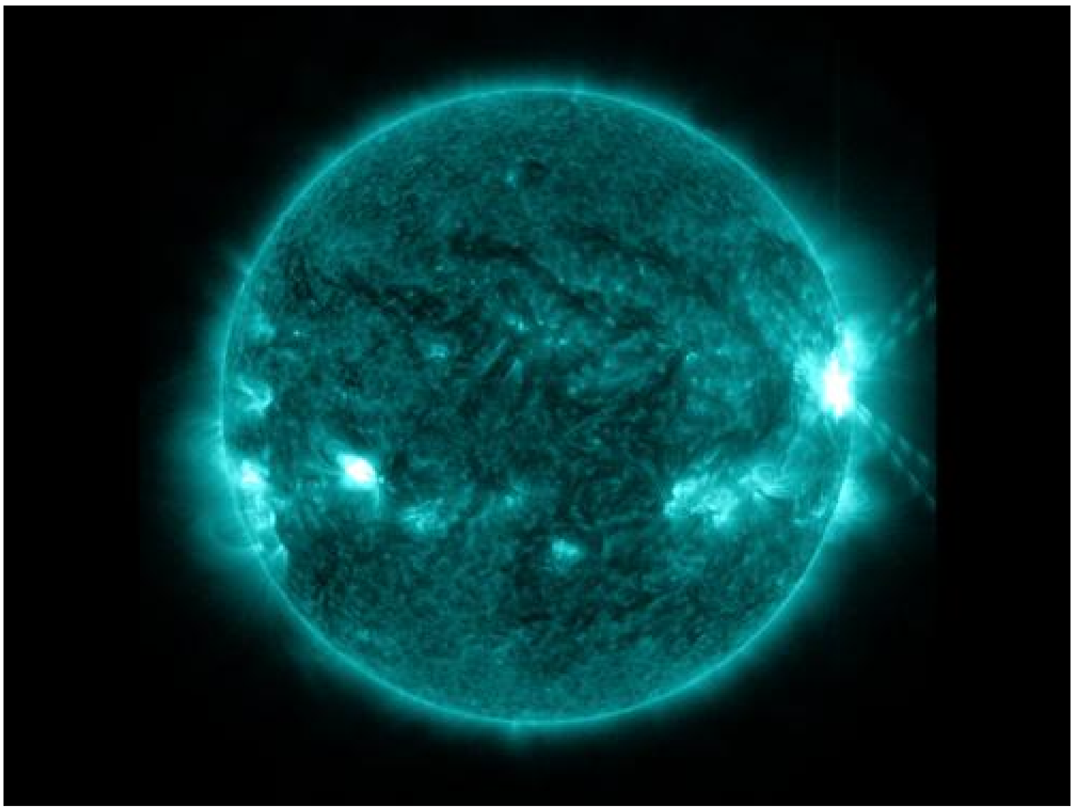
Sun continues to emit solar flares

October 28 2013



An X1.0-class flare exploded off the right side of the sun, peaking at 10:03 p.m. EDT on Oct. 27, 2013. This image was captured by NASA's Solar Dynamics Observatory in the 131 Angstrom wavelength, which is particularly good for showing solar flares and is typically colorized in teal. Credit: NASA/SDO

After emitting its first significant solar flares since June 2013 earlier in the week, the sun continued to produce mid-level and significant solar flares on Oct. 27 and Oct. 28, 2013.

Solar flares are powerful bursts of radiation. Harmful radiation from a flare cannot pass through Earth's atmosphere to physically affect humans on the ground, however—when intense enough—they can disturb the atmosphere in the layer where GPS and communications signals travel.

One of the larger flares was classified as an X1.0 flare, which peaked at 10:03 p.m. EDT on Oct. 27. "X-class" denotes the most intense flares, while the number provides more information about its strength. An X2 is twice as intense as an X1, an X3 is three times as intense, etc. In the past, X-class flares of this intensity have caused degradation or blackouts of radio communications for about an hour.

Another large flare was classified as an M5.1 flare, which peaked at 12:41 a.m. EDT on Oct. 28. Between Oct. 23, and the morning of Oct 28, there were three X-class flares and more than 15 additional M-class flares.

Increased numbers of flares are quite common at the moment, since the sun is headed toward solar maximum conditions as part of its normal 11-year activity cycle. Humans have tracked this solar cycle continuously since it was discovered in 1843, and it is normal for there to be many flares a day during the sun's peak activity.

The recent solar flare activity has also been accompanied by several coronal mass ejections or CMEs, another solar phenomenon that can send billions of tons of particles into space that can reach Earth one to three days later. These particles cannot travel through the atmosphere to harm humans on Earth, but they can affect electronic systems in satellites and on the ground.

Experimental NASA research models, based on observations from NASA's Solar Terrestrial Relations Observatory and ESA/NASA's Solar and Heliospheric Observatory show that five CMEs, traveling at different speeds, may join up into a single moving cloud of particles.

CMEs can cause a space weather phenomenon called a geomagnetic storm, which occurs when they funnel energy into Earth's magnetic envelope, the magnetosphere, for an extended period of time. The CME's magnetic fields peel back the outermost layers of Earth's fields changing their very shape. Magnetic storms can degrade communication signals and cause unexpected electrical surges in power grids. They also can cause aurora. Storms are rare during solar minimum, but as the sun nears solar maximum, large storms occur several times per year.

In the past, geomagnetic storms caused by CMEs of this size, speed and direction have usually been mild.

NASA and NOAA – as well as the US Air Force Weather Agency (AFWA) and others—keep a constant watch on the sun to monitor for space weather effects such as geomagnetic storms. With advance notification many satellites, spacecraft and technologies can be protected from the worst effects.

More information: To see how this event may impact Earth, please visit NOAA's Space Weather Prediction Center at http://spaceweather.gov, the U.S. government's official source for space weather forecasts, alerts, watches and warnings.

Provided by NASA's Goddard Space Flight Center

Citation: Sun continues to emit solar flares (2013, October 28) retrieved 31 January 2023 from https://phys.org/news/2013-10-sun-emit-solar-flares.html