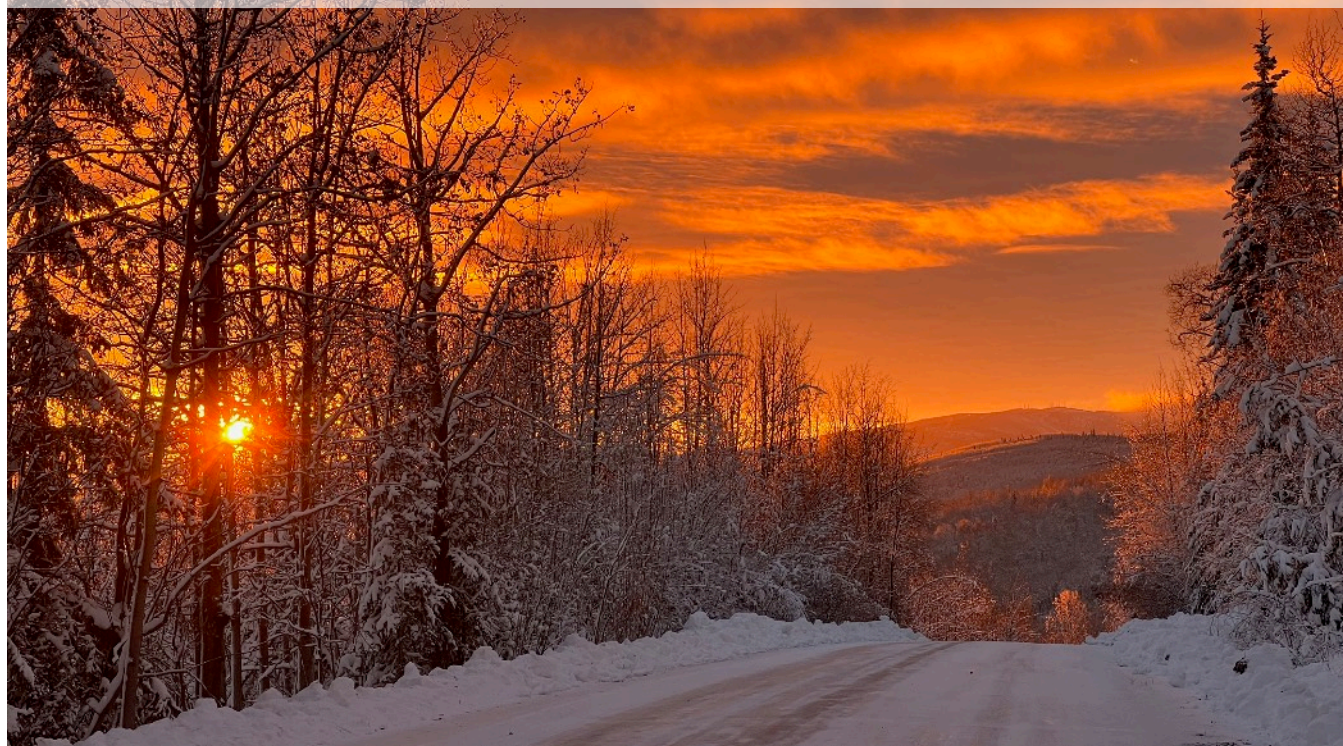




Alaska Climate Research Center
The Alaska State Climate Center

STATEWIDE CLIMATE SUMMARY OCTOBER 2024



Fairbanks views after the first major snow storm of the season. Photo: Oct. 24, 2024, by Carl Schmitt.

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Alaska’s Statewide Climate Summary for October 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

Severe coastal flooding in Kotzebue

First major snow storms of the season in Fairbanks and Anchorage

Fourth warmest October on record in Utqiagvik

Over 350% of normal precipitation in Fairbanks

Significant Weather Events and Synoptics

October started out with a low pressure system in the Gulf of Alaska, an upper level trough the Bering Sea, and high pressure over northern Alaskan and the eastern Interior. The Panhandle had rainy weather with short breaks of sunshine during the first week of the month (Fig. 1, upper panel) while Interior Alaska got to enjoy a few days of sunny and clear fall weather. As troughing in the Bering Sea deepened, the Aleutians and western coastal areas experienced high winds and elevated surf. This storm system then moved across the Aleutian chain and into the western Gulf of Alaska, pushing rain and snow showers into Southcentral. In the Interior, an Arctic low moving in from the northwest put

an end to the sunny weather and brought colder air and widespread snow flurries around October 7 and 8, with more substantial snow accumulation in the Alaska Range (Fig. 1, middle panel).

Snow showers continued through the second week of October. Anchorage recorded their first official snow fall of the season on October 10th, slightly ahead of the average “first snow” date on October 16th. Another strong Bering Sea storm system and its fronts brought very strong winds to western Alaska and the Gulf starting around October 11. High wind warnings were issued for parts of Southcentral and along the west coast up to the Bering Strait.

Around mid-month, low pressure over northern Alaska and parts of Arctic Canada began pushing cooler air masses southwards into mainland AK and temperatures took a notable downward turn

