

2025 See <https://www.spaceweather.com>
<https://www.spaceweatherlive.com/en.html>
<https://www.nesdis.noaa.gov/news/time-lapse-of-solar-cycle-25-displays-increasing-activity-the-sun>

<ftp://ftp.swpc.noaa.gov/pub/warehouse/2025/>

New SDO imagery is unavailable due to severe damage after flooding (broken pipe) at the processing facility on November 26, 2024. Reports from November 27 onwards will be updated when images become available in 2025.

GOES-16 X-ray imagery <https://lasp.colorado.edu/space-weather-portal/now/sun>

1-2 Jan Severe (**G4**) **GEOMAGNETIC STORM: Kp=8 Dst= -214 Bz~ -22**

КОГНИТИВНАЯ МЕТОДИКА ОБНАРУЖЕНИЯ АНОМАЛЬНЫХ ИЗМЕНЕНИЙ ИНТЕНСИВНОСТИ ПОТОКА КОСМИЧЕСКИХ ЛУЧЕЙ

Мандрикова О.В., Мандрикова Б.С.

ГИА Том: 65Номер: 5 Год: 2025 Страницы: 656-668

+3 Jan 11:39– ~**spike X1.2**, AR3947, N10E64, imp S9~280
22:41–**spike X1.1/1N**, AR3947, N10E61, imp S15~330
23:56–**spike M5.8/1N**, AR3947, N10E56
<https://www.spaceweather.com/images2025/04jan25/crackling.jpg>

During the nearest days there were numerous other M-class flares

Remarkably, no significant CMEs have emerged. For some reason, these explosions are not lifting material out of the sun's atmosphere.

+4 Jan **GEOMAGNETIC STORM: Kp=5 Dst= -87 Bz~ -13**
05:18– **short M7.6**, AR3947, N10E56, imp S9~340
12:48–**spike X1.8**, AR3947, N10E56, imp S9~410

The STEREO ReleASE System: Solar Energetic Proton Forecasting in the Heliosphere

H. Dröge, B. Heber, M. Karavolos, A. Kollhoff, P. Kühl, O. Malandraki, A. Posner

Space Weather Volume 23, Issue 6 e2025SW004434 2025

<https://doi.org/10.1029/2025SW004434>

<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2025SW004434>

4-5 Jan **SEP, protons J10~20**, SW (filament) eruption ~18 UT, LDE C7.6, significant CME

5 Jan 02:39– **short LDE M4.1**, AR3947, N11E44,
09:36– **short LDE M4.1/2N**, AR3947, N11E40,

6 Jan 01:52– **short M3.1/1N**, AR3947, N11E30, imp S9~250
16:24– **spike M4.8**, AR3947, N11E28, imp S5~590

Strong 4-day flaring period <https://lasp.colorado.edu/space-weather-portal/goes-x-ray-flux?duration=5&endDate=2025-01-07>

Solar Radio Wide-Band Spectroscopy and Imaging Facilities of the Chinese Meridian Project Phase II

[Yihua Yan](#), [Wei Wang](#), [Linjie Chen](#), [Jin Fan](#), [Yao Chen](#), [Shuwang Chang](#), [Fabao Yan](#), +++
[Space Weather](#) Volume 23, Issue 11 e2025SW004595 2025
<https://doi.org/10.1029/2025SW004595>
<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2025SW004595>

7 Jan >09 UT– significant but slow N CME, probably backside. See STEREO NW eruption

Eruption-Related Ultraviolet Irradiance Enhancements Associated with Flares

[Luke Majury](#), [Marie Dominique](#), [Ryan Milligan](#), [Dana-Camelia Talpeanu](#), [Ingolf Dammasch](#), [David Berghmans](#)
Solar Phys. 2025
<https://arxiv.org/pdf/2512.15639>

