



Alaska Climate Research Center
Alaska State Climate Center



IN THIS ISSUE

Monthly Highlights.....pg. 2
Statewide Temperatures.....pg. 3
Statewide Precipitation.....pg. 5
Drought Conditions.....pg. 9
State of the Sea Ice.....pg. 10
Newsworthy Information.....pg. 12



Alaska’s Statewide Climate Summary for November 2020 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 1981-2010 period. We report on temperatures, precipitation and drought conditions in the state, as well as the condition of the Arctic sea ice.

HIGHLIGHTS

Very warm November for the northern and northwestern parts of the state due to late development of sea ice near the coast and above average ocean temperatures.

Utqiagvik reported **significantly higher than normal monthly temperature and precipitation**. It is tied for 3rd warmest November on record.

Fairbanks received a **record-breaking about of snow on November 5/6**: 14 inches, or, nearly 60% of its total normal monthly snowfall in one event.

The November **average daily sea ice extent** is 3rd lowest on record in the Chukchi Sea and 2nd lowest on record in the Bering Sea in the 43-year satellite record.

Temperature

Multiple locations around the state of Alaska reported warmer than usual temperatures, with the largest departures from normal in the far north (Utqiagvik, with 14.6°F) and the western part of the state (Kotzebue with 6°F; Nome with 8.4°F; and Bethel with 7.0°F), as seen in Figure 1 and Table 1. The Utqiagvik temperatures have been continuously above normal since mid-September with the most extreme anomalies observed in November 2020 (Figure 2). Much colder than average temperatures were constrained to Gulkana (-3.6 °F) and along the southeastern part of the state (Juneau at -2.3 °F and Yakutat at -1.8°F).

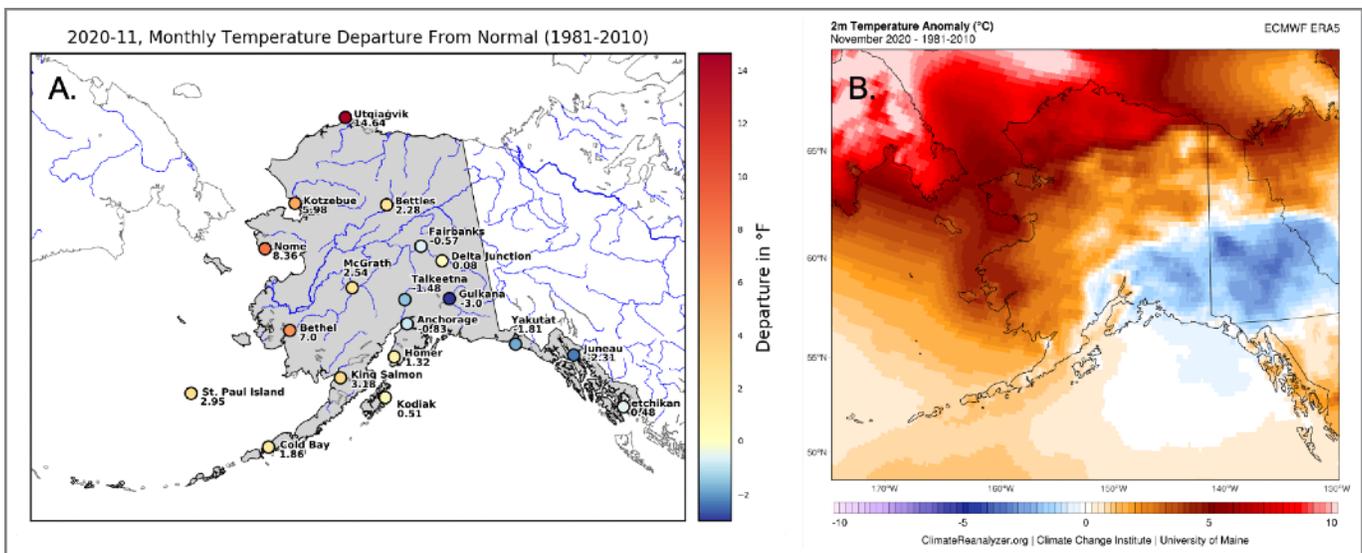


Figure 1. A. Monthly mean temperature departure from normal, November 2020. B. ERA5 reanalysis with gridded (2-m) anomalies showing the extreme warmth along the North Slope, leading to a very warm Beaufort Sea and a mostly ice-free Chukchi Sea.