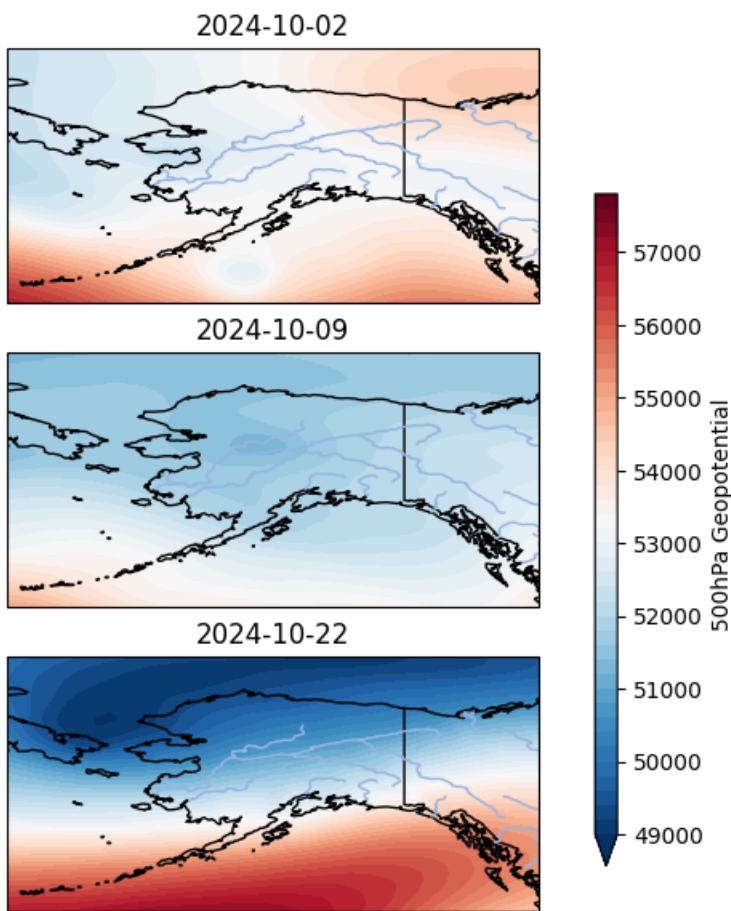


Figure 1. 500hPa Geopotential over Alaska on October 2, 9, and 22. ERA5 reanalysis data courtesy of copernicus.eu

across much of the state. Snow showers continued intermittently in the Interior and Southcentral. Winter also arrived on the Panhandle with the first snow of the season in Haines, Skagway, and Juneau. The first snow reports for Juneau were registered on October 17 and 18, along with unseasonably cool temperatures across the Panhandle for much of the week.

Meanwhile, a strong storm system building over eastern Siberia began moving towards Alaska (Fig. 1, lower panel). The storm track and strength of the system made it apparent that this would turn into a very impactful event for western Alaska and the Interior. Various warnings and advisories were issued by the NWS for strong winds and coastal flooding in areas along the Bering and Chukchi coasts, and heavy snow in the Interior. Kotzebue was severely impacted by coastal flooding as the storm hit the coast. Over 80 residents evacuated their homes as waters rose to 3 to 4 feet above the normal high tide line on October 22. At least one home was reported to have collapsed and numerous fish camps and other seasonal infrastructure were washed away. A disaster declaration was issued as multi-agency response got underway to aid recovery efforts and repairs before winter truly sets in.

In Fairbanks and the surrounding areas, the same system produced a severe winter storm with impressive precipitation totals and a few days of very hazardous traffic conditions. October 21 was the third wettest day on record in Fairbanks in terms of precipitation totals (as in, snow and rain combined and converted to liquid) with 1.99". This was a new daily record for October 21. Daily records were also set in Tanana, Bettles, and Nome on October 20 and 21. Due to the relatively warm temperatures and rain mixing with snow, the accumulated snow on the ground was very heavy (Fairbanks residents described it as "cement-like") and traffic conditions were very difficult. Downed trees caused widespread power outages and damage to power lines. Many businesses and schools were closed until the snow could be cleared from the major roadways. The storm was followed by a few days of calmer weather and a bit of sun before another round of more moderate snowfall moved into the Interior.

The Bering Sea to Gulf of Alaska storm track also remained active (Fig. 2) and Anchorage ended the month with their first major snow storm of the season. The Anchorage NWS reported 12" of snow at their offices on October 29, all from the one storm. The MatSu school district closed a number of schools and issued a remote learning day due to

hazardous traffic conditions. After the main wave of precipitation, rising temperatures and a mix of freezing rain and lingering snow showers on top of already slick roads made for a quite a spooky Halloween on the roads in Anchorage and the MatSu region.

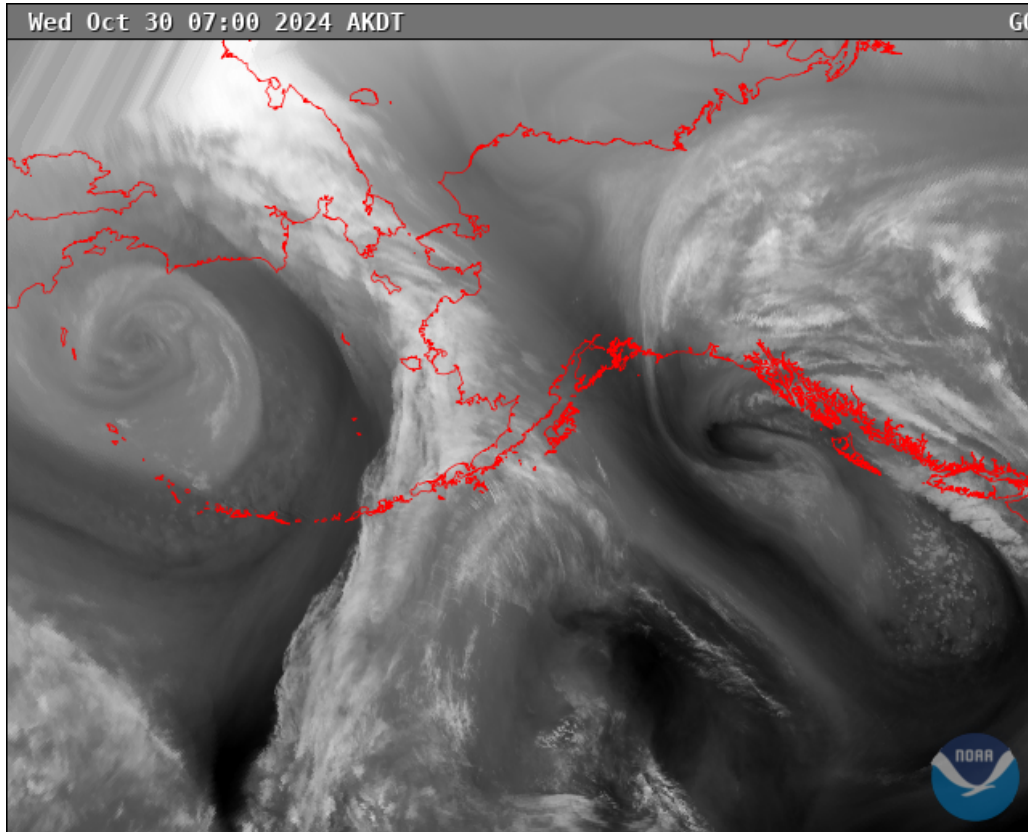
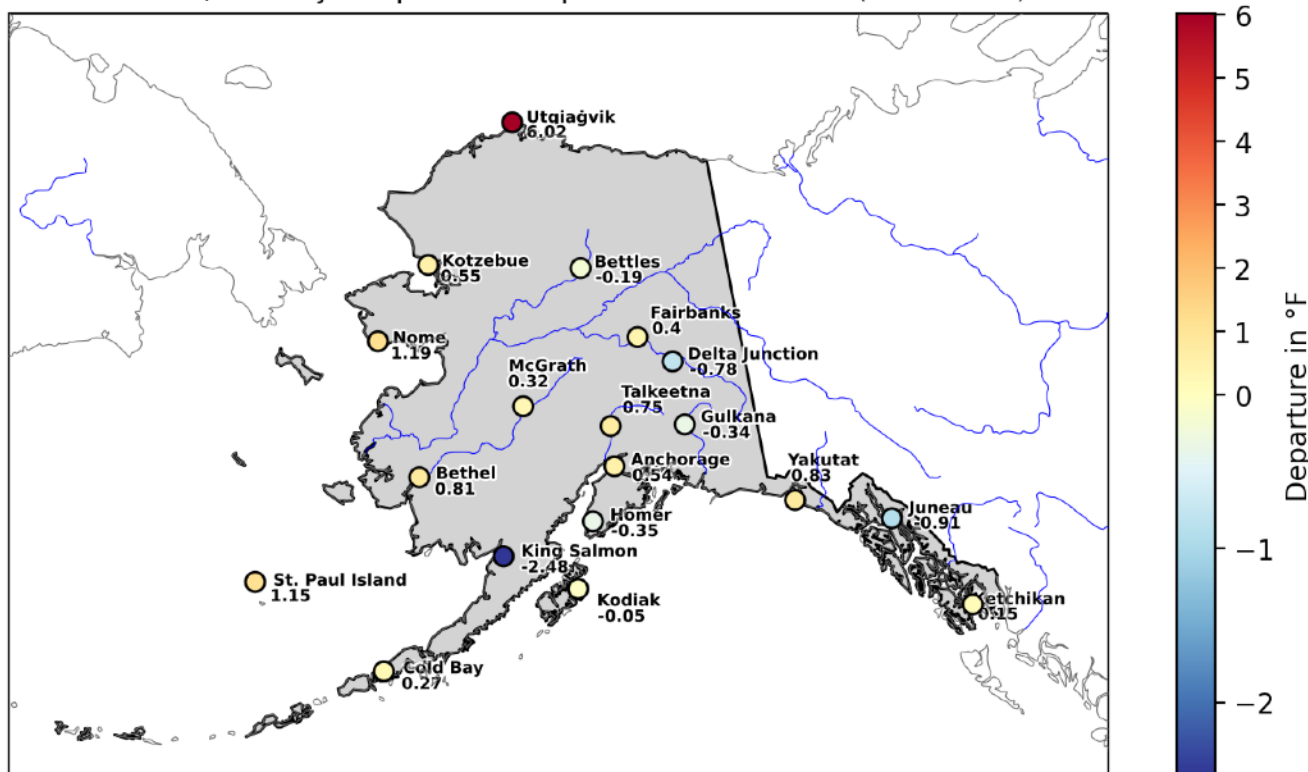


