



Quarterly Weather & Climate Summary Wrangell-St. Elias National Park & Preserve Winter 2015

Photo by Bryan Petryl

Wrangell-St. Elias Winter Weather

In Gulkana, December temperatures were warmer than normal for most of the month, with the last few days of the month reaching near record high temperatures. Overall, the December mean of 7.8°F was 7.4°F warmer than normal. It was the 7th warmest December on record (1949-2014). January was also warmer than normal; with variability throughout the month. The average monthly temperature for January was -0.5°F, 2.4°F above the 1981-2010 normal. The first part of February was cold and the second half was warm; the monthly average temperature for the month was just below normal at 5.3°F. Overall, the winter in Gulkana was 3.2°F warmer than normal (Figure 1, Table 1).

In Yakutat, the monthly mean temperature for December was above freezing at 33.7° F compared to a normal of 29.6° F. Temperatures fluctuated between near normal and above normal for most of the month. Fog was present for 25 of the 31 days of the month. January was a very warm month; the average monthly temperature was 7.2°F warmer than normal at 35.3°F. This was the 6th warmest January on record (1949-2015); 2014 was the 5th warmest. Temperatures were above normal and above freezing for most of the month. Although February started out cool, that quickly changed and the majority of the month had temperatures above normal. The monthly average temperature was 33.5°F, 3.8°F warmer than normal. This was the 2nd warmest winter on record in Yakutat, 5°F warmer than the long term average of 29.1°F (Figure 1, Table 2).

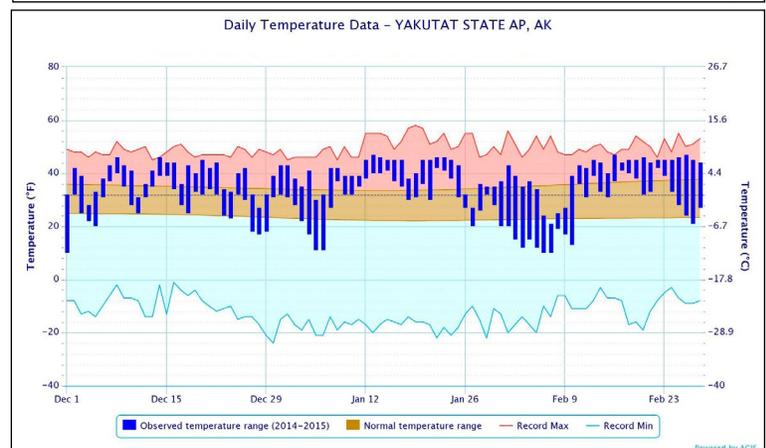
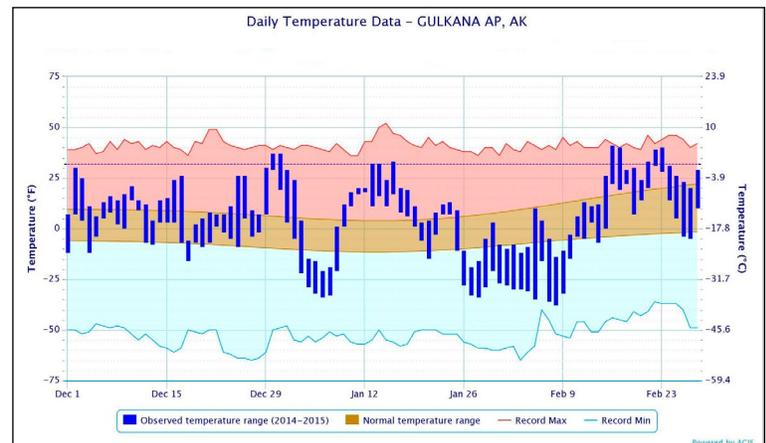


Figure 1. Winter 2015 temperatures at Gulkana and Yakutat showing record maximum (red), record minimum (blue), normal (brown) and 2015 observed daily range (blue).

Winter Precipitation

In Gulkana, December precipitation was just about normal for December with 0.74 inches of precipitation recorded for the month; normal is 0.78 inches. Temperatures were below freezing, so all of this precipitation fell as snow rather than rain. January precipitation was above normal with a total of 1.12 inches for the month; 243% of normal. The new snow course at park headquarters in Copper Center had 26 inches of snow on the ground at the end of January. February 2014 was the 6th wettest February on record with 1.30 inches of precipitation recorded. Many days in February were above freezing, so some of this most likely fell as rain. Despite the dry December, the seasonal precipitation totaled 3.16 inches, 181% of normal and the 5th wettest winter on record (Figure 2, Table 1).

