

# Arches National Park Water Year 2020 Climate Summary

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This document summarizes current temperature and precipitation anomalies relative to 30-year (1981-2010) averages for Arches National Park (ARCH) during the 2020 water year (October 2019 through September 2020). The data for these analyses were collected at the Co-op weather station at the visitor center by NPS personnel and downloaded from the [Global Historical Climatology Network](#) on 26 October, 2020 using R (ver. 4.0.3, R Core Team, 2020) and the rnoaa package (ver 1.2.0, Chamberlain, et al. 2020). The data used for these analyses include the daily high temperature (TMAX), daily low temperature (TMIN), and daily precipitation accumulation (PRCP). Averages were calculated using the mean for the period of interest.

## Temperature

Water year 2020 was the 18th warmest water year in the 40-year record for ARCH (1980 to 2020); the average annual temperature was 0.28°C above the 30-year average. This summary suggests that temperatures are increasing 0.23°C per decade (figure 1).

The average annual TMAX was 0.37°C below the 30-year average and has been increasing 0.12°C per decade (figure 2A). The average monthly TMAX exceeded the 30-year monthly average 7 times (Nov, Mar, Apr, May, Jun, Aug, and Sep; figure 3A).

The average annual TMIN was 1.08°C above average and has been increasing 0.35°C per decade (figure 2B). The monthly average TMIN exceeded the 30-year monthly average 9 times (Dec, Jan, Mar, Apr, May, Jun, Jul, Aug, and Sep; figure 3B).

## Precipitation

Water year 2020 was the 5th driest on record for ARCH. Total precipitation was 77.6 mm less than the 30-year average, measuring 141.1 mm of precipitation. This summary suggests that precipitation is decreasing at a rate of 9.81 mm per decade (figures 4A).

Nov, Dec, and Jun received above average precipitation (figures 4B), but were not enough to compensate for the 9 months that were below average (Oct, Jan, Feb, Mar, Apr, May, Jul, Aug, and Sep; figure 4C).

## Figures

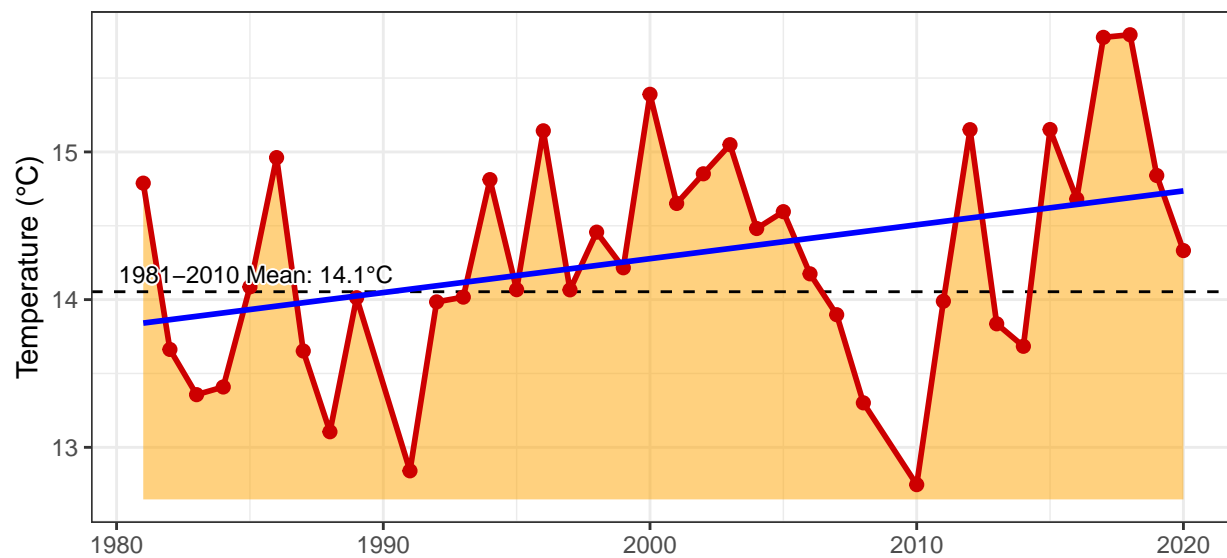


Figure 1: Average annual temperatures.

