving towards Alaska. The storm track and the strength of the system made it apparent that this would be an impactful event in western Alaska and the National Weather Service issued warnings for coastal flooding and high winds along the Bering and Chukchi coasts. The storm hit the coast on October 22, severely impacting Kotzebue. The water level rose 3 to 4 feet above normal high tide levels, flooding much of the town. Over 80 residents had to evacuate and there was major damage to homes and other infrastructure as a result of the flooding. The National Guard joined response efforts to assist with repairs before the winter. Several other coastal communities, including Shishmaref, Deering, Nome, Kotlik, and Unalakleet were affected by flooding from the same storm system.

Fairbanks and Anchorage also saw their first major winter storm events of the season in late October. Power outages from downed trees and hazardous traffic conditions due to snow and freezing rain disrupted everyday life in both cities.

2024 Temperature in Detail

Annual Temperature in Alaska

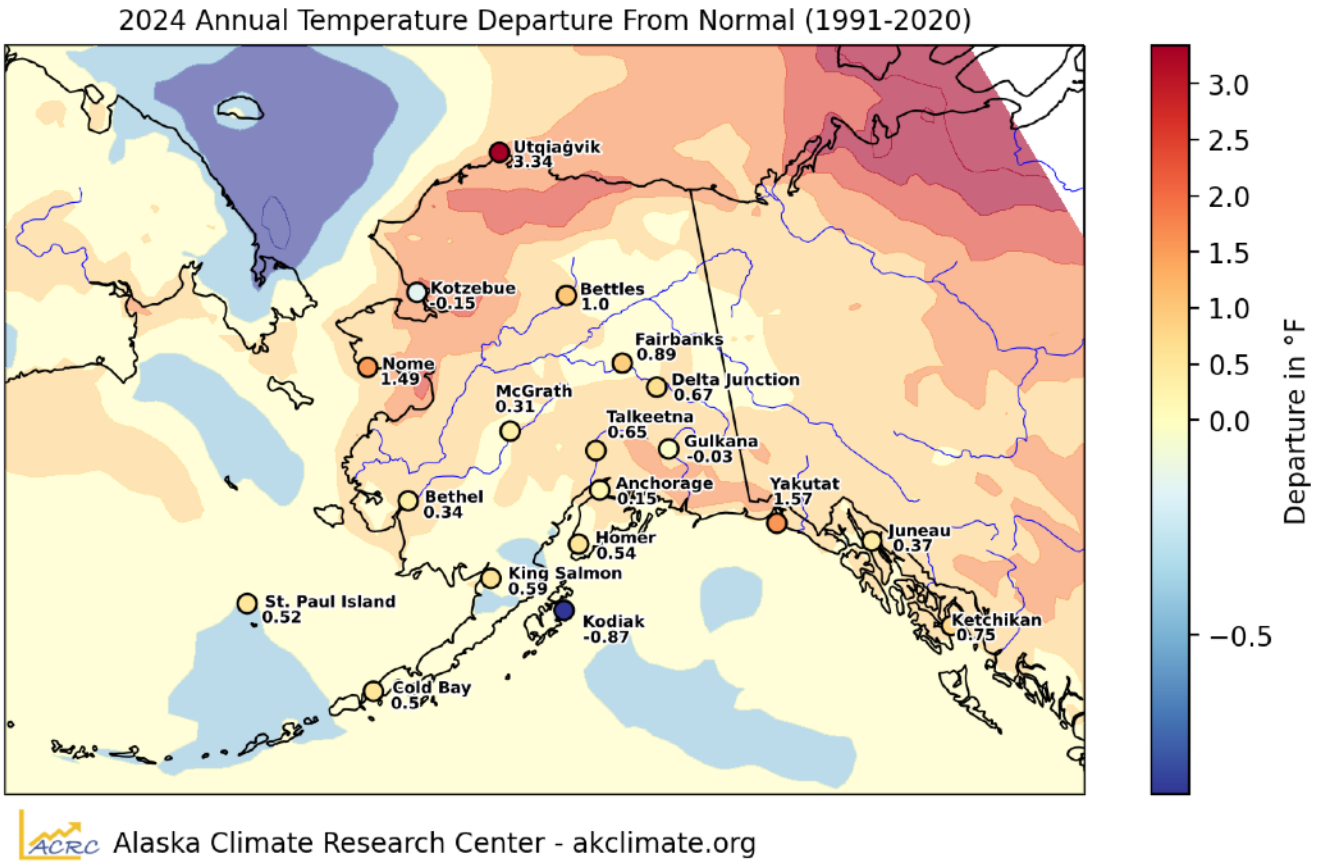

Figure 2. *Mean annual (2024) air temperature deviations (in Fahrenheit) from the normal (1991 - 2020) for selected stations (circular markers, same color scale as the background shading). Overlay: ERA5 gridded temperature data, courtesy of Copernicus.eu.*

Most of the selected First Order stations recorded a warmer than average mean annual air temperature in 2024 compared to the 1991-2020 climatology (Figure 2, Table 1). Utqiaġvik was the warmest station in relative terms with +3.34°F above normal. This is slightly below last year's deviation of +3.81°F. Kotzebue had the third year in a row with a negative deviation, although 2024 was only minimally below the climatological normal (-0.15°F). The only other station with a negative deviation from normal this year was Kodiak with -0.87°F. Except Utqiaġvik and Nome (+1.49°F), all of the selected stations had a mean annual air temperature within ±1°F of the 1991-2020 normal this year.

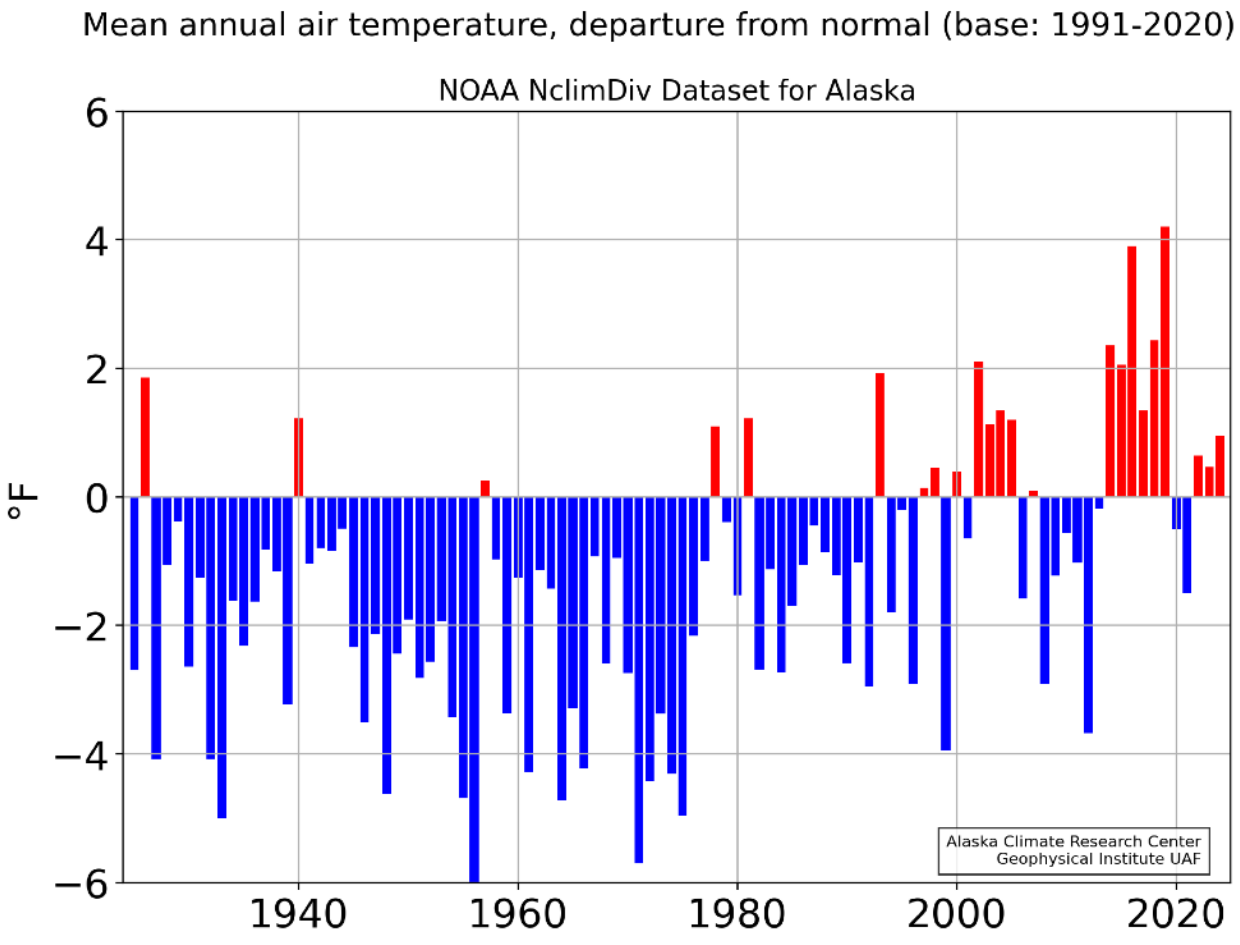

Figure 3. *Mean annual air temperature deviations (in Fahrenheit) from the normal (1991-2020).*

December was very warm in many regions of Alaska and shifted the annual statistics a little further towards the warm side during the last weeks of the year. The mean annual deviation from normal across the 19 selected stations was 0.7°F. The statewide mean

deviation per the NCEI nClimDiv data set (Vose et al., 2014) was 0.9°F (Fig. 3). Individually, all of Alaska's NCEI climate regions (Bieniek et al., 2012) were also warmer than average. The North Slope region had the largest positive deviation from normal with +2.3°F, followed by the West Coast with +1.1°F (Figure 4). The Panhandle had the lowest positive deviation with +0.3 above normal.

