

National Aeronautics and
Space Administration



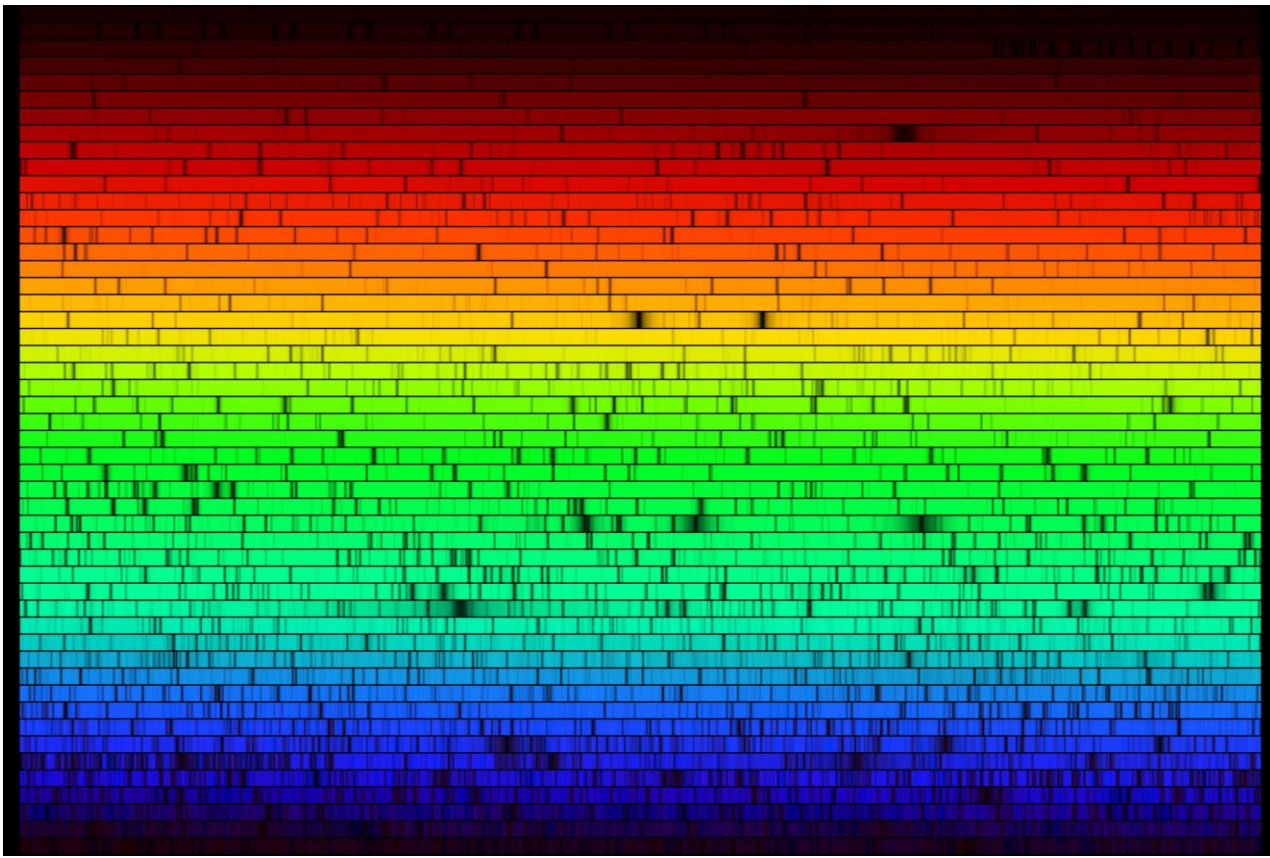
NASA Outreach Space Weather

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Memphis, TN
