

STCE Newsletter

31 Aug 2026 - 6 Sep 2026



Published by the STCE - this issue : 11 Sep 2026. Available online at <https://www.stce.be/newsletter/> .

The Solar-Terrestrial Centre of Excellence (STCE) is a collaborative network of the Belgian Institute for Space Aeronomy, the Royal Observatory of Belgium and the Royal Meteorological Institute of Belgium.

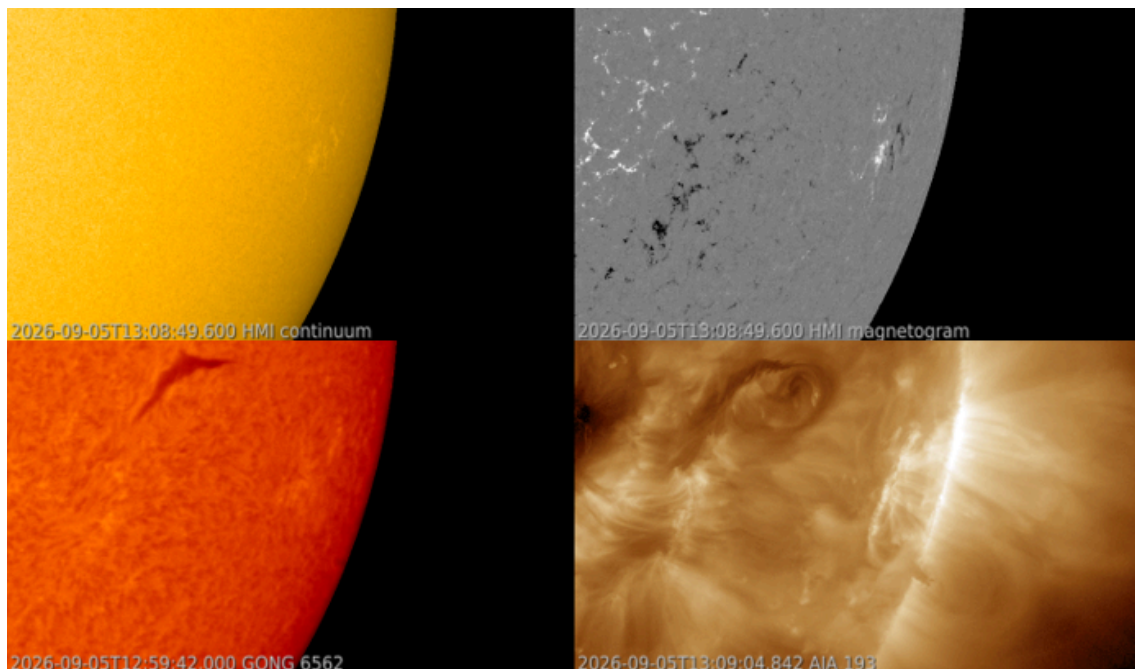
Content	Page
1. Antics of a spotless active region	2
2. STCE hosts MILSWx-10	6
3. Review of Solar and Geomagnetic Activity	7
4. International Sunspot Number by SILSO	9
5. PROBA2 Observations	9
6. Noticeable Solar Events	11
7. Geomagnetic Observations in Belgium	12
8. The SIDC Space Weather Briefing (31 Aug 2026 - 6 Sep 2026)	12
9. Upcoming Activities	13

Final Editor : Petra Vanlommel
Contact : R. Van der Linden, General Coordinator STCE,
Ringlaan - 3 - Avenue Circulaire, 1180 Brussels,
Belgium

