



Alaska Climate Research Center
Alaska State Climate Center

MONTHLY REPORT



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Alaska’s Statewide Climate Summary for February 2021 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. Here, we report on temperature and precipitation conditions in the state, as well as the condition of the Arctic sea ice.

HIGHLIGHTS

Much colder February across most of Alaska with particularly cold temperatures in the Interior.

Less than normal precipitation along parts of the Panhandle and the north/northwestern part of the state.

Regions from the West Coast to the Interior received **significant above normal snowfall**. **Fairbanks doubled its snow depth** in February.

Arctic sea ice tracked well below average for February, but by month’s end was **higher than levels recorded in recent years**.

Temperature

Reporting stations around the state of Alaska observed much colder than usual temperatures for the month of February, with the largest departures from normal in the interior of the state (Bettles with -13.2 °F; Kotzebue with -12.5 °F; and Gulkana with -11 °F from normal), as seen in Figure 1 and Table 1. This is not unexpected as 2020/21 is a La Niña year and Alaska does not typically feel the effects until later in the winter: November – January temperatures were above normal, while February was much colder than normal for most of the state. Sea surface temperatures were warmer than average in the North Pacific and cooler than average near the Panhandle in February, while land temperatures were colder than average, with cold temperatures pervading the interior of the state and along the Panhandle (NOAA National Centers for Environmental Information). Fairbanks Airport reported its first -40 °F temperature for the season on February 22. Figure 2 shows the upper air pattern between February 11 and 16, where the high pressure (red) across the polar region allowed the jet stream to dip far south across the continental United States. Warmer than normal temperatures were observed along the Northwest Gulf and the regions along the Aleutians up to St. Paul Island. Monthly mean temperatures were above normal at St. Paul Island (+8.9 °F) and Cold Bay (+7.2 °F), feeling the effects of the lack of sea ice in the Bering Sea. Bethel, King Salmon, Kodiak and Homer had close to normal temperatures for the month. Figure 3 shows the climograph for Cold Bay, and Figure 4 shows daily mean temperature departures for each day in February 2021. Notable is Cold Bay, where every single day during the month of February was warmer than the normal.

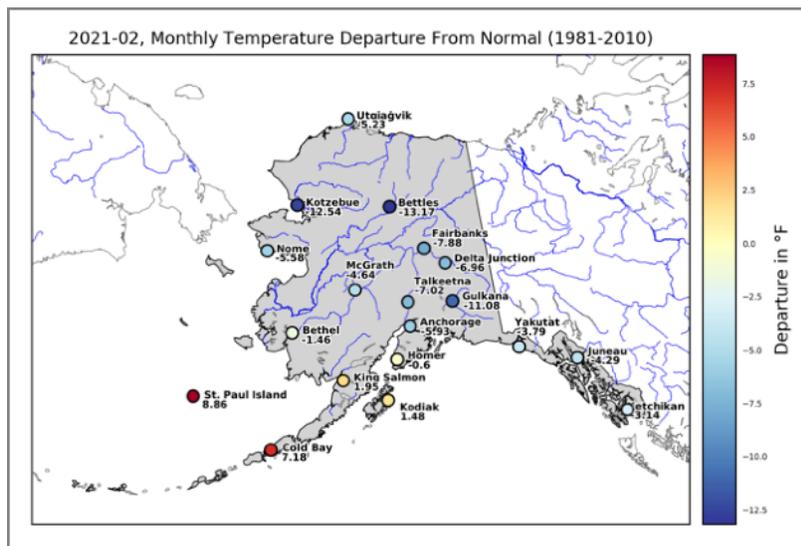


Figure 1. Monthly mean temperature departure from normal, February 2021, for selected stations around the state of Alaska.