In Yakutat, the total precipitation in December was 12.05 inches compared to a normal of 16.28 inches. Most of that fell as rain; there was only 1.8 inches of snowfall recorded for the month. January was quite unusual with only 1.3 inches of snow recorded for the month, the average is 32 inches. The precipitation amount for January was close to normal at 14.02 inches, but most of that fell as rain. The trend continued into February with more rain than snow falling in Yakutat for the winter. The normal snowfall total for February is ~ 29 inches; this February there was a total of 4 inches of snow for the month. Again the amount of precipitation was close to normal at 10.35 inches compared to 10.86 inches. Winter precipitation ended up at 36.42 inches, 89% of normal. The winter snowfall total of 7.5 inches was the lowest amount ever recorded (Figure 2; Table 2).



Figure 2. Winter 2015 accumulated precipitation at Gulkana (top), and Yakutat (bottom) compared to normal (brown line).

Climate Monitoring in Wrangell-St. Elias

The NPS climate stations in Wrangell-St. Elias are approaching the 10-year mark for climate monitoring (Figure 3). The NPS stations complement long-term records

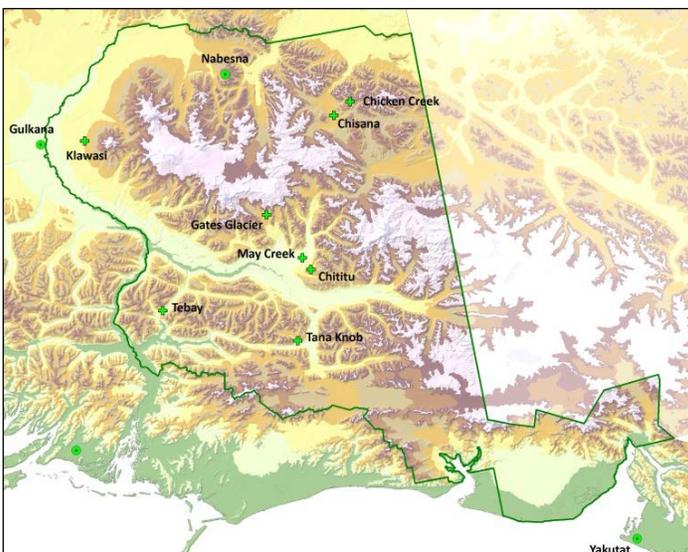


Figure 3. Map of NPS stations in Wrangell-St. Elias National Park and Preserve

available from the National Weather Service stations in Gulkana and Yakutat. The NPS stations are providing critical data at higher elevations which helps characterize climate gradients and patterns affecting resources in Wrangell-St. Elias National Preserve. Table 3 summarizes the winter weather data for NPS sites.

Interesting Notes from the CAKN Stations

- It was 53°F at Chisana on February 22 – this is the warmest February temperature ever recorded at Chisana and the second warmest winter temperature ever recorded (a high temperature of 55°F was recorded on December 21, 1999).
- Both the minimum and maximum winter temperatures were recorded during February 2015 for many of the sites.
- The snow depth at Tebay on February 28 was 23 inches; the average over the past 10 years has been ~ 52 inches.

Table 1. Gulkana winter 2015 Temperature and precipitation compared to the 1981-2010 normal.

Winter 2014-2015	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
December	7.8	0.4	+7.4	37 / Dec. 30, 31	-16 / Dec. 18
January	-0.5	-2.9	+2.4	33 / Jan. 16	-34 / Jan. 6, 28
February	5.3	5.5	-0.2	41 / Feb. 16	-38 / Feb. 8

Winter Season Temperature Departure from Normal: +3.2°F

Winter 2014-2015	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. total in. / Date	# Days with >=0.01 in. water
December	0.74	0.78	-0.04	0.26 / Dec 1	7
January	1.12	0.46	+0.66	0.32 / Jan 24	11
February	1.30	0.51	+0.79	0.43 / Feb 23	7

Winter Season Precipitation Departure from Normal: +1.41 inches (181% of normal)

Table 2. Yakutat Winter 2015 Temperature, Precipitation, and Snowfall compared to the 1981-2010 normal.

Winter 2014-2015	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
December	33.7	29.6	+4.1	46 / Dec. 8, 14	10 / Dec. 1
January	35.3	28.1	+7.2	47 / Jan. 13	11 / Jan. 5, 6
February	33.5	29.7	+3.8	47 / Feb. 16, 26	10 / Feb. 6, 7

Winter Season Departure from Normal: +5.0°F

Winter 2014-2015	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. total in. / Date	# Days with >=0.01 in. water
December	12.05	16.28	-4.23	2.16 / Dec. 14	22
January	14.02	13.66	+0.36	1.78 / Jan. 16	20
February	10.35	10.86	-0.51	2.20 / Feb. 21	16

Winter Season Departure from Normal: -4.38 inches (89% of normal)

Winter 2014-2015	Total Monthly Snowfall in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. snowfall total in. / Date	Snow Depth at end of Month in.
December	1.8	23.2	-21.4	1.0 / Dec. 1	0.4
January	1.7	31.9	-30.2	1.3 / Jan 25	0.2
February	4	28.6	-24.6	2.6 / Feb 8	0.4



Photo by Bryan Petryl

Table 3. Summary of weather statistics from WRST climate stations. All data are preliminary and subject to review.

