

Space Weather Forecast

Issued on Wednesday, 29 December 2021 at 12:36 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: Slight chance of Minor Geomagnetic storms. Chance of Minor R1 radio blackouts from moderate class X-ray flares throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has reached Moderate levels over the past 24 hours, with one Moderate-class flare. There are currently five active regions on the visible disc. The more complex region in the northwest produced the recent M-class flare, and shows signs of developing a mixed polarity spot. The main region in the southwest remains the largest region, with the recently developed region in the northwest also rather large, but neither has produced any noteworthy flares. The other regions are weak and stable.

No Earth-directed Coronal Mass Ejections (CMEs) were observed in available imagery during the period.

Solar Wind / Geomagnetic Activity: The solar wind speed was elevated at first around 530 km/s, easing to ambient levels currently near 360 km/s. The Interplanetary Magnetic Field started at moderate levels but soon became weak. The important north-south component varied weakly. Geomagnetic activity was Quiet (Kp 0-2). These parameters suggest a waning connection to a coronal hole fast wind.

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

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate solar activity is forecast to continue throughout the period with a chance of further isolated Moderate-class flares, most likely from either of the two larger regions in the western hemisphere. No significant regions are anticipated to rotate onto the visible disc from the far-side during the period.

Solar Wind / Geomagnetic Activity: Earth may experience a glancing blow from a CME on Day 2 (30 Dec), but this is low confidence. Wind speeds are currently ambient, but may reach slightly elevated levels at times until Day 4 (01 Jan) when a fast wind from a coronal hole is likely to arrive. Geomagnetic activity is forecast to be largely Quiet to Unsettled. There is a chance of Active intervals through the period and a slight chance of a G1/Minor Geomagnetic storm, this most likely on Day 4.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, however there is a very slight chance of a minor solar radiation storm (S1). This is only if any significant X-ray flare activity occurs, mainly from the larger active regions, which are now in the western hemisphere and therefore well placed for a proton event.

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	5	10	5	20
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	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

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	5	5	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)