11 Jan **SOHO IMAGES ARE RESTORED**

17 Jan 13:35– **spike+ M7.4**, AR3964, N07W32, imp S5~130

19 Jan

Detecting fast-variation pulsations in solar hard X-ray and radio emissions

[Dong Li](#)
MNRAS 2025
<https://arxiv.org/pdf/2506.14433>

21 Jan 10:39–**short LDE M3.3/SF**, AR3967, S19E23, coronal wave, type II(2),
potentially Earth-directed CME,
https://www.spaceweather.com/images2025/21jan25/m3_teal.gif
<https://www.spaceweather.com/images2025/21jan25/nasamodel.gif>

24 Jan

Eruption-Related Ultraviolet Irradiance Enhancements Associated with Flares

[Luke Majury](#), [Marie Dominique](#), [Ryan Milligan](#), [Dana-Camelia Talpeanu](#), [Ingolf Dammasch](#), [David Berghmans](#)
Solar Phys. 2025
<https://arxiv.org/pdf/2512.15639>

26 Jan [A dramatic filament eruption](#)

31 Jan 14:06–**short LDE M6.7**, AR3978, N11E42, short S9~280
https://www.lmsal.com/solarsoft/archive/sdo/media/ssw/ssw_client/data/ssw_service_250131_062457_44609_ssmq_/www/ssw_cutout_20250131_133511_aia_211_N13E42_20250131_133509_j.html

1-2 Feb **THE SOLAR WIND HAS ARRIVED:** Earth is inside a stream of solar wind flowing from [a large hole](#) in the sun's atmosphere. [G1](#)-class (Minor) geomagnetic storm Dst~-38

2 Feb 10:12–**spike M3.0**, AR3981, N05E26
14:04–**spike M5.1** ; AR3977, N19E04, imp S5~280
23:24– **short LDE M4.1**, AR3981, N05E18, imp S9~150

3 Feb 03:58–**spike M8.8**, AR3981, N05E14
05:47–**spike M3.1**, AR3981, N05E14, imp S3~220
13:18–**spike+ M6.1/2B**, AR3981, N05E14
18:36–**spike+ M4.3/2B**, AR3981, N07E12, imp S9~100

4 Feb 11:21–**short M4.7**, AR3981, N19W03

13:14.3– **short LDE M3.2**, AR3977, N19W26, imp S9~590

5 Feb

Compact Ca II K Brightenings Precede Solar Flares: A Dunn Solar Telescope Pilot Study

[Aman Priyadarshi M. Kumar](#), [Juie Shetye](#), [Sean G. Sellers](#), [Damian J. Christian](#)

ApJL 2025

<https://arxiv.org/pdf/2512.21872>

Solar Radio Wide-Band Spectroscopy and Imaging Facilities of the Chinese Meridian Project Phase II

[Yihua Yan](#), [Wei Wang](#), [Linjie Chen](#), [Jin Fan](#), [Yao Chen](#), [Shuwang Chang](#), [Fabao Yan](#), +++

[Space Weather](#) Volume 23, Issue 11 e2025SW004595 2025

<https://doi.org/10.1029/2025SW004595>

<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2025SW004595>

6 Feb 11:04–**short M7.6/1B**, AR3981, N06W30, imp S9~490 [GOES-19](#) CME

https://www.spaceweather.com/images2025/06feb25/ccor1_anim.gif

7 Feb 07:21–**short LDE M3.2**, AR3981, N08W43, imp S5~160

09:21–**short LDE M7.5**, AR3981, N08W43

10-20 Feb a number of **minor G1 geomagnetic storm** under low spot and flare activity

from a [crescent-shaped hole](#) **Kp=4.5 Dst= -62 Bz~ -13.** It is flowing from [a canyon-like hole](#)

21 Feb 12:15 – **spike M3.3/1B** on the LDE enhancement background, AR4000, N18E17

23 Feb 02:13– **short M4.9**, AR4001, N24W79, imp S15~740, narrow CME

19:27– **spike+ X2.0 flare**, AR4001, N24W79, imp S9~610, weak but fast CME

24 Feb 07:02– **spike M3.3** , AR4000, N17W27, imp S9~400, J10~0.8, modest CME

23:02–**LDE M3.9 SIGNIFICANT SW FAR SIDE EXPLOSION, SEP** J10~37, large [very bright CME](#)

https://www.spaceweather.com/images2025/25feb25/farside_teal.gif

Compact Ca II K Brightenings Precede Solar Flares: A Dunn Solar Telescope Pilot Study

