
Space Weather Forecast

Issued on Wednesday, 15 December 2021 at 01:28 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 G1/Minor Geomagnetic Storms day 1 (15th). Potentially increasing solar activity.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar Activity was Low, but with increasing frequency of common-class flares through the day. There are currently four sunspot regions on the visible disc, all in the southeastern quadrant, with another sunspot rotating over the southeast limb at present to likely increase the number to five shortly. Two of the sunspot regions are complex in appearance and offer the potential for significant flaring. A slow Coronal Mass Ejection (CME) from a filament eruption around N45W05 at 14/1200 UTC may be earth-directed, however, further imagery is needed to confirm if this is the case. Otherwise no Earth-directed CMEs have been observed in available imagery.

Solar Wind / Geomagnetic Activity: The solar wind speed was at background levels throughout the period and between 310-330 km/s for much of the day. A slow increase in recent hours to speeds of around 340-350 km/s may be indicative of the onset of a connection to the fast wind from a coronal hole. The magnetic field carried by the wind was weak with the important north-south magnetic field component of the solar wind also weak. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar Activity is expected to be mainly Low, but with a chance of Moderate-class flares and slight chance of Strong flares given the recently developing and increasing numbers of sunspot regions on the visible disc. Further sunspot regions may rotate onto the visible disc in the coming days to supplement the current risk of significant flares.

Solar Wind / Geomagnetic Activity: Solar winds will increase on day 1 (15th) from background to likely become elevated due to the onset of the fast wind from a coronal hole. Winds should gradually ease later day 2 (16th) and eventually back to slightly elevated or background by the end of day 4 (18th). No further coronal hole enhancements are anticipated during the period. A filament eruption from the northern hemisphere centre disc around 14/1200 UTC is awaiting analysis to determine if the subsequent slow CME is earth-directed. Geomagnetic activity is expected to be Unsettled or Active initially on day 1, with a slight chance (20%) of a G1/Minor Storm. Geomagnetic activity will wane again after the peak period of fast wind into days 2 and 3 (16th and 17th) with Quiet conditions predominant.

Energetic Particles / Solar Radiation: The count of energetic particles (high energy protons) is most likely to persist at background levels with no solar radiation storms likely; this depending on upcoming developments of aforementioned sunspot regions.

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	20	5	1	1
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	No	25	25	25	25
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	3	3	3	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)