

SOLAR ERUPTIONS

April 23, 2020

Context: A major Coronal Mass Ejection (CME) erupts from the sun.

- Occasionally, the sun erupts giant amounts of particles known as coronal mass ejections.
- A coronal mass ejection (or CME) is a giant cloud of solar plasma drenched with magnetic field lines that is blown away from the Sun often during strong, long-duration solar flares and filament eruptions.
- Recent CME isn't earth-bound, but the ejection is an important forewarning of things to come, and is also a *likely* signal of the beginning of solar cycle 25
- When such an eruption slams into Earth's magnetic field, it generates surges of electrical current.
- Solar scientists do not have reliable ways to predict such an eruption.
- The largest one known to hit Earth was the Carrington event in 1859,
- On July 23, 2012, NASA's Stereo-A spacecraft was hit by a gigantic coronal mass ejection bigger than the Carrington eruption

Other

- **Corona**
 - The Sun's corona is the outermost part of the Sun's atmosphere. The corona is usually hidden by the bright light of the Sun's surface. That makes it difficult to see without using special instruments. However, the corona can be viewed during a total solar eclipse.
- **Sun Cycle**
 - The 11-year sunspot cycles are caused by the sun's rotation in space, according to NASA. As the star

rotates roughly once every 27 days, its material acts like a fluid, so that its equator rotates much faster than its poles do.

- That makes the sun's powerful magnetic fields become progressively more "tangled" – and its sunspots and other magnetic activity more violent – until the entire star reverses its magnetic polarity (sort of like electric charge, but in this case, the state is either north or south).
- The sun's change in polarity causes its magnetic activity – and its sunspots – to eventually die down, resulting in a solar minimum. But the sun's rotating magnetic field slowly gets tangled again, and the sunspot cycle begins anew.
- Two new sunspots have ended a long period of relative quiet on the surface of Sun, heralding the start of a new 11-year cycle of sunspot activity – resulting in sometimes dramatic space weather that could disrupt communications and power grids here on Earth. This indicate the onset of a new sunspot cycle – known as Solar Cycle 25, or SC25