

# Sun's magnetic 'flip' may affect Earth's climate

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In the next three to four months, the Sun's magnetic field is expected to undergo a 180-degree "flip" that will see its magnetic north and south poles reverse positions.

The warning comes from NASA, which has been monitoring solar activity, and the U.S. space agency has cautioned that it could affect storms on Earth and even disrupt satellites.

During this flip, activity on the star's surface intensifies, producing violent solar flares and coronal mass ejections that are precursors to effects that ripple across the Solar System, reaching as far as where the Voyager 1 space probe is now — more than 18 billion km away.

The outer layers of the Sun consist of a soup of charged particles whose constant motion influences the alignment of the Sun's magnetic field. There are two "winds" of such charged particles, one moving east-west and the other, north-south.

These tug at each other to move the magnetic



The bright light of a solar flare on the left side of the Sun and an eruption of solar material shooting through the Sun's atmosphere, called a prominence eruption, are seen in image taken June 20.

— PHOTO: REUTERS

north and south poles of the Sun, making them go a full-circle once every 22 years. This period is called a solar cycle, understood as a reorientation of the solar dynamo which is the source of the Sun's magnetic field.

In the coming months, the magnetic field will flip half a circle, marking the end of 11 years of the 24th such cycle on record. "This is a regular part of the solar cycle," said solar physicist Phil Scherrer at Stanford University.

However, this particular flip has puzzled some scientists because one magnetic pole of the Sun appeared to flip "too early" last year.

In an announcement, scientists at NASA's Marshall Space Flight Centre had noted that there was an imbalance between the north and south poles. The north was found to be in transition well ahead of the south, and scientists didn't know why.

Once the second pole catches up, the next half of the cycle will be under way.

Nevertheless, the event itself is big. As the magnetic field flips, a weak electric field that rises out of the Sun and pervades the Solar System experiences small disturbances. As a moving Earth dips in and out of this field, stormy space weather can be stirred up around our planet, say researchers.

Cosmic rays, which are high-energy particles accelerated to nearly light speed by supernova explosions and other violent events in the galaxy, could also be affected, influencing cloudiness and the climate on Earth.