

Central Alaska Network

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Alaska Region
Inventory & Monitoring Program



Denali NP & PRES • Wrangell-St. Elias NP & PRES • Yukon-Charley Rivers N PRES

4th Quarter 2015

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

Wrangell-St. Elias Fall Temperatures

In Gulkana, September temperatures were at or below normal for most of the month and then warmed up during the last few days to near record high temperatures for the last few days of September. Overall, September was 0.7°F cooler than normal. The average monthly temperature for both October and November were well above normal — 5.8°F and 7.6°F warmer, respectively. There were several days towards the end of November where the temperatures were at or near record highs. The average temperature departure for the last week of November was 27°F warmer than normal. A record high temperature of 43.0°F was recorded on November 27. Overall, the fall of 2015, with an average temperature of 29.5°F, was 4.3°F warmer than normal and the 5th warmest fall on record (1949-present) (Figure 1, Table 1).

In Yakutat, the monthly mean temperature for September was 47.7°F compared to a normal of 48.4°F. Daily minimum temperatures were cool the first few days of the month with a new record low of 32°F on September 2. October started out on the cool side, but temperatures started to climb the second week of the month. The average temperature in October was 44°F, which is 3.0°F warmer than normal. The variable temperature patterns in November looked very similar to Gulkana's temperatures, with cooler temperatures mid-month and warmer temperatures at the end of the month. November was 2.4°F warmer than normal with an average monthly temperature of 34.7°F. Overall the 2015 fall season in Yakutat was 1.6° warmer than normal (Figure 1, Table 2).

Fall Precipitation

In Gulkana, September is normally the third wettest month of the year following July and August. This year September was dry with a monthly precipitation total of only 0.71 inches, which is only 45% of normal. October was also drier than normal with (again) a total of 0.71 inches or 70% of normal October precipitation. Things changed in November, when the total for the month was 212% of normal with 1.78 inches of rain and melted snow recorded. The seasonal precipitation total ended up at 97% of normal. 3.20 inches of precipitation was measured in fall 2015, compared to a normal seasonal total of 3.31 inches (Figure 2, Table 1).

September and October are statistically the two wettest months of the year in Yakutat. This year September was just about normal

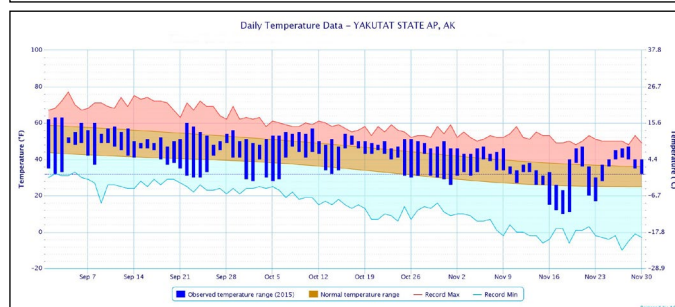
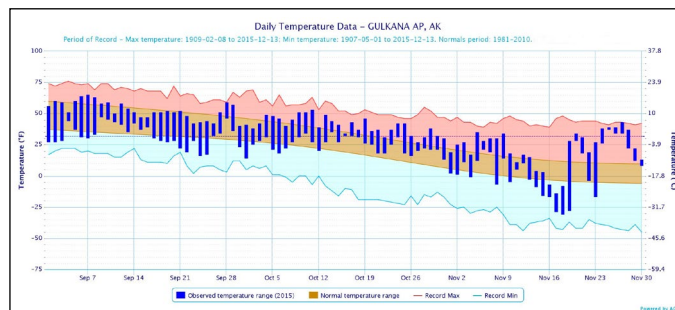


Figure 1. Fall 2015 daily temperatures at Gulkana (top) and Yakutat (bottom) showing **record maximum** (red), **record minimum** (blue), **normal** (brown) and **2015 observed** daily range (blue).

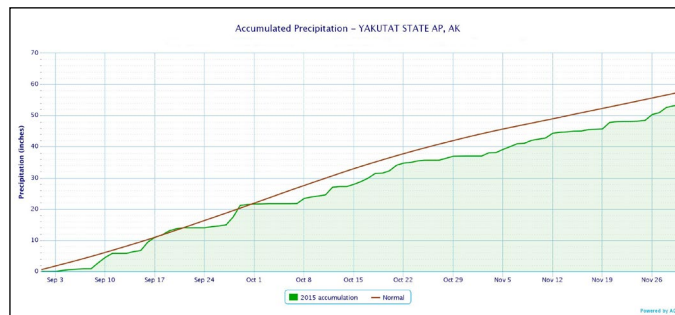


Figure 2 Fall **2015** accumulated precipitation at Gulkana (top), and Yakutat (bottom) compared to **normal** (brown line).

with 21.46 inches of rain recorded during the month. A record 3.77 inches fell on September 29. October was drier than normal with only 15.55 inches of rain falling, normal is 21.98 inches (the 15.55 inches was all rain, no snowfall was

recorded for October of 2015). With just over 16 inches of precipitation, November was 102% of normal. Fall precipitation totaled 53.24 inches; the 1981-2010 normal is 57.54 inches (Figure 2; Table 2).

