Space Weather Forecast

Issued on Tuesday, 07 December 2021 at 00:54 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

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Space Weather Forecast Headline: Slight chance of G1/Minor Storms on 9th.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Low over the past 24 hours, with occasional common class flares, these attributable to a developing region over the western limb and the growth in the sole remaining front-sided sunspot in the southeastern quadrant. The one remaining sunspot, AR2904, simplified.

The period also saw a single filament lift off. Starting around 05/2200UTC the filament close to centre disk in the southeast quadrant underwent a slow but definite lift off. This has been analysed as arriving at Earth as a weak feature on Friday 10th December around 0900 UTC +/-12hrs.

Solar Wind / Geomagnetic Activity: The solar wind, as measured by DSCOVR at L1, varied between slightly elevated and elevated levels, due to an ongoing connection to the fast wind of a coronal hole. The total interplanetary magnetic field strength was weak, with the important north/south component also weak. Resultant geomagnetic activity was generally Quiet to Unsettled (Kp 1-3).

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

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be low, with the chance of further notable X-ray flares from behind the sun's western horizon now significantly decreased, leaving one small current front-sided sunspot.

Solar Wind / Geomagnetic Activity: There are three potentially Earth-directed CMEs in the forecast.

The first coronal mass ejection in the forecast is from a filament eruption on Friday 03 December, scheduled as a near-miss of Earth on Tuesday 07 December. A placeholder 5% risk of G1 is included as a result. The second coronal mass ejection is a faint emission from a filament eruption on Sunday 05 December, and is expected to arrive Thursday 09 December 1800UTC +/-9 hours, but again confidence is low due to limited imagery for analysis. The third CME which left the Sun as a filament lift-off late on 05 December will likely arrive at Earth as a weak feature on Friday 10th December around 0900 UTC +/-12hrs.

The current elevated wind speeds are expected to ease during day 1 (Tuesday 07 December), before a further fast wind enhancement is possible towards the end of day 3 (Thursday 09 December). All considered, there is a Very Slight Chance of G1/Minor Storm on day 1 from the probable near miss from the 03 December coronal mass ejection, with 20% Chance of G1/Minor Stroms on Thursday 09 and Friday 10 December should the CMEs arrive, perhaps coinciding with the arrival of the next coronal hole fast winds.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

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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	5	1	20	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 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	1	1	1	1
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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