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News & Comments

Are We Observing the Sun the Wrong Way?

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Sun is behaving strangely lately. We have seen flares and coronal mass ejections almost every day in 2022, some of which were the strongest eruptions our star has ever seen.

Erupting Suns aren't weird by themselves. In roughly 11-year cycles, it goes through periods of high and low activity.

Since September 2020, solar activity has consistently exceeded NASA and NOAA predictions for the current solar cycle. But still, it isn't weird, because solar cycles are unpredictable. It's because we don't fully understand the solar dynamo, which produces sunspots and flares at the surface. The inaccuracy of the prediction is unsurprising; it is one of the outstanding problems in astrophysics, according to solar astrophysicist Michael. There is a possibility that we're basing our predictions on the wrong metric, and we need to rethink it all. It takes roughly 11 years for the magnetic poles of the Sun to flip, from north to south. During solar maximum, sunspots, flares, and coronal mass ejections (CMEs) are at their peak. This reversal is followed by a dip in activity, followed by an increase in activity. The current cycle is in its escalation phase, the 25th since we began counting. One metric characterizes and predicts the activity cycles of the Sun: the number of sunspots. Flares and CMEs are facilitated by temporary regions with particularly strong magnetic fields. According to solar physicist Scott McIntosh of the US National Center for Atmospheric Research, predicting solar cycles based on how many sunspots we count is a problem. According to him, the sunspot cycle is not the primary thing. It's a secondary thing, but the way the solar activity is presented, it's portrayed as the primary. It's not, and the main factor is the 22-year magnetic cycle that underlies the Hale cycle. There is a lot more to this picture than the sunspot cycle. The Hale cycle discovered by George Ellery Hale consists of two 11-year sunspot cycles – the time it takes for the poles to swap twice, thereby returning to their original positions. The sunspots are an interference pattern, generated by the magnetic fields of overlapping Hale cycles. McIntosh and colleagues first noticed a pattern emerging in sunspot data in 2011, an overlap in what is called butterfly diagrams. McIntosh and his team have predicted the current solar cycle based on the 'interference pattern', which is close to current observations compared with official predictions based on sunspot counts.

KEYWORDS

Astrophysics, astronomy, sun, solar, sunspots, Hale cycle, interference pattern, Sun Clock, Solar Seasons