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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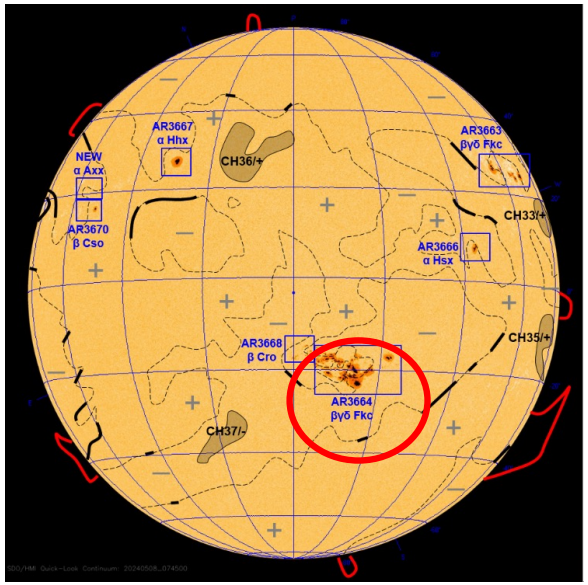
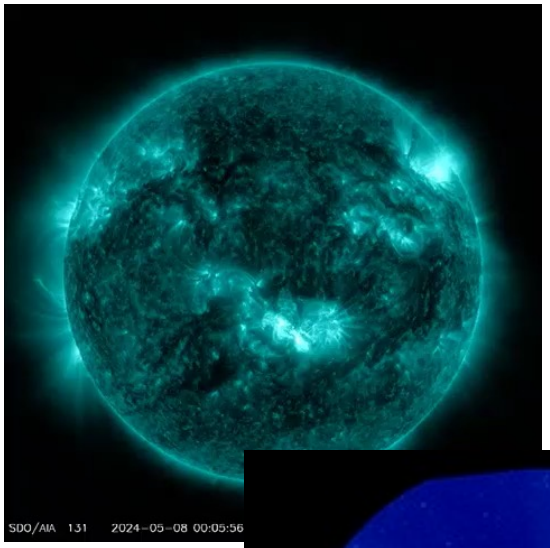
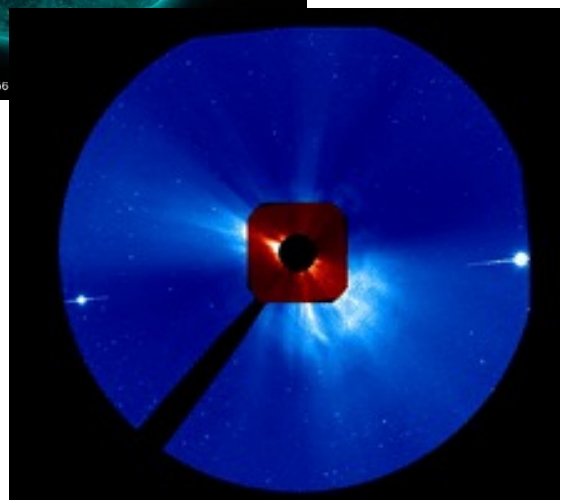
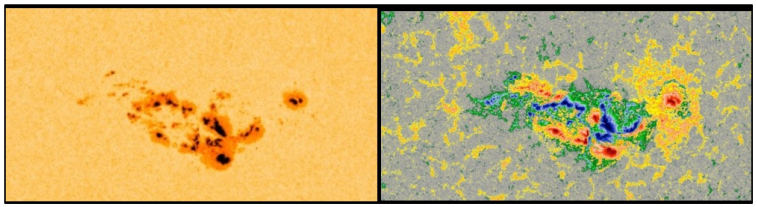
# May 7-9 Events



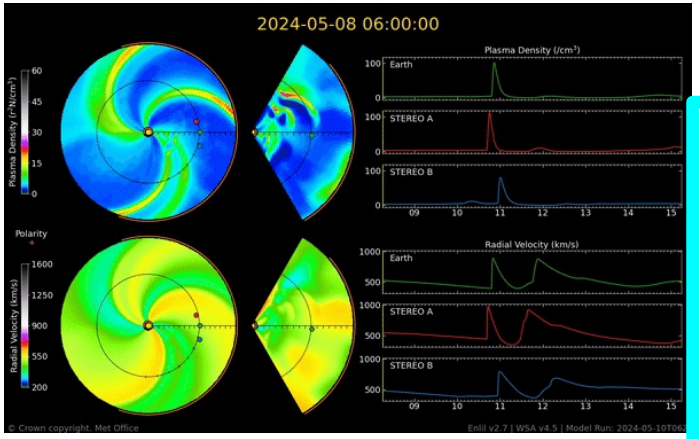





AR2664
(Fkc/Beta-gamma-delta)

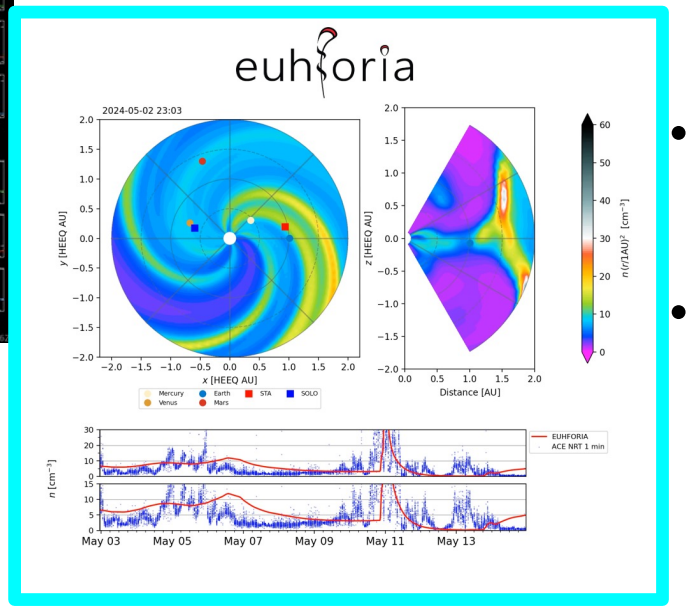
- A large sunspot region AR3664 has been transiting across the surface of the sun, increasing in size and complexity.
- Multiple X class flares were observed from the 7th May
- Halo coronal mass ejections follow – indicating they are likely Earth directed

# 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 10th – 11th May expected

# May 7-10 Events


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.


- 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 9th May, with G5 geomagnetic conditions reached shortly after midnight UTC on the 10th – the strongest geomagnetic storm since 2003
- Widespread aurora sightings – but also impacts…