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24 February 2011

Solar flares and other space weather events could wreak havoc on Earth



Image: NASA

The massive solar flares released by the sun last week were the largest such eruptions in four years, but experts warn that such events will strike again, potentially wreaking havoc on Earth as they damage electronic equipment and cause trillions of dollars worth of damage.

Last week the sun released several massive solar flares from a gigantic sunspot that extended more than a hundred thousand kilometres across. Solar flares are the most violent explosions in the solar system, each releasing as much energy as a hundred million hydrogen bombs. The flares released last week extended tens of thousands of kilometres into space and sent magnetic energy, light, ultraviolet and X-rays into space, according to the Guardian.

The sunspot generated its brightest solar flare on Tuesday, ejecting billions of tons of material towards the Earth at a speed of 900 kilometres/second. The solar activity disrupted radio and satellite communications around the world, but this was mostly confined to the northern latitudes.

"Actually it turned out that we were well protected this time. The magnetic fields were aligned parallel so not much happened," said the

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European Space Agency's Juha-Pekka Luntama. "In another case things might have been different."

Contemporary society is increasingly vulnerable to space weather because of the dependence on satellite systems for synchronizing computers, airline navigation, telecommunications networks and other electronic devices.

A potent solar storm could disrupt these technologies, scorch satellites, crash stock markets and cause power outages that last weeks or months, experts said Saturday at the American Association for the Advancement of Science's annual meeting, reports AFP.

"Space weather has to be taken seriously. We've had a relatively quiet period of space weather and we expect that quiet period to end," said Professor Sir John Beddington, the UK government's chief scientific adviser.

The situation will only become more dire because the solar cycle is heading into a period of more intense activity in the coming 11 years. Indeed, the sun's activity rises and falls over an 11 year cycle and is expected to reach its peak in 2013.

"This is not a matter of if, it is simply a matter of when and how big," said National Oceanic and Atmospheric Administration administrator Jane Lubchenco. "The last time we had a maximum in the solar cycle, about 10 years ago, the world was a very different place. Cell phones are now ubiquitous; they were certainly around (before) but we didn't rely on them for so many different things," she said.

"Many things that we take for granted today are so much more prone to the process of space weather than was the case in the last solar maximum," she said.

Beddington also noted that the growth in the use of complex electronic machinery over the past decade has made society far more susceptible to catastrophic disruption than a decade ago when the last solar activity cycle reached its peak.

"At the same time, over that period the potential vulnerability of our systems has increased dramatically, whether it is the smart grid in our electricity system or the ubiquitous use of GPS systems," he said. The root of the world's vulnerability in the modern age is global positioning systems that provide navigational information but also serve as time synchronizers for computer networks and electronic equipment.

"GPS helped and created a new dependency," said Lechner, noting that the technology's influence extends to aerospace and defence, digital broadcast, financial services and government agencies.

In Europe alone, there are 200 separate telecommunication operators, and "nothing is standardized," Lechner said. "We are far from understanding all the implications here."

The experts said that at the moment there is not much that can be done to predict such a storm, much less shield the world's electrical grid by doing anything other shutting off power to some of the vulnerable areas until the danger passes.

"Actually we cannot tell if there is going to be a big storm six months from now but we can tell when conditions are ripe for a storm to take place," said Luntama.

World governments are hurrying to work on strategies for cooperation

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Despatch (8 Maart 2011): ISWN -
Dit is nou 7h51 nm ek het hier n
weerlig afgeneem na v...
<http://bit.ly/eG77qs> 10 minutes ago

RTSO - Storm in the PE area
moved in over the sea. Smaller
storms still active north of PE. -
SAWDIS 26 minutes ago

Wind 2.4 km/h. Barometer 991.0
mb, Temperature 20.8 °C. Rain
today 0.0 mm. Humidity 36%
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Beware of lightning.... lightning
kills - SAWDIS 37 minutes ago

So far reports indicate that the
storm in PE seems to be more a
electrical storm with not much
rain. - SAWDIS 37 minutes ago

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minutes ago

SA National Weather Warning: 8
March 2011 16h00 SAST:
NameWarning (Click for detail)
Eastern Cape No alertsFr...
<http://bit.ly/gWMT6c> 43 minutes ago

RTSO - Very loud thunder and
lightening in PE for the last 20
minutes. Not as much rain. Seems
to be dying down. Obs. edeni's 43

and information sharing ahead of the next anticipated storm.

