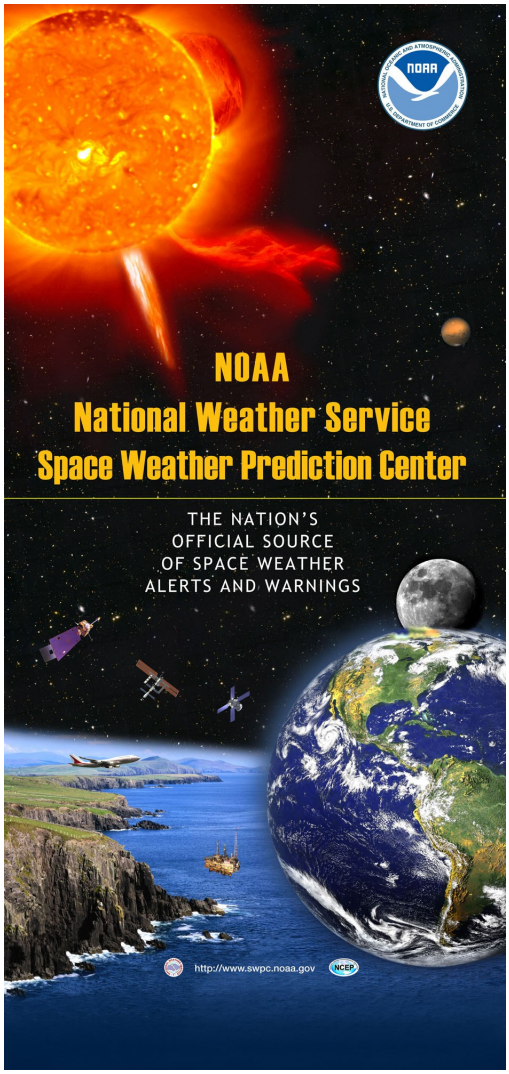
NOAA's Space Weather Prediction Center

What is the Space Weather Prediction Center (SWPC)?

NOAA's Space Weather Prediction Center, located in Boulder, Colorado, operates 24x7 to continually monitor and forecast space weather. SWPC works closely with its Department of Defense counterpart, the U.S. Air Force 557th Weather Wing, to ensure forecast coordination and product compatibility between civil and military sectors. It is the Nation's official civilian source for space weather watches, warnings, alerts, and forecasts.



What is space weather?

Space weather refers to variations in the space environment between the sun and Earth (and throughout the solar system) that can affect technologies in space and on Earth. In addition to the heat and light we are familiar with, the sun produces coronal mass ejections, flares, particle events, and high speed solar wind streams. When these phenomena are aimed at Earth, we get space weather. Producing accurate space weather forecasts depends on understanding these phenomena and how they interact with the near-Earth environment.

Why does space weather matter?

Space weather is a global issue. Unlike terrestrial weather events, like a hurricane, space weather has the potential to impact not only the United States, but wider geographic regions. These complex events can have significant economic consequences and have the potential to negatively affect numerous sectors, including: communications, satellite and airline operations, human space flight, navigation and surveying systems, as well as the electric power grid.

To receive a wide range of watches, warnings, alerts, and forecasts within moments of being issued, sign up for NOAA's Space Weather Prediction Center
Product Subscription Service

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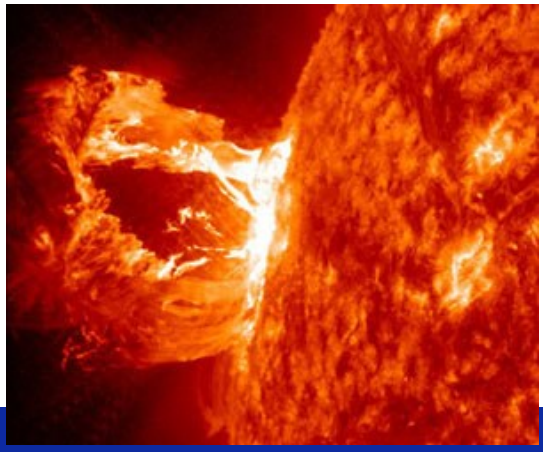
How is space weather predicted?

SWPC forecasters use instruments on the ground and in space to watch the sun for threatening features. Forecasters estimate when storms will begin, how long they will last, and how strong the impacts will be using computer models and other tools. They issue watches, warnings and alerts based on their forecast. These products allow decision makers to prepare for, and respond to, the potentially devastating impacts of space weather.



What is the Aurora Borealis?

Aurora Borealis (Northern Lights) are one of the most well known effects of space weather events. They are caused when electrically charged particles in Earth's magnetic field enter Earth's atmosphere and collide with gases such as oxygen and nitrogen. The result is an incredible light show seen in the vicinity of the North or South pole. During significant space weather events, the Aurora can become very intense and might be visible in lower latitudes that rarely see these events.

Who uses space weather information?

SWPC serves a large customer base that covers a broad spectrum from the private sector to other government agencies, industries, and activities impacted by space weather include aviation, satellite operations, electric power grids, radio communications, navigation (including GPS users), and human space flight. A growing number of customers are realizing societal and economic benefits from space weather products and services. This trend is expected to continue as the world becomes increasingly dependent on space-based systems and other technologies vulnerable to hazardous space weather.

Learn more about space weather by visiting NOAA's Space Weather Prediction Center

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