

Are We Ready for a Solar Katrina?

Severe Solar Storms Could Harm Power Grid, Navigational Systems and Spacecraft, Scientists Say

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More than a million [people without power](#). The distribution of drinkable water disrupted. Transportation, communication and banking upset. Trillions of dollars in damage.

Hurricanes, blizzards and other earthly tempests aren't the only natural forces with the potential to sow catastrophe.

Severe weather in the sun's outer atmosphere could knock out much of the country's power grid, incapacitate navigational systems and jeopardize [spacecraft](#), scientists say.

While the odds of a solar disaster are relatively small, scientists warn that we need to ramp up our defenses against [solar storms](#), especially given our increasing dependence on [technology that is so susceptible to radiation from the sun](#).

"It's one of those events that is of low probability but high consequence," Dr. Roberta Balstad, a research scientist with Columbia University's Center for Research on Environmental Decisions. "The consequences could be extreme."

And Balstad and her colleagues emphasize that we've seen those extreme consequences before.

Solar Storms Cause Blackouts, Impair Communications

In 1859, a solar storm, also known as the Carrington event (after the astronomer Richard Carrington, who first recognized the cause) fried the telegraph system.

Another powerful space weather event in 1989 caused a blackout in Quebec, Canada. Other storms have led to diverted airplanes and impaired telecommunications satellites.

Earlier this year, a group of experts from around the country, including Balstad, issued a report to the National Academies of Sciences on the economic and social impacts of solar storms.

The point of the report was to raise awareness and encourage the government and private businesses to prepare for the long-term consequences of a major event.

"We tend to think that we're in control of nature, but we're not," she said. "What we need to pay attention to is our total dependence in all parts of lives on the electric grid, which is vulnerable. ... If there is some kind of disruption, we need to be ready to deal with it."

In the face of a "space weather" Katrina, she said we wouldn't be prepared.

The direct result of a space storm would be the breakdown of the electrical grid, the report warned.

John Kappenman, an analyst with Metatech Corporation, a company that studies the effect of electromagnetic interference on power systems, said in the report that damaged transformers take a long time to repair.

Restoring Power Grid Could Take More Than 12 Months

In well-documented cases involving heat failures in the transformers that undergird the power system, he said it has taken 12 months or more to replace the damaged units with new ones.

According to the NAS report, "Collateral effects of a longer-term outage would likely include, for example, disruption of the transportation, communication, banking, and finance systems, and government services; the breakdown of the distribution of potable water owing to pump failure; and the loss of perishable foods and medications because of lack of refrigeration."

The loss of services, it said, would spill over from one region of the country to the entire nation and potentially lead to international implications.

The price tag of such a calamity? Several trillion dollars per year, the report said.

Worst-Case Scenario Is Unlikely

But scientists emphasize that this situation is improbable.

Michael Kaiser, project scientist for NASA's Solar TERrestrial RELations Observatory (STEREO) mission, told ABCNews.com that he doesn't think it's likely that a doomsday situation will unfold.

Even though he acknowledged the devastation previous storms had caused, he said that were storms of equal magnitude to hit now, power grid operators could adjust the system to mitigate harm if they had enough notice.

"People who run the power grids on the ground could probably lower the amount of power they're carrying," he said.

He also said that given how quiet the sun has been recently, he doesn't expect a powerful solar storm anytime soon.

The sun's activity waxes and wanes in an 11-year cycle. Right now, he said, the sun is experiencing the deepest minimum in about a century.

But, he said, in the next few years, as the sun approaches the peak of its cycle, the possibility for interference increases, especially considering we have launched more spacecraft and rely more heavily on technology.

He emphasized that the airlines, the oil and gas industry, agriculture companies and others are dependent on technology that is vulnerable to the sun's volatility.

For example, he said, highway companies, agro-business and deep sea drilling rigs rely on precision GPS technology. Solar interference could knock them off about 100 yards, and even that could have a negative effect on their operations.

We're More Susceptible but 'We're Getting Smarter'

He and his colleagues are working to predict sun storms with the same accuracy as meteorologists who predict hurricanes but said they can only forecast about 12 to 17 hours in advance.

Given the potential impact of the storms, they're working to refine their systems.

"It takes a less intense storm to do some damage," he said. "On the other hand, we're getting smarter now."

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