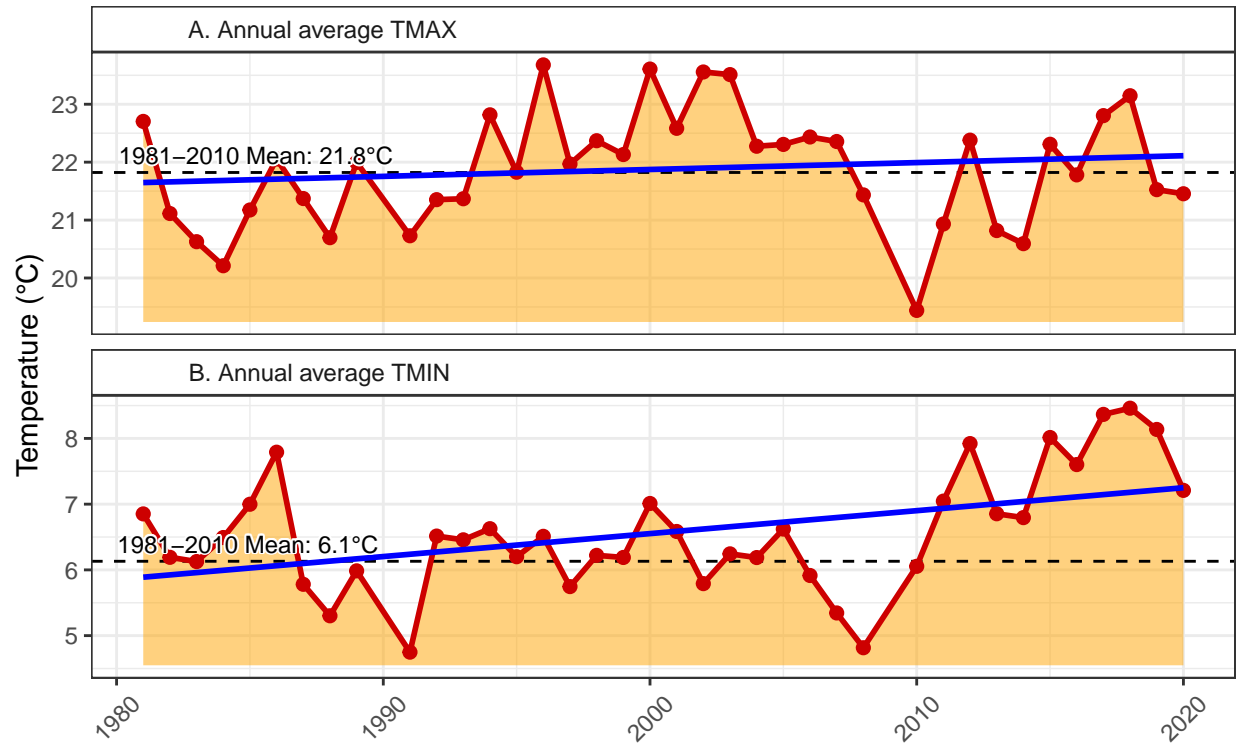


Figure 2: Average annual TMAX and TMIN.