11/1/2019

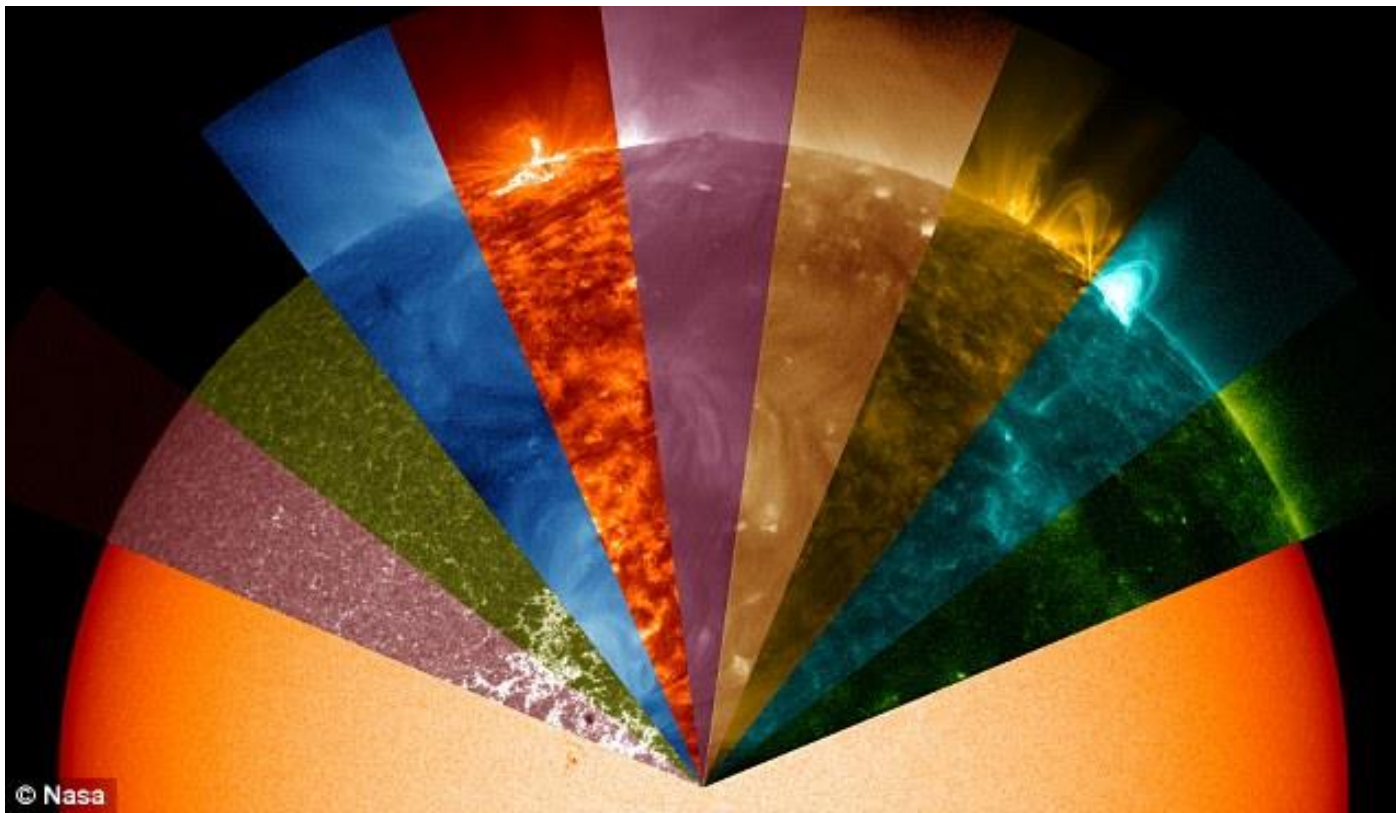


**EXPLORE
MARSHALL**



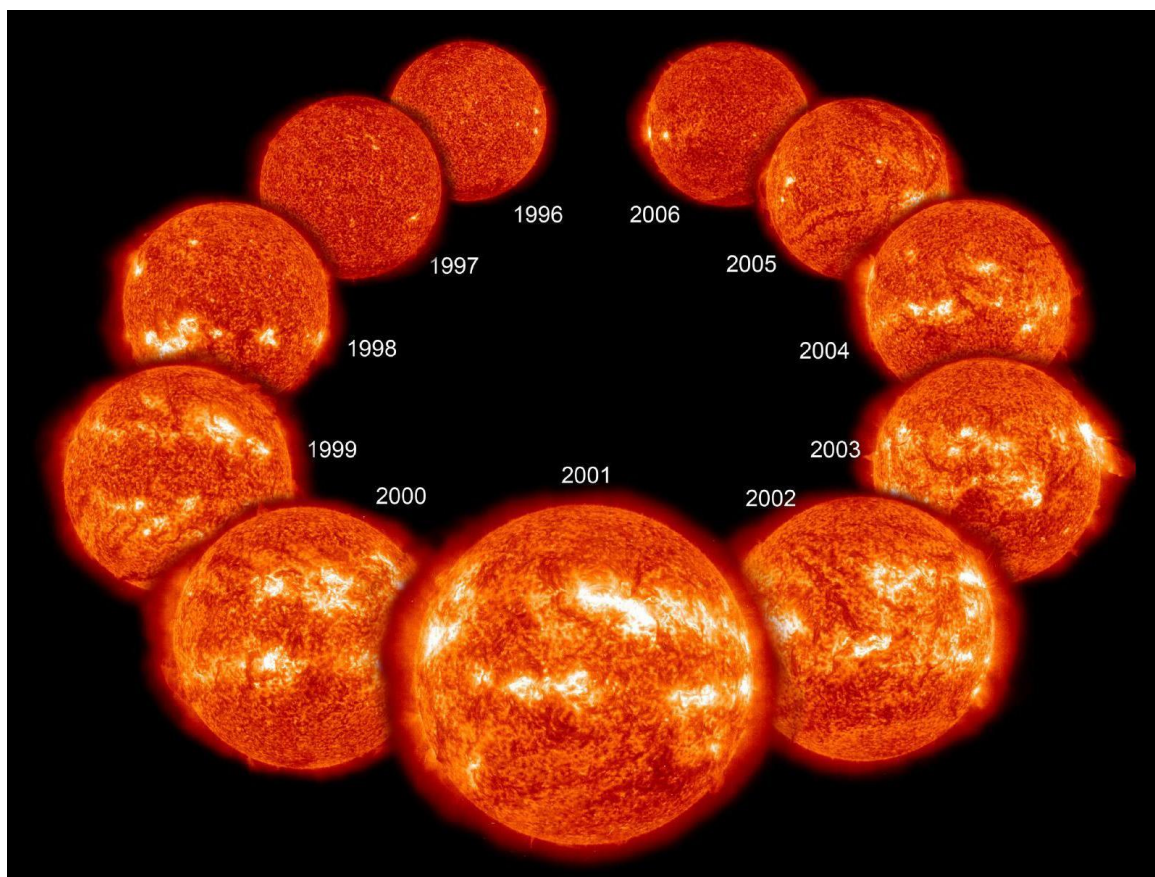
Sunlight that we can see