Figure 2. Storm systems can be seen spinning west of Alaska in the Bering Sea and in the eastern Gulf of Alaska in a water vapor scene acquired by the GOES satellite on October 30. Image courtesy of NOAA.

Temperature

Monthly mean temperatures in October were largely near normal. Most of the selected First Order stations were within ± 1 °F of the 1991-2020 average (Fig. 3). Exceptions are King Salmon, the coldest station in relative terms this month with -2.5°F below normal, St. Paul Island and Nome with $+1.1^{\circ}\text{F}$ and $+1.2^{\circ}\text{F}$ above normal, and Utqiagvik with a whopping 6°F above normal. In Utqiagvik, October 2024 is tied with 2012 for fourth warmest October on record. This comes on the heels of a very warm September (monthly deviation from normal of 5°F , second warmest September of the time series).

2024-10, Monthly Temperature Departure From Normal (1991-2020)



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

Daily temperatures (Fig. 4) in Utqiagvik were also once again persistently above normal almost every day of the month. Most of the other selected stations saw some relatively pronounced temperature swings with a cold spell from about mid-month until October 20th as low pressure built over Arctic Alaska. In Utqiagvik, temperatures trended downwards during this period but remained above normal on all but one day. Fairbanks, Bettles, and Delta Junction saw another period of unseasonably cool weather during the last third of the month.

Daily temperature records were not very numerous this month but show a bit of a regional contrast as the various storm systems moved from west to east. On October 20 and 21, Juneau set several new low records for daily temperatures. On the same days, St. Paul Island, Cold Bay and McGrath set new high records for daily temperature parameters (daily mean, maximum, or minimum temperatures). See the appendix for a full list of daily temperature records set this month.