Station	Observed (°F)	Normal (°F)	Departure (°F)
Anchorage	37.8	37.6	0.2
Bethel	31.8	31.5	0.3
Bettles	25.0	24.0	1.0
Cold Bay	39.8	39.3	0.5
Delta Junction	30.8	30.0	0.7
Fairbanks	29.2	28.4	0.9
Gulkana	28.4	28.3	0.0
Homer	40.6	40.1	0.5
Juneau	42.5	42.1	0.4
Ketchikan	46.9	46.1	0.8
King Salmon	37.1	36.5	0.6
Kodiak	41.3	42.2	-0.9
Kotzebue	24.0	24.1	-0.1
McGrath	29.1	29.0	0.3
Nome	29.5	28.0	1.5
St. Paul Island	36.5	36.0	0.5
Talkeetna	36.6	36.0	0.6

Utqiaġvik	17.3	13.8	3.3
Yakutat	42.7	41.1	1.6

Table 1. *Mean temperature for 2024, normal temperature (1991-2020) and deviations from the mean for the 19 first-order meteorological stations in Alaska, color-coded to Figure 1. None of the selected stations had more than 5 days of missing data this year. Missing data are ignored in the computation of the mean.*

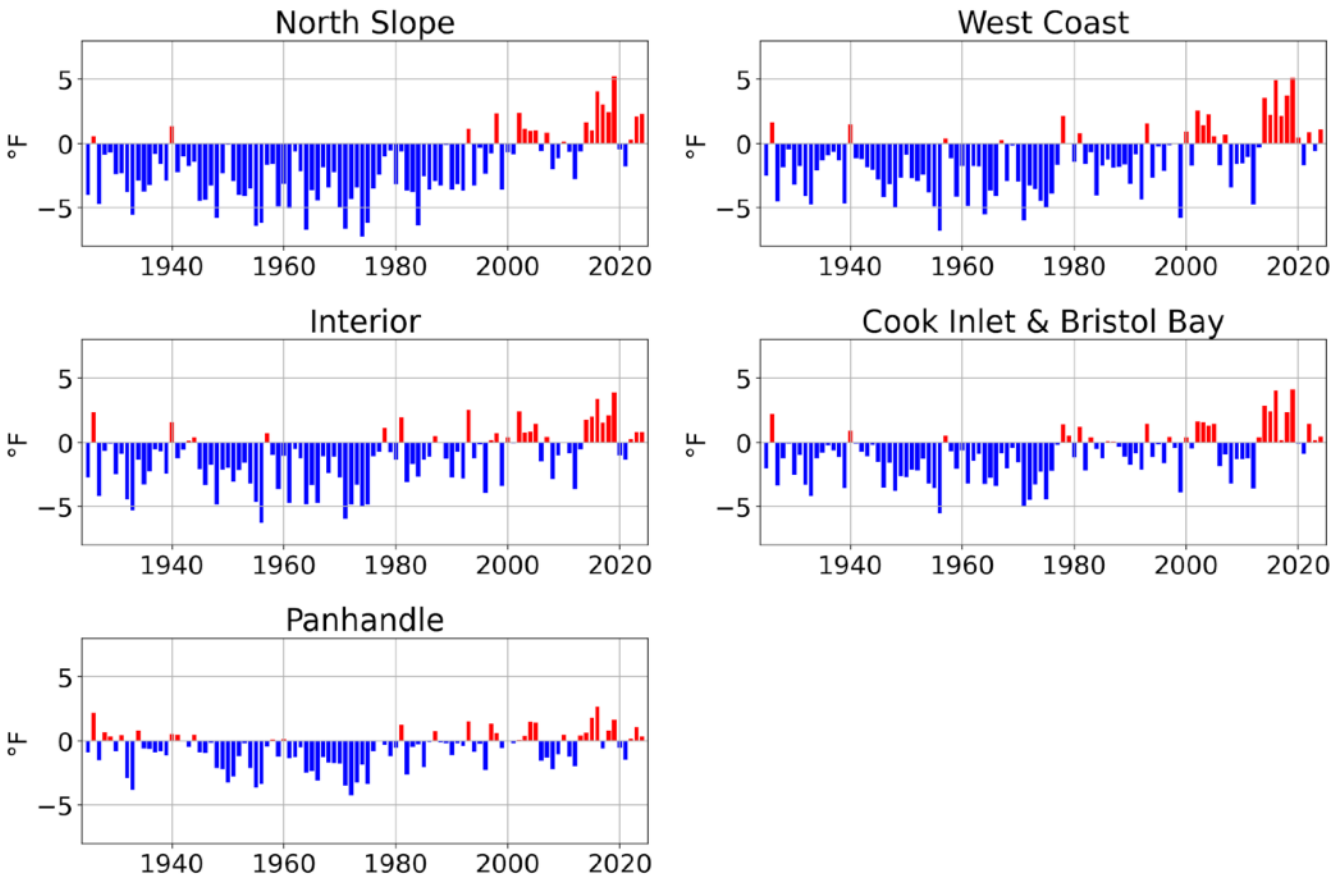

Figure 4. *Time series of annual mean temperature departure from the normal (1991-2020) for the Alaska climate divisions. Data source: NOAA nClimDiv.*

Monthly Mean Temperatures

Averaging over the First Order stations, July was the warmest month of 2024 in absolute terms, followed by June and August. The largest positive deviation from normal was recorded in December (+6.4°F) by a large margin. The next warmest months (relatively speaking) were February and March with +1.9°F above normal. April, June, September,

and October also had moderately above normal temperatures on average over the First Order stations. May and July had the most negative deviations from the 1991-2020 normal with -1.6°F and -1.4°F, respectively.

Considering temperature deviations at the individual stations, the December temperature records confirm the unusually warm month. At 18 of the 19 selected stations, December brought the highest positive deviation from normal of the year. See tables A1 and A2 in the appendix for monthly temperatures and temperature deviations at all of the selected stations. The highest monthly deviation recorded this year was +12°F in December in King Salmon. January and May were relatively cool months at many stations with temperatures below the climatological average (Table A2). January was the coldest month of the year in absolute terms at most stations; only St. Paul Island and Utqiaġvik recorded their coldest month of the year in March (Table A1). Utqiaġvik was a notable exception from the patterns seen in other parts of the state. They recorded the highest positive temperature deviation from normal in January and the most negative deviation in July. The otherwise

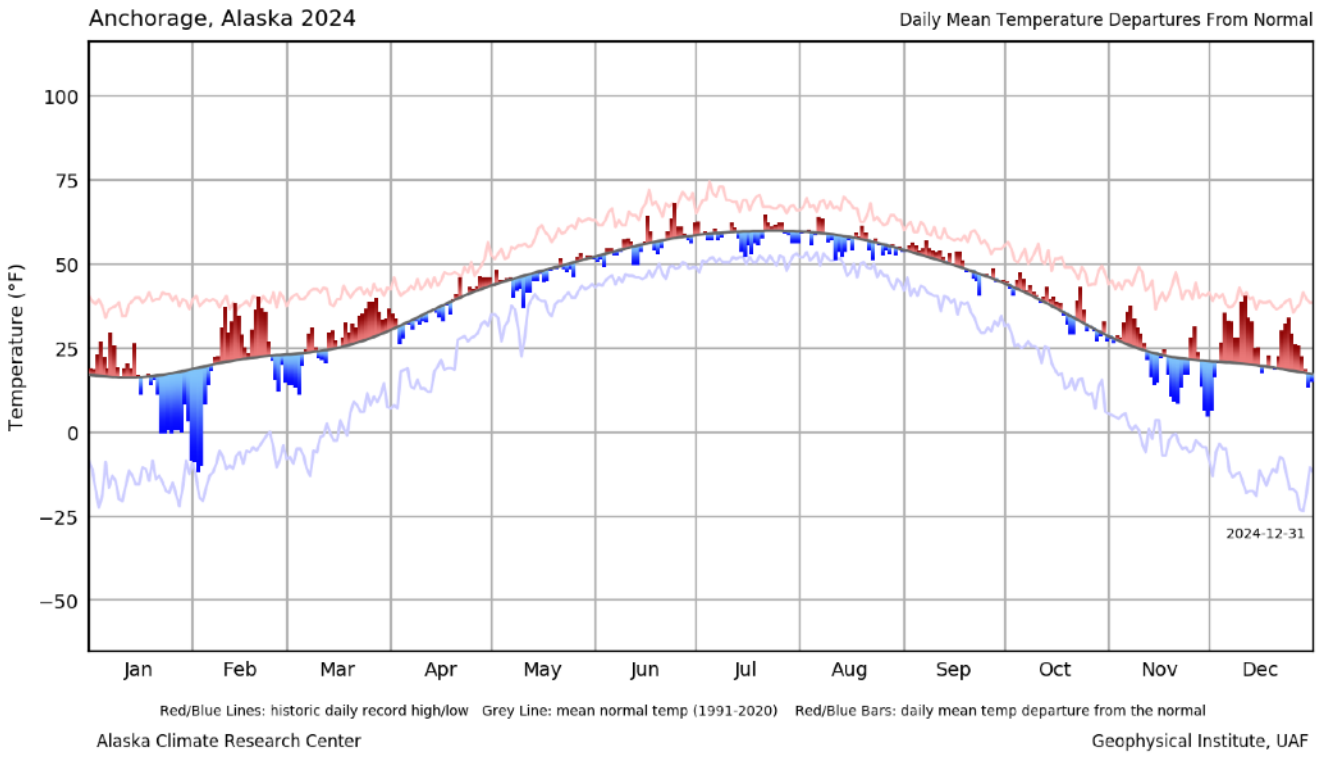

Figure 5. *Mean normal temperature, daily mean departure from normal, and historic daily record minimum and maximum for Anchorage, 2024.*

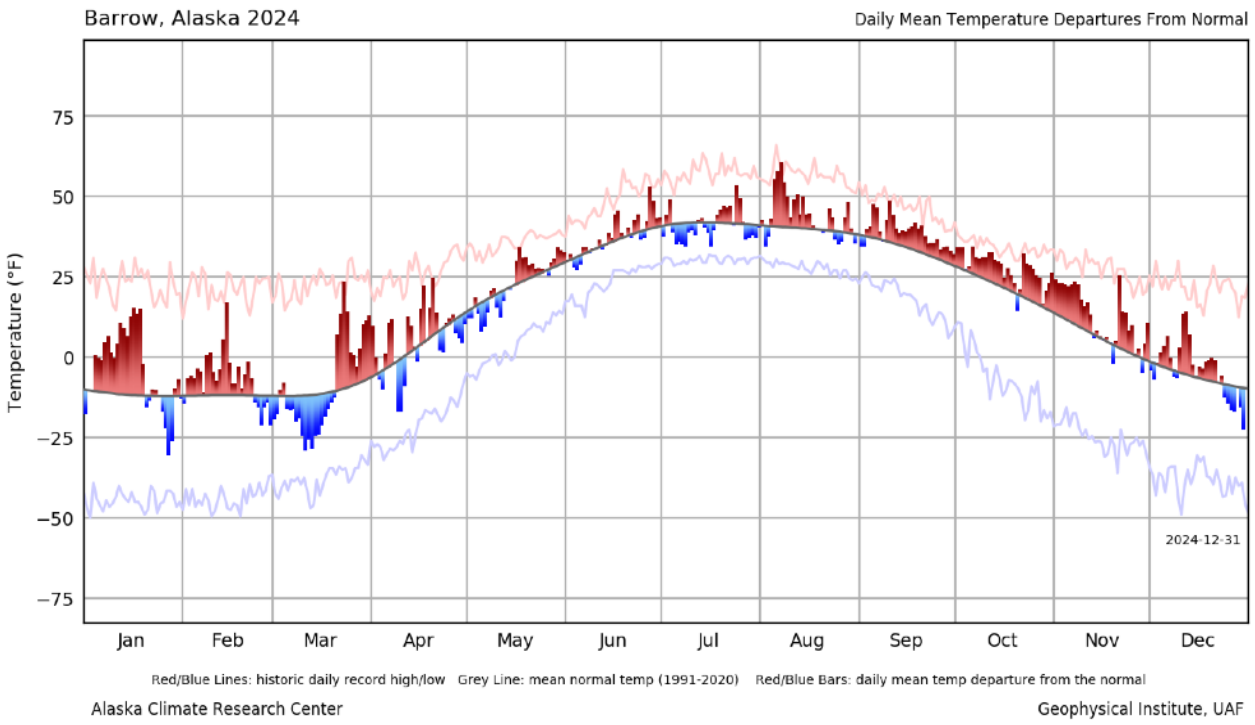

Figure 6. *Mean normal temperature, daily mean departure from normal, and historic daily record*