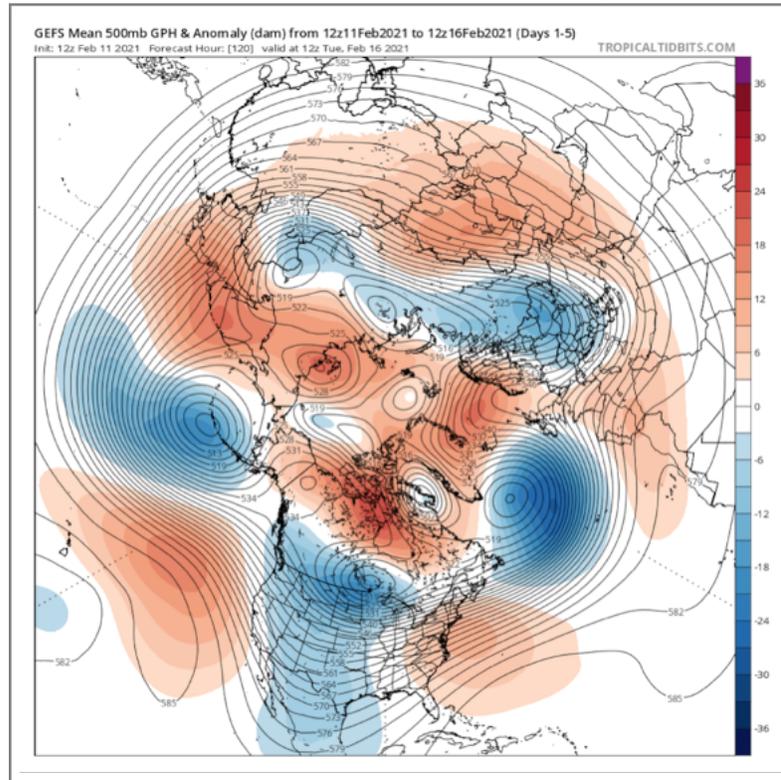


Figure 2: The Global Ensemble Forecast System (GEFS) mean 500 mb geopotential height and anomaly (in decameters (10 meters)) for February 11 – 16, 2021, showing the high pressure across the polar region.

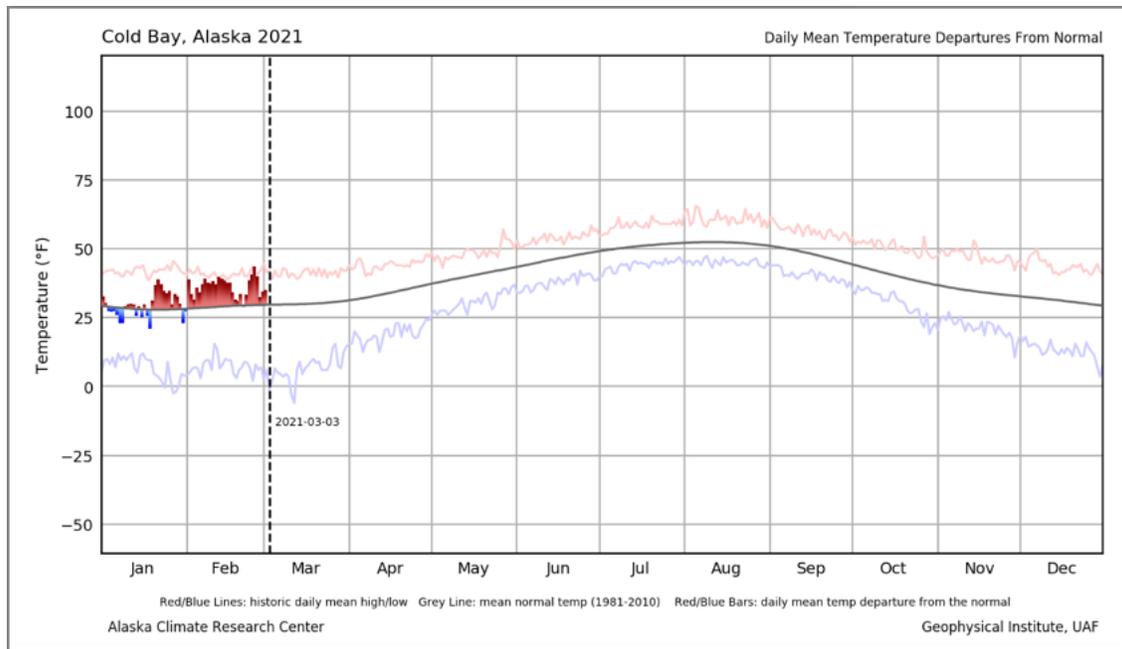


Figure 3: Cold Bay daily mean temperature departures from normal (1981 - 2010) for 2021. Red and blue bars represent positive and negative temperature departures. Grey line represents the mean normal temperature, red and blue lines represent, respectively, the historic highest and lowest records of mean daily temperature.

