

A Solar Forecast With Good News for Civilization as We Know It

Space weather experts believe the sun has entered a new sunspot cycle, and expect it to be a relatively quiet one.



By **Kenneth Chang**

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The sun is beginning to perk up again.

An international panel of scientists announced on Tuesday that the sun had emerged from the quietest part of its 11-year sunspot cycle and had now entered the 25th numbered cycle. (The numbering of sunspot cycles goes back to 1755.)

The researchers predicted that the forthcoming cycle would be a pretty quiet one.

Solar scientists track the cycle through the ebb and flow in the number of sunspots, which reflects the level of ferocity in the sun's magnetic fields. Sunspots can shoot out bursts of radiation called solar flares as well as giant eruptions of particles known as coronal mass ejections. If a giant coronal mass ejection hit Earth, it could upend modern civilization, knocking out satellites and inflicting continentwide blackouts.

Such a solar explosion in 1859, known as the Carrington event, disrupted telegraph systems. Today, the world is more electrically interconnected, and giant transformers that are part of power grids are thought to be particularly vulnerable.

Just as economists wait months to declare the start or end of a recession, scientists delay such pronouncements for solar cycles, because they average the sunspot numbers over 13 months to avoid being fooled by short-term fluctuations in the sun's activity. Nine months ago, in December, the sunspot cycle reached its calmest state.

“Since then it’s been slowly but steadily increasing,” said Lisa Upton, a solar scientist at the Space Systems Research Corporation and co-chair of Solar Cycle 25 Prediction Panel, which is sponsored by NASA and the National Oceanic and Atmospheric Administration.

Over the past half century, the solar cycles have become progressively weaker, leading some scientists to speculate that the sun might be on the cusp of an extended quiet period. The last solar maximum, with an average sunspot number of 114, was the weakest since 1928 and the fourth weakest over all.

The prediction panel expects that activity during this solar cycle will be well below average, with a peak of 115 in the sunspot number, give or take 10. That would be about the same as the last cycle. The maximum is predicted to occur in July 2025.

“If this turned out to be true, this would make Cycle 25 almost identical to the Solar Cycle 24,” said Douglas A. Biesecker of the Space Weather Prediction Center in Boulder, Colo., the other co-chair of the panel. A very active cycle reaches a sunspot number greater than 200, he said.

Forecasts by individual scientists still vary widely, with some predicting an even more quiet cycle and others foreseeing a rebound to higher levels. But Dr. Upton and Dr. Biesecker said the panel reached a consensus fairly easily, relying on models that use measurements of the magnetic fields in the sun’s polar regions to infer what would happen in the coming years.

“We’ve gotten very good at modeling the evolution of the polar magnetic fields,” Dr. Upton said. “This is one of the best indicators for the amplitude of the coming cycle and was one of the main features that the prediction panel looked at.”

She said there were other indicators that this cycle would remain quiet, including a large number of spotless days during the solar minimum. But if in the coming months the sunspot cycle ramps up faster than expected, that will be a sign that perhaps the experts underestimated the coming cycle’s intensity, she said.

Even during weaker solar cycles, the sun can unleash gigantic explosions. In 2012, an eruption rivaling the Carrington event erupted off the sun’s surface — but fortunately it was not aimed at Earth.

Still, a quieter sun increases the odds that our planet will not be struck by a solar cataclysm in the next 11 years.