[Aman Priyadarshi M. Kumar](#), [Juie Shetye](#), [Sean G. Sellers](#), [Damian J. Christian](#)

ApJL 2025

<https://arxiv.org/pdf/2512.21872>

25 Feb 11:59 – **M3.6 LDE**, AR3998, S17W52?, S9~390, CME

26 Feb [A large coronal hole](#) squarely facing Earth

1 Mar

STEREO REleASE+: Adding Robustness to Solar Proton Event Forecasting in the Heliosphere by Means of Automated Recognition of Type-III Radio Bursts

[Arik Posner](#), [Olga E. Malandraki](#), [Kostas Tziotziou](#), [Michalis Karavolos](#), [Henrik Dröge](#), [Bernd Heber](#), [Patrick Kühl](#), [Lefteris Tsipis](#)

[Space Weather](#) Volume 23, Issue 12 e2025SW004596 2025

<https://doi.org/10.1029/2025SW004596>

<https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2025SW004596>

<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2025SW004596>

9 Mar G2 **GEOSTORM Kp=5.5 Dst=- 61 Bz~-12** Effect of CIR

11 Mar

Comprehensive study of solar type II radio bursts and the properties of the associated shock waves

[K. Bhandari](#), [D. E. Morosan](#), [S. Normo](#)

A&A 2025

<https://arxiv.org/pdf/2512.21846>

12-13 Mar

G1-class geomagnetic storm as $K_p=5$ $Dst=-82$ $B_z\sim-11$ Earth passes through a magnetized stream of solar wind

<https://www.spaceweather.com/images2025/12mar25/magnetizedstream.jpg>

19 Mar

Accessing the fine temporal scale of EUV brightenings and their quasi-periodic pulsations: 1-second cadence observations by Solar Orbiter/EUI

Daye [Lim](#)^{1,2*}, Tom Van Doorselaere², Nancy Narang¹, Laura A. Hayes³, Emil Kraaikamp¹, Aadish Joshi², Konstantina Loumou¹, Cis Verbeeck¹, David Berghmans¹ and Krzysztof Barczynski^{4,5}
704, A58 (2025)

<https://doi.org/10.1051/0004-6361/202557135>

<https://www.aanda.org/articles/aa/pdf/2025/12/aa57135-25.pdf>

22-... Mar

G2 GEOSTORM $K_p=5.5$ $Dst=-61$ $B_z\sim-14$

26 Mar

G2 GEOSTORM $K_p=6+$ $Dst=-63$ $B_z\sim-21$ from a giant hole

+28 Mar

15:21 –X1.1 LDE, NE-limb AR4046, $S_9\sim 2200$, a blast of solar material from the area