Station	Observed (°F)	Normal (°F)	Departure (°F)
Anchorage	14.2	20.2	-5.9
Bethel	9.6	11.0	-1.5
Bettles	-18.2	-5.0	-13.2
Cold Bay	36.2	29.0	7.2
Delta Junction	-1.8	4.9	-7.0
Fairbanks	-9.2	-1.3	-7.9
Gulkana	-5.6	5.5	-11.1
Homer	25.6	26.3	-0.6
Juneau	25.8	30.1	-4.3
Ketchikan	32.6	35.8	-3.1
King Salmon	20.8	18.9	1.9
Kodiak	32.3	30.8	1.5
Kotzebue	-13.3	-0.8	-12.5
McGrath	-3.2	1.4	-4.6
Nome	1.9	7.4	-5.6
St. Paul Island	33.2	24.4	8.9
Talkeetna	11.1	18.1	-7.0
Utqiagvik	-19.4	-14.2	-5.2
Yakutat	25.9	29.6	-3.8

Table 1: Mean monthly air temperature, normal (1981-2010) and departure for selected stations throughout the state, February 2021. Color-coded to Figure 1 (yellow-orange-red = warmer than usual; shades of blue = cooler than usual).

Precipitation

Drier than normal conditions prevailed along the Brooks Range and the northwestern coast of the state (Kotzebue and Nome), on Kodiak Island, and along the Panhandle (Ketchikan and Yakutat). Juneau received more than usual precipitation (127% of normal), as did King Salmon (205%), Bethel (401%), Utqiagvik (329%) and Fairbanks (326%) (Figures