Daily mean temperatures (Figure 3) reveal that, aside from Utqiagvik, the cities of Bethel, Bettles, Delta Junction, King Salmon, Kotzebue, McGrath, Nome and St. Paul Island showed more than half of the month with temperatures warmer than usual. Multiple temperature records were set including a new record for highest maximum daily temperature in Cold Bay with a temperature of 56 °F on 11/10/2020, breaking a previous record of 50 °F set in 1959; and in Utqiagvik with a temperature of 34 °F on 11/06/2020, breaking a previous record of 32 °F, set in 1950. In Fairbanks, a new lowest mean daily temperature record was set with a temperature of -15 °F on 11/02/2020, breaking a

previous record of -14.5 °F in 1975. See the appendix for more details on this month’s record-breaking high and low temperatures.

Station	Observed (°F)	Normal (°F)	Departure (°F)
Anchorage	21.4	22.2	-0.8
Bethel	24.4	17.4	7.0
Bettles	1.2	-1.0	2.3
Cold Bay	36.4	34.5	1.9
Delta Junction	6.3	6.2	0.1
Fairbanks	2.0	2.6	-0.6
Gulkana	2.4	5.8	-3.6
Homer	30.0	29.5	0.3
Juneau	31.2	33.5	-2.3
Ketchikan	37.9	38.4	-0.5
King Salmon	26.1	22.9	3.2
Kodiak	34.5	33.9	0.5
Kotzebue	15.1	9.1	6.0
McGrath	8.8	5.6	3.4
Nome	25.2	16.9	8.4
St. Paul Island	36.0	33.0	3.0
Talkeetna	18.0	19.4	-1.5
Utqiagvik	15.3	0.7	14.6
Yakutat	30.5	32.3	-1.8

Table 1: Mean monthly air temperature, normal (1981-2010) and departure for selected stations throughout the state, November 2020. Color-coded to Figure 1 (yellow-orange-red = warmer than usual; shades of blue = cooler than usual).

