

# Central Alaska Network

National Park Service  
U.S. Department of the Interior

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 Denali National Park & Preserve Fall 2015

### Denali Fall Weather

In Denali, September was cool and very wet. The average air temperature for the month was 36.9°F, 3.5°F cooler than normal. It was a very snowy September. A total of 23.3 inches of snow fell during the month, the third snowiest September on record behind 1992 (39.8 inches) and 1999 (23.5 inches). On September 26th 10.5 inches of snow was recorded, which was a new daily record. The total amount of rain and melted snow was 3.91 inches, 230% of normal for the month.

October was warm. The average monthly air temperature was 7.8°F warmer than normal at 30.7°F. Fifteen Octobers have been warmer! The daily average temperature was above freezing (32°F) for 17 of the 31 days of the month. The total precipitation was just shy of normal at 97%. 8.4 inches of snow fell during the month, normal is 9.9 inches. There was 11 inches of snow on the ground at the beginning of the month, but the warm temperatures made October's snowpack look more like an April snowpack with a steady decline through the 29th when only 4 inches remained. A storm system at the end of the month brought the snow depth at park headquarters back up to 11 inches.

November was warm and snowy! A total of 32.6 inches of snow fell during the month, 247% of normal, and the 6th snowiest November on record. Temperatures climbed above freezing and into the low 40s during Thanksgiving week, but most of the snow remained and on the last day of the month there was 23 inches of snow on the ground. It was 3.5°F warmer than normal for the month, with an average monthly temperature of 12.4°F.

Overall, fall of 2015 was the 4th snowiest fall on record and the 5th wettest in terms of total precipitation (rain and melted snow). A total of 64.3 inches of snow fell between September

1 and November 30. The seasonal temperature of 26.7°F was 2.6°F above the 1981-2010 normal (Figures 1 and 2; Tables 1, 2, and 3).

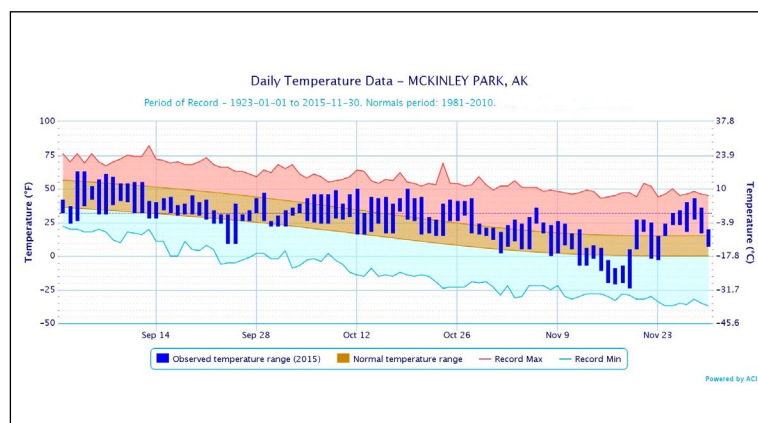


Figure 1. Fall 2015 daily temperatures at Denali showing **record maximum** (red), **record minimum** (blue), **normal** (brown) and **2015 observed range** (blue bars).

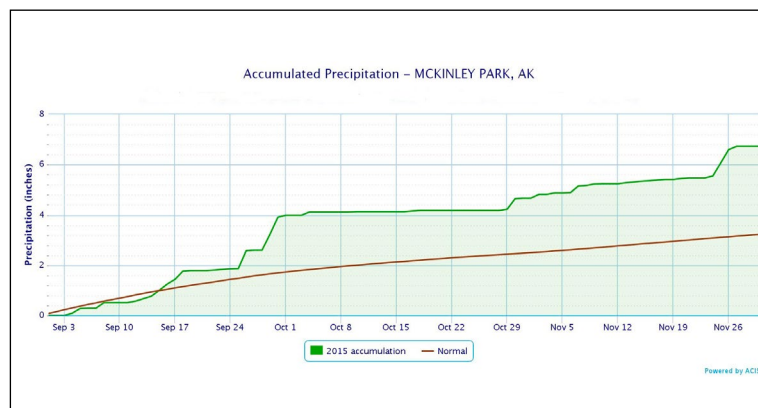


Figure 2. Fall **2015 accumulated precipitation** at Denali (green) compared to **normal** (brown line).

