With Solar Cycle 25 still peaking, what sights, threats experts expect

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Credit: Harrison Haines from Pexels

In May, powerful solar storms delivered stunning auroras to latitudes that rarely experience them. Light shows were seen as far south as Florida and Texas, while more northerly areas of the United States were treated

to spectacular displays. But Solar Cycle 25, the current surge in the sun's storm activity, isn't set to peak until summer of 2025, meaning we may well see more appearances of the northern lights in places not used to seeing them.

"Geomagnetic storms can produce northern lights in lower latitudes," says Kevin Sterne, senior research associate with the Super Dual Auroral Radar Network (SuperDARN) at Virginia Tech. "But they can also increase the radiation exposure to communication and other satellites. This increase in radiation can damage or increase the degradation of satellite electronics, which could shorten the life of these satellites."

The solar cycle repeats every 11 years, but we are currently headed toward a peak. "We're seeing more solar flares right now because we're approaching the solar maximum, which is a mark of the highest number of sunspots," says Sterne.

"But not all sunspots produce flares. The magnetic fields need to be set up in the right condition for a sunspot to produce multiple flares." Sterne compares the swings to winter storm activity, where a storm-filled winter might dump as much snow as the past several years combined.

With solar maximum not set to peak until next summer, that means more chances for awesome light displays, but also for potential communications disruption. "The northern lights are one visual impact of the response to Earth's magnetic field from a geomagnetic storm. Generally, the stronger the storm, the farther south the 'northern' lights will move," says Sterne.

The last round of storms caused timing delays in the GPS units on farming equipment. But those weren't nearly as strong as the 1859 Carrington Event, the strongest geomagnetic storm on record, which disabled telegraph communication around the world. What would such a

storm do to our far more developed telecommunications structure today?

"It's hard to gauge the possibility when we aren't able to easily test our communication networks on an event that doesn't usually happen," says Sterne. "That's where a lot of researchers are working to create models that capture these storm time events, so that we can try to simulate how the next Carrington Event would impact modern day electronics."

Provided by Virginia Tech

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