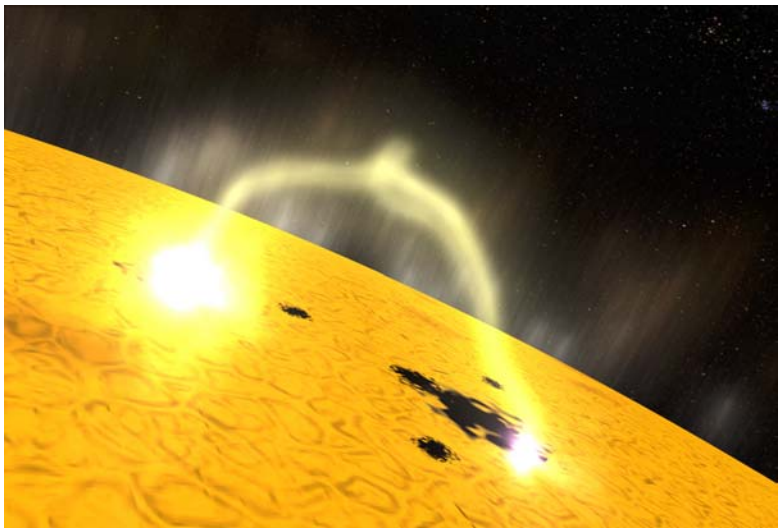
New Solar Cycle Not Packing Much Punch



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Many solar scientists expected the new sunspot cycle to be a whopper, a prolonged solar tantrum that could fry satellites and raise hell with earthly communications, the power grid and modern electronics.

But there's scant proof Sunspot Cycle 24 is even here, let alone the debut of big trouble.

So far there have been just a couple minor zits on the face of the sun to suggest the old cycle is over and the new one is coming.

The roughly 11-year cycle of sunspot activity should have bottomed out last year, the end of Cycle 23 and the beginning of Cycle 24. That would have put the peak in new sunspot activity around 2012.

But a dud sunspot cycle would not necessarily make it a boring period, especially for two solar scientists with the Tucson-based National Solar Observatory.

Two years ago, William Livingston and Matt Penn wrote a paper for the journal Science predicting that this could not only be a dud sunspot cycle, but the start of another extended down period in solar activity. It was based on their analysis of weakening sunspot intensity and said sunspots might vanish by 2015.

And here's the punch line: That last long-term down period, 1645-1715, coincided with the Little Ice Age, a period of bitter cold winters.

That kind of talk could ruffle some feathers in this time of climate change and global warming, starring man-made carbon dioxide as the devil.

The paper, rejected in peer review, was never published by Science. Livingston said he's OK with the rejection.

"I accept what the reviewers said," Livingston said. "'If you are going to make such statement, you had better have strong evidence.' "

Livingston said their projections were based on observations of a trend in decreasingly powerful sunspots but reviewers felt it was merely a statistical argument.

He is aware that some opponents of the prevailing position that climate change and global warming are the result of manmade activity -- greenhouse gas, specifically carbon dioxide, buildup -- are very much interested in the idea that changes might be related to solar activity.

"But it has not been proven yet," cautioned Livingston, an astronomer emeritus who still works out of an office at the National Optical Astronomy Observatory headquarters building on the University of Arizona campus.

"We may have to wait. We may be wrong. (But) the sun is going to entertain us one way or another," he said.

It's not just a scientific curiosity. There's a lot at stake in predicting whether sunspot cycles are going to be tame or wild, said Matt Penn of the National Solar Observatory.

The powerful blasts of radiation that come from solar activity can fry electronic equipment on Earth; particularly vulnerable are satellites.

The high-energy radiation produced by solar flares travels at near the speed of light, getting to Earth in just minutes.

But the magnetic effects of a solar flare can take between two and three days to reach Earth, said Penn, a solar scientist.

In the 1800s, magnetic blasts from intense solar activity induced currents in telegraph lines in the U.S. and Italy, starting fires and damaging equipment. Later, it was learned that solar activity affected radio transmission.

It can also affect the electrical-power grid. A solar tantrum in 1989 blew transformers and caused a blackout in Canada. And a number of satellites are thought to have failed from exposure to high-energy blasts from solar activity.

Satellite operators can turn them away or shut down vulnerable equipment aboard, and astronauts can use shielding to avoid those blasts.

If Cycle 24 is the big cycle predicted, Penn said, "it's likely we'll have geomagnetic storms with a lot of sunspots, a lot of flares on the sun."

Penn said even so-called "quiet sun" periods are far from boring because the sun's "surface consists of Texas-sized hot gas bubbles, which rise upward at a speed of about a mile per second. The gas cools and falls downward in narrower channels at about the same speed. That's what we call the 'quiet sun.'"

"As we get more into the space environment with satellites, GPS and communication satellites, it means money. People who are about to launch new communication satellites really want to know how much shielding to put on their satellites.

"But shielding amounts to weight, which is money. If they want them to last through (an intense cycle), they're going to want to protect them more, and that will cost them more."

Penn is the telescope scientist on the McMath-Pierce solar telescope, the strange angular white thing amid all the white and silver-domed things atop Kitt Peak. Specifically, Penn works with an instrument that "sees" in the infrared range to provide information about magnetic activity.

Sometimes, sunspot activity is more than theory or data to him.

Several years ago, he was making an early-morning run from Tucson up to Kitt Peak to do some solar observing. He noticed his gas gauge was dangerously low and decided to stop for gas at the convenience store in Three Points.

It was about 5 a.m., and no one was there to take cash, so he tried to use his credit card to gas up. But the pay-at-the-pump system was down.

Crossing his fingers and driving up the mountain, Penn said he hoped he'd have enough gas after work to make it back to the station on the way home.

When he got to work, he learned that "a communications satellite had been damaged by (a solar flare). Lots of communications were dropped that morning, and my credit-card pay-at-the-pump attempt was one of them."

Though Aimee Norton appreciates the practical benefits of being able to predict the sun's activity, solving some of the star's mysteries that relate to the big picture are more compelling. Norton is a program scientist on the solar observatory's SOLIS (Synoptic Optical Long-term Investigations of the Sun) facility at Kitt Peak.

"Part of what we're trying to understand is how the magnetic field regulates or moderates the energy that is transported in the atmosphere," Norton said. "Because one of the mysteries of the sun is, it's hotter in the upper atmosphere than (at the surface). So there is energy being transported. Some people think the magnetic field is somehow magically getting that energy out there."

Norton said she's hoping for a powerful cycle, noting, "It would give us more things to do research with -- either that or no cycle at all, which would be similar to the Maunder Minimum."

She said she figures there's little chance of a completely dead cycle but added, "Wouldn't that be fascinating if the solar system managed to offset our contribution?"

Because you can't go

--Visit Solar Cycle 24: www.solarcycle24.com/

--Mr. Sunspot's Answer Book: http://eo.nso.edu/MrSunspot/answerbook/polarity.html

--NASA's Solar Physics: http://solarscience.msfc.nasa.gov/whysolar.shtml

--Solar storms: www.solarstorms.org

--National Solar Observatory's Solis solar telescope (Synoptic Optical Long-term Investigations of the Sun): http://solis.nso.edu

--For more information on sunspots: http://spaceweather.com or http://science.nasa.gov

--For a list of sometimes spectacular sunspot-induced problems: http://sw.astron.kharkov.ua/swimpacts.html

Source: The Arizona Daily Star

http://www.redorbit.com/news/space/1391817/new_solar_cycle_not_packing_much_punch/index.html#