

# **New Climate Normals (1981-2010)**

Climate normals are produced every 10 years for the previous 30-year period. On August 1, we will begin incorporating the new normals into our climate products, replacing the 1971-2000 normals with normals based on data from 1981-2010.

## **Frequently Asked Questions**

**What are normals?**

In a general sense, a "normal" is the expected value (e.g., temperature, precipitation amount, etc.) for a particular location during a particular time of year. Normals help describe a location's climate by quantifying certain elements, such as precipitation seasonality (i.e., when during the year precipitation tends to fall.) For monthly and annual values, normals are typically the average values during the 30-year period. Distinctly different from averages, daily normals (1981-2010) were computed using a harmonic fit, a statistical method which dampens the effects of outliers, creating a smooth transition between adjacent days. (A cubic spline based on monthly means was used to compute 1971-2000 normals.)

**Why does NOAA produce normals?**

NOAA's computation of climate normals is in accordance with the recommendation of the World Meteorological Organization (WMO), of which the United States is a member. While the WMO mandates each member nation to compute 30-year averages of meteorological quantities at least every 30 years (1931-1960, 1961-1990, 1991-2020, etc.), the WMO recommends a decadal update, in part to incorporate newer weather stations. Further, NOAA's National Climatic Data Center (NCDC) has a responsibility to fulfill the mandate of Congress "... to establish and record the climatic conditions of the United States." This responsibility stems from a provision of the Organic Act of October 1, 1890, which established the Weather Bureau, the predecessor to the National Weather Service, as a civilian agency (15 U.S.C. 311).

**For what purposes are normals used?**

Meteorologists and climatologists regularly use normals for placing recent climate conditions into a historical context. NOAA's normals are commonly local weather news segments for comparisons with the day's weather conditions. In addition to weather and climate comparisons, normals are utilized in seemingly countless applications across a variety of

sectors. These include: regulation of power companies, energy load forecasting, crop selection and planting times, construction planning, building design, and many others.

Why are the new normals being incorporated into climate products on August 1, 2011, instead of January 1, 2012, as was done when the 1971-2000 normals were introduced 10 years ago?

Improvements in technology have allowed climate normals to be compiled more quickly than in the past. Data from the current winter season (July 2011 to June 2012) will be compared to the new normals. In addition, annual values for the calendar year 2011 will be assessed using the 1981-2010 normals.

Our year-to-date precipitation departure from normal may suddenly change on August 1. Is this a problem?

Departures from normal help gauge extreme events, such as the current drought. The utility of this concept is not lost when new normals are introduced, but when new normals are noticeably different from the previous iteration, departures from normal may appear more or less impressive.

Are there any significant differences between the 1971-2000 normals and the values for 1981-2010?

For our region, the 1981-2010 normals are warmer than the 1971-2000 normals. Data from 1981-2000 are included in both sets of normals, so the changes are based on the differences between 1971-1980 and 2001-2010. In a nutshell, the most recent decade was warmer and wetter than the 1970s. The 1970s were quite cold, but it is interesting to note that the summer of 1980 is no longer included in our normals.

Is our climate becoming warmer and wetter?

The climate of a particular location changes over time, but climate normals were not designed to be metrics of climate change. They may capture recent trends, giving a better perspective of the current state of the climate, but changes between sets of normals do not necessarily confirm a trend. Because of the rigidity of the 30-year time period, a trend on shorter or longer time scales may not be represented. When coupled with other issues, including the aforementioned urbanization, siting, and instrumentation, the changes from one set of normals to the next are not necessarily reflective of real changes in the underlying climate

signal. Normals aim to provide expected values, but they cannot and do not provide a prediction of the future state of the climate.

If the new normals are wetter, will this make the current drought more intense?

For the period of reduced precipitation, departures from normal will increase and percent of normal values will decrease. This may give the impression that the drought is worse than if 1971-2000 normals were used, but drought statistics are much more than comparisons to the current normals. Precipitation totals can be compared to previous events, irrespective of the normal values used at the time. The U.S. Drought Monitor incorporates both objective and subjective methods to assess drought in a historical context. For example, droughts from the entire instrumental climate record are considered, many of which occurred long before the recent 30-year periods. Exceptional drought (D4) is reserved for events with a return period of 50 years, far beyond the scope of climate normals.

I noticed that the 100-degree day and freeze statistics on your website are averages and not normals. Is there a difference?

Yes, there is a very significant difference between 30-year averages and 30-year normals based on daily threshold values. Sparing you the details of the statistical methods involved, it should suffice to say that statistics applied to dampened daily normals will tend to underestimate the likelihood of reaching an extreme value. (Normal daily high temperatures might imply that 100-degree days are uncommon since normal daily highs in the summer never actually reach 100 degrees, but this is not the source of the discrepancy.) As a result of the methods used to calculate the normals, 30-year normals of 100-degree days (or freezes) are less than 30-year averages. Since such averages more closely mirror what has occurred (and perhaps what is likely to occur), we have chosen to show threshold exceedance values as averages instead of normals. (One notable exception is precipitation exceedance normals, which are based on mean values.)

Are snowfall normals available now?

Snowfall normals have been calculated for some locations, but there are some concerns about the completeness of the data set used to calculate them. The National Weather Service and the National Climatic Data Center are working to resolve this issue.