Table 1. Gulkana Fall 2015 temperature and precipitation compared to the 1981-2010 normal.

Gulkana Fall 2015	Average Monthly Temp (°F)	1981-2010 Normal (°F)	Departure from Normal (°F)	Monthly High (°F / Date)	Monthly Low (°F / Date)
September	42.6	43.3	-0.7	65 / Sep 7	16 / Sep 24
October	32.4	26.6	+5.8	53 / Oct 11	13 / Oct 31
November	13.4	5.8	+7.6	43 / Nov 27	-31 / Nov 18

Fall Season Temperature Departure from Normal: + 4.2 °F

Gulkana Fall 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
September	3.91	1.70	2.21	0.71 / Sep 26	20
October	0.76	0.78	-0.02	0.42 / Oct 30	8
November	2.06	0.75	1.31	0.53 / Nov 26	19

Fall Season Precipitation Departure from Normal: - 0.11 °F (97% of normal)

Table 2. Yakutat Fall 2015 temperature and precipitation compared to the 1981-2010 normal.

Yakutat Fall 2015	Average Monthly Temp (°F)	1981-2010 Normal (°F)	Departure from Normal (°F)	Monthly High (°F / Date)	Monthly Low (°F / Date)
September	47.7	48.4	-0.7	63 / Sep 2, 3	30 / Sep 23, 24
October	44.0	41.0	+3.0	57 / Oct 11	28 / Oct 2, 5
November	34.7	32.3	+2.4	47 / Nov 6, 21, 28	10 / Nov 18

Fall Season Temperature Departure from Normal: + 1.6 °F

Yakutat Fall 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
September	21.46	21.11	+0.35	3.77 / Sep 29	21
October	15.55	21.98	-6.43	2.47 / Oct 12	25
November	16.23	14.45	+1.78	2.09 / Nov 20	27

Fall Season Precipitation Departure from Normal: - 4.30 inches (93% of normal)



Climate Monitoring in Wrangell-St. Elias

The NPS climate stations in Wrangell-St. Elias have been collecting climate data for the past decade as part of the Central Alaska Network climate monitoring program (Figure 3). The NPS stations complement long-term records 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. Gates Glacier is the featured station for this summary.

The Gates Glacier site is located on a ridge between the Gates and Kennecott Glaciers in the Wrangell Mountains at an elevation of 4060 feet (Figure 3). Temperatures are cool in the summer compared to the river valleys, but are moderate in the

winter due to a persistent inversion that generally develops in mid-October.

The site is exposed to cool, down glacier katabatic winds between March and August from the nearby Kennecott Glacier (Figure 4). The site receives an abundant amount of snow in winter and has on average ~10.35 inches of summer rainfall. The phenology camera on site captures the snow season, green-up period, and other basic phenologic information.

The period of record average temperature for the Gates Glacier site is 28.5°F. The highest temperature recorded thus far was 74°F on 8/13/2005 and the lowest was -29°F on 1/28/2013.

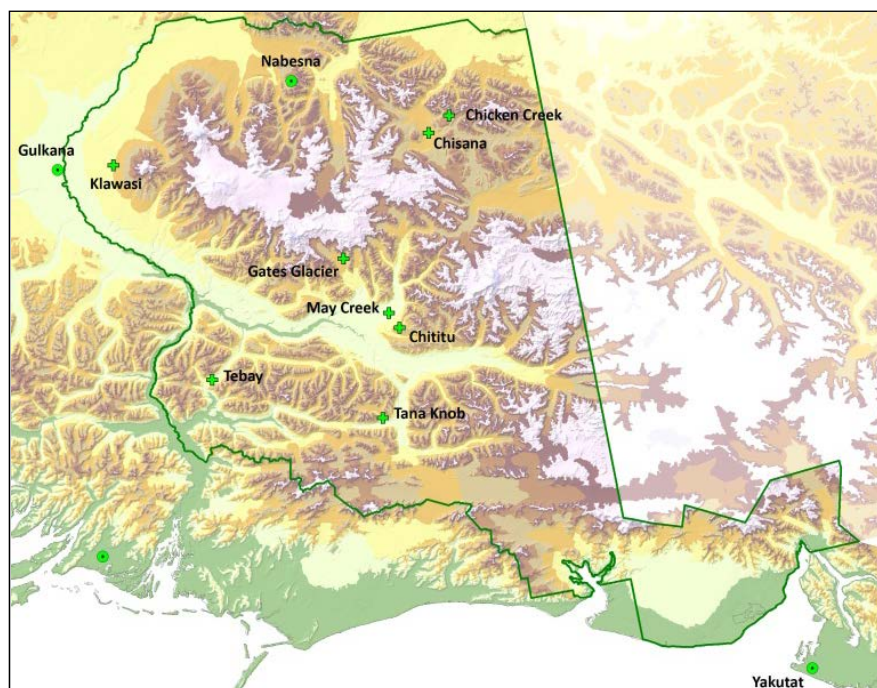


Figure 3. (left and top) Map of NPS stations in Wrangell-St. Elias National Park & Preserve and the featured Gates Glacier station.