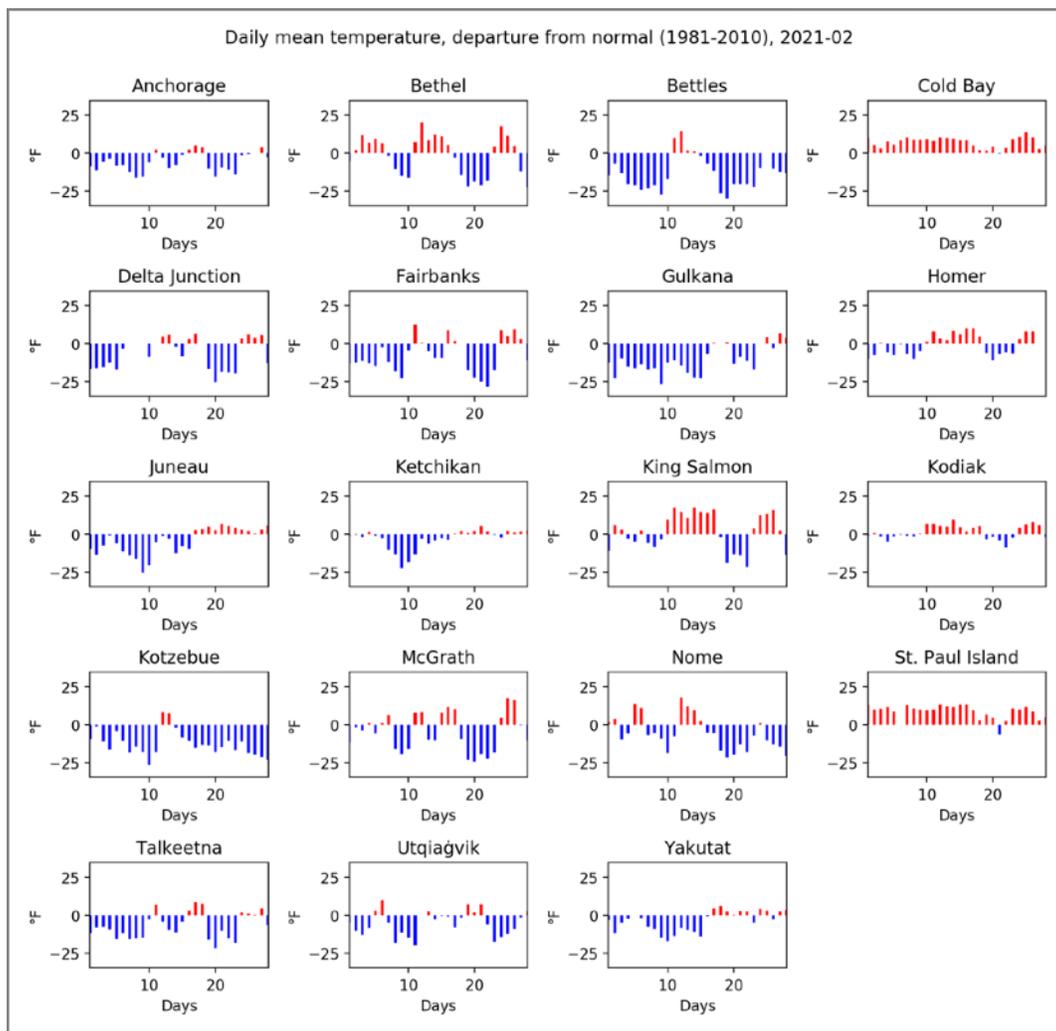


Figure 4: Daily mean temperature departures for each day in February 2021, at the selected stations.

5 and 6; Table 2). Around the middle of the month, Juneau had instances of light freezing rain mixed with snow; and, at the end of the month, on Feb 27/28, Juneau received heavy precipitation that fell mostly as rain (with less than an inch of snow falling). Despite this, Juneau saw most of its precipitation fall as snow (21.1 inches versus 5.2 inches of rain). Its snow depth remains low, though, given warmer than usual temperatures for the latter half of the month, melting the snow. Thus, while the Panhandle was dry for the first half of the month, it saw a very active pattern for the second half, though there was a lot of spatial variability in snowfall/rainfall. Fairbanks recovered from its dismal January snow totals to record nearly 22 inches of snow and doubled its snow depth from the previous month, going from 14 to 28 inches. On February 16, Fairbanks set a new daily snowfall record with 4.1 inches, beating the previous record of 3.9 inches set in 1932. Anchorage also had significantly more snow, gaining 8 more inches in snow depth from January 2021. Figure

6 shows the monthly precipitation sums for February 2021 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 collects snowfall data.