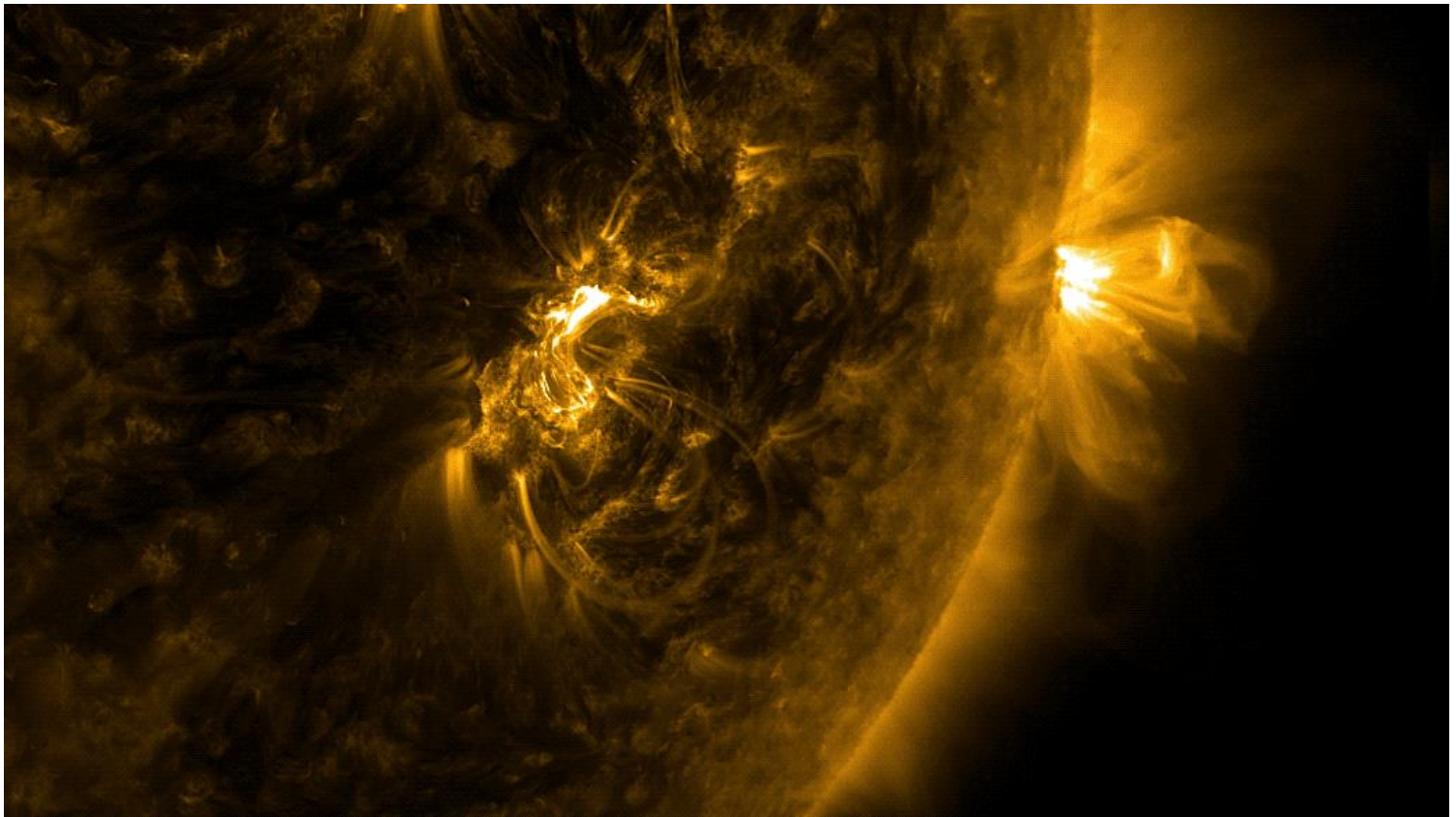
Sunlight in ultraviolet *colors*





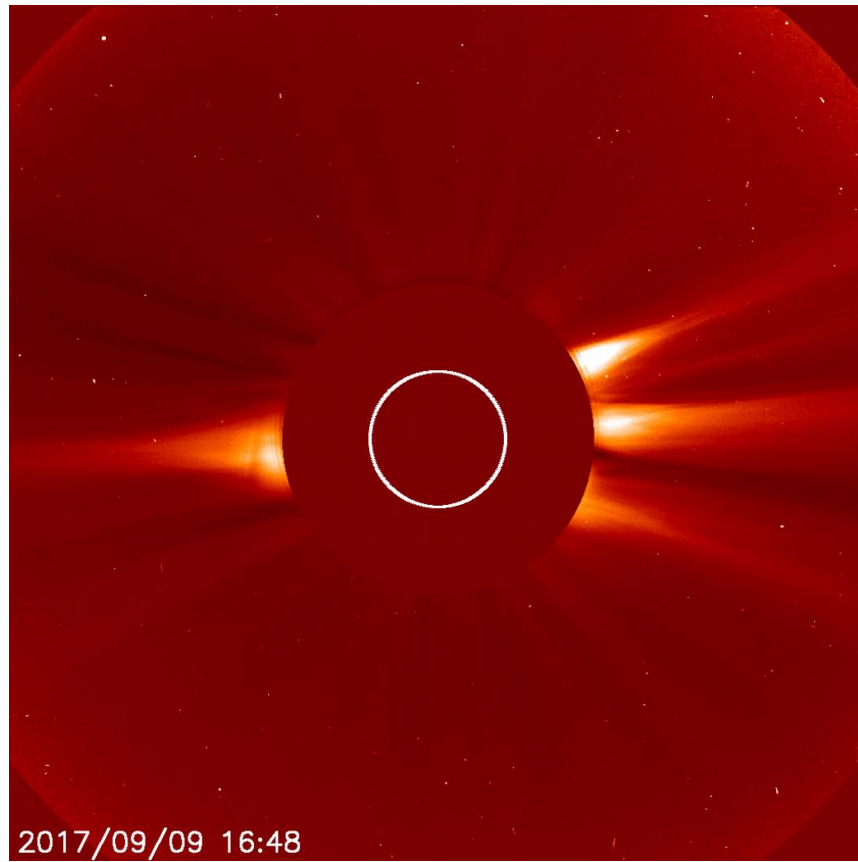
Solar activity and the solar cycle





Solar flare on 9/6/2017