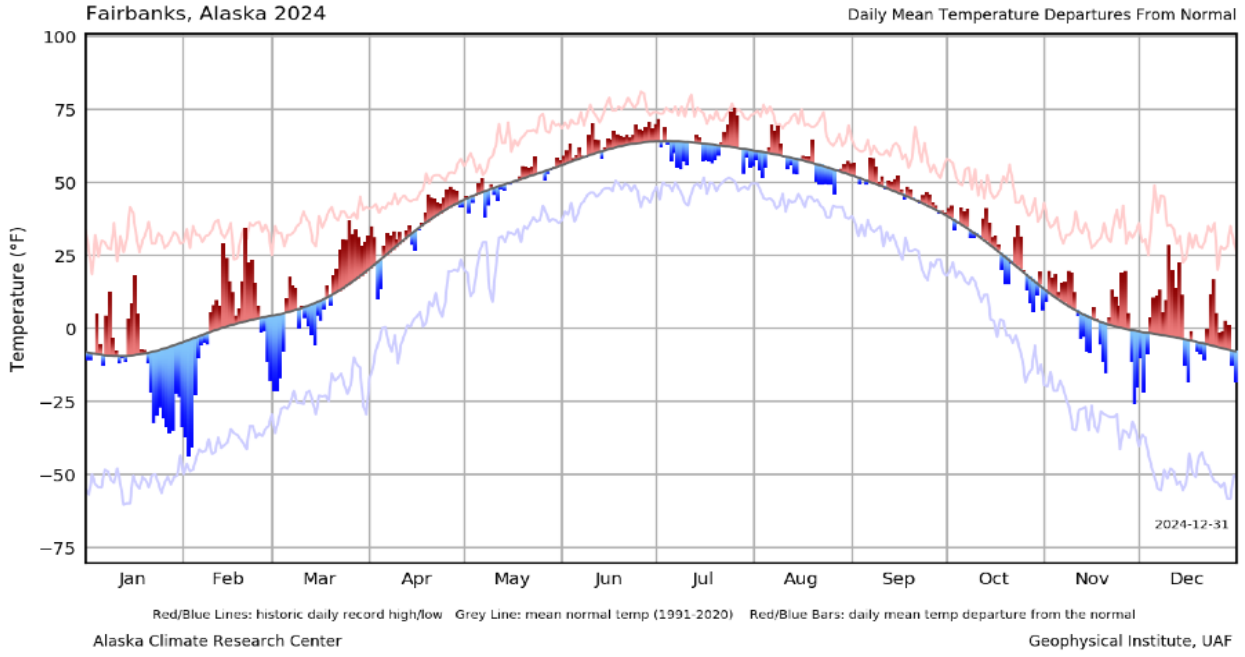

Figure 7. *Mean normal temperature, daily mean departure from normal, and historic daily*

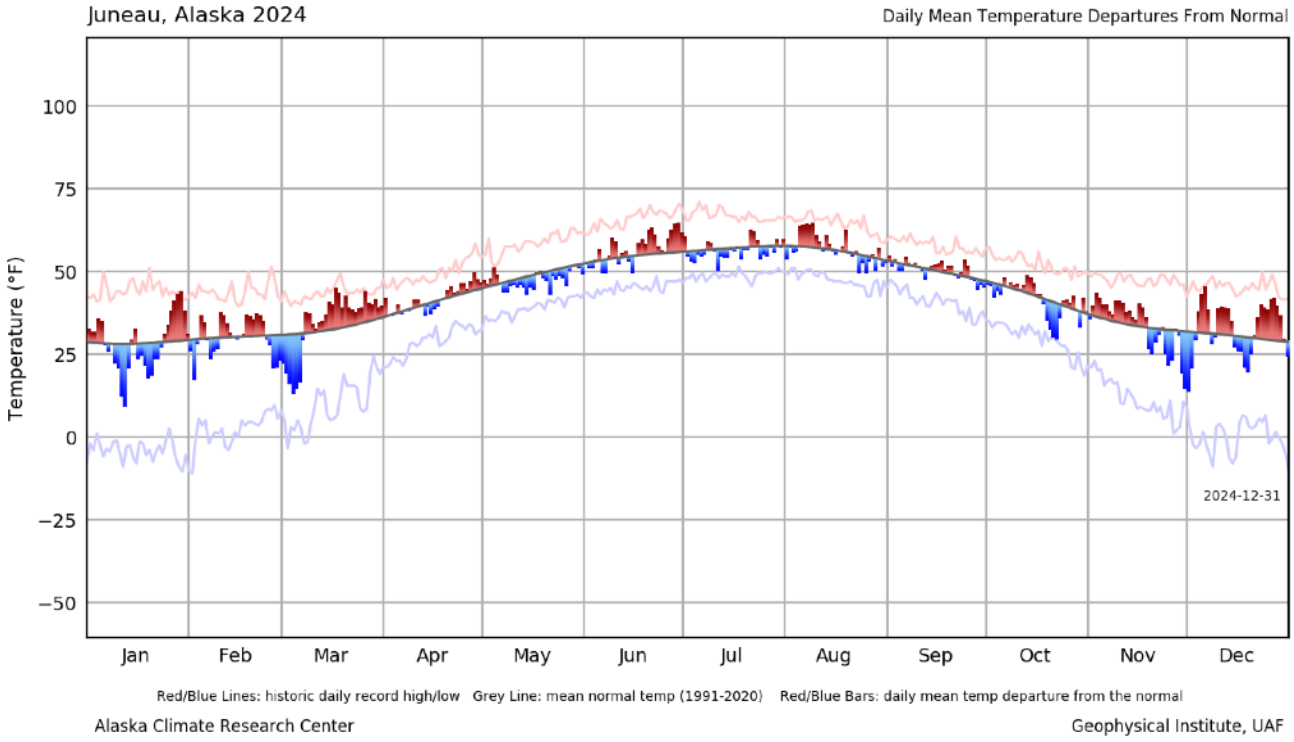

Figure 8. *Mean normal temperature, daily mean departure from normal, and historic daily record minimum and maximum for Juneau, 2024.*

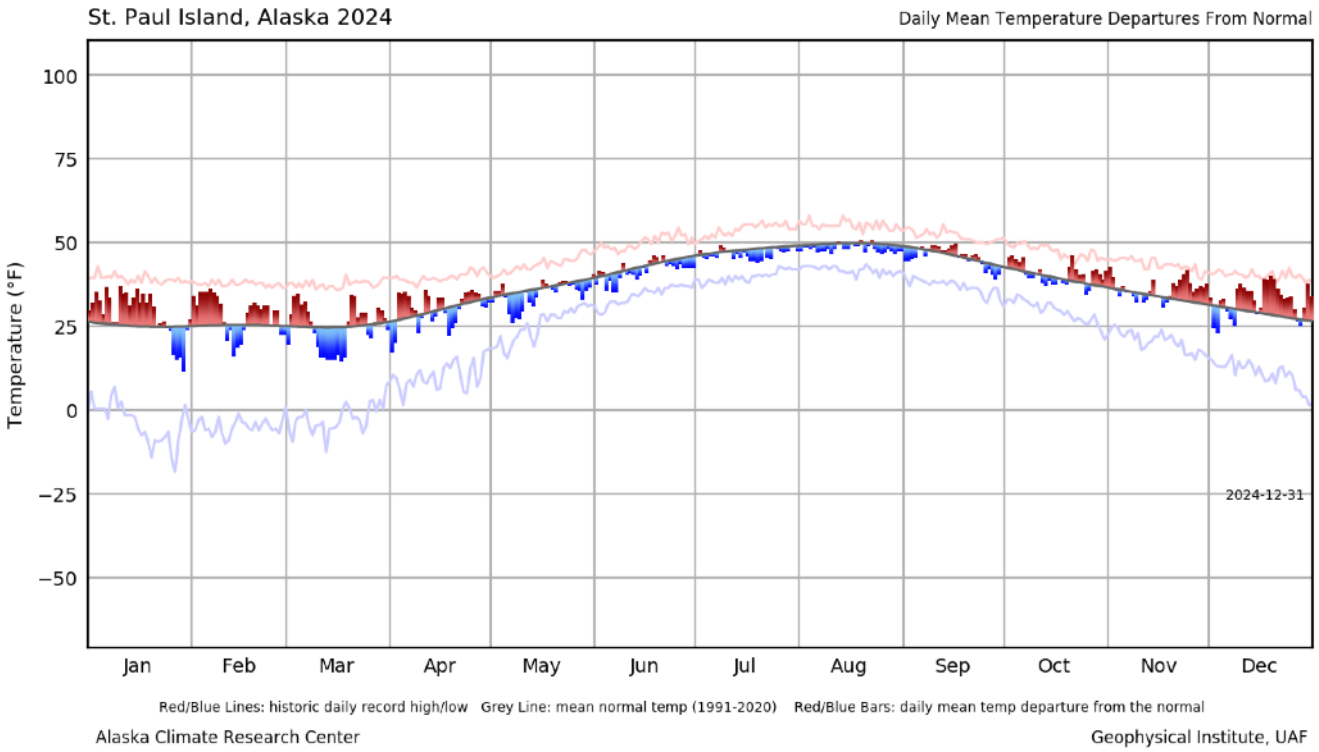

Figure 9. *Mean normal temperature, daily mean departure from normal, and historic daily record minimum and maximum for St. Paul Island, 2024.*

unusually warm December was not exceptional in Utqiaġvik, with only a moderately positive monthly anomaly of +1.5°F. Figures 5 through 9 show climographs for, respectively, Anchorage, Utqiaġvik (Barrow), Fairbanks, Juneau, and St. Paul Island, as examples of 2024 temperature deviations in the five main climate regions of Alaska. Climographs are available for other locations in Alaska at akclimate.org.