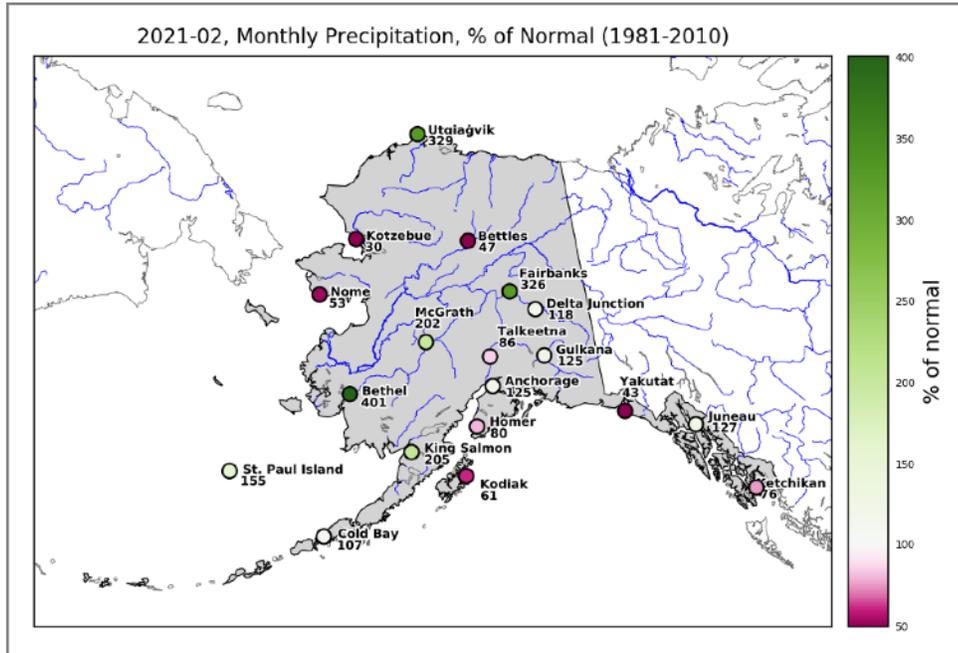


Figure 5. Monthly precipitation sums expressed as percent of normal (1981-2010), February 2021.

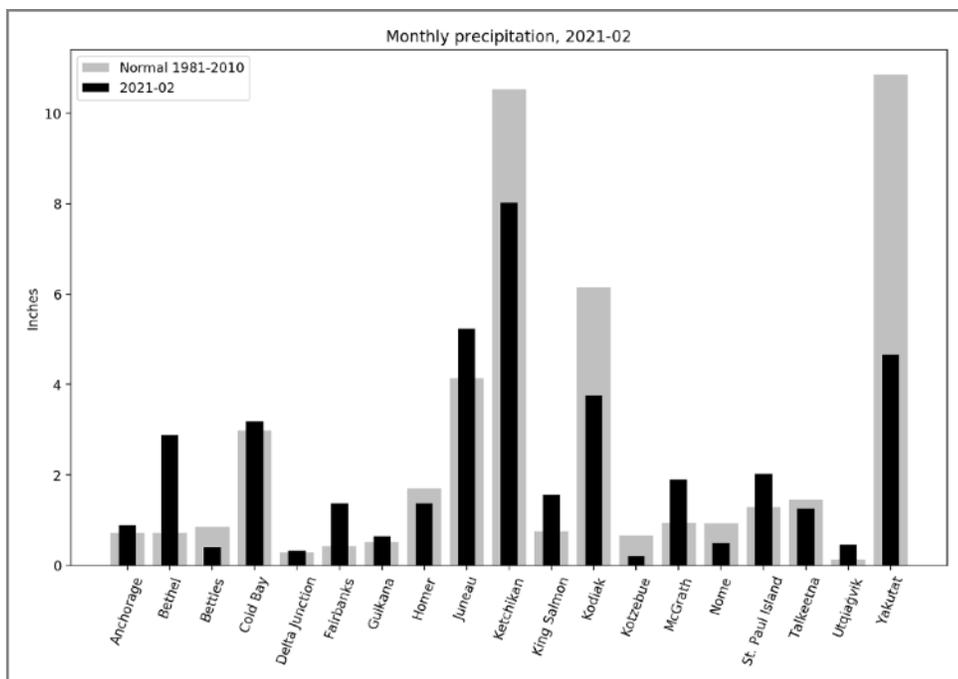


Figure 6. Monthly precipitation sums for February 2021 at the selected stations compared to the normal (1981-2010), in inches.

Station	Precipitation (in)	Normal (in)	% of Normal
Anchorage	0.9	0.7	125.0
Bethel	2.9	0.7	401.4
Bettles	0.4	0.8	47.1
Cold Bay	3.2	3.0	106.7
Delta Junction	0.3	0.3	117.9
Fairbanks	1.4	0.4	326.2
Gulkana	0.6	0.5	113.7
Homer	1.4	1.7	80.1
Juneau	5.2	4.1	126.9
Ketchikan	8.0	10.5	76.2
King Salmon	1.6	0.8	205.3
Kodiak	3.8	6.1	61.2
Kotzebue	0.2	0.7	30.3
McGrath	1.9	0.9	202.1
Nome	0.5	0.9	52.7
St. Paul Island	2.0	1.3	155.4
Talkeetna	1.2	1.5	86.2
Utqiagvik	0.5	0.1	328.6
Yakutat	4.7	10.9	42.9

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, February 2021. Shades of purple and green correlate with Figure 5.