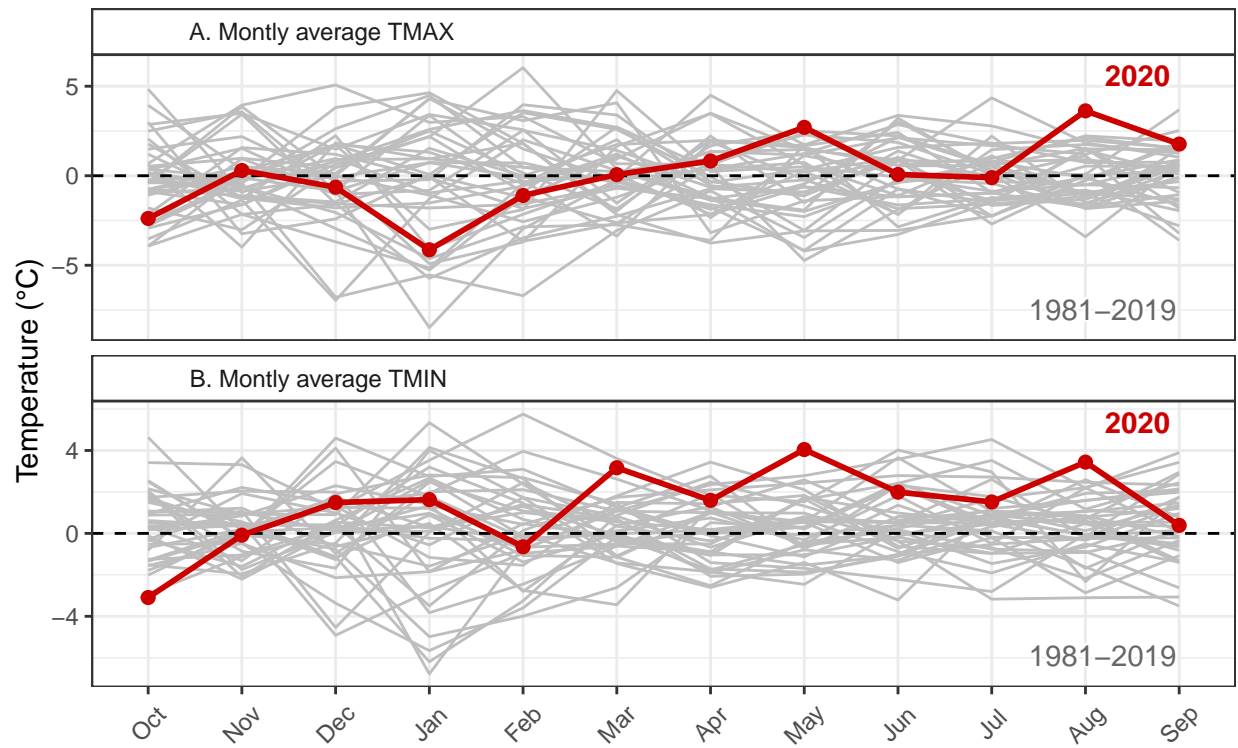
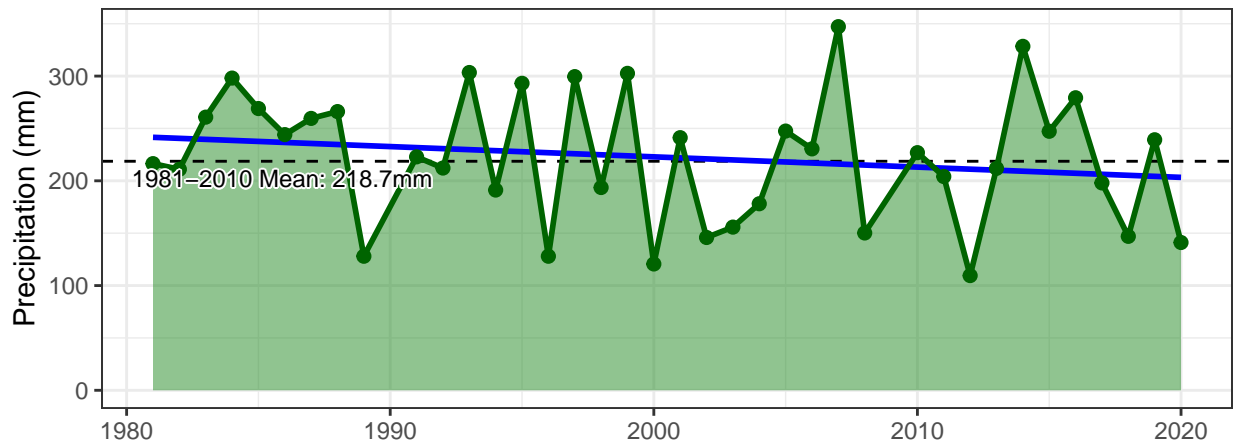
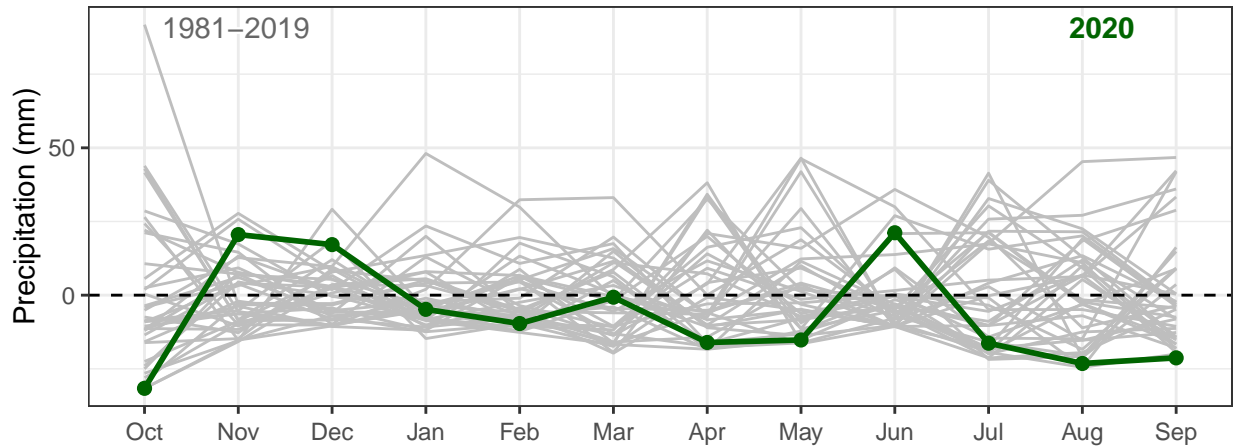


