

Five-Day Running Average Min/Max Temperature at Philadelphia International Airport

The two figures plot five-day moving average maximum temperatures and five-day moving average minimum temperatures in degrees Fahrenheit at Philadelphia versus the Julian date. They also plot ranges of plus or minus one and two standard deviations of the maximum and minimum temperatures respectively. The plots were derived from maximum and minimum temperature data from 1926 through 1999. Moving averages are plotted as opposed to daily averages for purposes of smoothing random variation. Note that the Julian date is the day of the year in numerical sequence from 1 to 365 or 366 (for years with a February 29th) starting on January 1st.

Since Julian date maximum and minimum temperatures are normally distributed, their standard deviations are excellent indicators of the rarity of occurrence of individual daily temperature events. Specifically, a particular daily maximum (minimum) temperature can be expected to fall within one standard deviation of the mean temperature about 68% of the time, and a specific daily maximum (minimum) temperature can be expected to fall within two standard deviations of the mean temperature about 95% of the time.

So, if the minimum temperature at Philadelphia on February 1st (when the Julian date is 32) is 12 degrees, one can use the minimum temperature table to see that such a minimum temperature is, although cold, not so unusually low that it falls outside of the 95% range. Generally, statisticians use 95% to indicate statistical significance.

