

Solar Magnetic Field

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In News

A complete understanding of the sun's magnetic field – including knowing exactly how it's generated and its structure deep inside the sun – is not yet mapped out, but scientists do know quite a bit. For one thing, **the solar magnetic system is known to drive the approximately-11-year activity cycle on the sun.**

With every eruption, the sun's magnetic field smooths out slightly until it reaches its simplest state. At that point the sun experiences what's known as solar minimum, when solar explosions are least frequent. **From that point, the sun's magnetic field grows more complicated over time until it peaks at solar maximum,** some 11 years after the previous solar maximum.

More About Solar Magnetic Field

- **Electric currents inside the sun generate a magnetic field** that spreads throughout the solar system. The field causes activity at the surface of the sun, surging and ebbing in a regular cycle.
- At solar maximum, the magnetic field has a very complicated shape with lots of small structures throughout – these are the **active regions** we see.
- **At the peak of the cycle, the polarity of the field flips,** during a time of maximum sunspot activity.
- **At solar minimum, the field is weaker and concentrated at the poles.** It's a very smooth structure that doesn't form sunspots.
- The solar magnetic field controls the dynamics and topology of all coronal phenomena.
- **A solar wind composed of charged particles carries the**

magnetic field away from the sun's surface and through the solar system.

- The sun's magnetic influence extends well past the planets and into interstellar space. This region, called the **heliosphere, acts as a magnetic shield against charged particles from deep space** called cosmic rays.

Recent Developments

- In possibly a first, the **Sun's magnetic field recorded over five decades of the 20th century have been digitally mapped**, which will facilitate solar physicists to better understand the Sun's behaviour in future.
- Solar observations recorded between 1915 and 1965 were gathered from **Kodaikanal Solar Observatory (KoSO) run by the Indian Institute of Astrophysics (IIA)**.
- Among one of the oldest solar observatories in the world, KoSO has been providing **continuous and long-term uniform solar observations for over a century** now, many of them taken in the form of photographic images.
- The mapping has **showcased the movement of magnetic fields from lower to higher solar latitudes** during the five decades besides pinning the exact time of the pole reversal and its links between two solar cycles.