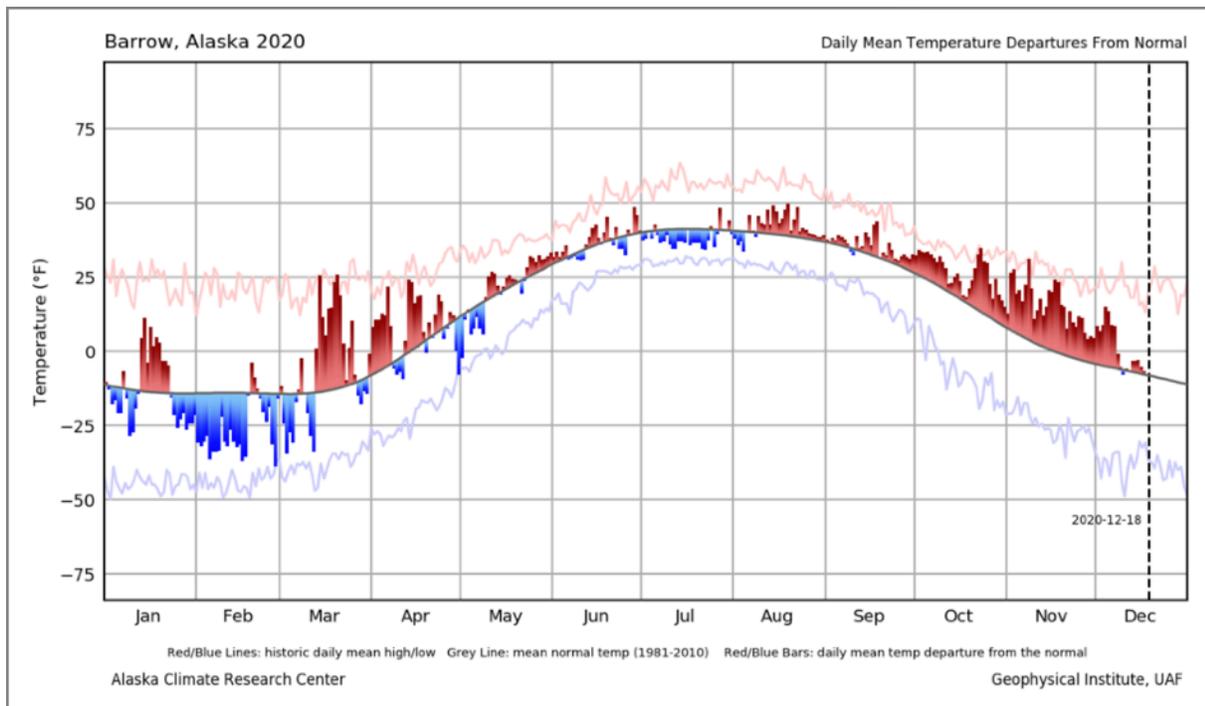


Figure 2: Utqiagvik (Barrow) daily mean temperature departures from normal (1981-2010) for 2020. Red and blue bars represent positive and negative temperature departures. Grey line represents the mean normal temperature, red and blue lines represent respectively the historic highest and lowest records of mean daily temperature.

Precipitation

Significant above normal precipitation was recorded along the North Slope, the West Coast, the Northwest Gulf, Bristol Bay and parts of the Cook Inlet (Figure 4). Utqiagvik received almost 5-times the normal precipitation (481% of normal). Twice the normal precipitation was observed at Fairbanks (206% of normal), Nome (197%), King Salmon (226%) and Ketchikan (181% of normal). Anchorage received 134% of the normal precipitation.

The majority of the monthly total precipitation at Fairbanks was associated with a heavy snowfall event on November 5/6, as well as a rain/snow event on November 7/8. Around 57% of the monthly precipitation total is just from November 6th: 14 inches of snow (0.79 inches of liquid precipitation), breaking a daily record

