

The Sun Is Asleep. Deep 'Solar Minimum' Feared As 2020 Sees Record-Setting 100-Day Slump



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[Science](#)

I write about science and nature, technology and travel, stargazing and eclipses.



A composite of the August 21, 2017 total solar eclipse showing third contact  the end of totality ... [\[+\]](#) UNIVERSAL IMAGES GROUP VIA GETTY IMAGES

While we on Earth suffer from coronavirus, our star—the Sun—is having a lockdown all of its own. [Spaceweather.com](#) reports that already there have been 100 days in 2020 when our Sun has displayed zero sunspots.

That makes 2020 the second consecutive year of a record-setting low number of sunspots— which you can see (a complete absence of) [here](#).

Note: never look at the Sun with the naked eye or through binoculars or a telescope that aren't fitted with solar filters.

So are we in an *eternal sunshine of the spotless kind*?

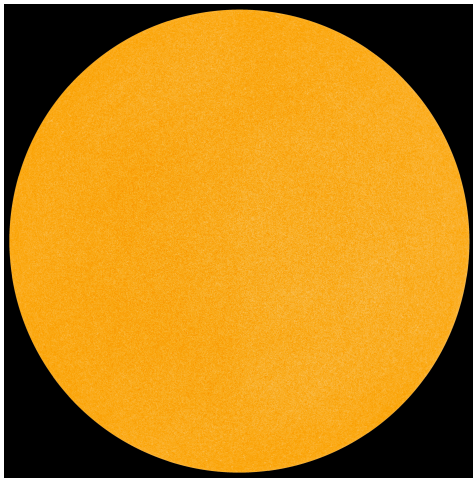
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The sun is blank--no sunspots.

SDO/HMI

“This is a sign that [solar minimum](#) is underway,” reads [SpaceWeather.com](#). “So far this year, the Sun has been blank 76% of the time, a rate surpassed only once before in the Space Age. Last year, 2019, the Sun was blank 77% of the time. Two consecutive years of record-setting spotlessness adds up to a very deep solar minimum, indeed.”

What does all of this mean? Here’s everything you need to know about the Sun, the solar cycle, and what a deep solar minimum means for us.

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What is a sunspot?

It’s an area of intense magnetic activity on the surface of the Sun—a storm—that appears as an area of darkness. Sunspots are indicative of solar activity, birthing [solar flares](#) and [coronal mass ejections](#) (CMEs). Although sunspots seem like tiny specks, they can be colossal in size.

Sunspots have been continuously counted each day since 1838, which has allowed solar scientists to describe a repeating pattern in the wax and wane of activity on the Sun's surface—the *solar cycle*.

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What is the solar cycle?

The Sun has a cycle that lasts between nine and 14 years—typically 11 years, on average—and right now we're in the trough. At the peak of that cycle—called *solar maximum*—the Sun produces more electrons and protons as huge solar flares and coronal mass ejections.

From a visual perspective, the solar cycle is a “sunspot cycle” since solar scientists can gauge where the Sun is in its cycle by counting sunspots on its surface.



Aurora Borealis, the Northern Lights, over the Vestrahorn mountain in the east of Iceland.

(Photo by ... [+]
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How does the solar cycle affect Earth?

While there's some evidence that [the solar cycle affects Earth's weather and climate](#), the status of the Sun has the most obvious effect on the intensity and frequency of aurora. The more charged-up the solar wind headed towards Earth, the brighter and more frequent are the [displays of Northern Lights](#) and Southern Lights. What's known as the 'auroral oval' gets larger, too, so people who live in areas that normally don't experience aurora—such as the USA and Western Europe—sometimes get to see them.

Either way, a solar maximum is historically when aurora are at their most frequent and spectacular.

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What is 'solar minimum'?

Just as solar maximum sees many sunspots, the trough of solar minimum features zero sunspots—and that's what's going on now. However, it's been continuing rather longer than expected, which means the Sun is in the midst of a particularly deep solar minimum. The most infamous happened between 1645 to 1715 when a "[Maunder Minimum](#)" saw a prolonged sunspot minimum when sunspots were very rare for an extended period.

The current record-breaking solar minimum is part of a longer pattern of wax and wane; in fact, it's believed that [the Sun may have been in a magnetic lull for the last 9,000 years](#) at least.

