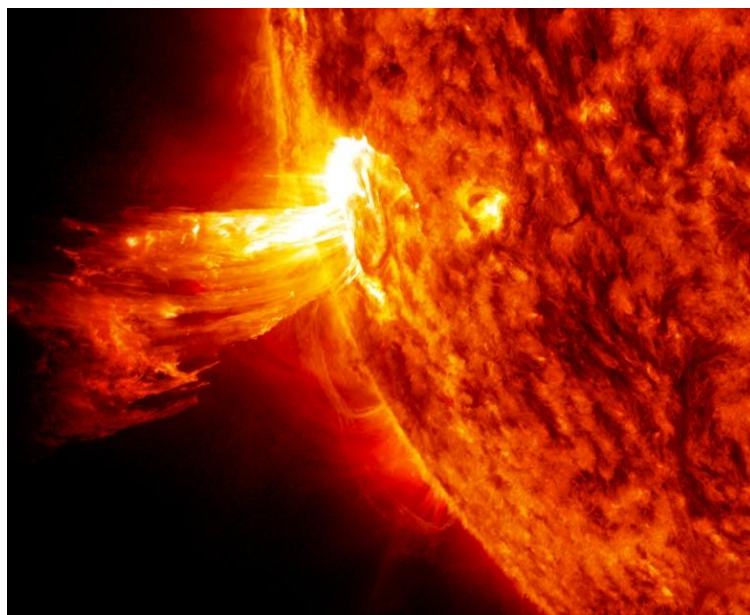
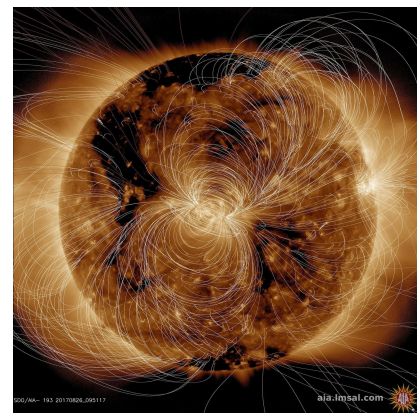


It starts on the sun. The sun is made of **plasma and gas**, mostly in the form of hydrogen. In the core of the sun hydrogen is compressed, creating helium in a process of nuclear fusion.

Just like the earth, **the sun rotates**. But unlike the earth, the sun rotates at different speeds at different parts of the sphere. Around the equator of the sun there is one full rotation every 25 days. Near the poles of the sun there is one full rotation every 35 days. That's a big difference!

Also similar to earth, the sun has a **magnetic field**. However, because the rotation of the sun is so different from the equator to the poles, the magnetic field lines become stretched and twisted.

This helps lead to **sunspot** formation. Sunspots are areas where the magnetic field is especially strong.



Where the magnetic field becomes stressed, it can reconnect, leading to an explosion of light and radiation. This is a **solar flare**. The light comes to earth at the speed of light, in 8 minutes. Any associated energetic particles can arrive in as quick as 20 minutes.

Coronal Mass Ejections, CMEs, also result from the reconnection of stressed magnetic field lines. A CME is a sudden release of plasma. It often takes place in association with a solar flare, but can happen without a flare. CMEs take 18 hours to 4 days to arrive at earth.

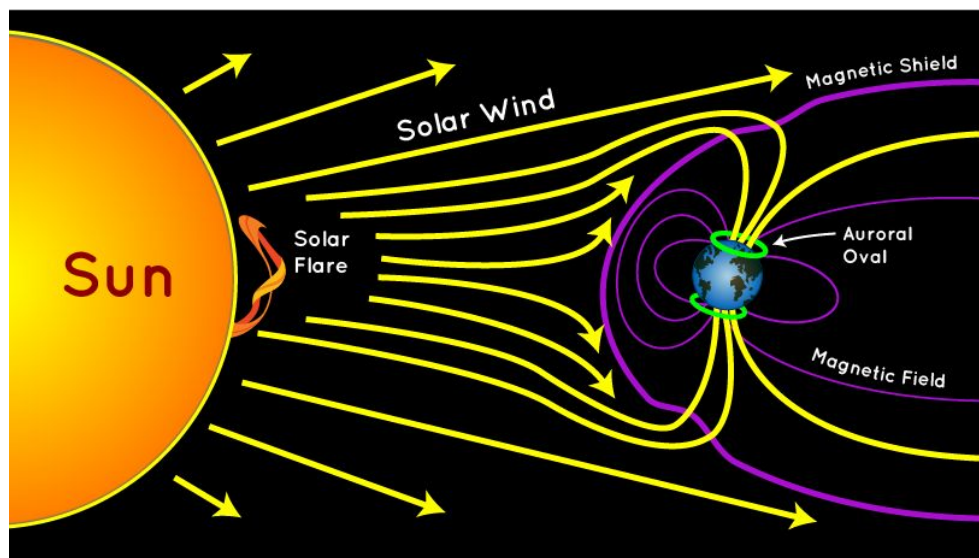


Learn more about: Forecasting Space Weather



NOAA in Boulder, Colorado is home to the **Space Weather Prediction Center**. This office is part of the National Weather Service. Forecasters work 24/7, every day of the year. They forecast space weather for all of the United States.

Light, energy, plasma, and solar wind all travel out from the sun and can move through earth, **interacting with earth's atmosphere and magnetic field**. This is what forecasters are looking for.



Space weather can impact **radio communication**, damage electronics on **satellites**, create extra electric current burden on the **power grid**, and expose astronauts to **radiation**. Forecasters warn people in all these fields so they can protect lives, the electric grid and communication.



NOAA Boulder

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