

# The Solar Activity Cycle

Mary Lou West

**Background:** The sun has varying amounts of activity in at least three types of behaviors: number of sunspots, position (latitude) of sunspots, and magnetism (north, south polarity) of sunspots. All three have the maximum and minimum at the same time, so they are just surface symptoms of some underlying phenomenon. This has a cycle length of about 11 years.

However, there is a fair amount of variation in this cycle length. We will investigate this variation. This is especially interesting in 2008 because the current cycle (Cycle 23) is unusually long. This is especially interesting right now because the first sunspot of Cycle 24 erupted onto the sun's surface yesterday (9/22/2008). Many people think that Cycle 23 is overly long and that we should be very worried.

**Procedure:** To investigate the sun's activity cycle we first need to get some historical data. Go to the Solar Influences Data Analysis Center (SIDC) of Belgium at [sidc.oma.be/html/sunspot.html](http://sidc.oma.be/html/sunspot.html). Download the ascii text file of monthly and monthly smoothed sunspot number. Open in Excel. How many rows are in this table? \_\_\_\_\_

Plot sunspot number vs. date (columns 2 and 3) and mark the minimum times. You may want to plot only 50 years at a time. Use the scatter, line only option. Use Layout to add gridline and axis titles. Make a table of the Cycle number and the length of that cycle. Do you see any trend?

What is the average cycle length and the standard deviation? \_\_\_\_\_, \_\_\_\_\_

How does the cycle 23 fit? \_\_\_\_\_

Examine the months around the minimum time for each cycle transition. What is the length of time for "minimum"?

Average and standard deviation?

How does Cycle 23 fit?

Repeat this analysis for the smoothed data (columns 2 and 4).

Make a conclusion about whether Cycle 23 is overly long.

Write a report.

Include information on the Maunder Minimum.

Should we panic yet?

What are the predictions for Cycle 24? See NOAA/SEC at [www.swpc.noaa.gov/SolarCycle/SC24](http://www.swpc.noaa.gov/SolarCycle/SC24)