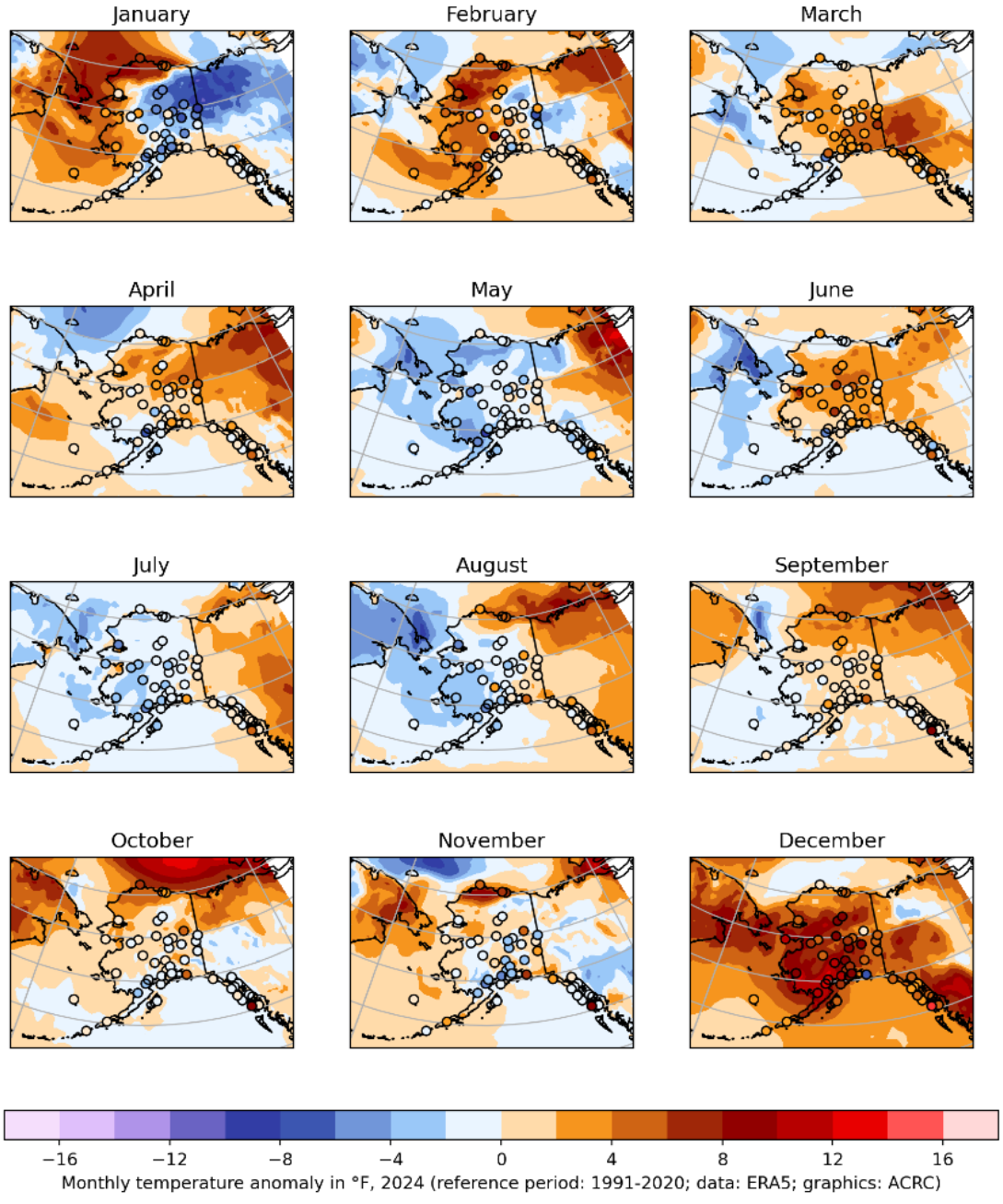

Figure 10. *January - December 2024 monthly anomaly maps over Alaska based on ERA5 reanalysis data and the 1991-2020 climatology. Circle markers show station*

For a more detailed look at spatial variations across the state, Fig. 10 shows monthly anomaly maps based on ERA5 reanalysis data (Hersbach et al., 2020). January brought warmer than average temperatures in western Alaska and some very cold weather in the Interior and Southcentral. February was also warmest in the west with moderate cool anomalies in the Interior. March and April were warmer than average, with regionally cooler conditions in southwest Alaska. A cold May in most of the state was followed by a warm June in mainland Alaska, although regional cold anomalies persisted in the Bering and Chukchi Sea. July and August were moderately colder than normal in most of the state, with regionally positive deviations on the North Slope in August. Positive temperature anomalies returned to most of the state in September, with slightly cooler conditions in the Southwest. Notably, the cold anomalies in the Chukchi and Bering Sea remained in place from May through September. In October, warmer than average conditions spread into the Chukchi and Bering Sea and broke the maritime "cool spell". Northern Alaska saw pronounced warm anomalies in October and November while the rest of the state experienced regionally variable temperatures. As mentioned above, December was unusually warm in much of the state and many regions recorded their highest monthly temperature anomalies of the year in this month. The North Slope was an exception to this pattern. December in northern Alaska was slightly warmer than the 1991-2020 normal but anomalies remained substantially below the values experienced in the southern half of the state.

Large-Scale Circulations: PDO and ENSO

Large circulation patterns like ENSO (El Niño-Southern Oscillation) and the related Pacific Decadal Oscillation (PDO) can influence the weather and climate of Alaska (Mantua et al. 1997, Hartmann and Wendler 2005). The PDO is related to sea surface temperatures in the Pacific north of 20° latitude. Globally, record high ocean temperatures were recorded in 2024 and the northern Pacific stood out as an area with particularly high sea surface temperature anomalies (Cheng et al., 2025).

Like ENSO, the PDO index has a "cool", negative phase and a "warm", positive phase. A positive PDO tends to coincide with above average temperatures in Alaska. For example, the 1976 phase shift of the PDO index from negative to positive has been linked to an increase in regional temperatures in the mid-1970s (Hartmann and Wendler, 2005). Since early 2020, the PDO index has been negative. In 2024, the index dropped below -3 in

several months, with the lowest value registered in October at -3.78. This is the lowest monthly value in the NOAA NCEI time series, which goes back to 1854. The strongly negative PDO may have dampened temperatures regionally. However, quantifying the potential impact of the PDO on Alaska temperatures is difficult and the linkage is incompletely understood.

ENSO typically oscillates between positive and negative phases at time scales of 2 to around 5 years. PDO cycles are much slower and occur at roughly decadal scales. ENSO as expressed by the Oceanic Niño Index (ONI) transitioned from the "warm" el Niño phase and a strongly positive ONI to ENSO neutral conditions and slightly negative values during the summer months of 2024. ENSO forecasts have been favoring a transition into weak la Niña conditions in recent months and continue to predict decreasing values for the 2024/25 winter. At the end of the year, the ONI remains slightly negative in ENSO neutral conditions.

2024 Precipitation in Detail

Annual Precipitation

2024 was a wetter than average year in the North Slope climate region, on the West Coast, and in the Interior. The Cook Inlet and Bristol Bay region and the Panhandle had slightly below average annual precipitation with 93 to 94% of normal. The deviation from normal was greatest on the North Slope with 134% of normal precipitation followed by the West Coast with 114% (Fig. 11).

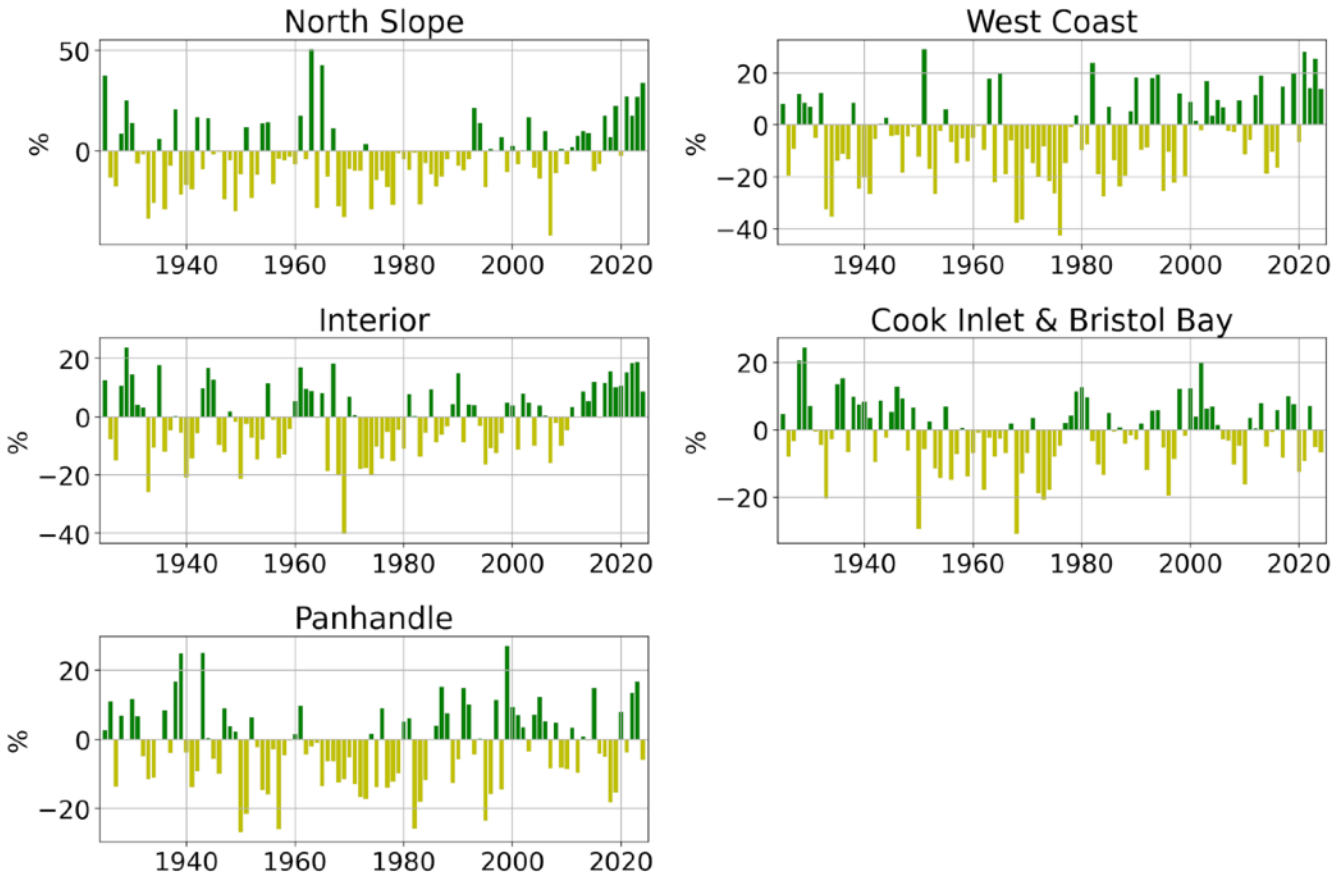

Figure 11. *Time series of annual precipitation sums as percentage departure from the normal (1991-2020) for the Alaska climate divisions. Data source: NOAA nClimDiv. Note: Y-axis scale differs for the regions to show more detail.*