<https://www.swpc.noaa.gov/news/r3-strong-solar-flare-occurred-28-march-2025>

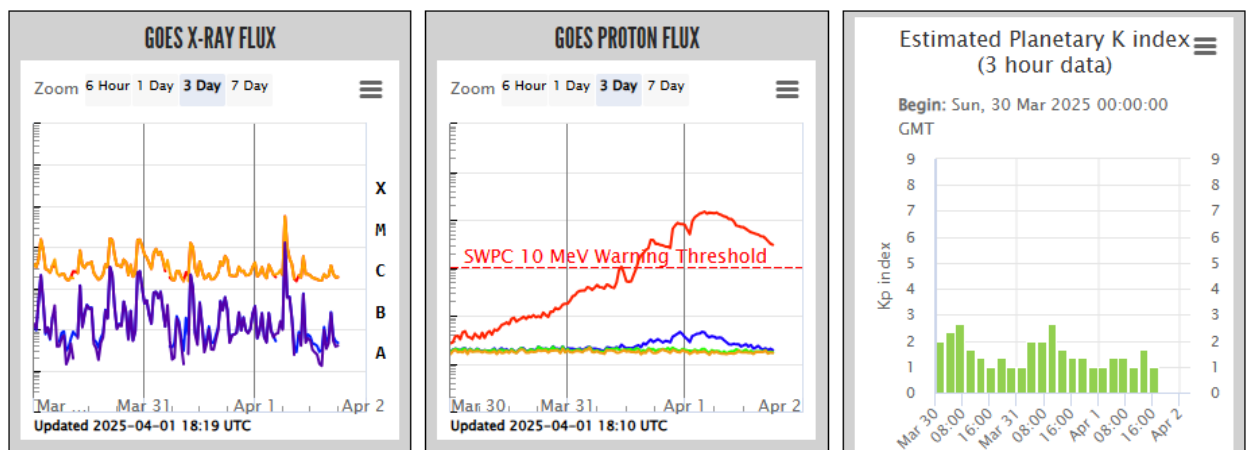
https://spaceweathergallery2.com/submissions/pics/s/Senol-SANLI-GN-2_1743181869_lg.png

The explosion hurled a **significant CME** into space--complete with internal plasma bullets:

<https://www.spaceweather.com/images2025/29mar25/plasmabullets.gif>

1 Apr

Soft SEP from the 28 Mar X1.1 LDE, NE-limb flare: $J_{10}\sim 147$ pfu. The ESP role?



See <https://www.spaceweather.com/> for 28 Mar–1 Apr 2025

06:46–almost spike M5.6 flare, AR4046, N05E27, imp $S_5\sim 230$

Thread Separation and Expansion Observed in Multi-Stranded Solar Coronal Loops

David H. [Brooks](#), [Harry P. Warren](#)

ApJ 2025

<https://arxiv.org/pdf/2512.12417>

4-5... Apr G2 **GEOSTORM** **Kp=5.5** **Dst=- 63** **Bz~-10** due to a [co-rotating interaction region](#) (CIR)

12 Apr W AR4055 produced at least 8 M-class flares during the past 24 hours
https://spaceweathergallery2.com/indiv_upload.php?upload_id=222018

13 Apr <Morning **SE/central DOUBLE significant FILAMENT ERUPTION, coronal waves, arcades, 304 A**, a pair of [closely-spaced CMEs](#)
https://www.spaceweather.com/images2025/13apr25/double_filament_red_crop.gif
18:51– short **M3.2 flare**, AR4055, N08W76

14 Apr 06:50– short **M4.2 flare**, AR4055, N06W82, imp S15~110

15-16 Apr G3 **GEOSTORM** **Kp=7.5** **Dst=- 127** **Bz~-19** due to a pair of CMEs on 13 Apr.

18 Apr 23:30–short M4.5 LDE behind E-limb squirted the CME debris straight down,
https://www.spaceweather.com/images2025/18apr25/plasmashot_crop_strip.gif

19-20 Apr **GEOSTORM** **Kp=4?** **Dst=- 61** **Bz ~-13**

21 Apr **A LARGE CORONAL HOLE** <https://www.spaceweather.com/images2025/21apr25/ch.jpg>

26 Apr
Solar Filament Physiognomy: Inferring Magnetic Quantities from Imaging Observations
P. F. **Chen** **Review**
Solar Phys. 2025
<https://arxiv.org/pdf/2511.15980>

2-3 May **GEOSTORM** **Kp=5+** **Dst=- 67** **Bz ~-12**

5-8 May Several filament eruptions and small (J10~1) SEPs

11 May short **GEOSTORM** **Kp=4.5** **Dst=- 61** **Bz ~-6**

12 May massive NW filament eruption [on May 12-13](#), **304 A**

13 May 15:38– short+small PE **X1.2/1B** NW-limb flare, new AR4086, N09W86, imp S15~900, SEP J10~6, [a CME](#)
https://www.spaceweather.com/images2025/12may25/x1_anim.gif
https://www.spaceweather.com/images2025/13may25/x1-teal_strip.jpg