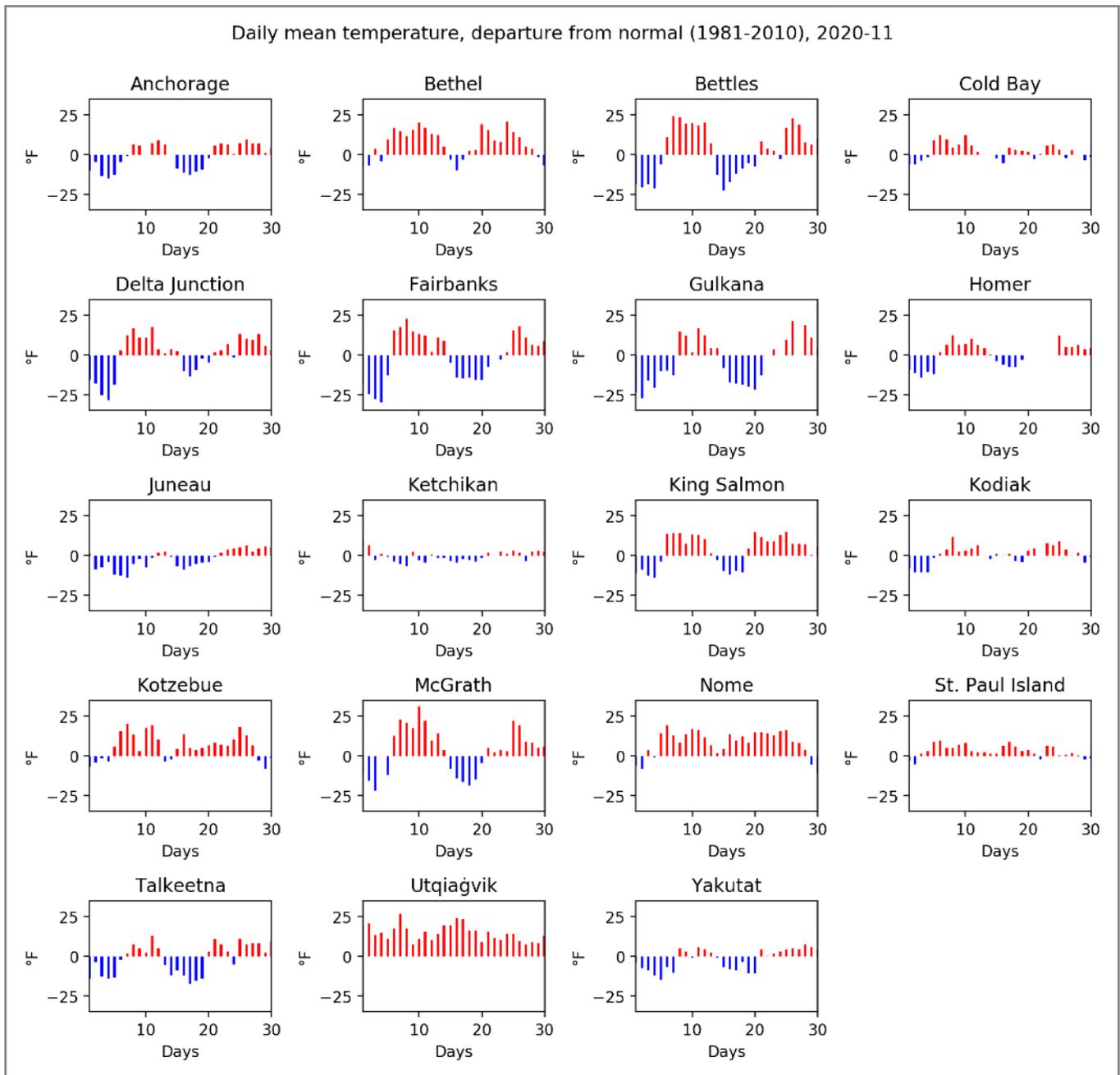


Figure 3: Daily mean temperature departures for each day in November 2020, at the selected stations.

previously set in 1950. Without the heavy snow event from November 5/6, Fairbanks would be at 88% of the precipitation normal.

A few locations around the state reported lower than usual amounts of precipitation, with the largest departures from normal at Delta Junction (63% of

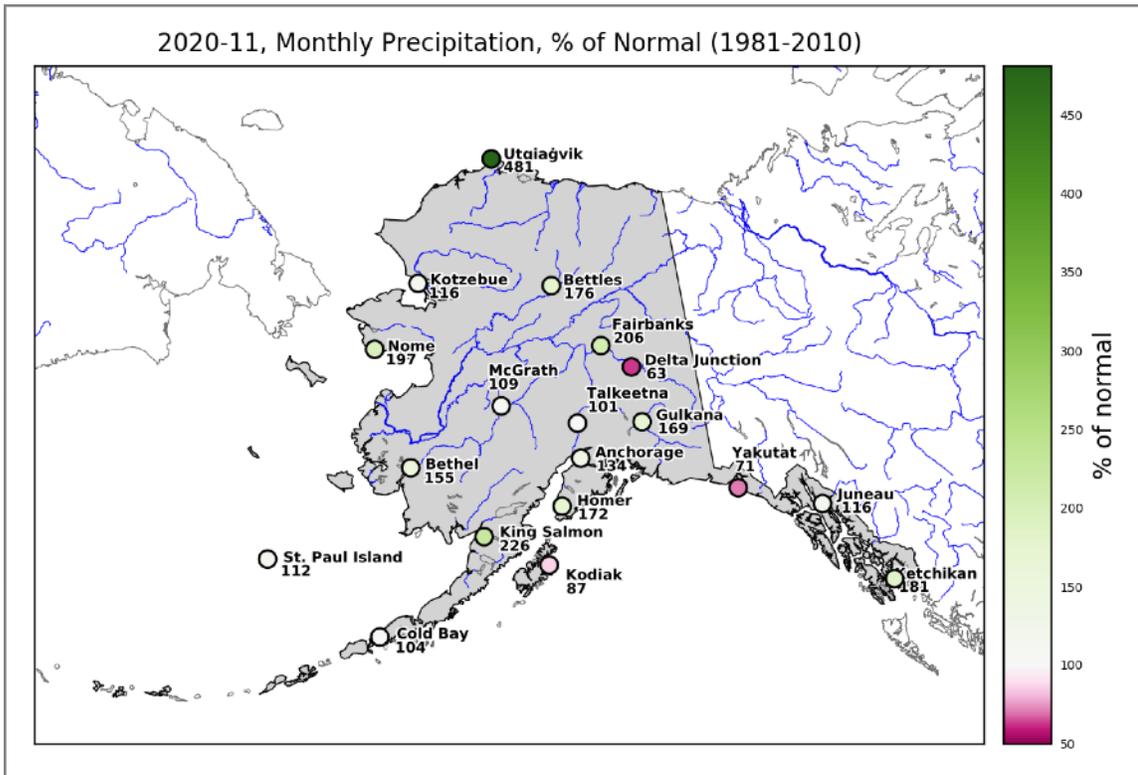


Figure 4. Monthly precipitation sums expressed as percent of normal (1981-2010), November 2020.

