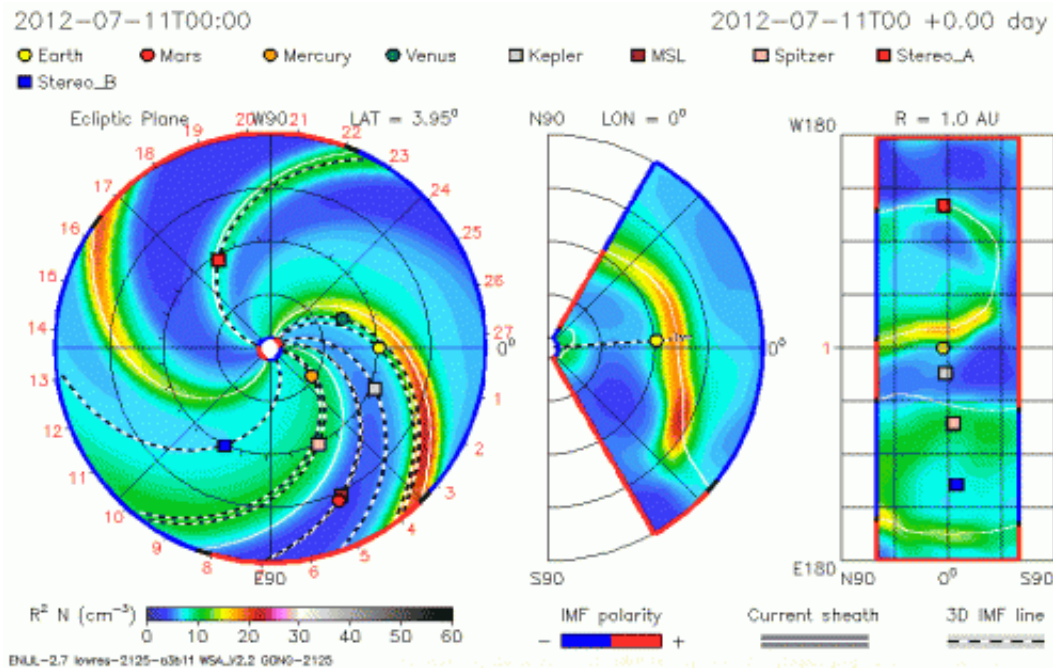


A taste of solar maximum

July 23 2012, By Dr. Tony Phillips



An experimental NASA computer model of the incoming CME predicted its arrival at Earth on July 14th. Credit: Goddard Space Weather Lab. animation

Forecasters say Solar Max is due in the year 2013. When it arrives, the peak of 11-year sunspot cycle will bring more solar flares, more coronal mass ejections, more geomagnetic storms and more auroras than we have experienced in quite some time.

On the weekend of July 14, 2012, sky watchers around the world got a taste of things to come.

It was mid-Saturday in North America when a coronal mass ejection or "CME" crashed into Earth's magnetic field and triggered the most sustained display of auroras in years. For more than 36 hours, magnetic storms circled Earth's poles. Northern Lights spilled across the Canadian border into the United States as far south as California, Colorado, Kansas, and Arkansas. In the southern hemisphere, skies turned red over Tasmania and New Zealand, while the aurora australis pirouetted around the South Pole.

The source of the CME was giant sunspot AR1520, a seething nest of tangled magnetism more than 15 times wider than Earth itself. On July 12th, the sunspot's magnetic field erupted, producing an X-class solar flare and hurling a billion tons of electrified plasma toward our planet.

NASA's twin STEREO probes and the European Space Agency's Solar and Heliospheric Observatory monitored the CME as it billowed away from the sun. Using those data, analysts at NOAA and NASA successfully predicted the cloud's arrival time. It would take almost two full days for the CME to cross the 93 million mile void between Earth and [sun](#).

The CME's impact sharply compressed Earth's magnetosphere, briefly exposing geosynchronous satellites to solar wind plasma. The shaking of Earth's magnetic field caused compass needles to swing--just a little--and prompted electrical currents to flow through the soil at high latitudes. Fortunately, the strike did no harm; satellites survived and power grids stayed online.

Next came the light show. As the CME's wake washed across Earth, the polar regions of our planet lit up like a Christmas tree. Red, green, blue and purple auroras capped both ends of the planet, glowing, dancing, and ultimately spreading to places where auroras are seldom seen.

In Arkansas, for instance, "there was a faint glow off and on for most of the night," reports Brad Emfinger from a little town called Ozark.

"Around 3am there was an outburst of red and purple plainly [visible](#) to the naked eye."

In Pawnee Grasslands, Colorado, photographer Robert Arn [saw the Northern Lights](#) for the first time ever: "As soon as I stepped out of the car, the sky looked like it was on fire. Then the Moon, Venus and Jupiter rose together in the east. To see the conjunction and the auroras side-by-side was incredible!"

Meanwhile at the other end of the planet, "auroras were going crazy over the South Pole," [reports](#) Robert Schwarz at the Amundsen-Scott south pole research station "We enjoyed the show under crystal clear skies with an air temperature of minus 105 degrees F."

In Ashland, Wisconsin, on the other hand, John Welling [watched the show](#) in his shirt sleeves: "Tonight was absolutely the best with a comfortable temperature of +78 degrees F and Northern Lights dancing overhead. The X-flare definitely lived up to the hype."

From one end of the planet to the other, spanning more than 90 degrees of combined north-south latitude, 183 degrees of temperature, and 360 degrees of longitude, this was truly a global space weather event.

And it was just a taste of things to come.

Provided by Science@NASA

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