14 May **Four intense short spike-like flares from the near E-limb AR4087, CMEs**
<https://www.spaceweather.com/images2025/14may25/fusillade.png>
03:25–spike-like **M5.3 flare**, AR4087, N17E70, imp S15~240, type II/2
08:25– spike-like **X2.7/2B flare**, AR4087, N15E68, imp S3-5~390
https://spaceweathergallery2.com/indiv_upload.php?upload_id=222778
11:19–spike-like **M7.7/1N flare**, AR4087, N19E65, imp radio
18:11–spike **M4.7 flare**, AR4087, N19E65, imp S15~150

17 May **GEOSTORM** **Kp=6+** **Dst=-58** **Bz ~-17**
caused by CME filament eruption launched on May 12th

19 May >04 UT–filament lifted off the N hemisphere and hurled [a NW CME](#)

https://sdo.gsfc.nasa.gov/assets/img/dailymov/2025/05/19/20250519_1024_0193.mp4

08:21–spike **M3.2 flare**

A BIG HOLE IN THE SUN'S ATMOSPHERE [Here it is in March](#), and [again in April](#)

<https://www.spaceweather.com/images2025/19may25/ch.jpg>

25 May 01:52–spike **X1.2**, AR4098, S05W43, imp S5-9~340

https://www.spaceweather.com/images2025/25may25/teal/20250525_015634_1024_0131.jpg

10:18–spike **M3.4/1N**, AR4098, S04W50

16:31–spike **M8.9/2B**, AR4098, S05W54, imp S15~290

26 May 13:06– double spikes **M2.9/2N**, AR4098, S05W67

+ 13:37 –**M1.4/1F**, AR4910, N11E70, type II

27 May **GEOSTORM Kp=4+ Dst=-37 Bz ~-8**

29 May **G3 GEOSTORM Kp=6.5 Dst=-62 Bz ~-23** A co-rotating interaction region

30 May 06:13–spike **M3.4**, AR4910, N06E55?, imp S9~180, type II, CME

30-31 May

The largest Forbush decrease in 20 years: Preliminary analysis of SEVAN network observations

A. Chilingarian, [T.Karapetyan](#), [B.Sargsyan](#)

2025

<https://arxiv.org/pdf/2506.17917>

31 May 00:05–**LDE M8.2**, AR4910, N08E12, post-eruptive arcade, type II/2, **halo CME**

https://www.spaceweather.com/images2025/30may25/multi_anim.gif

08:23– **M4.5/1N**, AR4910, N11E05, imp S5-9~1300

15:49–**M2.9/2B**, AR4910, N11E05, imp S3~210

<https://www.spaceweather.com/images2025/31may25/halocme.gif>

slow explosion with lots of power "[under the curve](#)."

SEP J10~63→122 (1 Jun) <https://www.swpc.noaa.gov/>

<https://services.swpc.noaa.gov/images/swx-overview-large.gif>

1-3 Jun **Triple G4 GEOSTORM Kp=8 Dst=-120 Bz ~-20**

from halo CME on 31 May and following CME activity,

the longest-lasting geomagnetic storms of Solar Cycle 25.

THE BIGGEST FORBUSH DECREASE IN 20 YEARS

https://www.spaceweather.com/images2025/03jun25/forbush_anim3.gif

SEP J10→666 ESP

The largest Forbush decrease in 20 years: Preliminary analysis of SEVAN network observations

A. Chilingarian, [T.Karapetyan](#), [B.Sargsyan](#)

2025

<https://arxiv.org/pdf/2506.17917>

2 Jun 11:14–short **LDE M3.3/2B**, AR4910, N12W19, imp S5~150

3 Jun **Significant eruption of N/central filament**

<https://www.solarmonitor.org/index.php?date=20250602®ion=&indexnum=1>

12-13 Jun G2 GEOSTORM Kp=6+ Dst=-104 Bz ~-14 CIR

13 Jun

Compact Ca II K Brightenings Precede Solar Flares: A Dunn Solar Telescope Pilot Study