Daily mean temperature, departure from normal (1991-2020), 2024-10

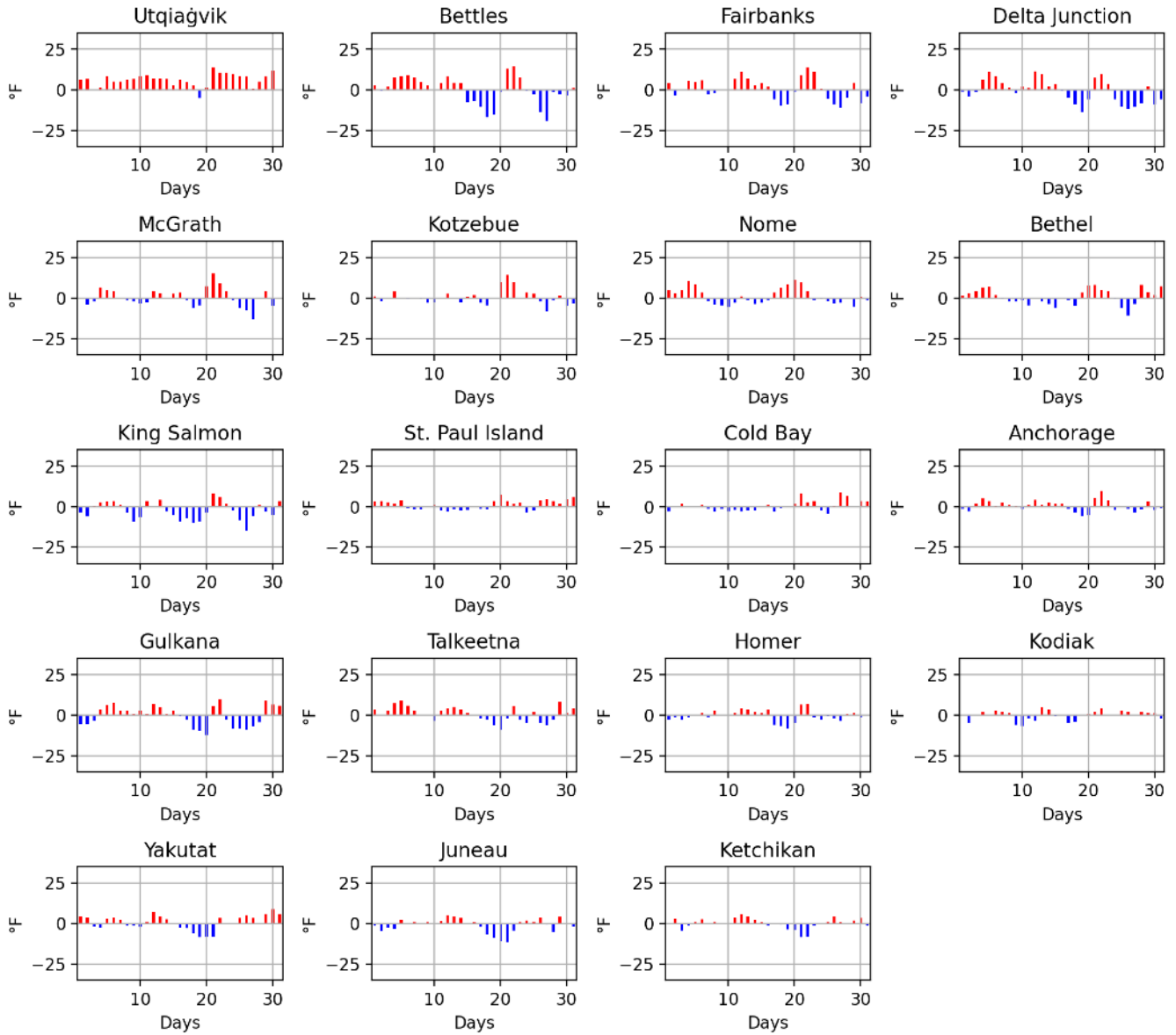


Figure 4. Daily mean temperature departures for each day in October 2024 at the selected stations.

Station	Observed (°F)	Normal (°F)	Departure (°F)
Anchorage	36.9	36.3	0.5
Bethel	33.0	32.2	0.8
Bettles	21.2	21.4	-0.2
Cold Bay	41.6	41.3	0.3
Delta Junction	25.7	26.5	-0.8
Fairbanks	26.7	26.3	0.4
Gulkana	26.8	27.1	-0.3
Homer	39.9	40.2	-0.3
Juneau	41.3	42.2	-0.9
Ketchikan	46.4	46.2	0.2
King Salmon	33.9	36.4	-2.5
Kodiak	42.1	42.1	-0.1
Kotzebue	27.6	26.9	0.6
McGrath	28.8	28.5	0.3
Nome	31.6	30.4	1.2
St. Paul Island	40.6	39.5	1.1
Talkeetna	34.6	34.2	0.8
Utqiagvik	27.5	21.2	6.0
Yakutat	42.7	41.9	0.8

Table 1. Mean monthly air temperature, normal (1991-2020) and departure for selected stations throughout the state, October 2024. Color-coded to match Figure 3 (yellow-orange-red = warmer than usual; shades of blue = cooler than usual).

Precipitation

The near-record precipitation event in Fairbanks on October 21 contributed to a very high monthly precipitation total. Fairbanks was the wettest station in relative terms this month with 354% above normal. Utqiagvik and Homer also had a wetter October than normal with 174% and 154%, respectively. Kotzebue was the driest station in relative terms with only 36% of normal precipitation. Talkeetna (42%), St. Paul Island (54%), Kodiak (61%), and Bethel (62%) also had a fairly dry month. The other selected stations were relatively close to the climatological mean (Fig. 5 & 6, Table 2).