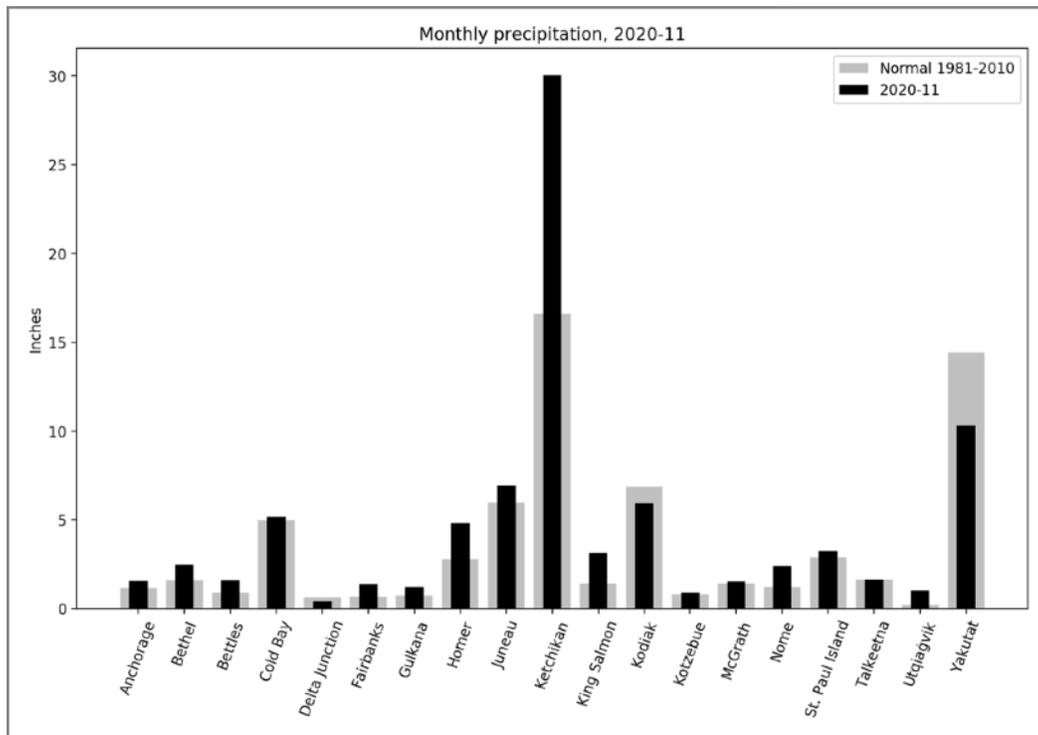


Figure 5. Monthly precipitation sums for November 2020 at the selected stations compared to the normal (1981-2010), in inches.

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	1.6	1.2	134.5
Bethel	2.5	1.6	155.0
Bettles	1.6	0.9	175.8
Cold Bay	5.2	5.0	103.8
Delta Junction	0.4	0.6	63.5
Fairbanks	1.4	0.7	206.0
Gulkana	1.2	0.7	168.1
Homer	3.6	2.8	127.6
Juneau	7.0	6.0	116.0
Ketchikan	30.0	16.6	180.7
King Salmon	3.1	1.4	225.9
Kodiak	6.0	6.9	86.6
Kotzebue	0.9	0.8	115.6
McGrath	1.5	1.4	109.2
Nome	2.4	1.2	196.7
St. Paul Island	3.2	2.9	112.1
Talkeetna	1.6	1.6	100.6
Utqiagvik	1.0	0.2	481.0
Yakutat	10.3	14.5	71.5

Table 2. Monthly precipitation sum, normal (1981-2010) and departure expressed as a percentage of the normal (1981-2010) for selected stations throughout the state, November 2020. Shades of purple and green correlate with Figure 4.

normal), Yakutat (71% of normal) and Kodiak, with 87% of normal (Figures 4/5, Table 2). Data for Delta Junction comes from the nearby Granite Creek SNOTEL station.

