** This news release from K-State Research and Extension is available online at https://ksre-learn.com/agriculture-solar-weather-gps-outage

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Could last year's Gannon space storm and GNSS outage impact farmers again?

K-State precision agricultural economist says these events were not an anomaly

By Jacob Klaudt, K-State Research and Extension news service

MANHATTAN, Kan. — A powerful geomagnetic weather event known as the Gannon Storm caused mass global navigation satellite system outages the weekend of May 10, 2024, leading to an assumed $565 million in losses for midwestern crop producers.

Kansas State University precision agricultural economist Terry Griffin said what seemed like a once-in-a-lifetime space weather storm may become more of an expectation for growers in the future.

"It seemed like an oddity because we haven't had something like this happen during planting time, yet the actual anomaly is we've had mild solar cycles as of late, which are usually 11 years," he said.

Humans have been measuring solar cycles since 1750. Griffin said the planet is entering its 25th right now, though only the third one since GPS has been commercialized, which is part of why these outages seemed out of the blue.

"It's probably what we should expect moving forward, not just for the next solar cycle, but also for this spring because we haven't passed the maximum amount of geomagnetic disturbances for the solar cycle yet," Griffin said. "Spring 2025, fall 2025 and even spring 2026, we should still expect this type of activity."

Looking back to the weekend of the Gannon storm, there was increased solar activity, which included sunspots seen by the naked eye and several coronal mass ejections that led to part of the atmosphere becoming more dense – the cause of the GPS and GNSS signal degradations.

"It was sort of a perfect storm of solar activity that even caused a radio blackout at one point," Griffin said. "Space weather is different from terrestrial weather. Besides the northern lights, there's nothing we can see, feel or hear from space."

He added: “Still, it is definitely a real thing and expected to be an issue for the remainder of this solar cycle.”

Until researchers develop alternatives to GPS and GNSS less vulnerable to space weather, Griffin said producers can best prepare themselves for future events by simply being aware and quickly determining the source of system outages.

“It’s important to know whether it's a local problem with your hardware or if it's a global problem that is outside of your control,” he said. “You can learn that online through the National Oceanic and Atmospheric Administration’s Space Weather Prediction Center.”

Growers can find a bar chart on the Space Weather Prediction Center’s website that denotes high geomagnetic activity for the entire planet with orange or red bars.

“If you're having problems with GPS and the bars are green, it’s probably a local issue,” Griffin said. “Call the dealer, but if the bars are dark red for nine hours or so, it’s probably the atmosphere being activated by solar activity, and there’s nothing we can do about it.”

More information about the effects of global GNSS outages is available online. Contact Griffin through AgManager.info to talk more about how solar weather influences agriculture.

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FOR PRINT PUBLICATIONS: Links used in this story
Impact of the Gannon Storm on Corn Production Across the Midwestern USA, https://agmanager.info/management-finance/precision-agriculture/impact-gannon-storm-corn-production-across-midwestern-usa

National Oceanic and Atmospheric Administration’s Space Weather Prediction Center, http://swpc.noaa.gov/

Global Cost Assessment of GNSS Outage to Agricultural Productivity, https://agmanager.info/news/recent-videos/global-cost-assessment-gnss-outage-agricultural-productivity

Terry Griffin contributor’s page on AgManager.info, https://agmanager.info/contributors/griffin

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