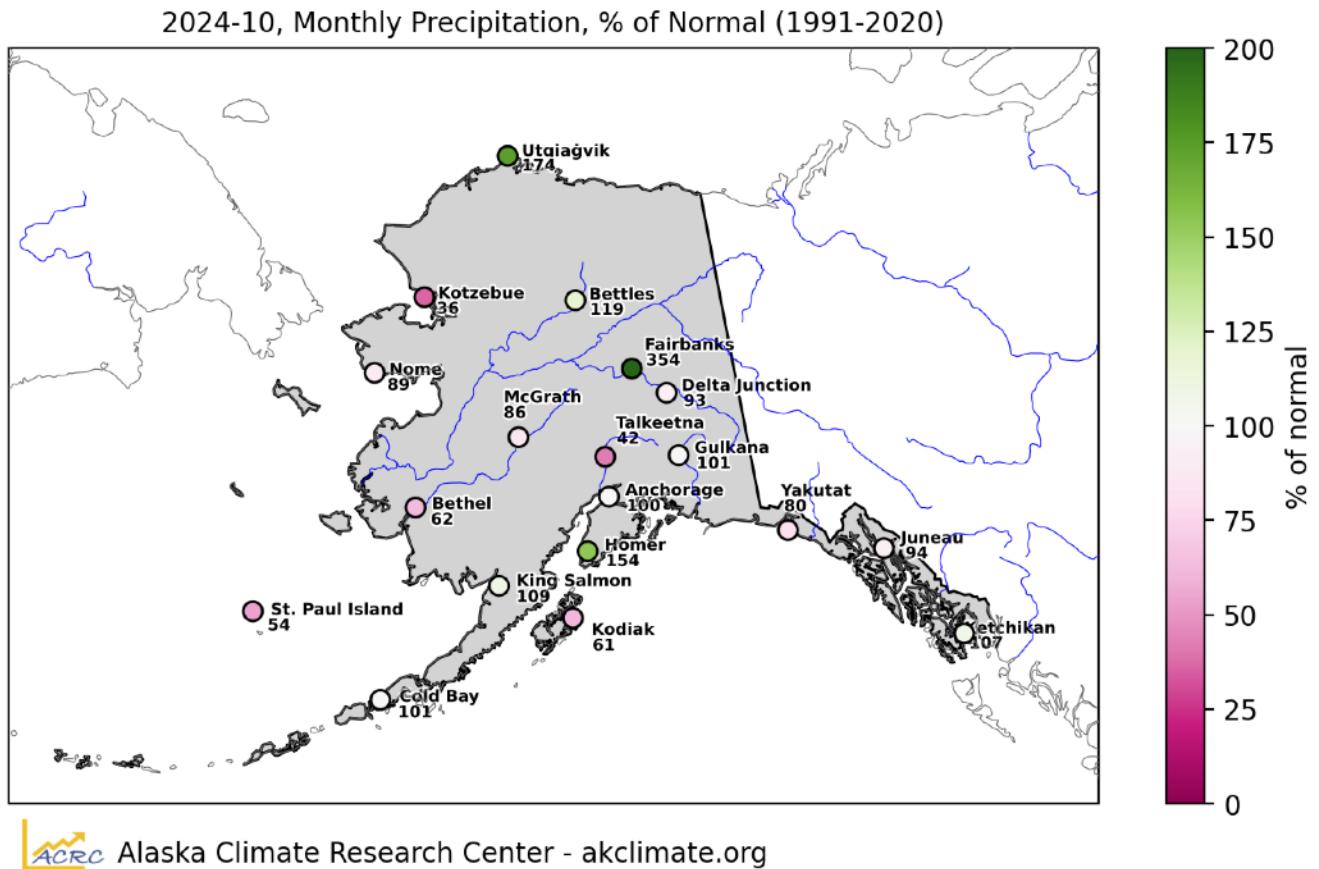


Figure 5. Monthly precipitation in percentage of normal (°F, 1991-2020 reference period), October, 2024, at the selected First Order stations in Alaska.

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	1.8	1.8	100.0
Bethel	1.1	1.8	62.0
Bettles	1.4	1.2	118.8
Cold Bay	5.0	4.9	101.0
Delta Junction	0.6	0.6	93.2
Fairbanks	2.7	0.8	353.9
Gulkana	1.0	1.0	101.0
Homer	4.0	2.6	153.6
Juneau	7.9	8.4	94.2
Ketchikan	19.7	18.4	107.5
King Salmon	2.5	2.3	109.1
Kodiak	5.4	8.8	61.1
Kotzebue	0.4	1.1	36.4
McGrath	1.3	1.5	86.3
Nome	1.6	1.8	88.6
St. Paul Island	1.8	3.3	53.9
Talkeetna	1.2	2.8	41.7
Utqiagvik	0.9	0.5	174.1
Yakutat	15.1	18.9	80.2

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

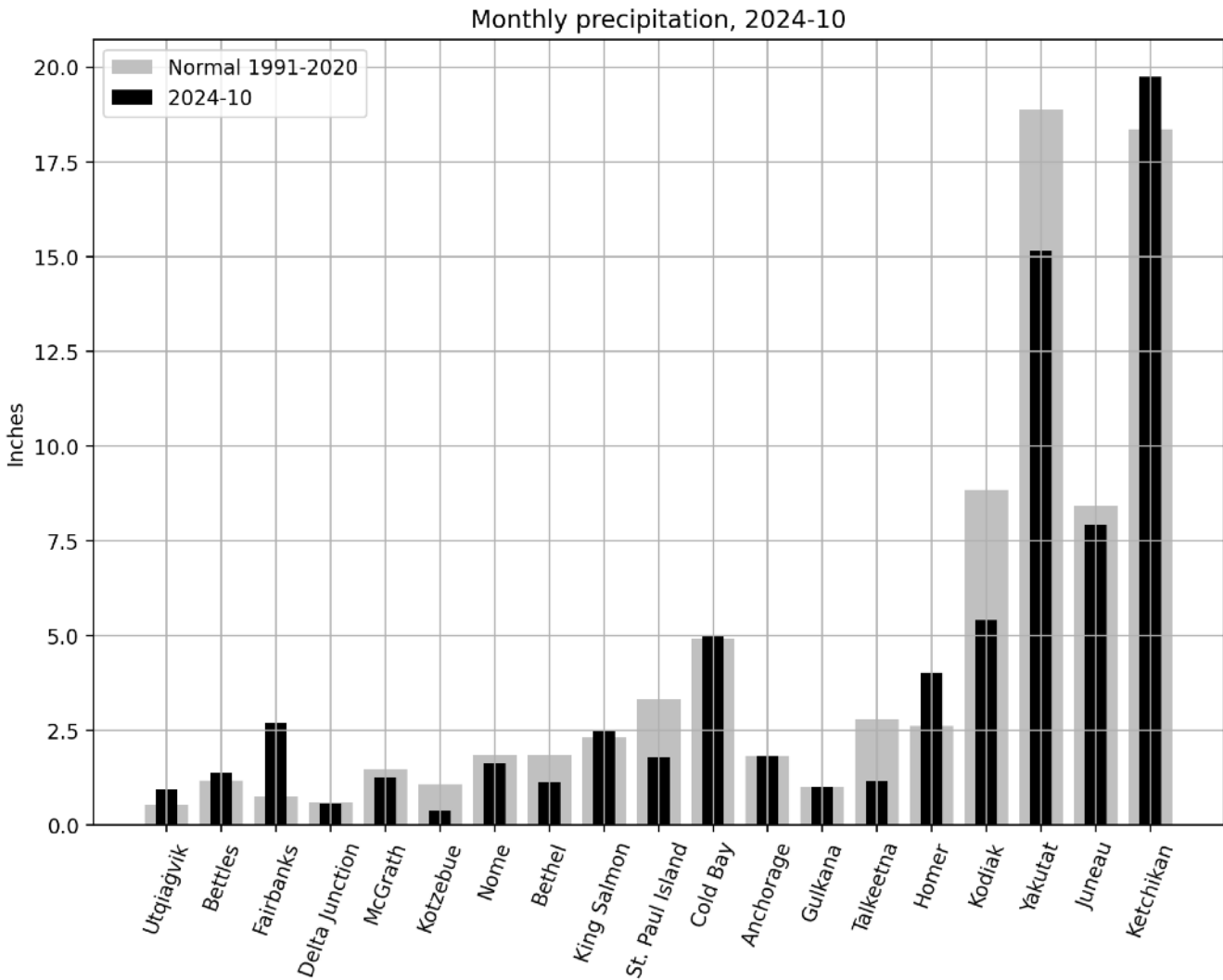


Figure 6. Monthly precipitation sum (black bars) compared to the 1991-2020 normal (grey bars) at the First Order stations.