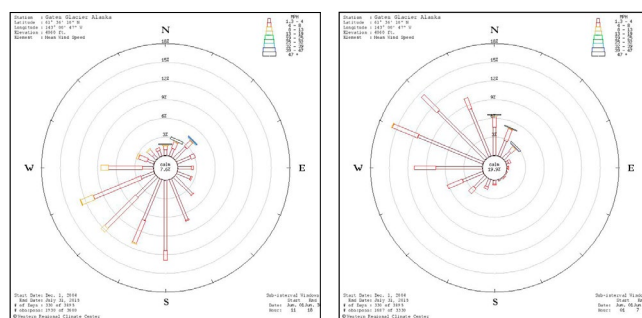


Figure 4. Daytime (above left) and nighttime (above right) wind roses in June for Gates Glacier climate station.

Long-term Fall Temperature Trends

At Gulkana, the average fall temperature for 2015 was 29.5°F, which is 4.3°F warmer than the 1981-2010 normal (the latest climate normal period) and 4.0°F degrees warmer than the long-term average (1949-2015).

We calculate the average fall temperature by simply taking the average of September, October, and November monthly temperatures. Average fall temperatures show great variability with a range between 18.8°F in 1996 and 35.0°F in 1979. Figure

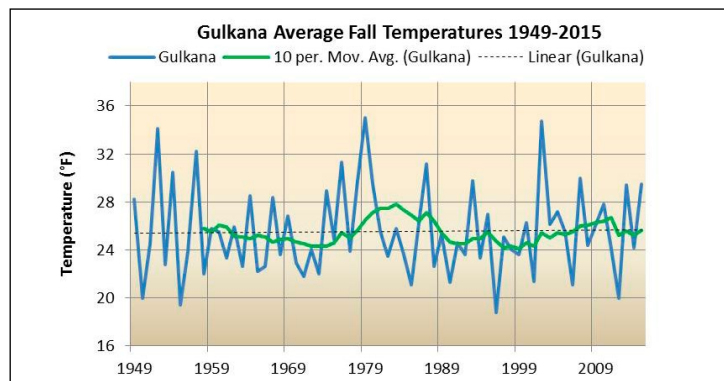


Figure 5. Average fall (September, October, November) temperatures in Gulkana since 1949. The green line shows the 10-year moving average. The dotted line shows a simple linear regression trend.

5 shows the high variability of fall seasonal temperatures from 1949 through 2015.

At Yakutat, the average fall temperature for 2015 was 42.1°F, which is 1.6°F warmer than the 1981-2010 normal (the latest climate normal period) and 1.5°F degrees warmer than the long-term average (1949-2015). Average fall temperatures range between 35.1°F in 1985 and 45.1°F in 1957 (Figure 6).

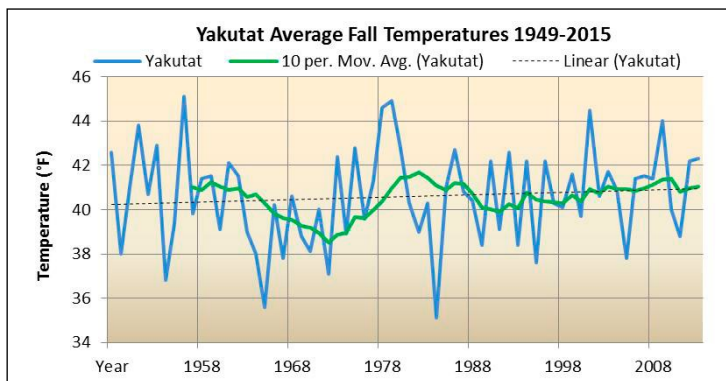


Figure 6. Average fall (September, October, November) temperatures in Yakutat since 1949. The green line shows the 10-year moving average. The dotted line shows a simple linear regression trend.



Does it rain in Yakutat in the fall?

So everyone knows it rains along the Gulf Coast of Alaska, it's a temperate rain forest after all. But it never ceases to amaze the interior Alaska folks to see monthly precipitation totals at Yakutat that are more than Gulkana's annual total. There were 19 days during September, October, and November when Yakutat had more than 1 inch of rain/melted snow recorded in a 24-hour period; 5 days with more than 2 inches of precipitation; and 1 day with almost 4 inches of rain recorded. Yakutat had the most precipitation of any first order climate station in Alaska for the month of September and on September 29th, 3.77 inches of rain fell, a new record for that day. All that precipitation during the fall season is normal; 53.24 inches of rain and melted snow was recorded during fall of 2015, which is 93% of normal.

Connecting Further

- 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](#)
- Check out the [Time-lapse video from Gates Glacier Climate Station](#) and the description of the project and the new video [Seasonal changes in Alaska's National Parks video](#)

More Information

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