

# Studying Space Weather to Help our Communities

Space Weather describes the variations in the space environment between the sun and Earth. In particular Space Weather describes the phenomena that impact systems and technologies in orbit and on Earth. Space weather can occur anywhere from the surface of the sun to the surface of Earth.

## *Our Sun*

In order to protect people and systems that might be at risk from space weather effects, we need to understand the causes. The sun is the main source of space weather.



## *Solar Flares*



Eruptions of plasma and magnetic field structures from the sun's atmosphere, called coronal mass ejections (CMEs), and sudden bursts of radiation, called solar flares, can cause space weather effects at or near Earth. Luckily, Earth's magnetosphere, ionosphere, and atmosphere do a great job of protecting us from the most hazardous effects.

## *Geomagnetic Storm*

If a CME arrives at Earth, it can produce a geomagnetic storm, which, in turn, can cause anomalies and disruptions to the modern conveniences we have come to rely on. These include:

- Water and wastewater distribution systems
- Perishable foods and medications
- Heating/air conditioning and electrical lighting systems
- Computer systems, telephone systems, and communications systems (including disruptions in airline flights, satellite networks and GPS services)
- Public transportation systems
- Fuel distribution systems and fuel pipelines.



## *Protecting Our Communities*



CGS will contribute to the advancement of the Nation's space weather preparedness and resilience by building capabilities to predict regional and global space weather, thus fulfilling priorities of the Space Weather Action Plan

Sources:

<https://www.weather.gov/safety/space>

<https://cgs.jhuapl.edu/>