Snow

After some minor flurries mostly at higher elevations, the new snow season truly got underway with the late October storms in the Interior and Southcentral. Anchorage and Fairbanks both saw more than twice the normal amount of snow fall for October (212% and 222% of normal, respectively). Almost all of this snow fell during the two storm events discussed above. Fairbanks ended October with about 10 inches of snow on the ground at the airport station and snow depth in Anchorage jumped from zero to 11 inches between over the course of the two storm days on October 28 and 29. For both cities, current snow depth represents well over twice the normal for the time of year. Long term snow depth records are also available from Bettles and Juneau. Bettles has had a bit of

snow on the ground since early October. The major October 21 and 22 storm pushed snow depth to above average levels, though not by as big a margin as in Fairbanks. Juneau saw their first snow falls during the last third of October but hasn't built a lasting snow pack, which is in line with climatological expectations for the Juneau airport site. Fig. 7 Shows current snow depth compared to the 1991-2020 normal for the four first order stations with long term records. Fig. 8 shows a big picture overview of current snow depth across the state.

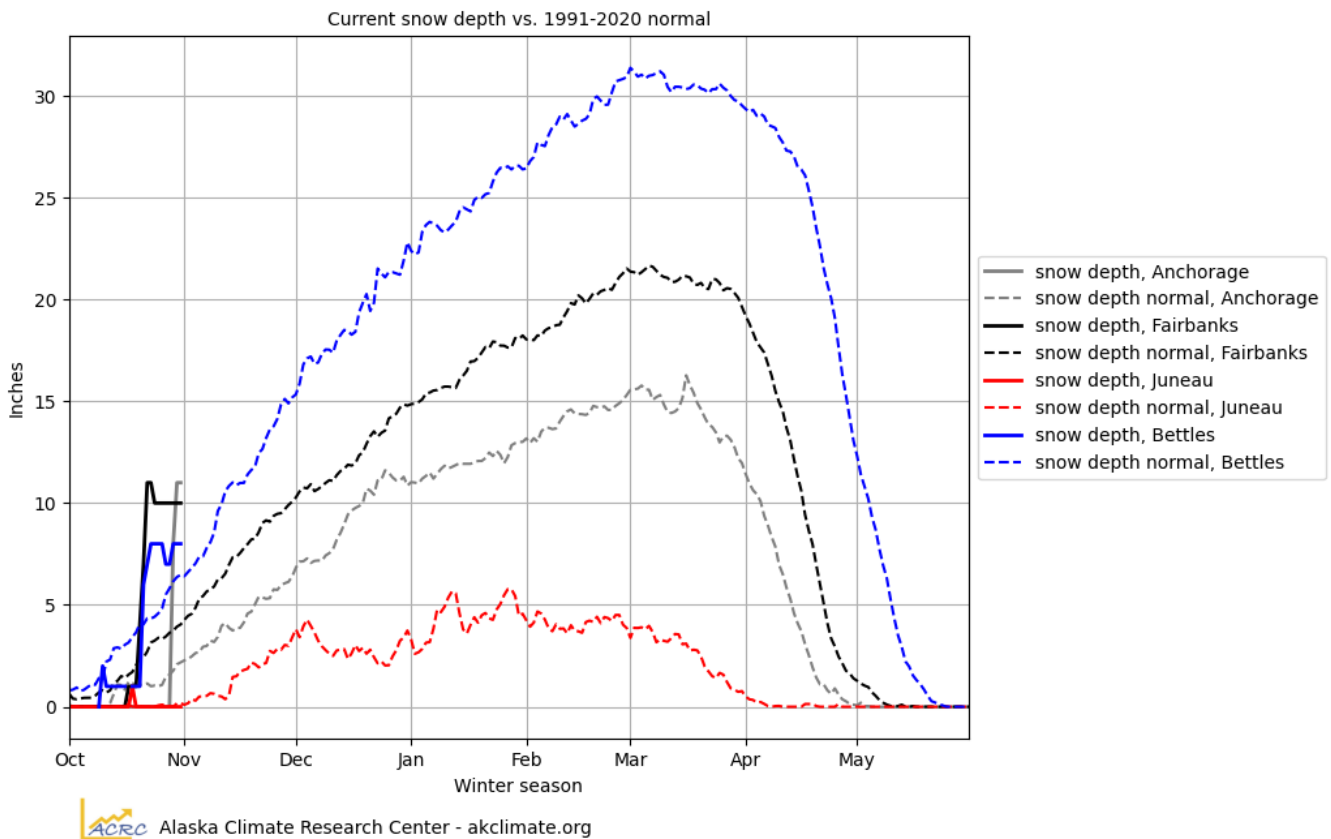


Figure 7. Current snow depth at the four First Order stations with long term records compared to the climatological normal

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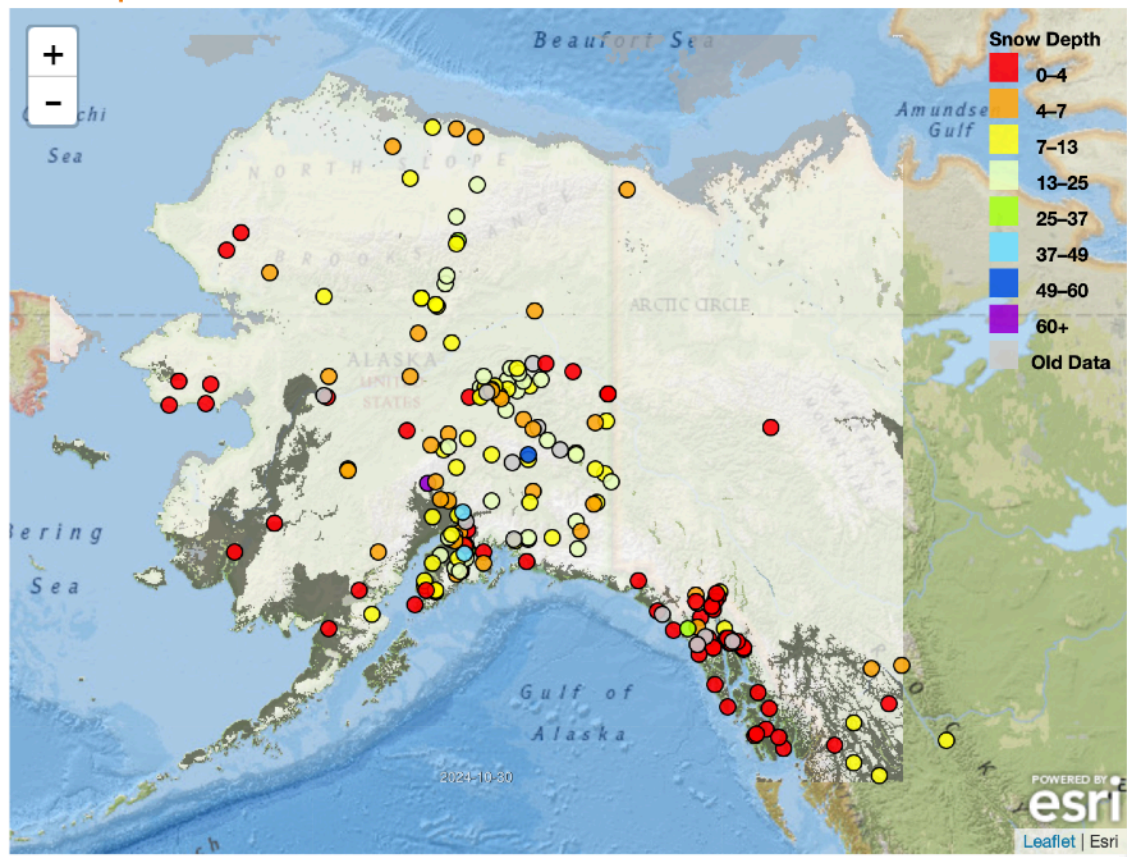