[Aman Priyadarshi M. Kumar](#), [Juie Shetye](#), [Sean G. Sellers](#), [Damian J. Christian](#)

ApJL 2025

<https://arxiv.org/pdf/2512.21872>

14 Jun 23:01 –spike M6.8, AR4105 , S15W71, imp S9~200

15 Jun 18:01–short M8.4/1B, [growing active region](#) AR4114, N18E16, S15~4300, type II/3, a CME, https://www.spaceweather.com/images2025/15jun25/m8_anim.gif

16 Jun 09:38–short+LDE M6.3/1B, AR4114, N19E08, imp S9~900

17 Jun 21:49–spike X1.2/2B, AR4114, N18W12, imp S5~680, faint CME
<https://www.spaceweather.com/images2025/17jun25/twinkle.gif>

19 Jun 23:50– spike X1.9/2B, AR4114, N19W39, imp S9~410, narrow faint CME
Сразу за этим хвост: 20 Jun, 00:04–M4.6/1N, AR4114, N19W35

SOLSTICE SOLAR FLARES

<https://www.spaceweather.com/images2025/15jun25/solsticesolarflares.jpg>

29 Jun Two significant CMEs: ~16 UT SW and ~21 UT W

4 Jul NE and SE CMEs
<https://www.spaceweather.com/images2025/04jul25/doomedcomet.gif>

15 Jul ~>04 UT: **Large NE filament eruption, narrow CME**
https://sdo.gsfc.nasa.gov/assets/img/dailymov/2025/07/15/20250715_1024_0193.mp4

5 Aug 15:53– spike+small LDE M4.4/1B ([movie](#)) , AR4168, N04W07, imp S9~360, type II(3), IV(1), weak W-directed CME

7 Aug 11:31– LDEM3.9/1N , AR4168, N03W31, imp S9~110, W CME

8 Aug 03:53– spike M2.8/SF, AR4168, N03W43

8-9 Aug G2 GEOSTORM Kp=6 Dst=-71 Bz ~-14

Combined effects from a coronal mass ejection (CME) which lifted off the Sun on 05 Aug and a coronal hole high speed stream (CH HSS)

19-20 Aug S and N E-limb M-C-class LDE flares and significant CMEs

21 Aug Morning : large **BRIGHT FAR SIDE CME**
<https://www.spaceweather.com/images2025/21aug25/halocme.gif>

22-27 Aug growing SEP: J10~0.5→14

25 Aug 05:24–short LDE M4.5, E-limb, imp S9~100

26 Aug 00:30–short M3.3, AR 4199, near E-limb

05:25–short M4.5, AR 4197, near E-limb

30 Aug Connected transequatorial activity in two central ARs.
15:59–M1.2, AR4197; 20:02–M2.7 LDE, AR4199
https://www.spaceweather.com/images2025/30aug25/m2p7_teal.gif
Halo CME <https://www.spaceweather.com/images2025/30aug25/halocme.gif>
A [NASA model](#) of the CME

1 Sep Soft SEP J10~6

4 Sep **Central sigmoid filament eruption, it** hurled a dark plume of plasma **304 Å** more than 700,000 km long into S space.
https://www.spaceweather.com/images2025/04sep25/sigmoid_anim_strip.gif
<https://www.spaceweather.com/images2025/04sep25/darkplasma.gif>

15 Sep **STRONG GEOMAGNETIC STORM** Kp=6.5 Dst=-72 Bz ~-16
The stream of solar wind responsible for this storm is flowing from central [a butterfly-shaped hole](#)

