

Space Weather Forecast

Issued on Saturday, 18 December 2021 at 00:36 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

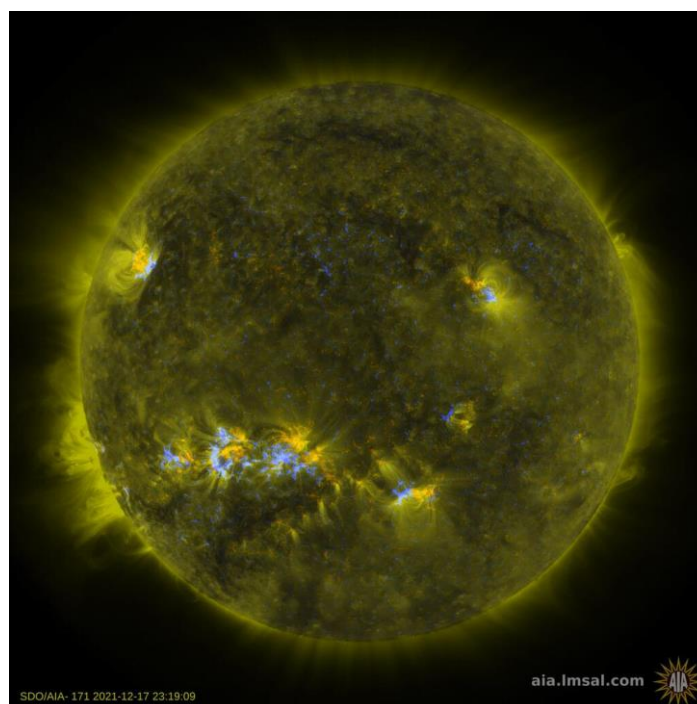
Space Weather Forecast Headline: Daily chance of Moderate-class flares, potentially increasing over the UTC weekend.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar Activity has been moderate in the last 24 hours, with a moderate class X-ray flare seen at 17/0051UTC, with this originating from a sunspot region in the northeast of the sun. This sunspot group was relatively dynamic in the 24 hours, even if not appearing overtly complex.

Including the above sunspot, there remain six on the facing side of the sun, with the southeastern quarter in particular remaining heavily populated and strongly polarised. As a general trend, rates of growth appeared to slow in all spots in the last 24 hours relative to the preceding 24, with slight spreading the main behaviour seen the nominally most threatening sunspots.

Figure 1: 18/2319UTC false-colour composite image of the sun comprising extreme UV and colourised magnetic imagery, showing a cluster of active regions in the southeastern quarter of the sun, as well as potential flux loops from further such regions over the southeastern (and perhaps northeastern) solar horizon.



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No Earth-directed Coronal Mass Ejections (CMEs) were observed in available satellite imagery for the period, although a CME was observed heading north and behind the Earth in its orbit into the UTC evening in satellite imagery.

Solar Wind / Geomagnetic Activity: Solar winds were reflective of a gradual exit from the influence of a fast stream of solar wind from a 'coronal hole'. The solar wind speed gradually decreased to background levels by the period's end. Both the number of particles comprising the solar wind and their associated magnetic field were small, stable and unremarkable in the period.

The net result of the above solar wind measures was provisionally quiet geomagnetic activity throughout the 24 hours, well below Minor Storm G1.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to continue mainly low, with the Chance (30%) of further isolated Moderate-class flares, and a slight (5%) chance of a strong-class flare. Flare probabilities may increase a little in the coming days (to 40 and 10% respectively), with further potential active regions likely to rotate around the east limb and none leaving over the west. The chances of common class flares are 90% throughout.

Solar Wind / Geomagnetic Activity: No CMEs feature in the current forecast period. Earth has recently exited a high speed stream from a coronal hole to leave quiet geomagnetic conditions. There is now thought to be a chance of some influence from a second small coronal hole later in the UTC weekend, probably peaking below Minor Storm G1 before reverting to quiet once again. Finally, there is a possible late peak in activity should a third, larger, coronal hole arrive on day four, Tuesday 21 December, signposted by a 5% slight chance of G1.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, although there is a slight increasing risk of achieving S1 in any significant flares as the sunspot regions transit 13 degrees a day towards the western solar hemisphere.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	1	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	30	40	40	40
Very Active	R3 to R5 X	No	5	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	2	2	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)