Figure 8. Current snow depth at stations across Alaska (see color legend). The white overlay indicates snow coverage and is generated from satellite imagery and derived products. Graphic courtesy of: https://www.weather.gov/aprfc/snow_depth

Arctic Sea Ice

After the seasonal minimum on September 11, Arctic sea ice has transitioned into the growth season. Weekly growth rates throughout October ranged from around 6% early in the month to over 20% in the week leading up to October 24. Growth rates dropped back to about 6% during the last week of the month. Total Arctic sea ice extent as of October 31 was 7.543 M km², up from 4.48 m km² on September 26.

The NSIDC provides a detailed [analysis of the 2024 sea ice season to date here](#), discussing conditions throughout the summer in different parts of the Arctic as well as the Antarctic.

Fig. 9 shows the current Arctic sea ice extent compared to climatology and previous notable years. Figures 10 A and B show Arctic sea ice extent and concentration on October 30, respectively.

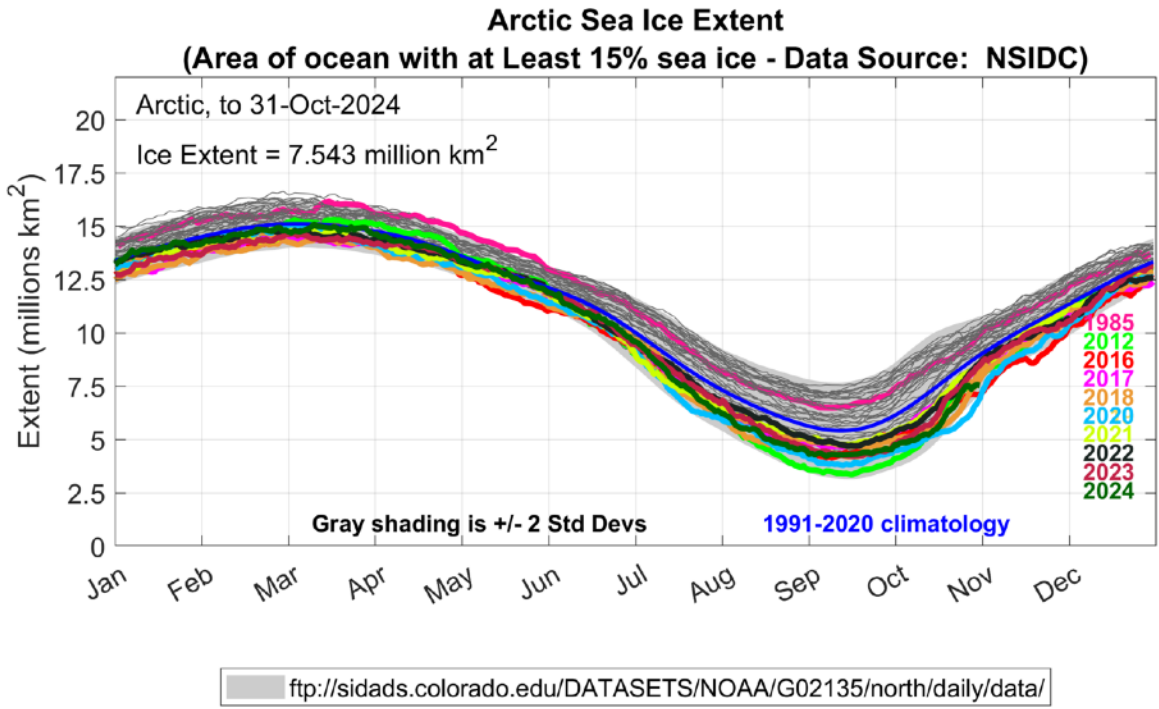


Figure 9. Time series of daily Arctic sea ice extent. This year's data (dark red) are updated until October 31, 2024. The median sea ice extent for the 1991-2020 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (nsidc.org/)