The ERA5 data shown in Fig. 12 paints a similar picture; most of the state recorded moderately above average precipitation. Parts of the eastern Interior, Southcentral, and the Panhandle were drier than the climatology but not extremely so. The First Order stations all recorded at least 80% of normal precipitation. Utqiaġvik, Nome, and Fairbanks had the wettest year of the selected stations in relative terms with 139% (Utqiaġvik and Nome) and 130% (Fairbanks) of normal. The driest stations, relatively speaking, were Yakutat (83%) and Ketchikan (89%) in the Southeast (Fig. 12 & 13, Table 2). The southern

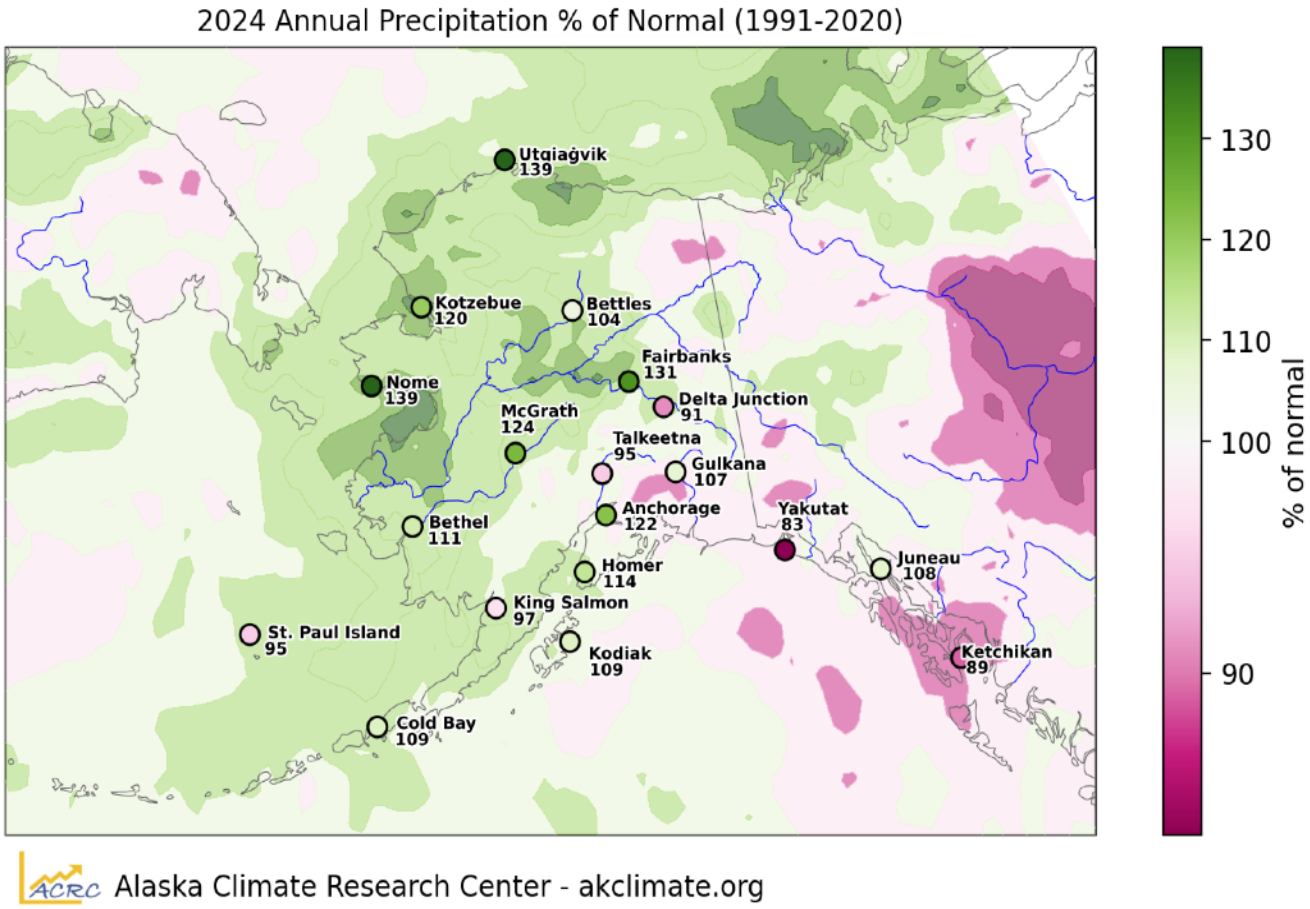

Figure 12. *2024 precipitation deviation (%) from the normal (1991-2020) for the selected stations (circular markers, same color scale as the background shading). Overlay: ERA5 gridded precipitation*

regions of the Panhandle experienced abnormally dry conditions and moderate drought between July and September as per the US drought monitor.

Station	Observed (°F)	Normal (°F)	Departure (°F)
Anchorage	20.1	16.4	122.4
Bethel	21.8	19.7	110.7
Bettles	16.7	16.0	104.3
Cold Bay	46.7	42.7	109.4
Delta Junction	9.4	10.3	91.3
Fairbanks	15.3	11.7	130.8
Gulkana	12.5	11.8	106.6
Homer	27.2	23.9	114.0
Juneau	72.1	67.0	107.6
Ketchikan	132.7	149.5	88.7
King Salmon	20.9	21.4	97.4
Kodiak	85.0	78.3	108.5
Kotzebue	13.6	11.4	119.7
McGrath	22.5	18.0	124.5
Nome	24.0	17.2	139.3
St. Paul Island	23.1	24.3	95.1
Talkeetna	25.2	26.5	95.2
Utqiaġvik	7.5	5.4	138.6

Yakutat	117.2	140.4	83.5

Table 2. *Annual precipitation (inches) for 2024, normal precipitation (inches) (1991-2020), and deviations from normal (%) for the 19 first- order stations. Shades of purple and green match Figure 12. None of the stations had more than five days of missing data this year. Missing data are ignored in the computation of the mean.*

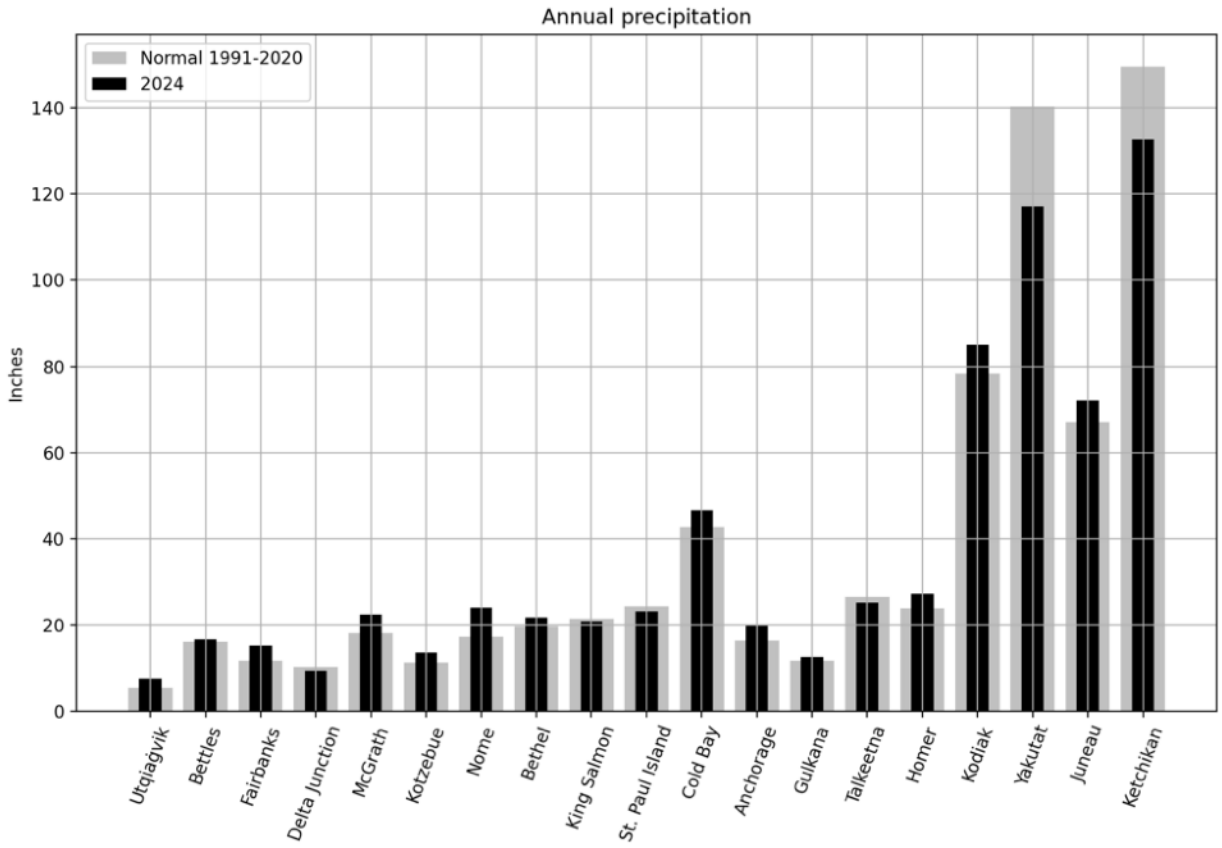

Figure 13. *Precipitation sums (in inches) for 2024 and corresponding normal values at the selected stations (1991-2020) for the selected stations.*

Monthly Precipitation

Precipitation is spatially and temporally very variable and the monthly anomaly maps (Fig. 14) serve to contextualise station data and regional averages. January was drier than the 1991-2020 normal in most of the state, with the exception of the northern and western coasts and part of the Panhandle. February brought far above average precipitation to

southwest AK and dry conditions in the Interior. March was relatively wet in all of the state and wettest in the west. April also brought very wet conditions for western Alaska. The eastern half of the state mostly saw below average precipitation. In May, deviations from normal were relatively moderate overall, with a tendency for drier conditions in the northwest and wetter weather elsewhere. June was mostly very dry, with some regional variability in the northern Interior and in the southwest. July and August were both