28 Sep 08:43–spike M6.4/1B, AR4232, N03E58, imp S9~180, narrow CME

29 Sep 01:45– spike M3.4, AR4232, N03E, imp S9~840
GEOMAGNETIC STORM Kp=4.5 Dst=-80 Bz ~-11 No. CME

30 Sep **G2 GEOMAGNETIC STORM** Kp=7+ Dst=-98 Bz ~-17
HSS solar wind blowing faster than 700 km/s

1 Oct **THE GEOMAGNETIC STORM CONTINUES**

2 Oct **G2 GEOMAGNETIC STORM CONTINUES** Kp=6.5 Dst=-84 Bz ~-8

9 Oct 12:31–short LDE M2.0, N-limb AR4236

21 Oct **LARGE FAR SIDE EXPLOSION, SEP J10~4,**
fast and potent CME, 2474 km/s--a sign of fast-moving shocks
<https://www.spaceweather.com/images2025/21oct25/fastCME2.gif>

29 Oct **STRONG FAR SIDE CME, type II.** The source is probably [old sunspot 4246](#),
<https://www.spaceweather.com/images2025/29oct25/cme.gif>

29-31 Oct **G2 GEOMAGNETIC STORM** Kp=5+ Dst=-68 Bz ~-13

3 Nov 09:25–M1.6, AR4274 together with
10:11–**M5.0 LDE**, AR4272, N22E53, **S5~5800**, coronal wave, large NE-limb CME [#1](#)
https://www.spaceweather.com/images2025/03nov25/cme_big.gif
12:36–M2.9 LDE, AR4274, S9~570
17:08–imp M1.5, AR4274, N26E69

4 Nov 01:48–short LDE M3.5, AR4274, N26E60, imp S9~260
17:24– **short LDE X1.8/1B**, AR4274, N26E63, S9~810, large NE-limb CME [#2](#)
[The explosion was dramatic](#)
22:01–**X1.1 imp+PE SE-limb flare**, AR4272+4274, large SE CME
https://www.spaceweather.com/images2025/04nov25/bothflares_crop3_strip.gif

5 Nov 11:19– **short LDE M7.4/2N**, AR4274, N22E51, S3~760, halo CME [#2](#)
22:07– **short M8.6/2B**, AR4274, N28E40, imp S3-5~180, partial halo CME [#3](#)

6 Nov **G3 GEOMAGNETIC STORM** Kp=6.5 Dst=-125 Bz ~-16

AR4274 sunspot's magnetic poles are arranged in an unusual way.

https://www.spaceweather.com/images2025/07nov25/20251107_000000_M_color_4k_lab_crop_strip.jpg
https://spaceweathergallery2.com/full_image.php?image_name=Robert-Spellman-hdr_1762631723.jpg

7 Nov **GEOMAGNETIC STORM** Kp=5+ Dst=-61 Bz ~-8
07:53–M1.7/1N, AR4274, N23E28, type II-IV/2, NE CME

8 Nov **GEOMAGNETIC STORM** Kp=6+ Dst=-67 Bz ~-9

9 Nov 07:35– **short LDE X1.7/2B**, AR4274, N23W03, S5~630, type II-IV/2, halo CME
https://spaceweathergallery2.com/full_image.php?image_name=Francois-Rouviere-2025-11-09_T_07-44-32_F100_75w_1762702124.jpg

10 Nov 09:19– **LDE X1.7/2B**, AR4274, N23W14, **S9~4000**, type II/3-IV/2, halo CME,
SEP J10~28
<https://www.spaceweather.com/images2025/10nov25/fullhalocme.gif>

The Calm before the Storm: High Spatial Resolution Mosaic of Active Region NOAA 14274 at the Onset of an X1.2 Flare

Carsten **Denker**, Robert Kamlah, Meetu Verma, and Alexander G. M. Pietrow
2025 Res. Notes AAS 9 321
<https://iopscience.iop.org/article/10.3847/2515-5172/ae230b>

11 Nov 10:04–**short top X5.1**, AR4274, N23W32, dimmings and large coronal wave,
type II/3-VI/3, **S15~11000**, **Hard SEP J10~156**, **GLE77**, Halo CME
https://www.spaceweather.com/images2025/18nov25/x5_teal.jpeg

Solar neutron and muon detection on November 11, 2025: First simultaneous recovery of energy spectra

A.Chilingarian, [B.Sargsyan](#), [L.Kozliner](#), [T.Karapetyan](#)
2025
<https://arxiv.org/pdf/2512.07859>

