



U-M solar scientists bask in glare of attention over sun storms

Researchers here developed one of top space weather prediction tools

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BY ANNE RUETER
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A tempestuous sun has been in the media spotlight for the last two weeks, as a series of explosions, among the most powerful ever recorded, have sent space storms toward Earth. Enjoying the publicity glow here in Ann Arbor are Tamas Gombosi and about 20 University of Michigan solar scientists. They've been fielding lots of questions from curious news media and friends around campus.

Gombosi's team loves the attention. "Every field loves to advertise their achievements, and the excitement and the fun we have." He's pleased too that the increasingly sophisticated field of space weather - in which the U-M is a key player nationally - is getting credit for limiting storm-caused disruptions for satellite-based communications companies, airlines and the military. Space weather forecasting still has far to go, he says.

Gombosi leads a research group at the U-M engineering college that developed one of the leading numerical space weather prediction tools in the country. Their computer program simulates the propagation and spread of solar storms from the sun to Earth's ionosphere. They run it on some of the nation's most powerful computers, located at NASA's Ames Research Center in California, Air Force facilities and National Science Foundation centers in Urbana, Ill., and San Diego. The U-M researchers didn't run the predictions in this case, although they have for previous solar events.

They are midway through a \$5 million, five-year grant from the Air Force to help it implement the numerical tools it developed for the National Oceanic and Atmospheric Administration. Gombosi's team is the prime contractor in this multi-university effort.

In unleashing three huge storms and several smaller ones in the last two weeks, the sun caused dramatic auroras on Earth.

Gombosi's students reported seeing huge light displays locally two days after the

major storm Oct. 28. A colleague on an airline flight told him of seeing fantastic pink and green light displays.

Damage of solar storms apparently limited

The storms knocked out two Japanese communication satellites, disrupted power in Sweden and caused brief lapses in airline flight communications and radio broadcasts. But Gombosi and other solar experts say their emerging skills in forecasting space storms enabled airlines, communications and utility operators and the military to avoid power surges and equipment damage.

Spacecraft operators adjusted their satellites to safe modes, minimizing the chance of damage to parts that are vulnerable if operating at high voltage, explains Gombosi.

"It takes time. It costs money. You can't use full capacity. But at least you save your assets," he says. "The nation has a huge financial investment in communications in space, and the military relies on its own systems as well," he says, adding that the central command for military operations in Iraq was among those stepping back to safe mode.

It's hard to know precisely the effects of this episode of violent space weather, Gombosi says. The military keeps damage assessments classified, and civilian companies worry about revealing weaknesses to competitors.

"Among the most closely guarded secrets are technical problems they have with spacecraft," he says.

Data a feast for scientists

Gombosi also can't wait to start analyzing what happened during this intense, unusually rapid-fire string of closely spaced events on the sun, which may not be over yet.

"The whole space weather community will be analyzing and learning lessons over the next year or so," he says.

Big solar events usually don't occur in rapid succession. "These were so close to each other, so we can examine the interaction between these events."

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