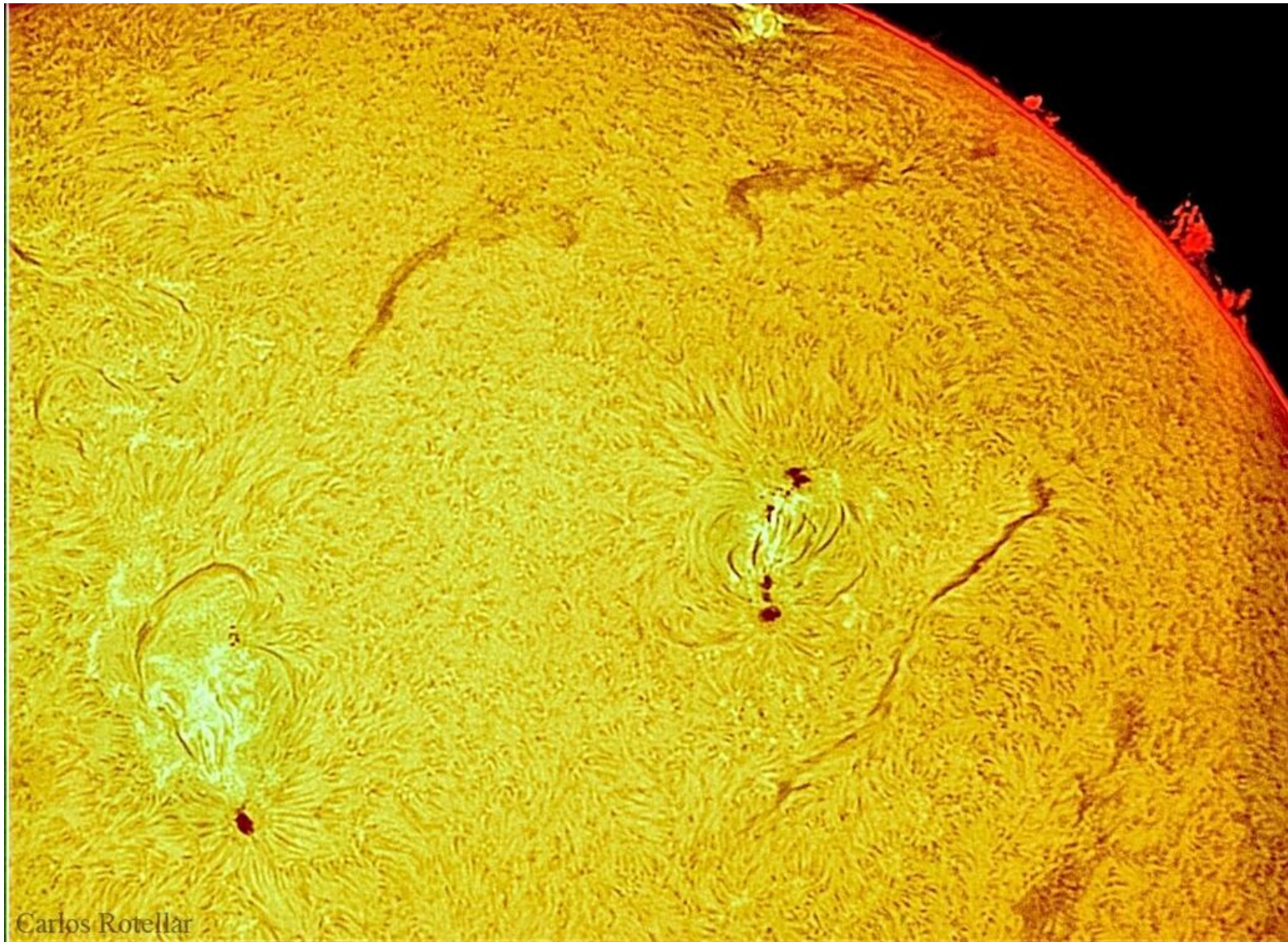


# Solar Storm

Sep 14, 2023



The sun's dark spots, the solar filaments as dark lines resembling spaghetti, and the solar prominence at the edge of the sun, in red.

Carlos Rotellar

September 1, 1859. Redhill, England. Richard Carrington.

“While engaged in the forenoon of Thursday, Sept. 1, in taking my customary observation of the forms and positions of the solar spots, an appearance was witnessed which I believe to be exceedingly rare.....When within the area of the great north group, two patches of intensely bright and white light broke out . ...”

This is known as the Carrington event, which is the stronger solar storm ever recorded. On Sept. 2, 1859 when the solar storm reached the earth, telegraph communications failed around the world. Telegraph machines caught fire and operators received shocks. Aurora Borealis (northern lights) was seen as far south as Cuba and Aurora Australis (southern lights) as north as Santiago of Chile.

The sun's activity cycles every 11 years from a low to high activity.

Currently the sun is on its 25th eleven year cycle and its activity has been projected to peak in 2024, a year earlier than estimated.

In this picture we can see the sun's dark spots, the solar filaments as dark lines resembling spaghettis, and the solar prominence at the edge of the sun, in red. All these elements increase as the activity of the sun increases. Eventually we see solar flares and coronal mass ejections (CME) that can cause geomagnetic storms, which can impact our planet significantly.

The technology of the 19th century was much less sensitive to the electromagnetic disturbances caused by a solar storm. However, today's world depends deeply on sun-sensitive technologies including the power grid, GPS, satellite communications, computers and internet.

On Aug. 4, 1972, there was a solar flare that disrupted long-distance telephone communications across Illinois.

On March 13, 1989, another solar flare affected the electrical power transmission in Québec, blacking out most of the region for more than nine hours and causing power surges that melted transformers in New Jersey.

The Bastille Day solar storm on July 14, 2000, was a major solar eruption causing some satellites to short-circuit leading to radio blackouts.

The Great Halloween solar storms of 2003 intermittently disrupted satellite, TV and radio services. Aircraft controllers had to reroute airplanes. It caused power outages in Sweden for over an hour. The Solar and Heliospheric Observatory (SOHO), which monitors solar activity, failed.

In Dec. 2006 a solar storm disrupted satellite to ground communications and GPS for about 10 minutes.

On Sept. 6, 2017, a geomagnetic storm caused blackout of high-frequency radio communications used by aviation, maritime, ham radio and other emergency bands for up to eight hours.

In Feb. 2022, another geomagnetic storm affected 40 Starlink satellites causing them to burn in the atmosphere.

In April of this year, Aurora Borealis was seen in Kentucky after a coronal mass ejection erupted from the sun. Plasma from that eruption traveled at about 1.7 million miles per hour toward Earth.

On July 2012 there was a massive coronal mass ejection at least as powerful as the one responsible for the 1859 Carrington event. The only difference is that the earth was not at the right place at the right time, and the solar storm missed our planet by a week. Experts say that if it had hit the earth, we would still be picking up the pieces.

If a Carrington type of event were to happen today, are we prepared to deal with its consequences and have we done anything to protect us against it?