Other stations part of the COOP network nearby to Delta Junction include Whitestone Farms, which reported 46% of normal and Delta Junction 20 SE, which reported 85% of normal. During the large snow event on November 5/6, which led to significant snowfall in nearby Fairbanks, Delta Junction reported high winds. Blowing snow led to under-reporting of total precipitation for Delta Junction. Figure 5 shows the monthly precipitation sums for November 2020 at the selected stations compared to the normal (1981-2010), in inches. Table 3 shows the monthly snowfall, normal, percentage of normal, and snow depth for all reporting locations for which the National Weather Service still collects snowfall data.

Station	Snow (in)	Normal (in)	Deviation (%)	Snow depth (in)
Anchorage	12.8	13.1	97.7	9
Bettles	15	16.1	93.2	13
Fairbanks	24.7	13.2	187.1	14
Juneau	14.8	13.1	113	0

Table 3. Monthly snowfall sum, normal (1981 - 2010), departure expressed as a percentage of the normal, and end-of-month snow depth for the selected stations that measure snowfall, November 2020.

Drought

Abnormally dry conditions (rated D0 in Figure 6) are more prevalent in the northwestern and south-central parts of the state. Kotzebue, which suffered from drought (16% of normal precipitation for August 2020) but went back up to 77.2% of normal for September 2020, 84.2% of normal for October 2020 and 116% of normal for November 2020, is no longer under moderate drought conditions. The figure on the next page has been produced through a collaboration of the USDA, NOAA and the National Drought Mitigation Center.

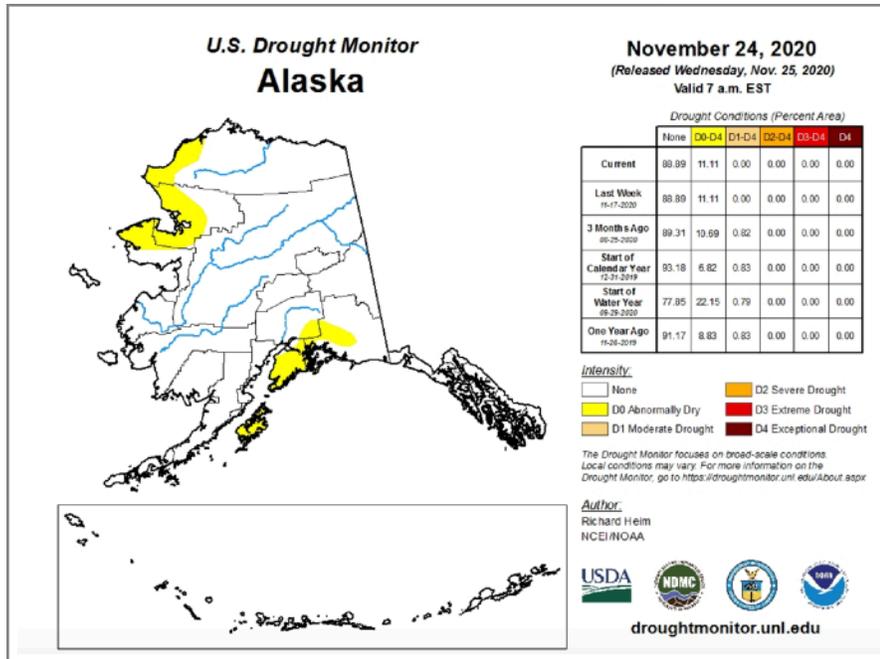


Figure 6. U.S. Drought Monitor map for Alaska, updated on November 24, 2020. The table on the right shows the percent area affected by different categories of drought intensity. Figures and data produced and released by the U.S. Drought Monitor, a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration (<https://droughtmonitor.unl.edu>).

Arctic Sea Ice

Through the month of November 2020, the sea ice grew an average of nearly 45,000 square miles per day, making that the fastest daily average growth on record for the month. However, these growth rates varied greatly through the month. While the sea ice grew rapidly the first week of November when the upper ocean lost its remaining summer heat to the atmosphere, it then slowed in the middle of the month, with a marked slowdown at the end of the month (Figure 7). Averaged for the month, the total sea ice **extent** for November 2020 was the 2nd lowest in the satellite record, behind 2016. As we enter the month of December, the start of winter in the Northern Hemisphere, the Bering Sea was almost ice free, and extreme low sea ice extent was also observed in the Chukchi Sea. Temperatures were 7 – 11 °F above average over the Beaufort and Chukchi Seas. Figure 8 shows Arctic sea ice concentration (as of November 30, 2020).