2017/09/09 16:48

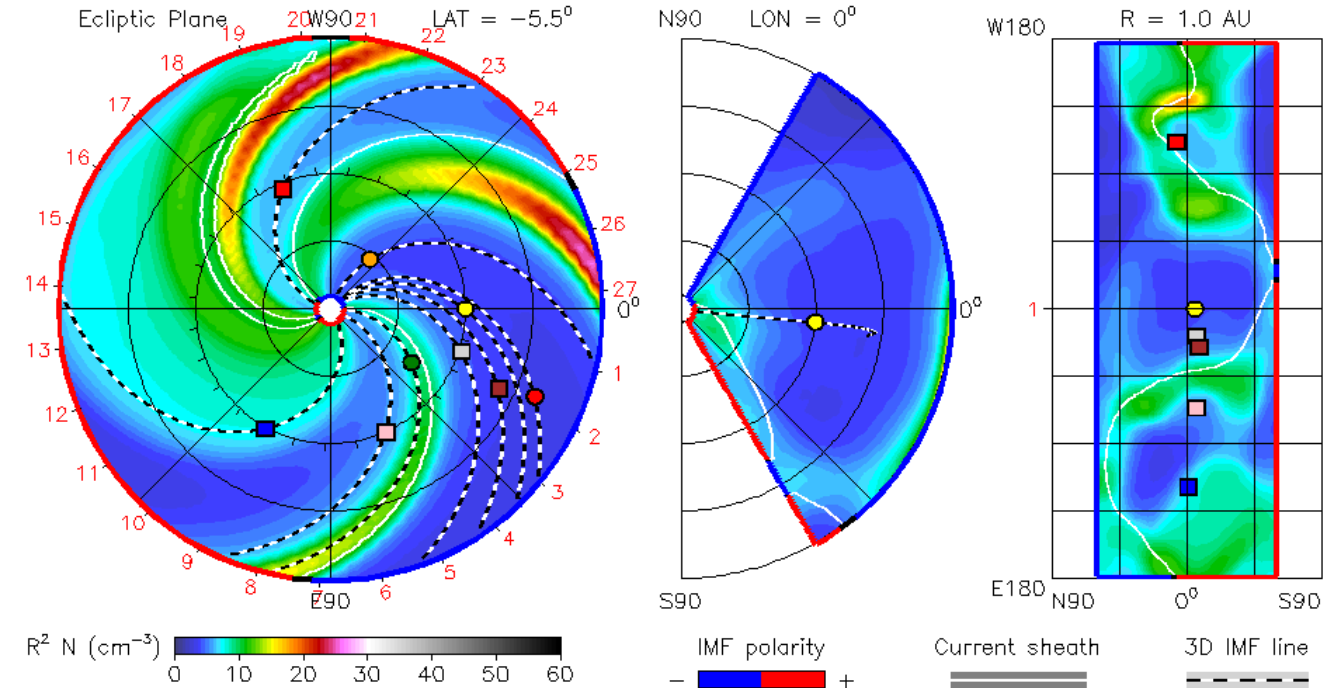
Coronal mass ejection on 9/9/2017



2012-04-15T00:00

2012-04-15T00 +0.00 day

- Earth
- Mars
- Mercury
- Venus
- Kepler
- MSL
- Spitzer
- Stereo_A
- Stereo_B



ENUL-2.7 lowres-2122-a3b1f WSA_V2.2 GONG-2122

com/c/wadri-cid/256x30x90x12122-a3b1f6-mep1umr1ed-1.g33q5d2.gong-2012-04-15T00 2012-04-16