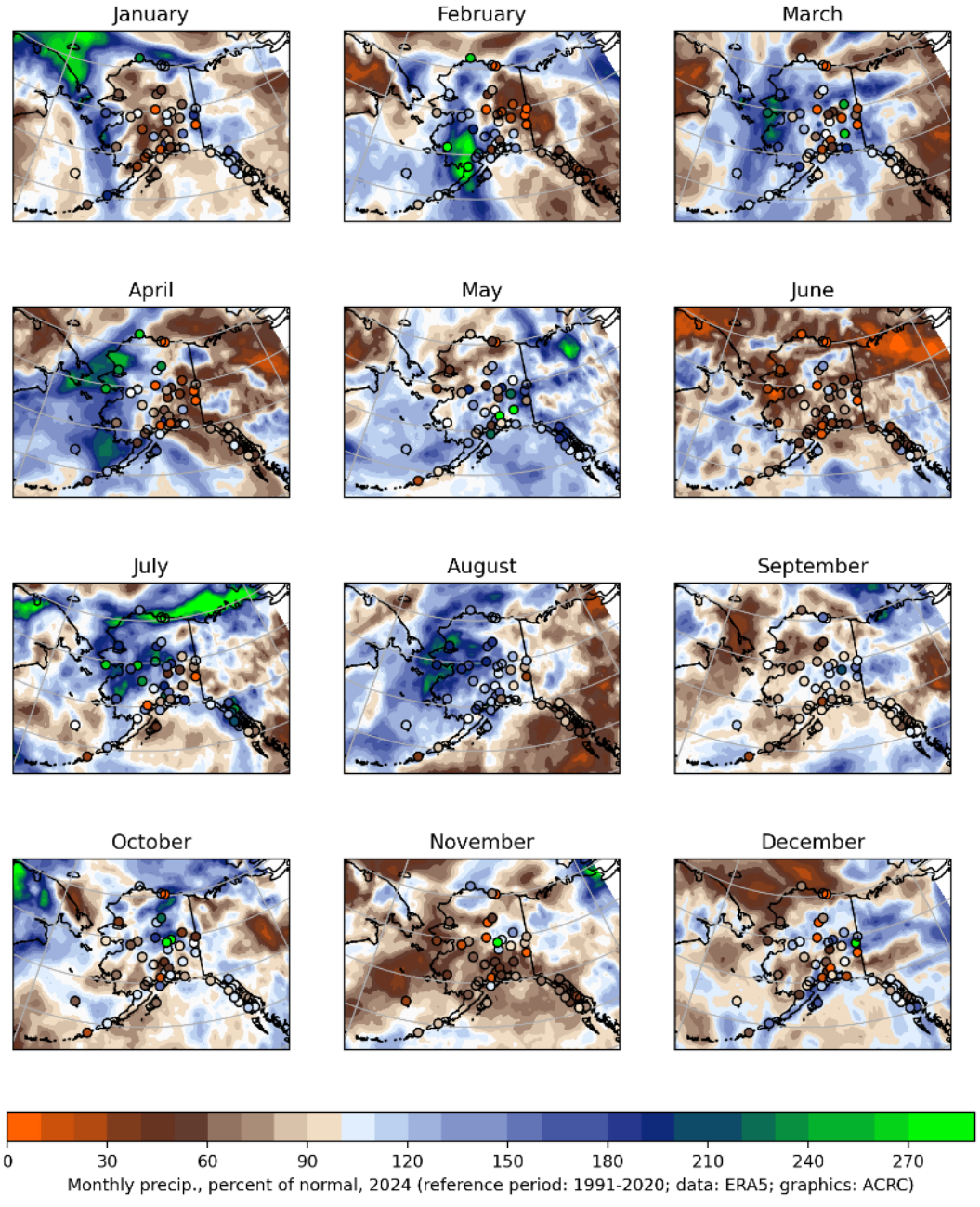

Figure 14. *January - December 2024 monthly precipitation as percentage of normal over Alaska based on ERA5 reanalysis data and the 1991-2020 climatology. Circle markers show station data in the same color scale as the ERA5 background.*

unusually wet. In July, large positive anomalies occurred along the Arctic coast and in the northwest. In August, all of western Alaska recorded well above average rain. September brought comparatively dry weather. October was regionally quite variable, with fairly dry conditions in the southwest and rainy weather in parts of the Interior. November was very dry in most of the state; only the North Slope saw slightly above average precipitation. December was again quite variable with dry conditions in the north and wetter weather in parts of the Interior and along the Gulf coast.

2024 Snowfall

Long term time series of snow fall and snow depth are available from the First Order Stations in Anchorage, Fairbanks, Juneau, and Bettles. Snow depth at these four locations is visualized in Figs. 15 and 16.

2023/24

In Fairbanks, the 2023/24 season started early and with above average values. Around mid-January a plateau was reached near the long-term average. The timing of melt out was also in line with the 1991-2020 normal. October, December, January, and April saw above average snowfall in Fairbanks. February was unusually dry. In Bettles, November and December, and the spring season from March to May were snowier than average. The seasonal evolution of snow depth in Bettles tracked the 1991-2020 climatology closely. Anchorage had another exceptionally snowy season, with far above average snowfall in November, December, and January (Fig. 15), a seasonal snowfall total of 171% of normal (Tab. 3), and record or near-record snow depth levels during much of the 2023/24 season. November 2023 was the snowiest November on record with over 300% of normal monthly snowfall. By December, Anchorage had its snowiest season to date since at least 1953. April and May were also relatively snowy and the Anchorage snow season lingered well into spring 2024. In Juneau, January set a new snowfall record for the station with over 70 inches, or more than 300% of normal (monthly report January 2024).

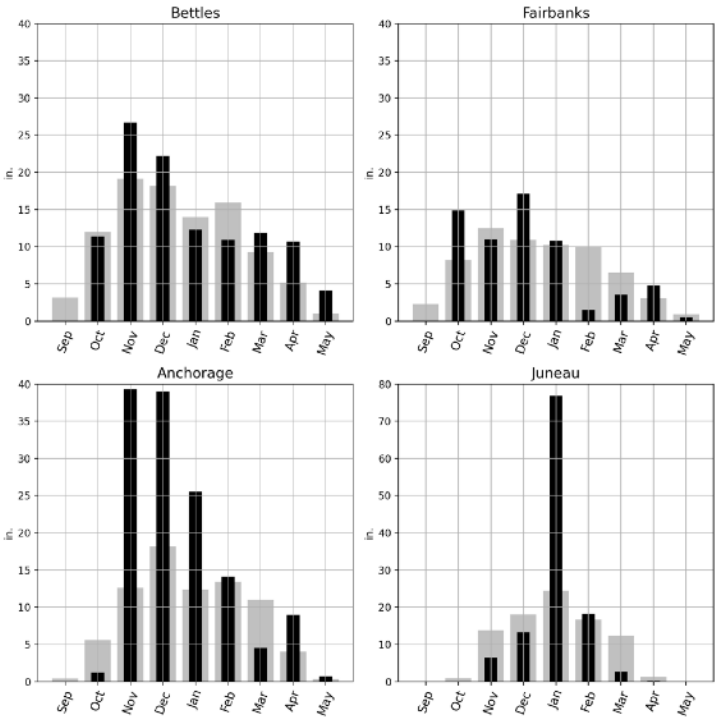

Figure 15. *Monthly snowfall in inches for selected stations in 2023/2024 (black bars), compared to the 1991-2020 normal (gray bars). Note that the plot for Juneau has a different scale for the x-axis to accommodate the high snow fall total in January at the site.*

Warm, rainy weather quickly melted the snow in late January and there was no lasting seasonal snow pack at the Juneau Airport station.

In many regions, the end of the 2024 snow season was brought on by a prolonged period of warmer than average temperatures starting around mid-April. River break-up also got underway during this time. On the Tanana River at Nenana, the Ice Classic tripod fell over on April 27, about two days earlier than average when compared to the 1991-2020 reference period and a week ahead of the 1931-1960 and 1961-1990 reference periods. Refer to our blog post on this for a graph of break-up dates on the Tanana since the start of the time series over a century ago. Based on data from the Natural Resource Conservation Service (NRCS) SNOTEL network, snow water equivalent (SWE) values were up to 200% of normal in parts of Southcentral at the end of April and regionally variable in the rest of the state, with moderately below average SWE in the central Interior and near normal values towards the ALCAN border. In May, break-up related flooding damaged homes and other infrastructure in communities along the lower Kuskokwim River. Low-lying parts of Bethel experienced unusually high-water levels and significant flooding due to an ice jam.

2024/25

Considering the start of the 2024/25 season, Anchorage was near their average snow depth by the end of December. A substantial snowfall in late October brought a strong start to the snow season but mild weather and rain then compacted the snow and lead to a decrease in snow depth from early November onwards. After two well above average snow seasons, Anchorage is experiencing a far less snowy winter so far in 2024/25. Fairbanks on the other hand is having an above average season to date, with notable snow fall events in mid-October and December. Juneau had another very snowy episode in late November followed by rain in December. In Bettles, the evolution of the snow pack once again followed the long-term average relatively closely and snow depth was sitting at slightly below average values in late December.

