Space Weather Forecast

Issued on Monday, 13 December 2021 at 13:29 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: Chance of G1/Minor Geomagnetic Storms, mainly day 3 (15th)

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar Activity was Low with a Common-class flare at 12/2114 UTC occurring from a new small sunspot that has rotated onto the Earth-facing disc in the last 24 hours. Two other sunspot regions are also present, however these are also small and simple regions. No Earth-directed CMEs have been observed in available imagery.

Solar Wind / Geomagnetic Activity: The solar wind was at Background speeds throughout, with a gradual increase from around 290km/s to between 320-340km/s by the end of the period. The magnetic field carried by the wind was mostly weak, as was the important North-South component. Geomagnetic activity was mostly Quiet (Kp 0-2), with one Unsettled (Kp3) interval between 13/0300-0600 UTC.

Energetic Particles / Solar Radiation: The count rate 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 Low to Very Low, with a 60% chance of further Common class flares from any of the sunspot regions on the disc.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs expected in the forecast period. Background solar wind speeds could become slightly elevated to elevated day 1 (13th) from the arrival of fast wind from a newly developed coronal hole, however confidence is low. A subsequent connection to another, more persistent coronal hole sourced fast wind is then expected to give elevated solar winds either late day 2 (14th) or more likely on day 3 (15th), before slowly easing back day 4 (16th). Quiet geomagnetic conditions at first will likely become Unsettled to Active for a period day 1 (13th), and then again but more persistently later day 2 or more likely day 3, also with an increased chance of isolated G1/Minor Storms intervals. This risk probably decreasing by day 4, with geomagnetic activity gradually decreasing to Quiet with Unsettled intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at background with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	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) (%)
Minor or Moderate	G1 to G2	No	10	20	30	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 Probability	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) (%)
Active	R1-R2 M Class	No	2	2	2	2
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	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) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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