Site	Elev. (ft)	Average Temp °F			Extreme High (°F)	Extreme Low (°F)	Peak Wind (mph)	Snow Depth Feb. 28 (inches)	Average Temp. Winter Season (°F)
		Dec.	Jan.	Feb.					
Chicken Creek	5420	20.2	14.2	16	41	-31	27	9	16.8
Chisana	3318	0.5	-4.9	5.8	53*	-47	12	12**	0.5
Chititu	4616	23.4	18.5	18.9	43	-22	67	m	20.3
Gates Glacier	4060	24.7	20.1	20.9	48	-21	34	19	21.9
Klawasi	3045	19.6	9	12.7	40	-28	55	—	13.8
May Creek***	1600	11.2	3.7	9.7	48	-39	—	18	8.2
Tana Knob	3739	23.6	15.3	18	41	-21	39	34	19
Tebay	2000	16.4	9.1	12.8	38	-22	14	23	13

*record warm temperature for February; 2nd warmest winter temperature (after 55°F on 12/21/1999); ** snow depth at Chisana SNOTEL on Feb 28; ***Data from May Creek SNOTEL; many missing values at May Creek RAWs

Long-term Winter Temperature Trends

At Gulkana, the average winter temperature for 2015 was 4.2° F, which is 3.3° F warmer than the 1981-2010 normal (the latest climate normal period) and 5.5° F degrees warmer than the long-term average (1949-2014). Average winter temperatures show great variability with a range between -13.6° F in 1969 and 13.7° F in 1977.

There has been a significant increase in winter temperatures in Gulkana based on a simple linear regression ($p < 0.01$). Figure 4 shows the high variability of winter seasonal temperatures from 1949-2014.

At Yakutat, the average winter temperature for 2015 was 34.2° F, which is 5.1° F warmer than the 1981-2010 normal (the latest climate normal period) and 6.7°F warmer than the long-term average (1949-2014). Winter temperatures show great variability with a range between 15.9°F in 1969 and 35.9° F in 1977.

It was the second warmest winter on record in Yakutat. There has been a significant increase in winter temperatures based on a simple linear regression ($p < 0.01$). The 10-year moving average shows the coolest period in the mid-1970s (Figure 5).

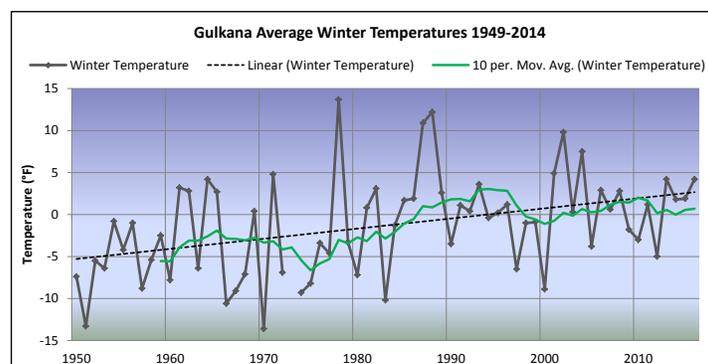


Figure 4. Average winter (December, January, February) temperatures in Gulkana since 1949. The green line shows the 10-year moving average. The dotted line shows a simple linear regression trend.

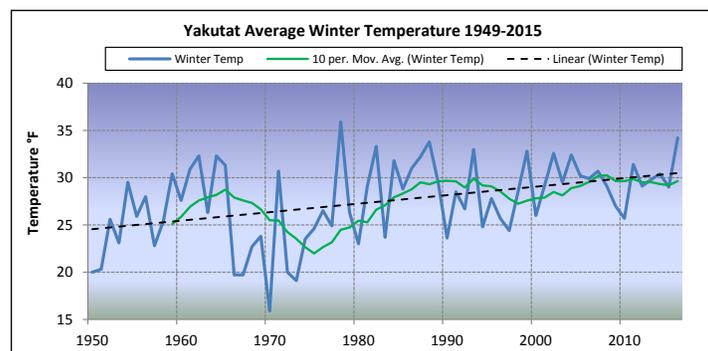


Figure 5. Average winter (December, January, February) temperatures in Yakutat since 1949. The green line shows the 10-year moving average. The dotted line shows a simple linear regression trend.

Connecting Further

- New publication – [Consistency and lack thereof in Pacific Decadal Oscillation impacts on North American winter climate.](#)
- Previous weather summaries & other climate monitoring documents on the [Central Alaska Network web portal](#)
- Access near real-time data from [Western Regional Climate Center](#) and [MesoWest](#)
- [Maps](#) of projected temperature and precipitation changes for Wrangell-St. Elias National Park and Preserve

More Information

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