A panel of NASA-assembled scientists issued a report in 2009 that said a powerful solar flare could overwhelm high-voltage transformers with electrical currents and short-circuit energy grids.

Such a catastrophic event could cost the United States alone up to two trillion dollars in repairs in the first year - and it could take up to 10 years to fully recover, the report said.

In addition, high-energy charged particles hitting the Earth have the ability to induce dangerous electric currents in power lines and oil pipelines, according to Thomas Bogdan, director of the Space Weather Prediction Centre in Boulder, Colorado.

He said a 14-year-old early-warning satellite is the only way of directly detecting the potential magnitude of the danger these particles pose to Earth. "Any storm coming from the Sun has to pass over that spacecraft before it hits Earth. If it takes 20 hours to go from the Sun to Earth, it's going to take about 20 minutes to go from that spacecraft to Earth. So our last warning is a 20-minute warning, which will tell us how big, how strong, how nasty that storm might be."

A solar flare in 1989 provoked geomagnetic storms that disrupted electric power transmission and caused blackouts across the Canadian province of Quebec, the US space agency said. As a result, six million people were left without power.


However, space storms are not a new phenomenon - for instance, British astronomer Richard Carrington recorded a major solar flare in 1859.

Other solar geomagnetic storms have been observed in recent decades. One huge solar flare in 1972 cut off long-distance telephone communication in the midwestern US state of Illinois, NASA said.

Meanwhile, Bao Xingming, solar physicist with the National Astronomical Observatories of the Chinese Academy of Sciences told the Xinhua news agency that the world must prepare for more intense space weather.

"More such eruptions, even more intense - either from the same solar hotspot or from others - are expected in the coming year or two," he said.

- www.defenceweb.co.za

Posted by SAWDIS at **2/24/2011 07:24:00 AM** 

Labels: [solar news](#), [Space Weather](#)

[minutes ago](#)

Can we get a real update from the Port Elizabeth area about the current storm? SMS info to: 076 251 3482 - SAWDIS [about an hour ago](#)

Real Time Storm Observation: Port Elizabeth (8 March 2011 18h41 SAST): Jeni writes: Good evening. The wind is ... <http://bit.ly/hpC1Hm> [about an hour ago](#)

RTSO - The possibility of hail in and around the Port Elizabeth area cannot be ruled out. Take precautionary action. - SAWDIS [about an hour ago](#)

RTSO - Intense storm currently approaching the Uitenhage and Port Elizabeth areas. This storm has damaging potential. - SAWDIS [about an hour ago](#)

BEWARE: Intense lightning in this area. - SAWDIS [about an hour ago](#)

Intense tunderstorm currently active over the Groot Winterhoekberge just North West of Uitenhage and Port Elizabeth. - SAWDIS [about an hour ago](#)

Space Shuttle Discovery on it's way home and due to land on Wednesday.: Image: NASA (Click on image for larger... <http://bit.ly/fQuDdh> [about 2 hours ago](#)

Dit is nou 18h05 wolke in die noorde van Despatch.TEMP binne huis 31 grade. WN J.PRETORIUS [about 3 hours ago](#)

RTWO - 4mm rain measured last night in Heiderand, Mossel Bay. Most welcome rain! - SAWDIS [about 3 hours ago](#)

Earthquake volunteers at risk: Study: Image: Rescue volunteers in earthquake disaster zones like Christchurch ar... <http://bit.ly/edHXny> [about 3 hours ago](#)

Beware lightning always accompany a thunderstorm. Seek indoor shelter. - SAWDIS [about 5 hours ago](#)

RTSO - Isolated thunderstorms currently active and building in the Karoo, E/Cape, Kwazulu Natal and Northern Cape. - SAWDIS [about 5 hours ago](#)

Severe Weather Event: Israel: Image: Google (Click on image for larger view.) Heavy precipitation, thunderstorms... <http://bit.ly/fghc6j> [about 5 hours ago](#)

Wind 12.7 km/h. Barometer 987.0 mb, Temperature 33.5 °C. Rain today 0.0 mm. Humidity 7% <http://bit.ly/ea0g5m> [about 5 hours ago](#)

SpaceweatherSA: M-class Xray flare in progress. Fading expected. Careful outside. [about 5 hours ago](#)

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