Figure 3: Average monthly TMAX and TMIN.

**A. Water year precipitation totals**



**B. Monthly departure relative to other water years**



**C. Accumulating departure through the water year**

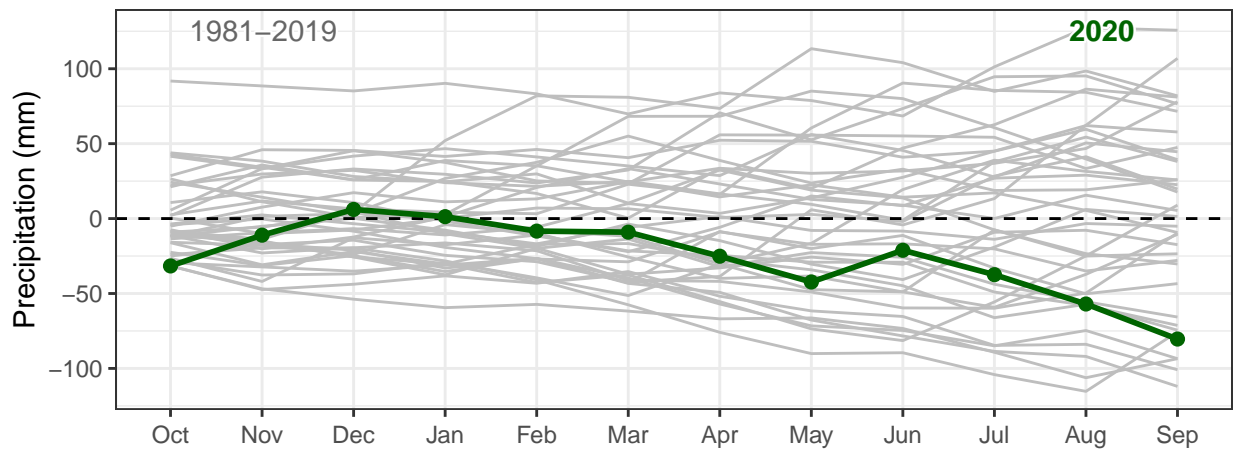


Figure 4: Water year precipitation totals and monly departures from 30-year averages.