Table 1. Temperature: Fall 2015 average monthly temperatures compared to the 1981-2010 normal.

| Fall 2015 | Average Monthly Temp (°F) | 1981-2010 Normal (°F) | Departure from Normal (°F) | Monthly High (°F / Date) | Monthly Low (°F / Date) |
|-----------|---------------------------|-----------------------|----------------------------|--------------------------|-------------------------|
| September | 36.9                      | 40.4                  | -3.5                       | 63 / Sep 3, 4            | 9 / Sep 24, 25          |
| October   | 30.7                      | 22.9                  | +7.8                       | 50 / Oct 12, 19          | 12 / Oct 31             |
| November  | 12.4                      | 8.9                   | +3.5                       | 43 / Nov 28              | -24 / Nov 19            |

Fall Season Temperature Departure from Normal: + 2.6 °F

Table 2. Precipitation: Fall 2015 monthly precipitation totals compared to normal.

| Fall 2015 | Total Monthly Precip. (in.) | 1981-2010 Normal (in.) | Departure from Normal (in.) | Greatest 24 -hr. total (in. / Date) | # Days with $\geq 0.01$ 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: +3.5 inches (208% of normal)

Table 3. Snowfall: Fall 2015 monthly snowfall totals compared to normal.

| Fall 2015 | Total Monthly Snowfall (in.) | 1981-2010 Normal (in.) | Departure from Normal (in.) | Greatest 24-hr snowfall total (in. / Date) | Seasonal Cumulative Snowfall (in.) |
|-----------|------------------------------|------------------------|-----------------------------|--------------------------------------------|------------------------------------|
| September | 23.3                         | 4.7                    | 18.6                        | 10.5 / Sep 26                              | 23.6 (0.3 in Aug.)                 |
| October   | 8.4                          | 9.9                    | -1.5                        | 6.3 / Oct 30                               | 32.0                               |
| November  | 32.6                         | 13.2                   | 19.4                        | 9.5 / Nov 26                               | 64.6                               |

## Climate Monitoring in Denali National Park and Preserve

There are additional NPS climate stations in Denali that complement the long-term record available from the National Weather Service station at park headquarters (Figure 3). These additional sites provide critical data on a park-wide scale that help characterize the climate gradients and patterns affecting resources in Denali National Park and Preserve. Eielson Visitor Center is the featured climate station this season.

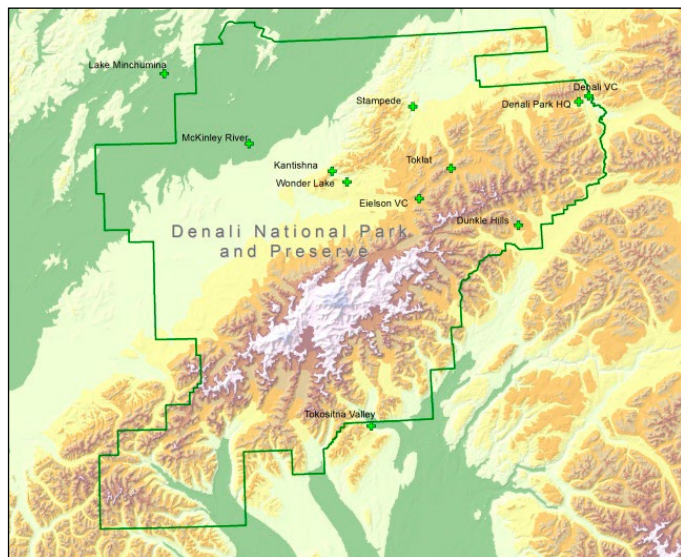


Figure 3. NPS climate stations in Denali National Park &amp; Preserve

The Eielson Visitor Center station is located on rolling tundra on the northern flanks of the Alaska Range at an elevation of 3944 feet. In the summer it is cooler and wetter than surrounding low elevation areas. Persistent winter inversions keep this site remarkably warm in the winter. The period of record (2005-2015) average air temperature is 29.1°F. The total summer rainfall is on average ~17.99 inches. The highest temperature recorded thus far is 77°F on 6/25/2013 and the lowest is -36°F on 1/25/2012.



Figure 4. Eielson Visitor Center station, Denali.

## Denali Fall Temperature Trends

The average fall temperature for 2015 was 26.7°F, which is 2.6°F warmer than the 1981-2010 normal (the latest climate normal period) and 1.7°F degrees warmer than the long-term average (1926-2015).

We calculate the average fall temperature by simply taking the average of September, October, and November monthly temperatures. The range in fall temperatures over the 89 year period of record is between 16.2°F (1932) and 35.1°F (2002). The overall trend is negative, but the temperature decrease is non-linear, with multi-decadal variations (Figure 5).