Station	Snow (in)	Normal (in)	Deviation (%)	Snow depth (in)
Anchorage	15.2	10.9	139.4	25
Bettles	2.6	14	18.6	23
Fairbanks	21.9	8.1	270.4	28
Juneau	21.1	16.8	125.6	2

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, February 2021.

Arctic Sea Ice

Arctic sea ice extent averaged for the month of February 2021 was 14.39 million square kilometers (5.56 million square miles), placing it seventh lowest in the satellite record for the month. By the end of the first week of February, the sea ice had increased from the previous week by a slightly higher rate of 2.28%, from the level on January 28 of 13.960 M km² to 14.286 M km². By February 11, the sea ice again increased from last week but by a slightly lower rate of 2.00%, from the level on February 4th to 14.577 M km². Then on February 18, it was observed that sea ice had actually **decreased** from last week by a surprising rate of 1.93%, from the level on February 11 to 14.295 M km². By February 25, sea ice continued to decrease, but at a lower rate of only 0.54%. We are approaching the seasonal transition when sea ice goes from increasing to decreasing, though it seems to have started a bit earlier this year.

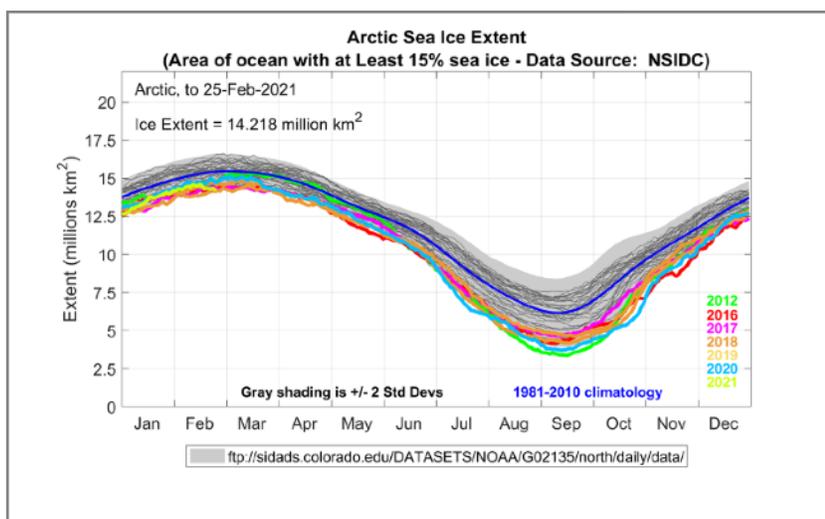


Figure 7. Time series of daily Arctic sea ice extent. This year’s data (lime green) are updated until February 25, 2021. The median sea ice extent for the 1981-2010 reference period is depicted in blue. Specific years are highlighted in colors. Plot Compiled by: Howard J. Diamond, PhD; Climate Science Program Manager at NOAA’s Air Resources Laboratory Data Source: National Snow & Ice Data Center (<https://nsidc.org/>).

