



METEOROLOGY PANEL



METP SWX User Workshop, 20 October 2025, Rome, Italy

# Case Study – May 2024 Event – Part 1 Scene Setting User Feedback Workshop

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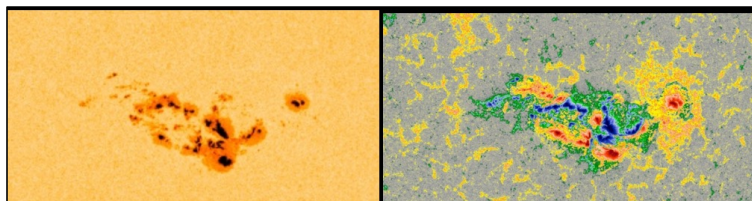
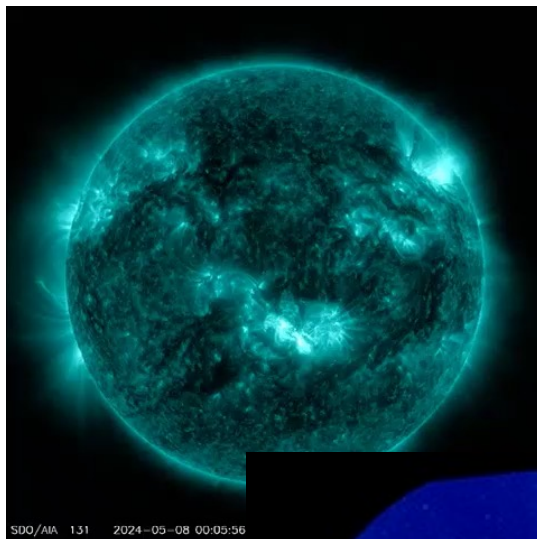
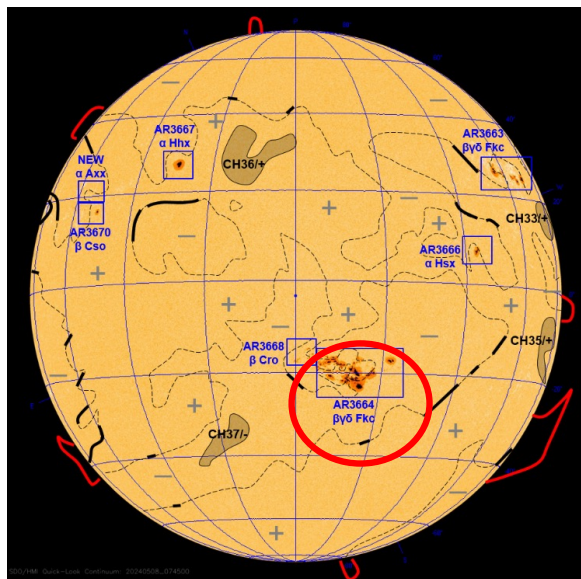




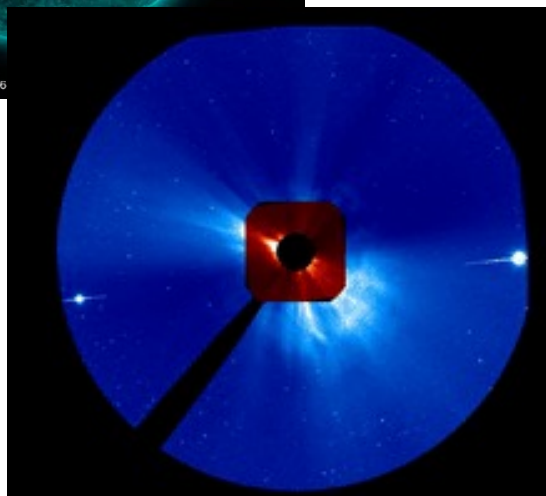
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# May 7-9 Events



AR2664  
(Fkc/Beta-gamma-delta)



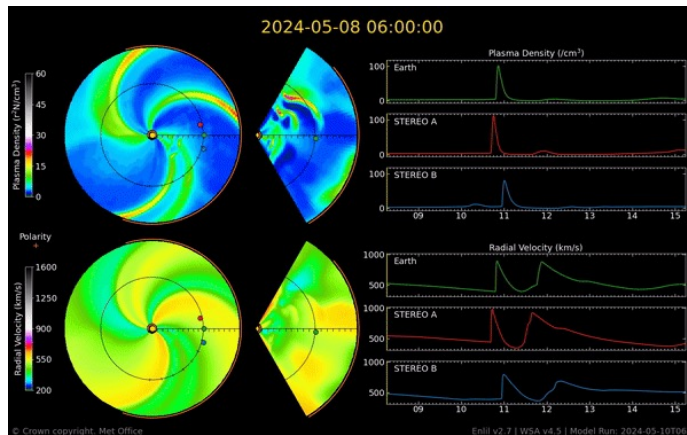
- A large sunspot region AR3664 has been transiting across the surface of the sun, increasing in size and complexity.
- Multiple X class flares were observed from the 7th May
- Halo coronal mass ejections follow – indicating they are likely Earth directed