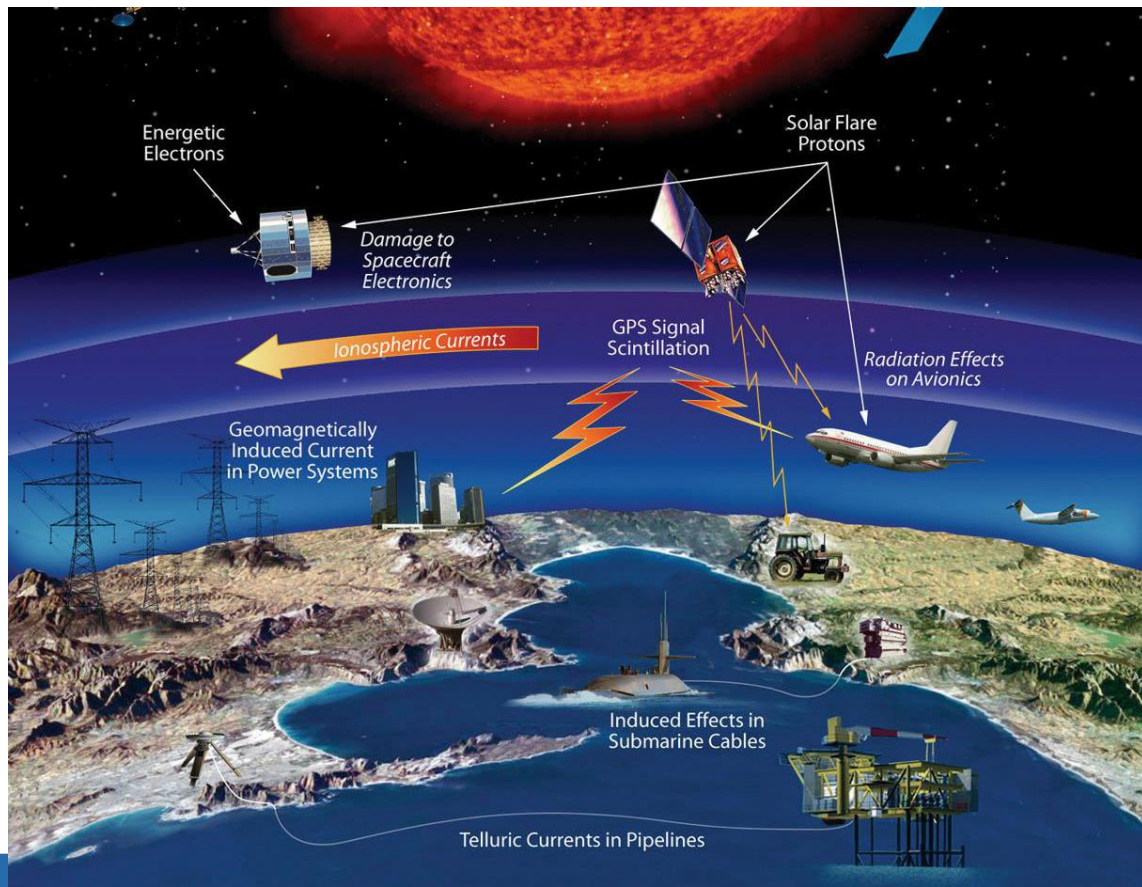


CME during last solar maximum



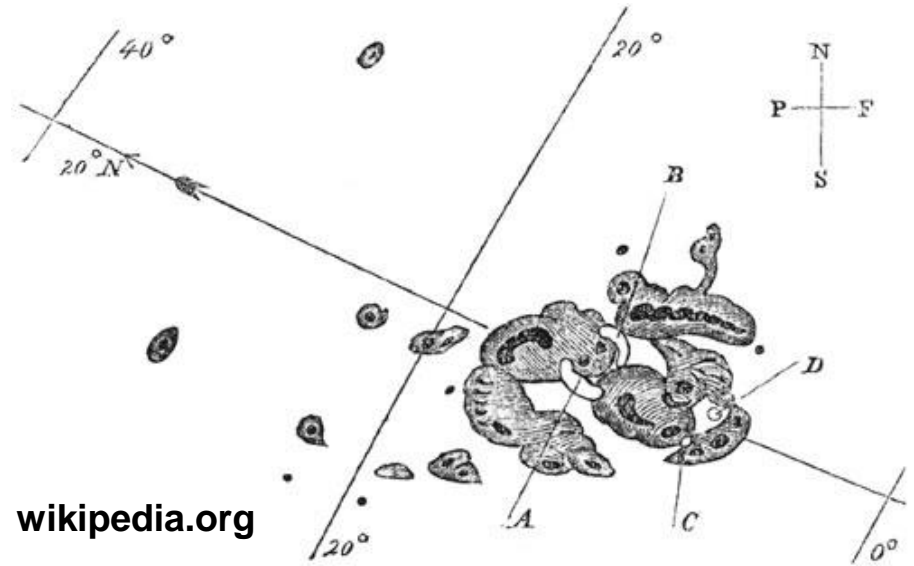
Northern lights from ISS on 9/15/2017



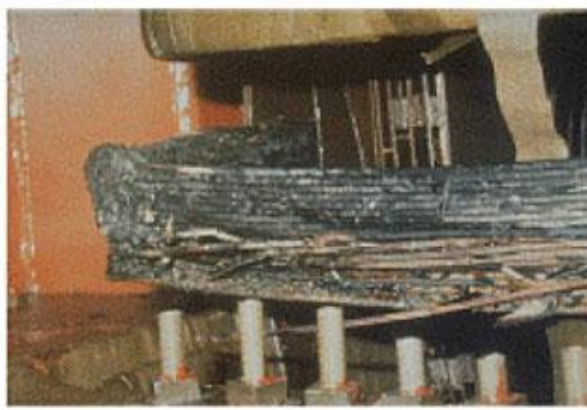


Effects of space weather

- One of the largest geomagnetic storms on record
- Auroras seen as south as Mexico and Colombia
- Telegraph systems failed in Europe and North America



Carrington Event 1859



Permanent damage to the Salem New Jersey Nuclear Plant GSU Transformer caused by the March 13, 1989 geomagnetic storm. Photos: PSE&G



Protecting astronauts from space weather



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A composite image of space exploration. In the foreground, the American flag waves on a flagpole. Below it, the Earth is visible, showing continents and oceans. In the background, the Moon is on the left, and Mars is at the top. The scene is set against a dark blue space background filled with stars.

Thank you!

EXPLORE
MARSHALL

MAKING HUMAN SPACE EXPLORATION POSSIBLE