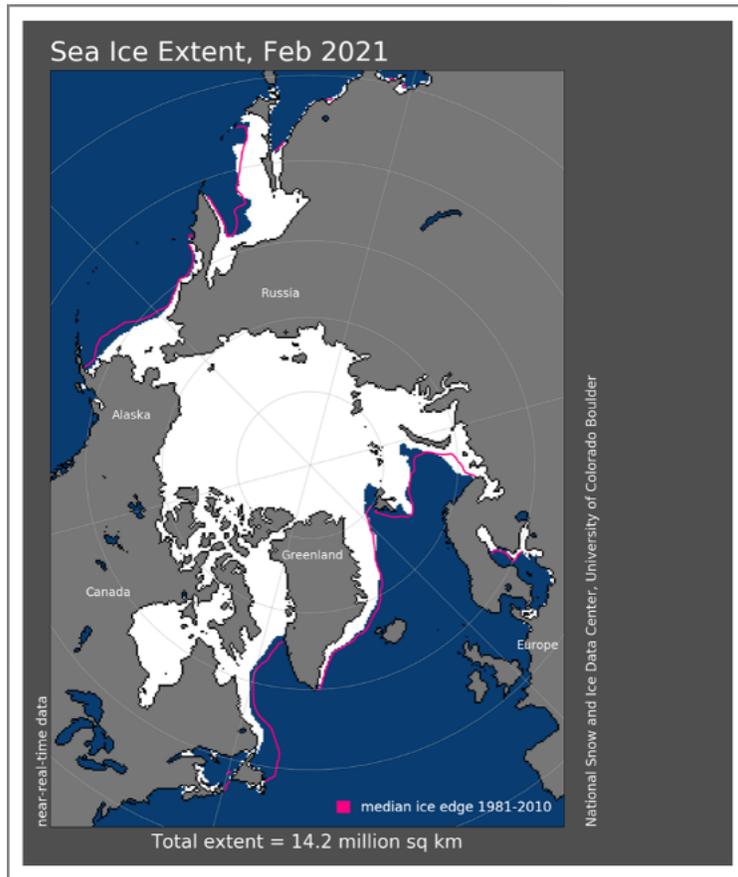


Figure 8. Arctic sea ice extent for February 2021. Image: NSIDC (nsidc.org).

News-worthy Information

Alaska could see more dangerous thunderstorms as Arctic sea ice melts and evaporation increases

According to new research published in Climate Dynamics, thunderstorm frequency could triple in Alaska by the end of the century. Continued loss of sea ice in the Arctic Ocean would provide greater moisture availability, leading to more frequent thunderstorms. <https://www.adn.com/alaska-news/science/2021/02/24/alaska-could-see-more-thunderstorms-as-arctic-sea-ice-retreats-and-evaporation-increases/>



NOAA’s Updated U.S. Climate Data Will Establish “New Normal”

The new climate normal is anticipated to reveal significant differences for Alaska. In May, NOAA is scheduled to release the nation’s updated 30-year Climate Normals, which will span from 1991 to 2020.

<https://www.ncei.noaa.gov/news/Upcoming-NOAA-2020-Climate-Normals>



Exploring the ‘ghost forest’ that got run over by a glacier in Southeast Alaska

A forest had established itself in the path of the La Perouse Glacier in SE Alaska by about the year 1206. That was many centuries before the glacier rumbled forward to consume the trees, turning the area into a ghost forest. About the time La Perouse Glacier was advancing, most of the world was experiencing cooler temperatures. Researchers call the period — from about 1250 to about 1900 — the Little Ice Age.

<https://www.adn.com/alaska-news/science/2021/02/20/exploring-the-ghost-forest-that-got-run-over-by-a-glacier-in-southeast-alaska/>



A “ghost forest” exposed as La Perouse Glacier in Southeast Alaska retreated. In the past, the glacier ran over the rainforest trees. (Photo by Ben Gagliotti)

Appendix

Table A1: February 2021 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. One new record for highest mean daily temperatures was set and two new records for lowest mean daily temperature record.

Highest Mean Daily Temperature on Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Cold Bay	2021-02-25	43.5	2003	41.0

Lowest Mean Daily Temperature on Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Ketchikan	2021-02-09	13.0	1922	16.0
Ketchikan	2021-02-10	17.0	1922	17.5

Table A2: February 2021 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 maximum daily temperature records were set and two new records for lowest maximum daily temperature records.

Highest Maximum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Cold Bay	2021-02-24	48.0	1997	47.0
Cold Bay	2021-02-25	50.0	1997	46.0
St. Paul Island	2021-02-12	41.0	1989	40.0

Lowest Maximum Daily Temperature Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Ketchikan	2021-02-09	20.0	1922	23.0
Ketchikan	2021-02-10	25.0	1922	26.0

Table A3: February 2021 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 and one new record for lowest minimum daily temperature.

Highest Minimum Daily Temperature on Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Kodiak	2021-02-12	39.0	1942	38.0
St. Paul Island	2021-02-15	36.0	1929	34.0

Lowest Minimum Daily Temperature on Record				
Station	Date	New Record (°F)	Year of Old Record	Old Record (°F)
Ketchikan	2021-02-09	6.0	1939	8.0

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.