The observation of Ground Level Enhancement GLE 77 by the neutron detectors of the Experimental Complex NEVOD

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<https://arxiv.org/pdf/2511.23048>

12 Nov **G4 GEOMAGNETIC STORM** Kp=8.5 Dst=-238 Bz ~-48
following the early arrival of [two CMEs](#) The [3rd CME](#) has arrived
SEP J10~1460 and SEP J10~819

13 Nov **G4 GEOMAGNETIC STORM** Kp=7+ Dst=-168 Bz ~-17 Final CME arrived

Soft **SEP J10~103**

14 Nov 08:30– short **LDE X4.0/3B**, AR4274, N22W61, S15~3600, type II/3_IV/2, large CME, large coronal wave, dimmings, **SEP J10~16,5**
https://www.spaceweather.com/images2025/14nov25/x4_teal.gif
https://www.spaceweather.com/images2025/14nov25/cme_x4.gif

16 Nov 08:17–short LDE M3.1, AR4274, N25W91

24-28 Nov CIR - Intermittent **G1-class storms Kp=5 Dst=-53 Bz ~-11**

29 Nov 22:22 – Impulsive M5.9 flare, SE-limb AR4294, imp S5~280, type II/2
<https://www.spaceweather.com/images2025/29nov25/m6teal.gif>

1 Dec 02:49– short **LDE X1.9/1N**, AR4299?, N22E89 + **AR4294, N15E50**, S9~3700, type II/3_IV/3, large CME The actual source, an unnumbered northern sunspot
<https://www.spaceweather.com/images2025/01dec25/x1p9.jpg>
https://www.spaceweather.com/images2025/01dec25/cme_anim_opt.gif

GIANT SUNSPOT ALERT: Sunspot complex 4294-96 is about the same size as the Carrington's sunspot <https://www.spaceweather.com/images2025/02dec25/comparison.jpg>

3-4 Dec CH CIR **G1-2-class storms Kp=6.5 Dst=-69 Bz ~-13**

4 Dec 02:50 – Impulsive M6.0/1F flare, AR4300, N06E54, imp S5~150, TYPE II/2, CME

6 Dec 20:39 – Short M8.1/2B flare, AR4299, N23W00, imp S3~1100, TYPE II/3,
https://spaceweathergallery2.com/indiv_upload.php?upload_id=229243
a full, but weak **EARTH-DIRECTED** halo CME
https://www.spaceweather.com/images2025/06dec25/cme_c3.gif

8 Dec 00:36 – Short M2.0/1N, AR4294, S15W30, imp S15~160
05:01 – **X1.1/2B spike**, AR 4398, S14W52, very compact flare
https://www.spaceweather.com/images2025/08dec25/x1_teal_0503.jpg
too brief to lift a significant CME
21:17 – **M3.1**, AR4294, S13W35, imp S15~560
22:28 – **M1.2/SN**, AR4299, N22W27

9 Dec 00:58 – M2.0/1N, AR4299, N21W20?

These days: Many M-class flares from connected N and S ARs

10 Dec 22:08 – spike M4.4/2B, AR4294, S20W66, imp S9~850, type II/3, weak CME

10-11 Dec **G2-geostorms Kp=6+ Dst=-87 Bz ~-15**

27 Dec 01:50–short M5.1 flare, [image](#). AR4323, SE limb, imp S5~260, type II/3, III/2

28 Dec 22:39 – short M4.2/2N flare, AR4317, N07W27, together with impulsive M1.3 and M2.2 flares from AR4325, S07E47 and AR4324, imp S3~300, significant CME
<https://www.spaceweather.com/images2025/28dec25/m4puff.gif>
A preliminary [model from NASA](#)

31 Dec 13:51– M7.1 LDE, AR4324, N26E21, type II/1+IV/2+III/2, imp S9~330, S3~550,
significant NE [halo CME](#)
https://www.spaceweather.com/images2025/31dec25/m7_fulldisk_crop_strip_opt.gif