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When is the next 'solar maximum?'

It's thought that the Sun will reach solar maximum in the mid-2020s, though exactly when sunspot frequency will peak is anyone's guess. It's something that can usually only be described in retrospect. The last solar maximum was in 2013/2014, but was ranked [among the weakest on record](#).

Once way to gauge what's going on visually is by counting sunspots—and the other is by looking at the Sun's mighty *corona* during a total solar eclipse.

Luckily, there's one coming up in North America right on cue.

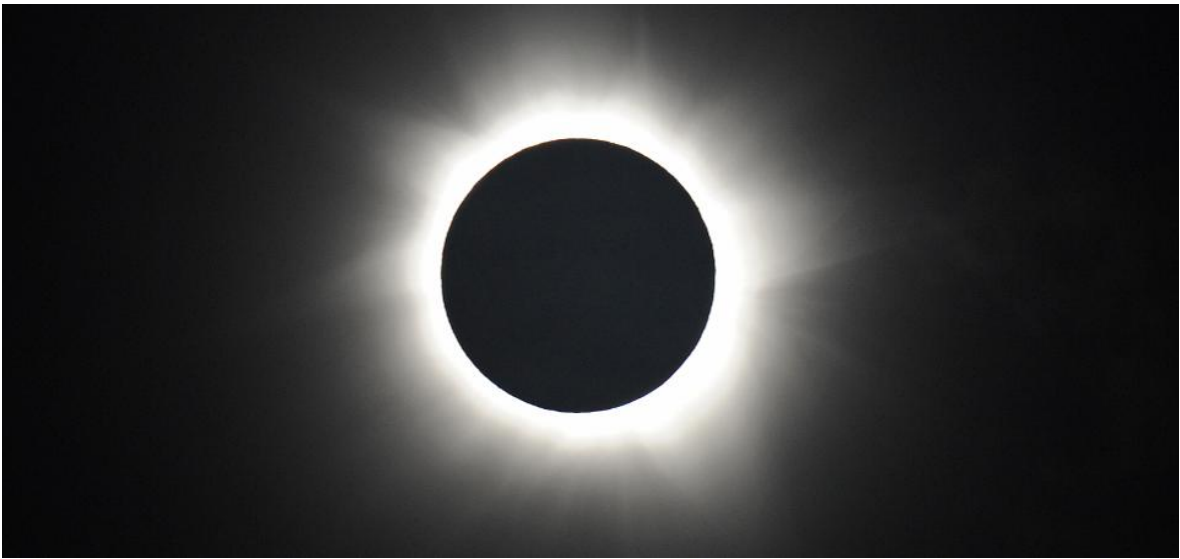
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How the solar cycle affects solar eclipses

During a total solar eclipse it's possible to see clear, naked eye evidence of where the Sun is in its cycle. Totality—when the Moon completely blocks the Sun's bright disk—affords a brief view of the Sun's corona, its hot outer atmosphere. During solar minimum the corona is relatively small and tightly bound to the surface. During solar maximum, the Sun's corona is typically flared and stretching away into space.



Totality is shown during the solar eclipse at Palm Cove in Australia's Tropical North Queensland on ... [+] AFP VIA GETTY IMAGES

How to see explosions on the Sun

When the Sun is at solar maximum the likelihood is increased of seeing prominences—huge solar flares and coronal mass ejections in action—around the limb of the Moon during a total solar eclipse.



A close-up view of the Sun's disk during a total eclipse reveals fiery solar prominences. | View ... [+] CORBIS/VCG VIA GETTY IMAGES

Here's an image (above) of some pink prominences that can be seen with the naked eye only during a total solar eclipse.

Why is this good news for North American eclipse-chasers?

All of this is well-timed for the next total solar eclipse in North America on April 8, 2024, since the Sun will, by then, be approaching solar maximum.

The 100-mile wide path of totality will, during the 139 minutes it's over land, afford a stunning view (if skies are clear) of a flared and stretched corona from anyone within under the Moon's shadow in:

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Wishing you clear skies and wide eyes.

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I'm an experienced science, technology and travel journalist interested in space exploration, moon-gazing, exploring the night sky, solar and lunar eclipses,...

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