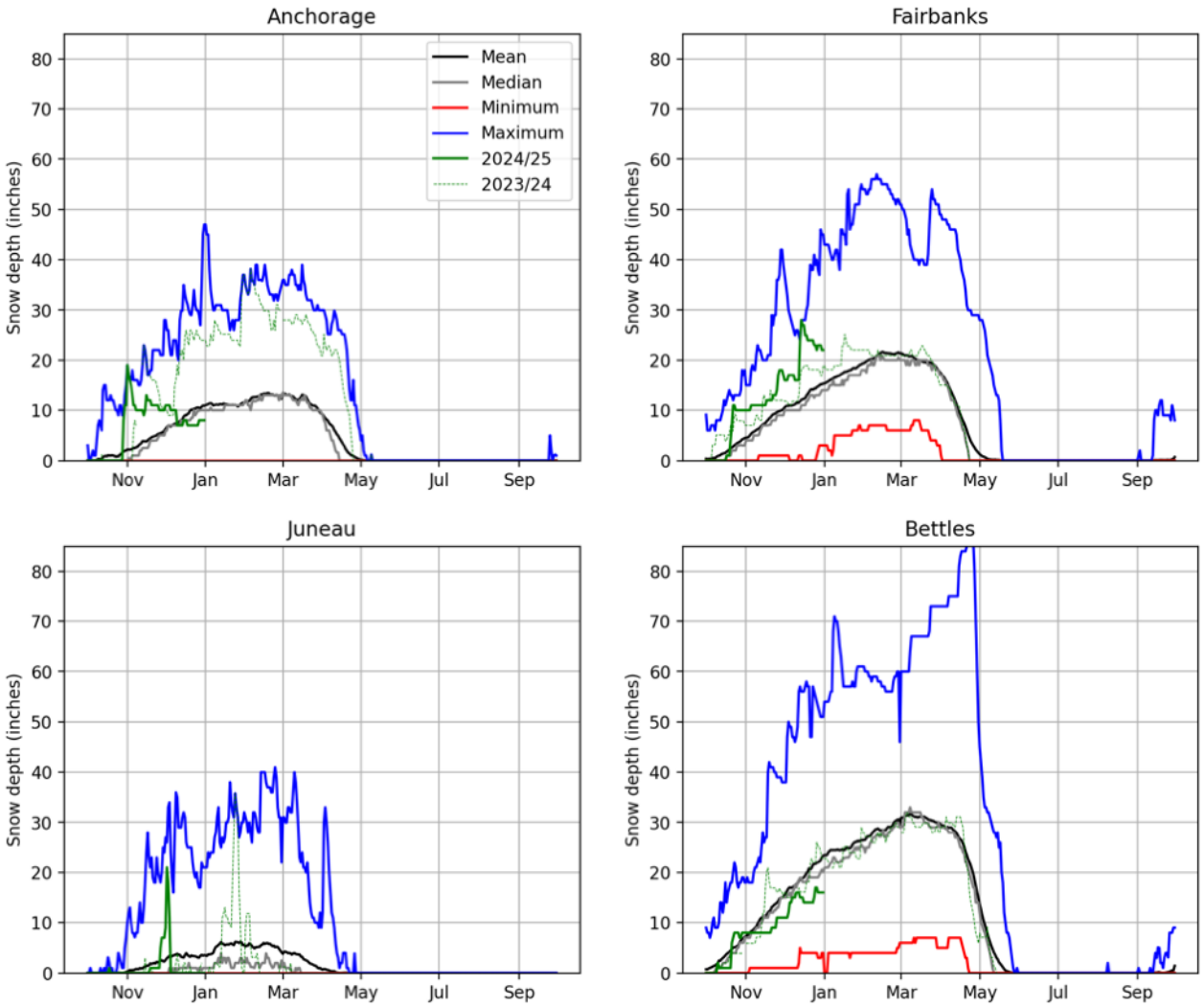

Figure 16. *Snow depth in Anchorage, Fairbanks, Juneau, and Bettles for the current season (2024/25, solid green line) and for 2023/24 (thin, dashed green line) compared to the time series minimum, maximum, and median.*

2024 Arctic Sea Ice

Arctic sea ice, particularly the development of sea ice in the Bering and Chukchi Sea, is a key driver for Alaska's climate. In 2024, Arctic sea ice extent was once again well below the average of the satellite record for the entire year - a symptom of what the National Snow and Ice Data Center (NSIDC) calls the "new abnormal" for Arctic sea ice, referring

to the stark decline in sea ice extent since the 1990s. The annual maximum extent for 2024 was reached on March 14 at 5.8 million square miles. This is the fourteenth lowest maximum extent in the 46-year satellite time series. The annual minimum, set on September 11th, 2024, was the seventh lowest in the satellite record with 1.65 million square miles. Sea ice growth was slow during part of the fall and especially during the early winter season. The total extent of the Arctic sea ice briefly dropped to record low levels for the time of year in mid-December. A time series of daily Arctic sea ice extent can be seen in Figure 17.

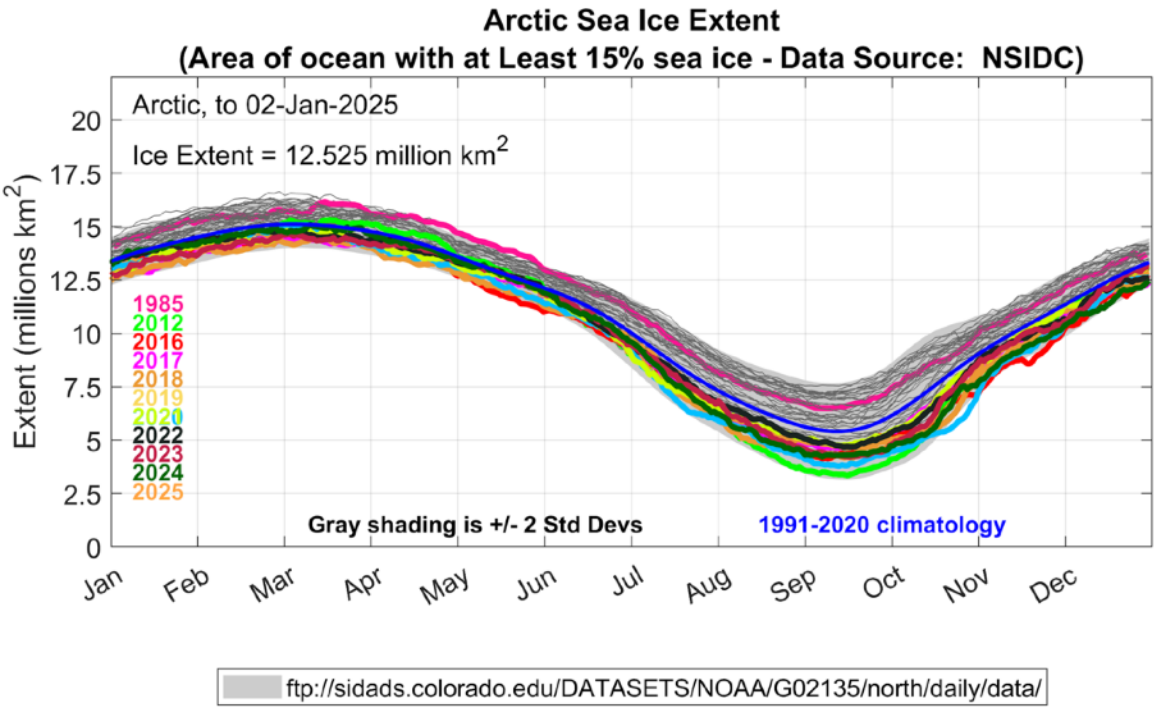

***Figure 17**. Time series of daily Arctic sea ice extent. This year's data (2024), seen in dark red, are updated through January 2, 2025. The median sea ice extent for the 1981-2010 reference period is depicted in dark blue. Plot compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (nsidc.org/).*

Like in 2023, the Antarctic sea ice conditions were notable due to the very low ice extent during the Antarctic winter. The seasonal maximum in 2024 was the second lowest on

record (6.63 million square miles on September 19) after the unprecedented, record-breaking 2023 season.

2024 Wildfire Season

The 2024 wildfire season began in May, with 94 fires burning a total of 6,699 acres by the end of the month. Human activity was responsible for 88 of these fires. Notable incidents included the Popovich Creek and Sanderson Creek coal seam fires, which subsided during the latter part of May due to wetter weather conditions. A tundra fire of unknown origin was discovered in the Yukon Delta National Wildlife Refuge in late May. Favorable weather in the final weeks of May helped limit the spread of these fires.

June saw a significant increase in wildfire activity, driven by prolonged warm and dry weather. By June 28, the total number of fires had risen to 280, with a burned area of 234,151.8 acres, a dramatic increase from the 6,699 acres reported at the end of May. Lightning was the primary cause, responsible for burning 230,800.5 acres through 133 lightning-caused fires. The remainder of the burned area was attributed to human activity or unknown origins.

Several major fires caused significant impacts in June. The Globe Fire, located on the western edge of the White Mountains National Recreation Area, grew rapidly, prompting evacuation orders along the Elliott Highway. The fire, situated in a full response area, required multiple hotshot and smokejumper crews to protect nearby structures. This activity also led to a temporary closure of the highway and an emergency closure of the western section of the recreation area. The McDonald Fire, near Blair Lakes and approximately 35 miles southeast of Fairbanks, slowed somewhat as it reached old burn scars but continued to threaten areas along the Tanana River and Richardson Highway, resulting in evacuation alerts. The McDonald Fire merged with the Clear Fire, forming the largest wildfire in Alaska for the season.

The wildfire smoke caused significant air quality issues in Fairbanks and other Interior communities during June. Despite the increase in activity, the 2024 wildfire season remained relatively moderate in terms of statewide burned area compared to historically severe fire years.

In July 2024, numerous wildfires in Alaska's interior and western regions impacted air quality and posed threats to roads and settlements. While rainy and cooler weather initially reduced fire activity, a late-July heatwave caused renewed danger, with notable fires like the Sinnott Fire near Eagle and the T'eedriinjik Fire near Venetie requiring significant suppression efforts, including water-dropping aircraft.

Although warm weather in early August briefly reignited fire activity, such as the American Fire near Preacher Creek and the Sinnott Fire, cooler weather by mid-August led to a gradual decline in fire activity. By September, scattered, smaller fires remained, including the Circle Bay Fire near Wrangell, but the season largely concluded. As of September 30, the Alaska Interagency Coordination Center (AICC) reported 390 fires burning a total of 667,064.8 acres, with over 99% of the area burned caused by lightning. Human-caused fires accounted for 209 incidents, though they burned minimal acreage.

These fires were managed across various jurisdictions, including federal, state, and private lands. The Bureau of Land Management (BLM) oversaw the largest share of wildfire acreage (83%), followed by the Department of Forestry (DOF) and the U.S. Forest Service (USFS). Burn permits were lifted on September 1, marking the official end of the season, with updates to resume in 2025.

Alaska operated at higher planning levels (PL4 and PL5) for 12 days during peak fire activity. Multiple incident management teams were assigned to coordinate responses, including both in-state and out-of-state teams. This wildfire season highlights the challenges of managing a large-scale, resource-intensive natural disaster in Alaska, with significant contributions from state, federal, and regional firefighting agencies. The collaborative efforts underscored the importance of coordination, resource allocation, and preparedness in mitigating wildfire impacts.

The 2024 season has a relatively moderate cumulative burned area (Fig. 18) compared to the most severe years, such as 2004 and 2015. The season of wildfire this year, while moderate in terms of total burned area compared to historical averages, presented significant challenges. Collaborative firefighting efforts and effective resource management played a critical role in mitigating the impacts of wildfires on communities, infrastructure, and air quality.