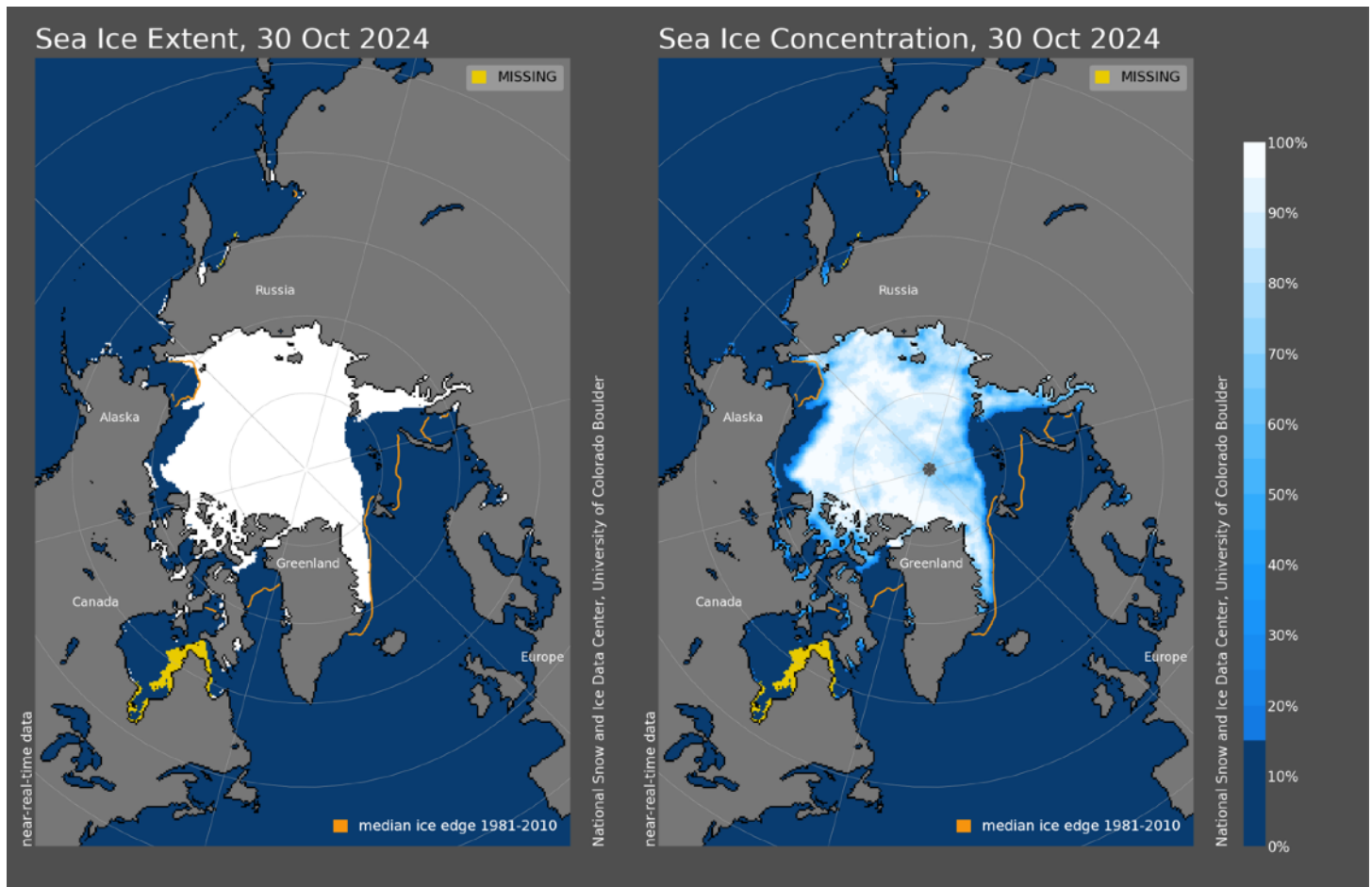


Figure 10. A (left) Arctic sea ice extent and B (right) concentrations as of October 30, 2024 compared to the average from 1981-2010 (Data and images: NSIDC)

News-worthy Information

Severe coastal flooding in and around Kotzebue

The flooding in Kotzebue from the storm system during October 20-23 caused major damage to homes and other infrastructure in the community. Numerous people had to evacuate their homes and shelter in the high school gym and the hospital. Alaskan media reported on the event, covering the storm as such ([Alaska Public Media](#)) and recovery efforts ([AKPM: Kotzebue flooding declared state disaster as residents recover](#)). One man and two children had to spend a night on the roof of a cabin outside of town and were rescued by helicopter ([ADN](#)). Kotzebue residents expressed that they could not remember seeing water levels this high. The [National Guard joined the response efforts](#) to help the community repair flood damage before winter fully sets in.

Second release of Suicide Basin Glacial Lake, minor flooding

As anticipated based on the data recorded in near-real time by the monitoring systems, the glacial lake in Suicide Basin drained for a second time this season. The Mendenhall River at the Auke Bay gauge crested at 10.77 ft during the night of October 20 to October 21, briefly reaching moderate flood stage. Compared to the very destructive flood in August, this second event was relatively minor without significant damage to infrastructure. The NWS cautioned mariners of debris and trees that were reported in the river and washed into Stephen's Passage. [See the NWS suicide Basin Monitoring Page for current information related to lake levels and the status of Suicide Basin](#)

First winter storm in Fairbanks and Anchorage

The record breaking precipitation event on October 21 and the associated power outages and snow related hazards to traffic disrupted every day life in the Interior, particularly in Fairbanks and the surrounding area. Alaskan media reported on the storm and its consequences: [AKPM: Fairbanks snowstorm closes borough schools, buildings](#). [News center Fairbanks: Winter storm brings slush and power outages to the Tanana Valley](#)

Anchorage had their first big snow storm on October 28 and 29. About a foot of snow fell across much of Southcentral, impacting Anchorage and the MatSu Borough. Numerous traffic accidents were reported and airport operations were affected until the snow could be cleared. [The University of Alaska Anchorage and many schools in the area declared a remote learning day on October 29.](#)



Figure 11. The late October storm produced a good base for the Fairbanks ski trails, the resident moose approve. Photo: Carl Schmitt, October 26.

Appendix

Highest Average Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
McGrath	2024-10-21	40.0	2013	37.5
St. Paul Island	2024-10-20	46.0	1936	44.5
Lowest Average Daily Temperature Record				
Juneau	2024-10-20	30.0	1966	32.0
Juneau	2024-10-21	29.5	1970	30.5

Table A1: October 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. Two new highest and lowest mean daily temperature records were set.

Highest Maximum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Cold Bay	2024-10-21	55.0	1981	54.0
Cold Bay	2024-10-27	55.0	1978	51.0
St. Paul Island	2024-10-20	49.0	2018	48.0

Table A2: October 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. Three 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)
Fairbanks	2024-10-12	37.0	1964	35.0
McGrath	2024-10-21	35.0	1964	33.0
St. Paul Island	2024-10-20	43.0	1936	42.0
Talkeetna	2024-10-05	44.0	1925	42.0
Lowest Minimum Daily Temperature Record				
Juneau	2024-10-20	22.0	1961	23.0
Juneau	2024-10-21	20.0	2020	24.0

Table A3: October 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. Four new records for highest minimum daily temperature were set. Two new record 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.