

# Sunspots

Sunspots are manifestations of magnetically disturbed conditions at the [Sun's](#) visible surface. They are somewhat cooler (and thus darker) than their surroundings, being about 3800 K hot while the photosphere is typically at about 5800 K. Because of this and their size (about 1000 - 100 000 km in diameter), they can be observed visually from the [Earth](#). Spots have a dark central region called **umbra** surrounded by a lighter region called **penumbra**. They grow over a few days and last from several days to a few months. They are also related to very strong magnetic fields, about 2000 - 4000 G (in photosphere only a few G).

Sunspot appear often in groups, and the **sunspot number**  $R$  is defined as  $R = k ( f + 10 g)$ , where  $f$  is the total number of spots visible to the observer,  $g$  is the number of disturbed regions (single spots or groups of spots), and  $k$  is a constant for the observatory related to the sensitivity of the observing equipment. Sunspots display a clear 11-year [cycle](#) in their number and latitude. In addition, they (and their groups) occur often in pairs so that the other has positive polarity (magnetic south, into the sun) and the other negative polarity (magnetic north, out of the sun); changes in this polarity create a 22-year cycle.

Sunspots indicate enhanced solar activity. For example, [solar flares](#) originate from the active region around the sunspots.

You can get sunspot data from, e.g., the [NGDC server](#). To plot sunspots from that data, click [here](#).

See also [Wikipedia on sunspots](#).