## Denali Fall Precipitation Trends

The total fall precipitation for park headquarters was 6.73 inches, normal is 3.23 inches. 2015 was the 5th wettest fall on record. 1970, with a total of 10.23 inches of fall precipitation, holds the record for the wettest fall. The overall trend in total fall precipitation is positive, but not significant (Figure 6).

## Denali Fall Snowfall

The total snowfall for the 2015 fall season was 64.3 inches, which is 36.5 inches more than normal. It was the fourth snowiest fall season on record behind 1970 (105.6 inches), 1992 (76.4 inches), and 1993 (67.7 inches). The snowiest period on record was in the 1990s (Figure 7).

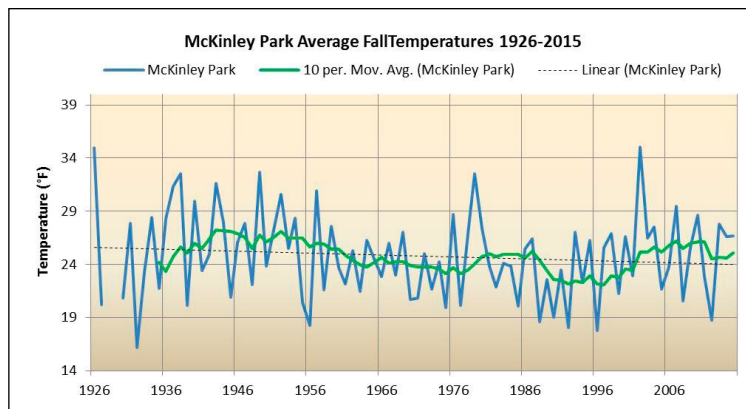


Figure 5. Average fall temperatures (September, October, November) at Denali Park Headquarters over the past 89 years. The green line is a 10-year moving average. The dotted line is a simple linear regression.

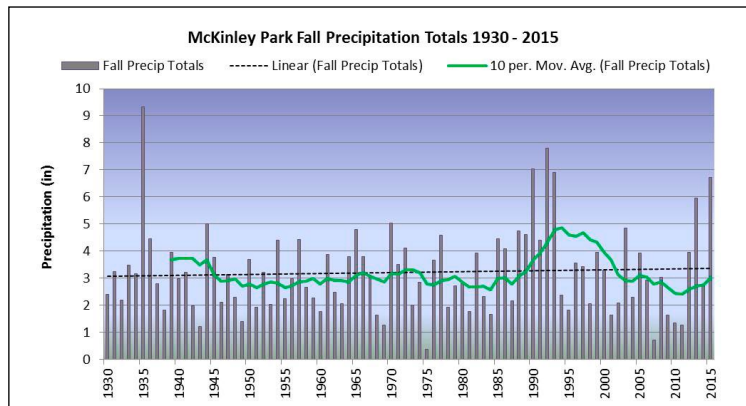


Figure 6. Total fall precipitation (September, October, November) at Denali over the past 75 years. The green line represents a 10-year moving average and the dotted line is a simple linear regression.

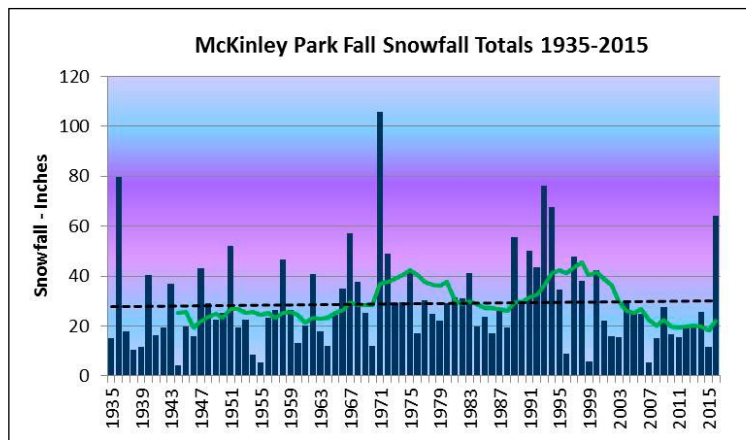


Figure 7. Total fall snowfall (September, October, November) at Denali Park headquarters over the past 80 years. The green line shows a 10-year moving average. The dotted line shows a simple linear regression trend.

## Connecting Further

- Previous weather summaries and other climate monitoring documents on the [Central Alaska Network web portal](#)
- Access near real-time data from [Western Regional Climate Center](#) and [MesoWest](#)
- Statewide summary of weather highlights in the latest [Alaska Climate Dispatch](#) from the Alaska Center for Climate Assessment and Policy

- [Maps](#) of projected temperature and precipitation changes for Denali National Park & Preserve

## More Information

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