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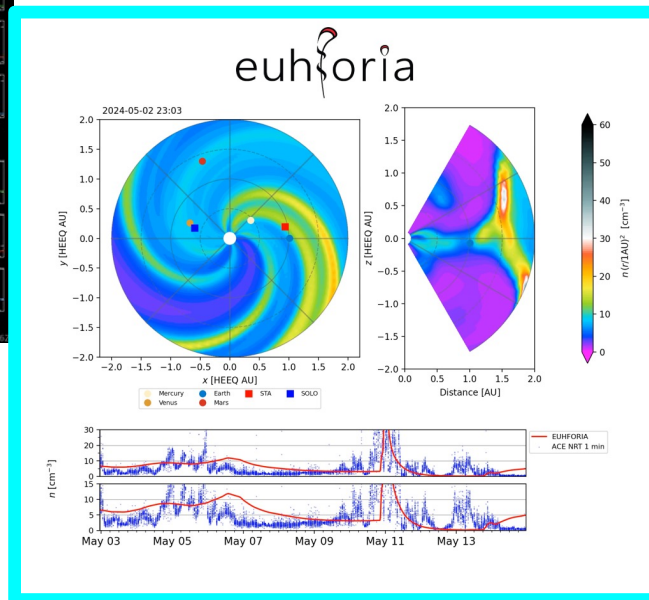


# May 7-9 Events



Geomagnetic Activity - Earthbound Coronal Mass Ejections

Date/time 21.5R (UTC)	Halo: Full or Partial	Source	Source Location	Estimated Speed	Estimated Arrival Time	Comments
06/0251	Partial	Filament	SE	323 km/s	10/1200 UTC	Slight chance glancing blow
08/0927	Full	AR3664	SW	850 km/s	10/2000 UTC +/- 7 hrs	Merges with last CME
08/1200	Partial	AR3664	SW	715 km/s	10/2000 UTC +/- 7 hrs	Merges with last CME
08/1840	Partial	Filament	NE	600 km/s	10/2000 UTC +/- 7 hrs	Merges with last CME
08/2140	Full	AR3664	SW	902 km/s	10/2000 UTC +/- 7 hrs	Merges with last CME
09/1130	Full	AR3664	SW	1582 km/s	10/2000 UTC +/- 7 hrs	Merges with last CME



- CMEs are modelled by space weather forecasting centres, confirmed as being Earth-directed
- Later CMEs observed to be faster than the previous
- Global forecasting centres independently predict the CMEs to merge, with an arrival time of 10<sup>th</sup> – 11<sup>th</sup> May expected





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# May 7-10 Events



**Geomagnetic Storm WATCH for May 11, 2024** G4 Updated 2024-05-09 1:30pm EDT

WHAT: Several CMEs will quite likely reach Earth and lead to highly elevated geomagnetic activity



**EVENT:**  
A coronal mass ejection (CME) is an eruption of solar material. When they arrive at Earth, a geomagnetic storm can result. Watches at this level are very rare.

**TIMING:**  
The CMEs are anticipated to merge and arrive at Earth by late on May 10th or early on May 11th.

**EFFECTS:**  
The general public should visit our webpage to keep properly informed. The aurora may become visible over much of the northern half of the country, and maybe as far south as Alabama to northern California.

National Oceanic and Atmospheric Administration U.S. Department of Commerce Safeguarding Society with Actionable Space Weather Information Space Weather Prediction Center: Boulder, CO

Watch issued by the Met Office at 10/05/2024 20:01:56 UTC

Notification Type: Geomagnetic Storm Watch

Estimated Maximum Storm Size: G5

Valid From: 10/05/2024 21:00:00 UTC

Valid To: 11/05/2024 12:00:00 UTC

Forecaster Text:

There is a (30 percent) chance that G5 (Extreme) Geomagnetic Storm activity may occur late 10 May into 11 May.

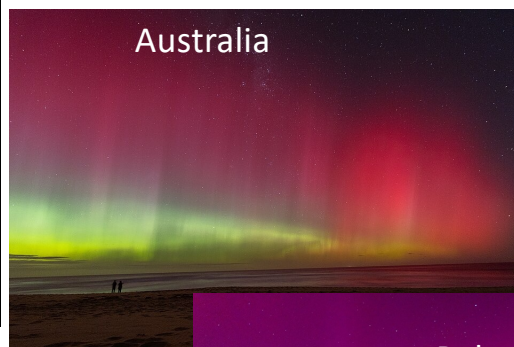
Potential impacts:

Power systems: Localised voltage control and protective system problems may occur.

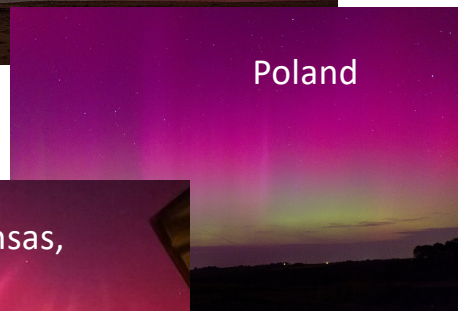
Spacecraft operations: May experience extensive surface charging, problems with orientation, uplink/downlink and tracking satellites.

Other systems: HF radio communication may be impossible in many areas for one to two days, GNSS(GPS) satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora could be seen as low as 40 degrees geomagnetic lat.

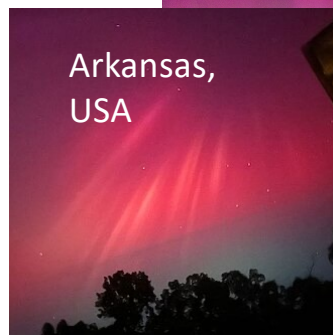
It is worth noting that if we see G5 (Extreme) Geomagnetic Storm observed, it is unlikely to be as long lived in terms of impacts as indicated above.



Australia



Poland



Arkansas, USA

- SWPC issued first G4 watch since 2005
- MOSWOC issue G4 watch, later upgraded to G5 – the first in it's 10 year history
- Initial CME arrival late on the 9<sup>th</sup> May, with G5 geomagnetic conditions reached shortly after midnight UTC on the 10<sup>th</sup> – the strongest geomagnetic storm since 2003
- Widespread aurora sightings – but also impacts...