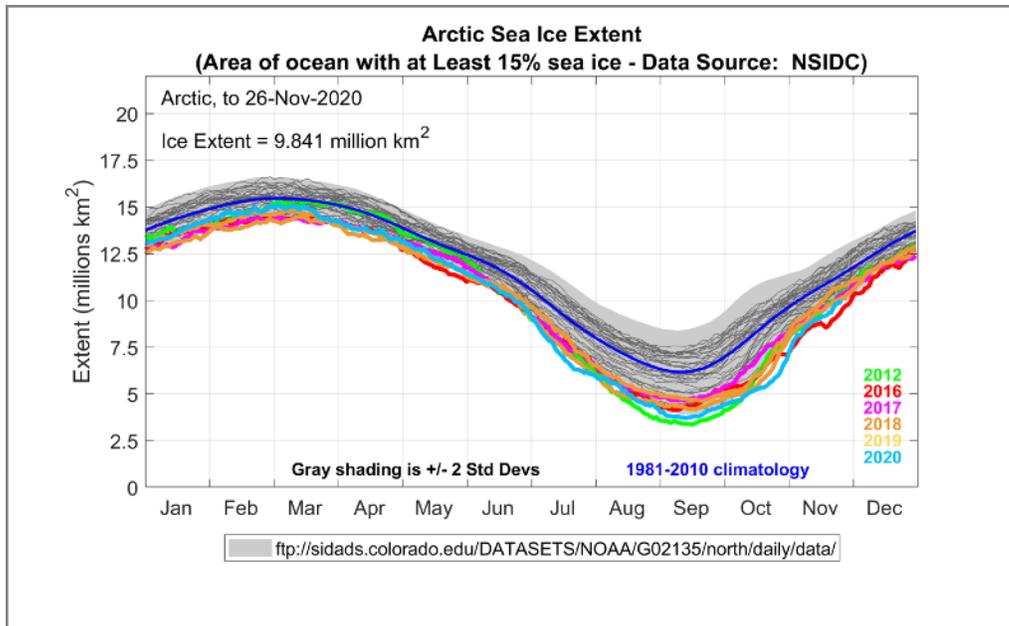


Figure 7. Time series of daily Arctic sea ice extent. This year’s data (light blue) are updated until November 26, 2020. The median sea ice extent for the 1981-2010 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA's Air Resources Laboratory Data Source: National Snow & Ice Data Center (<https://nsidc.org/>).

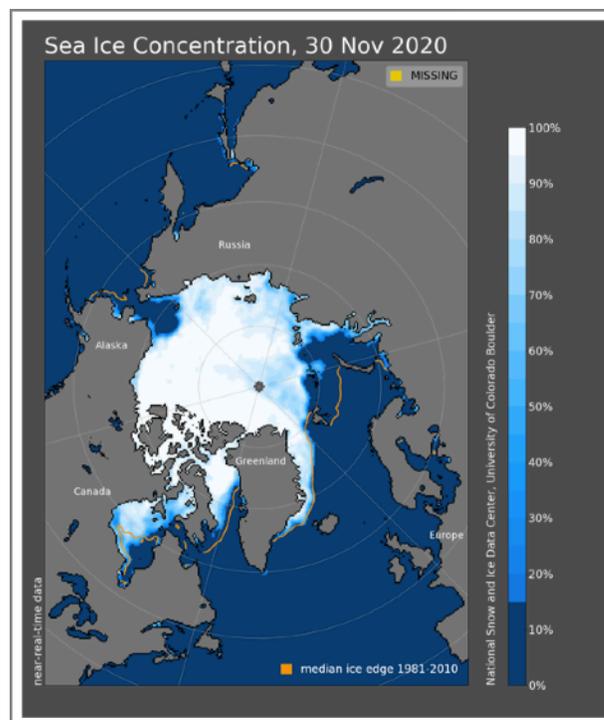


Figure 8. Monthly Arctic sea ice concentration for November 2020. Image: NSIDC (nsidc.org).

