Solar Storm

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Why in News?

India's Aditya-L1, along with 6 U.S. satellites has revealed why the May 2024 solar storm also known as Gannon's storm behaved so unusually.

> *The 6 U.S. satellites are NASA's Wind, ACE, THEMIS-C, STEREO-A, MMS, and NASA-NOAA joint mission DSCOVR.*

- **Solar Storm –** It is a sudden explosion of particles, energy, magnetic fields, and material blasted into the solar system by the Sun.
- **Causes –** The Sun's magnetic fields get twisted, like messy hair.
- Because the Sun's equator spins faster than its poles, the fields twist even more.
- When they get too stretched, they snap and reconnect (called ***magnetic reconnection***), releasing huge bursts of energy — this is how solar storms start.
- **Induce any or all the events – solar flare** (bright flash of light), **radiation storm** (flurry of solar particles propelled into space at high speeds) and **coronal mass ejection**.
- **Effects –** Solar storms can shake up Earth's magnetic field, causing geomagnetic storms.
- It may lead to radio blackouts, power cuts, and bright auroras in the sky.
- But they don't directly harm people because Earth's magnetic field and atmosphere protect us.

Quick Fact

Reasons for 2024's unusual solar storm

• **Scientists noticed something unusual** – 2 CMEs (coronal mass ejections) collided in space, squeezing each other so tightly that their magnetic fields snapped and reconnected.
• This process flipped the CME's magnetic field and made the storm's impact much stronger than expected.

Key Discoveries

• The reconnection region inside the CME was enormous — **about 1.3 million km** across (nearly 100 times Earth's size).
• 1st time such a giant magnetic breakup and rejoining was ever seen inside a CME.
• Satellites also noticed particles suddenly speeding up, proving the reconnection happened.

To know about Aditya L1, click here

References

1. The Hindu | Global effort reveals why the 2024 solar storm unusual
2. NASA | Solar Strom