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Study: Sun's magnetic field is weakening

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Ahmedabad: It is well known that the Earth's magnetic field reverses once in tens of millennia: the north pole becomes the south and vice versa. But that's not the story of our Sun. The ball of fire that sustains life on the Earth has a curious magnetic story.

The Sun's polarity changes once in 11 years, which marks one solar cycle. But a team of astrophysicists has found that the Sun's southern hemisphere reversed its polarity in mid-2013. And the reversal of the magnetic field in the Sun's northern hemisphere occurred 2.5 years later, after a sustained period of near-zero magnetic field strength.

The research, according to the team, will help monitor and evaluate the influence of solar activities and their implications on the Earth's climate. The astrophysicists' team included experts from Ahmedabad's Physical Research Laboratory (PRL), Japan, and China.

► Continued on P 4

Sun and 'Little Ice Age' on Earth

► Continued from P 1

The team also reported that over the past two decades, the strength of the magnetic field of the Sun's visible outer layer has been declining steadily. The research is in the public domain and was published by the reputable journal called "Astronomy & Astrophysics" in May 2018.

"The polar field strength during Sun's present cycle 24 is comparatively weaker than it was in cycle 23," says the research whose lead author is Prof Janardhan Padmanabhan, the dean of PRL. "Also, the polar field strength in cycle 23 had been weaker than in the cycles 21-22." The research further says: "This sustained weakening of the solar strength is probably also leading to a phase in which sunspots — the seats of solar magnetic fields — will be entirely absent if the declining trend continues."

Such periods of absence of sunspots have previously been

linked to global cooling, triggering 'Little Ice Ages' on the Earth. Apart from Janardhan, other researchers involved in the study were: M Ingale and Diptiranjan Rout of PRL; K Fujiki of the Institute for Space-Earth Environmental Research, Japan; and Susanta Kumar Bisoai of the Key Laboratory of Solar Activity, National Astronomical Observatory, Chinese Academy of Sciences (CAS), Beijing.

The astrophysicists have opined: "Since the magnetic polar field strength in cycle 24 is seen to be weaker than in the earlier cycle 23, we believe that the meridional flow — the flow of material along meridian lines from the equator toward the poles at the Sun's surface and from the poles to the equator below the surface — may also play an important role in the Sun's field reversal process."

Clear signatures of this asymmetry in polar field reversal were also unambiguously detected in the solar wind.