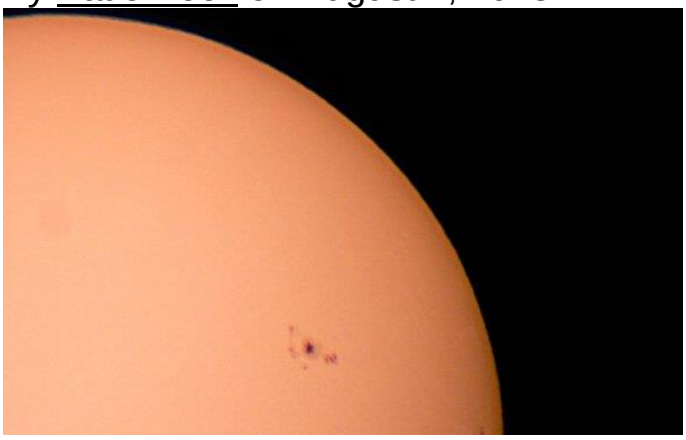
PHYSICS

The Sunspot Cycle Is More Intricate Than Previously Thought

The sun's dark spots cycle every 11 years—as well as every 88, 200, and 2,400 years

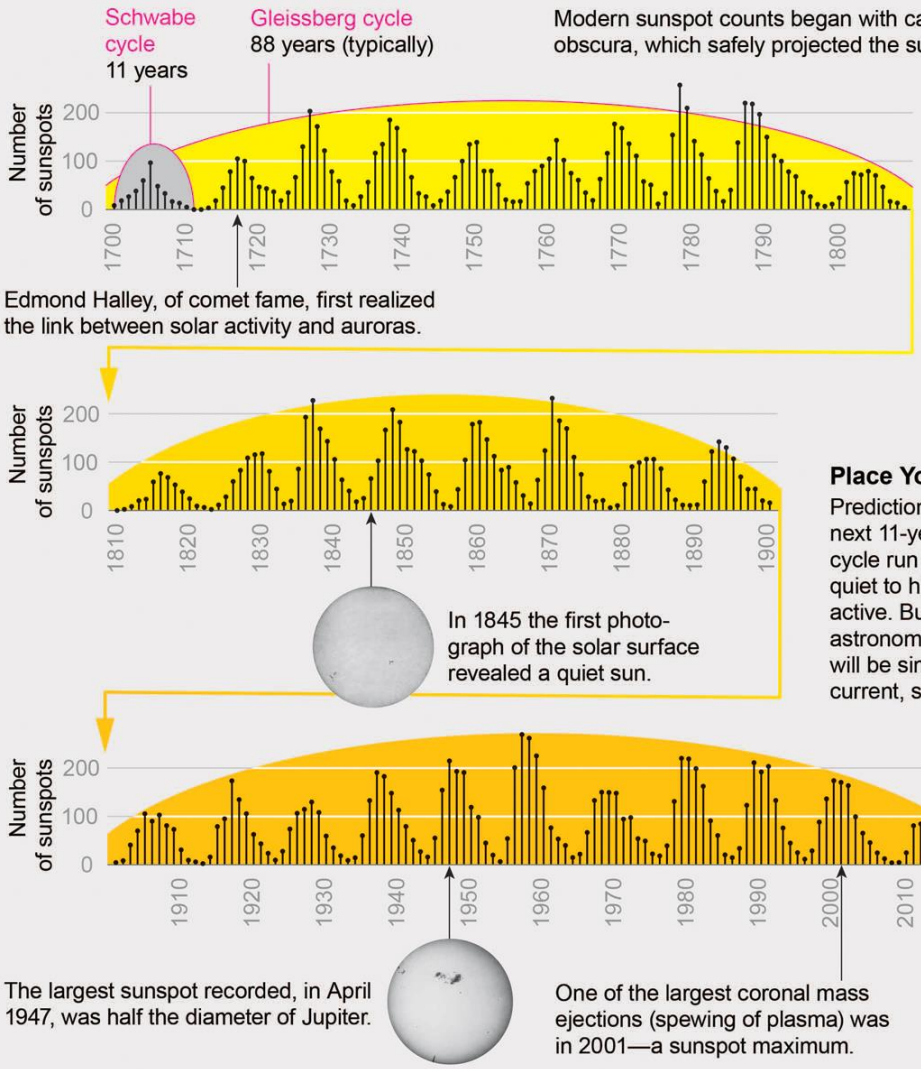
By Katie Peek on August 1, 2018



Credit: Chaz Scott Flickr (CC BY 2.0)