Newsworthy Information

The Sun sets for the last time in 2020 in America's northernmost city. After setting November 15th, the Sun won't officially rise in Utqiagvik, Alaska until late January: <https://www.clickorlando.com/weather/2020/11/18/no-sun-for-two-months-sun-sets-for-last-time-in-2020-in-americas-northernmost-city/>

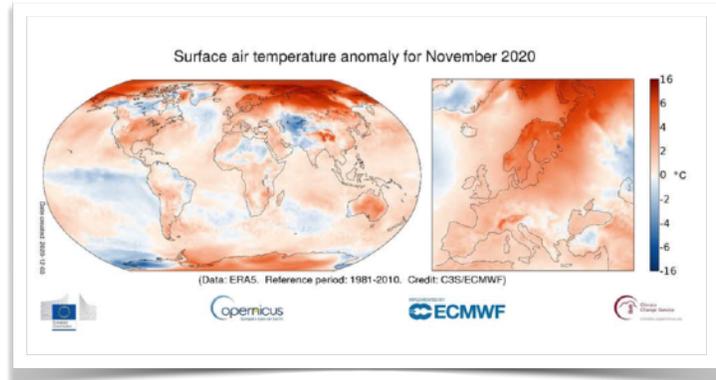


ACCUWEATHER

Alaska has recorded its earliest minus 40 or below reading since 2008

It turned brutally cold in parts of The Last Frontier this week.

On Monday, November 2nd, temperatures dropped to -23 F in Fairbanks for the first time this season, which is the earliest the city has recorded a temperature that low since October 25, 1996. The coldest November 2 on record in Fairbanks is -33 F, and that temperature reading was recorded back in 1907. Several hundred miles to the east of Fairbanks, the remote town of Chicken, Alaska, (population of 13, according to the United States Census Bureau) reached -40 F early Monday, [making it the earliest minus 40 or below reading in Alaska since 2008](https://www.wkyc.com/article/weather/accuweather/alaska-has-recorded-its-earliest-minus-40-or-below-reading-since-2008/507-70087284-8282-4280-8e63-6c7419eb191e), according to the National Weather Service (NWS): <https://www.wkyc.com/article/weather/accuweather/alaska-has-recorded-its-earliest-minus-40-or-below-reading-since-2008/507-70087284-8282-4280-8e63-6c7419eb191e>



Globally, November 2020 becomes one of the three warmest November months on record. Observations from around the world reveal that the global-mean temperatures recorded over the course of November 2020 were about 0.77°C warmer than the 1981-2010 average for this month. November 2020 was also 0.13°C warmer than the previous warmest Novembers, which occurred in 2016 and 2019.... temperatures were also substantially higher than average over a large region covering much of Siberia, the Arctic Ocean, its bordering coastal seas extending into western and northern Alaska and the far north-west of Canada, the Tibetan Plateau, and East Antarctica. Data from Copernicus.

Appendix

Table A1: November 2020 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. Three new records for highest mean daily temperatures were set and one new lowest mean daily temperature record.

Highest Mean Daily Temperature on Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Bethel	2020-11-10	39.0	1982	38.5
Cold Bay	2020-11-10	47.5	2019	46.5
Utqiagvik	2020-11-07	31.0	1998	30.0

Lowest Mean Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Fairbanks	2020-11-02	-15.0	1975	-14.5

Table A2: November 2020 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 maximum daily temperature records were set and four new lowest maximum daily temperature records.

Highest Maximum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Cold Bay	2020-11-10	56.0	1959	50.0
Utqiagvik	2020-11-06	34.0	1950	32.0

Lowest Maximum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Delta Junction	2020-11-04	-10.0	1975	-9.0
Fairbanks	2020-11-02	-7.0	1975	-5.0
Fairbanks	2020-11-04	-14.0	1975	-13.0
Yakutat	2020-11-03	29.0	1975	30.0

Table A3: November 2020 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. Two new records for highest minimum daily temperatures were set, while one was set for lowest minimum daily temperature.

Highest Minimum Daily Temperature on Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Bethel	2020-11-10	37.0	2014	35.0
Utqiagvik	2020-11-07	29.0	1950	26.0

Lowest Minimum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Gulkana	2020-11-01	-25.0	1975	-23.0

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 any errors to webmaster@akclimate.org.