

## *HOURLY WEATHER.*

We provide daily high and low temperatures for 1,221 weather stations for 100+ years.

Weather changes continually, not daily. You may examine hour temperature, which shows two seasonal patterns: daily and annually. The ARIMA process is more complex, with the change in the temperature over the past hour important for forecasts.

*Illustration:* To forecast daily temperature, we may use yesterday's daily temperature and the average (expected) daily temperature for today. If today's long-term average is 60° and yesterday's daily temperature was 70°, we may forecast 65°. The temperature two days ago does not have much effect.

For hourly temperature, the long-term average is less important, the temperature one hour ago is most important, and the change from two hours to one hour ago is also relevant.

*Illustration:* If today's long-term average for 2:00 pm is 60° and the temperature one hour ago was 70°, we may forecast 69.5°. The temperature two hours ago is relevant: If it was 68°, we may forecast 71°; if it was 72°, we may forecast 69°.

The accompanying comma delimited file have hourly weather statistics for 2007 for Allentown, Pennsylvania. See the web site of the Penn State Climatologist for details:

<http://climate.psu.edu/data/mesonet/datainv.php>

The file has comma delimited records. You can copy and past the data into an Excel spread-sheet or a text file.

*Take heed:* We do not give an Excel file. If you are not comfortable with converting the file into an Excel time series, do not use these data. If you want to do a student project on hourly temperature, check the Penn State Climatologist web site for information about reading this file. The attached file shows the type of data. You need an hour to two to get the data from the Penn State web site and convert it to usable format.

*Take heed:* The weather service records temperature hourly, and weather.com gives hourly forecasts for the coming two or three days. Historical data for hourly temperature are not readily available, though you can get data for certain sites.