The sun's pockmarked surface is always shifting. Sunspots and solar flares rise and fall every 11 years, a cycle associated with regular reversal of the star's magnetic field. Huge quantities of plasma—known as coronal mass ejections—fly into space, which can disrupt satellites and other electronic signals if they reach Earth. More solar activity during the cycle also amplifies auroras and warms Earth's temperatures slightly. Yet careful study has shown that longer periodicities exist, too. The Gleissberg cycle, first identified in 1862, strengthens and weakens the 11-year cycle over the course of a century (*shown in yellow*). One paper posits that the Gleissberg pattern is caused by a slow swaying of the sun's magnetic pole. The Suess-DeVries cycle (*green*) lasts about 200 years, whereas the Hallstatt cycle (*blue*) runs on the order of 2,400 years. Still, the sun can also be erratic, making it tricky for physicists to predict future sunspots, says Alexei Pevtsov, an astronomer at the National Solar Observatory in Boulder, Colo.: “There's an element of randomness.”

Recent History



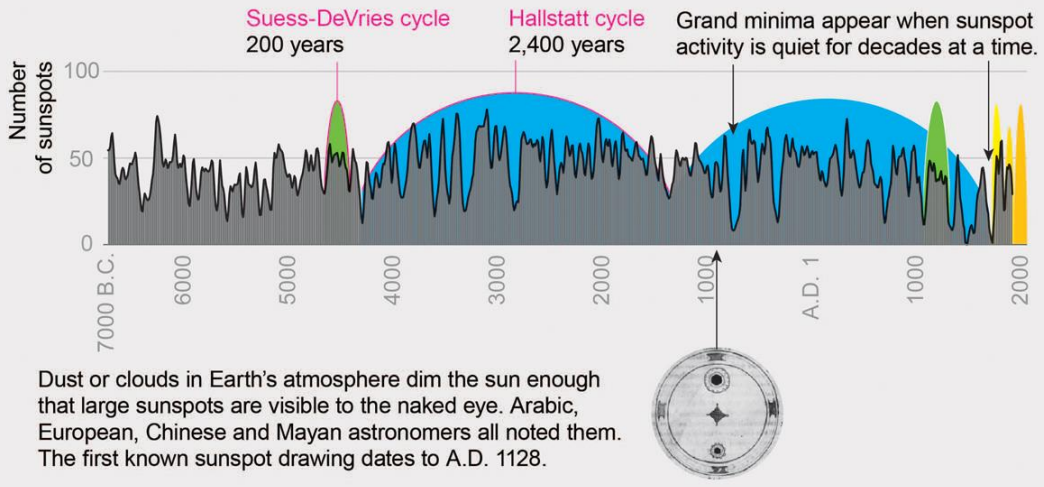
Place Your Bets

Predictions for the next 11-year solar cycle run from very quiet to highly active. But most astronomers think it will be similar to the current, sedate one.

The modern sunspot record (*yellow arcs, above*) overlaps with ice-core data (*below*). (The arcs are drawn only as a visual guide.)

The Long View

European researchers recently used radioactive elements carbon 14 and beryllium 10 in ice cores to reconstruct the sunspot count (*gray*) across nine millennia.



Dust or clouds in Earth's atmosphere dim the sun enough that large sunspots are visible to the naked eye. Arabic, European, Chinese and Mayan astronomers all noted them. The first known sunspot drawing dates to A.D. 1128.