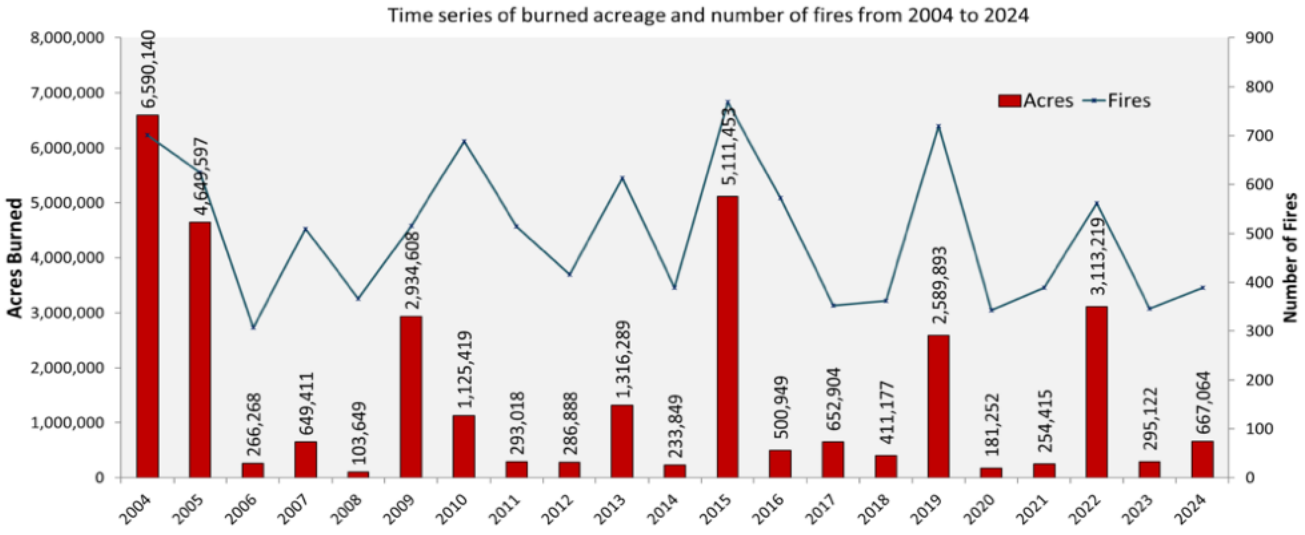

Figure 18. *Time series of burned acreage and number of fires from 2004 to 2024. Source: https://fire.ak.blm.gov/predsvcs/intel.php*

2024: Notable weather events by month

January

- Record-breaking snowfall in Juneau, exceeding 300% of normal, led to urban avalanche advisories and temporary road closures.
- Cold Bay experienced its wettest January on record with over 200% of normal precipitation.
- Fairbanks recorded temperatures below -40°F for the first time in over 700 days on January 23. Unlike previous cold spells, this event lacked strong temperature inversions.
- A warm start to January was followed by a prolonged cold spell, with much of the state experiencing very low temperatures, especially in the Interior.

February

- Early and late cold spells contrasted with a mid-month warm period, resulting in a 90°F temperature swing in the Interior.
- Numerous daily high-temperature records were set between February 13–20.
- Bethel recorded 325% of normal precipitation; King Salmon (286%) and Utqiaġvik (271%) also had a very wet month.
- Ice fog occurred in Fairbanks during early February cold spell, facilitated by extreme cold and air pollution.

March

- Slightly cooler than average in the southwest; warm elsewhere, with very high temperatures in late March.
- Interior Alaska experienced a dry March, while the West Coast was wetter than the 1991-2020 climatology. Nome recorded 228% of normal precipitation.
- Sea ice reached its seasonal maximum.

April

- Greatest positive temperature deviations occurred in the Interior and Northwest.
- Above-average precipitation on the North Slope.
- Rapid snowmelt during the second half of April caused river break-up and minor flooding.
- Kodiak experienced heavy rainfall around April 18–19, prompting flood advisories and minor landslides.
- Fairbanks, Anchorage, and Bettles saw 150–200% of normal snowfall.

May

- Cool temperatures dominated most of Alaska; wetter than average conditions in the south and Interior.
- Flooding from river break-up and snowmelt impacted communities along the Kuskokwim
  River.

- Bettles recorded 410% of normal May snowfall, the fourth snowiest May on record.
- Gulkana had its second wettest May on record with 292% of normal precipitation.

June

- Warm and dry conditions fueled wildfire activity, especially in the Interior, with "fire weather" marked by lightning and high winds.
- Smoke from wildfires degraded air quality in many communities.
- Bettles experienced its second warmest June, while Fairbanks recorded its third warmest.
- Early June storms brought significant rainfall to Kodiak, the only wetter-than-average station this month.

July

- Cool and rainy conditions prevailed across most of Alaska, with Juneau and McGrath experiencing their wettest July on record.
- A heatwave brought temperatures up to 90°F in the Interior, followed by the season's first
- Snow at higher elevations in late July.
- Drought conditions developed in southern Southeast Alaska.
- A glacier dam release near Salmon Glacier caused spikes in water levels on the Salmon River.

August

- Severe flooding in Juneau from the Suicide Basin glacial lake outburst flood (GLOF) caused extensive damage along the Mendenhall River.
- Heavy rains from an atmospheric river impacted southern Alaska, doubling seasonal water levels on the Kuskokwim River.
- One fatality, multiple injuries and destroyed homes due to a landslide in Ketchikan following heavy rain.
- Renewed fire activity in the Interior produced noticeable smoke columns.

September

- Moderately cooler conditions in western Alaska contrasted with warmer-than-normal weather in the east.
- Utqiaġvik recorded its second warmest September since 1901.
- Fairbanks experienced its latest first freeze on record.
- Sea ice reached its annual minimum on September 11, the 7th lowest on record.

October

- Severe coastal flooding in Kotzebue related to storm activity.
- Record-breaking precipitation in Fairbanks (354% of normal) disrupted daily life with power outages and traffic hazards.
- The first major snowstorms of the season impacted Fairbanks and Anchorage, both recording over 200% of normal snowfall.

November

- Southcentral Alaska experienced colder-than-normal conditions; pronounced temperature swings on the North Slope
- The state was relatively dry, with above-average precipitation recorded in Utqiaġvik.

December

- Warmer-than-average conditions persisted statewide, with Homer and Talkeetna tying for their second warmest December on record.
- Above average snowfall in Fairbanks with 157% of normal snowfall and a snow depth 146% above average.

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Appendix

	J	F	M	A	M	J	J	A	S	O	N	D
Anchorage	13.18	21.98	28.77	37.5	46.79	56.65	58.26	56.11	50.2	36.9	20.9	25.73
Bethel	10.84	17.21	13.32	28.23	39.47	54.67	53.87	50.32	44.42	32.97	18.05	18.05
Bettles	-16.5	-1.53	6.82	27.6	43.66	63.08	58.13	51.35	42.72	21.16	0.38	2.52
Cold Bay	29.41	31.31	29.11	36.07	39.52	46.93	50.79	51.93	48.65	41.56	37.55	34.66
Delta Junction	-7.31	10.38	16.06	35.8	47.24	61.22	60.1	55.42	45.17	25.68	7.1	11.59
Fairbanks	-12.68	0.52	13.89	36.28	50.47	65.05	61.27	56.15	47.52	26.66	3.88	1.19
Gulkana	-9.08	5.69	17.79	33.03	43.89	57.62	56.53	53.98	43.83	26.76	3.62	5.48
Homer	23.23	30.09	31.45	37.77	44.81	53.45	55.52	54.84	50.43	39.85	30.07	35.5
Juneau	28.11	29.93	35.02	41.7	47.35	57.02	56.00	56.85	50.18	41.29	32.92	33.47
Ketchikan	35.42	36.79	38.95	43.77	48.87	54.85	60.11	61.95	53.97	46.35	39.17	41.35
King Salmon	17.98	28.29	25.4	35.73	41.42	52.95	54.21	53.48	48.12	33.92	22.78	30.56
Kodiak	29.48	31.97	32.6	37.02	42.68	49.85	53.81	54.4	49.7	42.1	35.27	36.79
Kotzebue	-0.61	5.59	4.05	17.75	29.6	45.3	51.02	47.39	41.28	27.58	10.62	7.61
McGrath	-8.5	7.28	15.77	32.3	46.61	61.1	58.05	53.93	45.47	28.77	6.5	3.52
Nome	8.52	13.05	11.6	23.93	35.5	50.03	49.94	48.06	42.23	31.63	19	20
St. Paul Island	28.56	28.24	24.52	30.87	34.69	41.72	46.61	48	45.53	40.6	35.74	32.53
Talkeetna	10.65	18.52	28.5	36.03	46.77	58.58	57.73	54.48	49.47	34.62	17.93	25.32
Utqiaġvik	-3.78	-7.26	-8.32	5.35	23.71	37.85	41.15	43.71	38.65	27.35	11.4	-4.82
Yakutat	29.84	30.64	35.03	39.18	45.89	53.6	56.4	56.16	50.7	42.68	35.73	36.4

Table A1: Monthly mean temperature (in °F) at the 19 selected stations. The highest and lowest monthly means are colored in red and blue, respectively.

	J	F	M	A	M	J	J	A	S	O	N	D
Anchorage	-3.67	0.67	2.98	0	-1.35	0.76	-1.3	-1.34	0.89	0.55	-2.69	6.32
Bethel	3.89	3.87	-1.17	-0.83	-3.58	1.37	-2.42	-3.58	-1.64	0.81	-0.5	8.04
Bettles	-5.85	1.76	3.13	3.05	-1.3	4.49	-1.67	-1.29	1.52	-0.19	0.09	8.52
Cold Bay	0.94	1.07	-0.79	1.07	-1.49	-0.12	-0.76	-0.69	0.24	0.27	2.3	3.91
Delta Junction	-6.36	2.93	1.92	1.96	-1.2	2.77	-0.61	-0.33	0.32	-0.78	-1.04	9.19
Fairbanks	-4.38	0.19	3.15	2.63	0.13	4.04	-1.63	-0.85	1.76	0.4	-0.22	5.55
Gulkana	-5.73	-0.05	3.1	0.43	-1.91	2.71	-1.38	0.44	0.19	-0.34	-3.19	5.61
Homer	-2.17	1.76	1.35	-0.93	-1.2	1.46	-0.63	-0.46	0.93	-0.35	-1.13	7.82
Juneau	-0.33	-0.23	2.12	0.9	-1.59	2.42	-1.05	0.85	0.09	-0.91	-0.83	3.11
Ketchikan	-0.18	0.58	0.95	0.25	-1.23	-0.45	1.26	2.96	0.35	0.15	-0.48	4.91
King Salmon	1.34	6.18	1.91	-0.32	-4.24	0.15	-2.54	-2.17	-0.53	-2.48	-2.12	12.01
Kodiak	-1.67	-0.39	-0.59	-2.13	-3.13	-1.5	-2.35	-2.14	-0.96	-0.05	-0.43	4.89
Kotzebue	1.34	4.19	2.51	1.45	-3.55	-2.21	-4.28	-4.76	-1.82	0.55	-0.13	5.21
McGrath	-2.75	2.6	3.86	0.11	-1.84	2.39	-2.76	-1.99	-0.48	0.32	-1.5	5.78
Nome	2.91	4	2	1.29	-1.75	1.73	-2.07	-2.14	-0.86	1.19	0.75	10.9
St. Paul Island	3.27	2.95	-0.64	0.76	-1.92	-1.37	-1.28	-1.55	-0.47	1.15	1.85	3.64
Talkeetna	-2.95	-0.35	4.99	-0.17	-0.93	1.54	-2.33	-2.15	1.96	0.75	-2.65	9.72
Utqiaġvik	7.81	4.64	2.18	1.3	1.01	1.85	-0.51	3.91	4.96	6.15	5.7	1.48
Yakutat	1.24	-0.02	3.12	0.59	0.23	1.7	1.01	1.51	1.3	0.83	2.03	5.59

Table A2: Monthly temperature deviations (in °F) from normal at the 19 selected stations. The highest and lowest deviations are colored in red and blue, respectively.