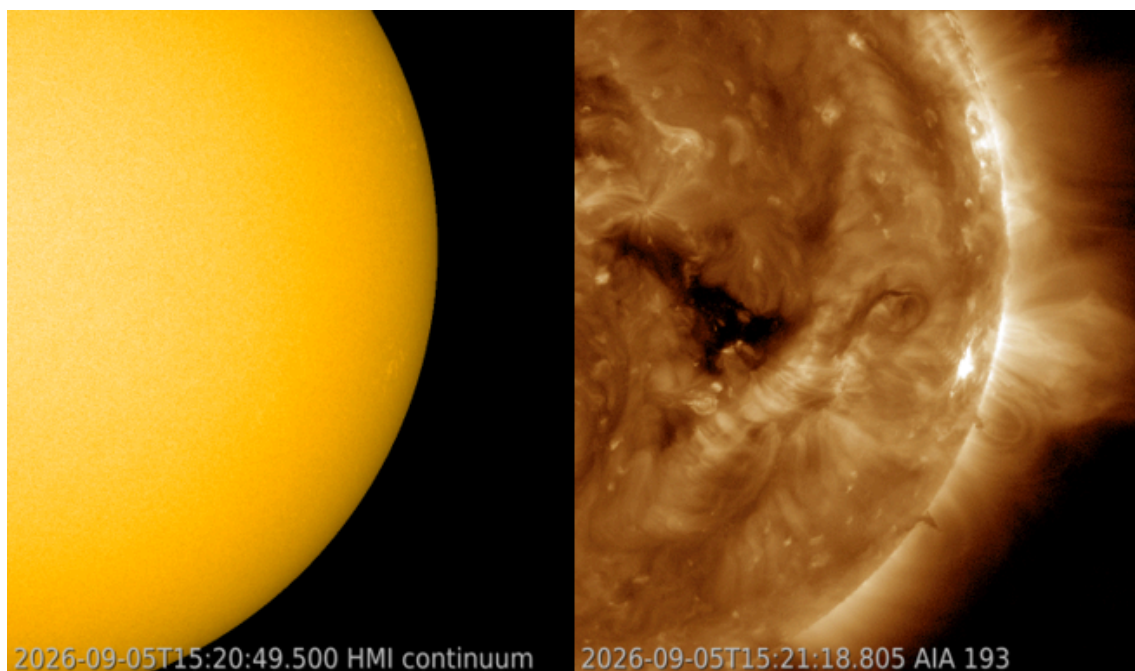
1. Antics of a spotless active region

Sometimes it's hard to be a space weather forecaster. SIDC sunspot region 951 (NOAA 4520) had become spotless on 3 September and had not produced any significant flaring (C-class or higher) for several days. There was also no filament visible in H-alpha. Solar filaments are clouds of charged particles ("plasma") above the solar surface squeezed between magnetic regions of opposite polarity. Being cooler and denser than the plasma underneath and their surroundings, they appear as dark lines when seen on the solar disk in dedicated filters such as in H-alpha (656.28 nm).

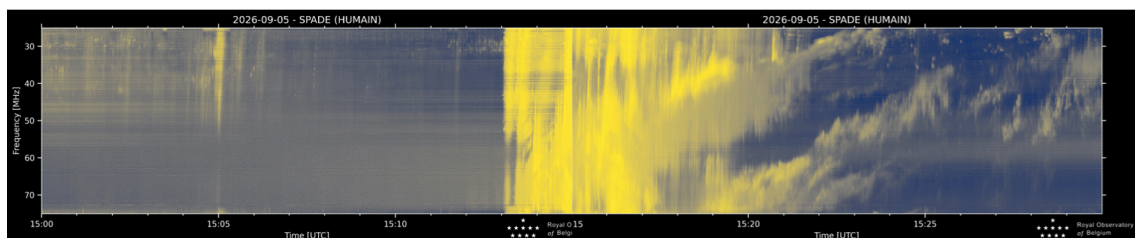
In this case, the region only revealed its location with some facula fields (bright regions in the photosphere), which is typical for a sunspot group that has decayed. Then, as the region was approaching the Sun's west limb on 5 September, out of nowhere it produced an M1.0 flare peaking at 15:18 UTC. The mosaic underneath was composed from SDO and GONG/H-alpha images showing the region two hours prior to the eruption in white light (upper left), H-alpha (lower left), extreme ultraviolet (EUV; lower right) and the magnetogram (upper right). In the latter, white denotes patches where magnetic field lines are leaving the Sun (positive polarity), and black denotes areas where magnetic field lines are returning to the Sun (negative polarity).



The quite violent eruption can be seen in the imagery underneath combining views in white light (left) and in EUV (SDO/AIA 193; right). A clip is available in the online version of this newsitem at <https://www.stce.be/news/835/welcome.html> A distinct coronal wave (also known as EIT wave or EUV wave - see this STCE newsitem at <https://www.stce.be/news/241/welcome.html>) can be seen in the EUV imagery emanating from the location of NOAA 4520. Post-eruption coronal loops can be seen rising along the neutral line in the active region (mainly in the north-south direction), which separates opposite polarity magnetic fields.



The radio emission associated with the flare was nicely recorded by the SPADE instrument of the Humain Radio Astronomy Station (HuRAS - https://www.sidc.be/humain/spade_latest). The spectrogram underneath covers the frequency range from 25 to 75 MHz (vertical axis), with time on the horizontal axis. It nicely shows Type III and Type II radio bursts (see the STCE SWx classification page at <https://www.stce.be/educational/classification#radio>) around the time of the eruption. This radio noise from the Sun prevented radio-amateurs in Belgium for a full 5 minutes -from 15:15 to 15:20 UTC- to make useful observations of radio meteors (<https://www.stce.be/news/512/welcome.html>) at their beacon frequency of 49.99 MHz (see online chart - Credits: Felix Verbelen). A small but noticeable interruption.



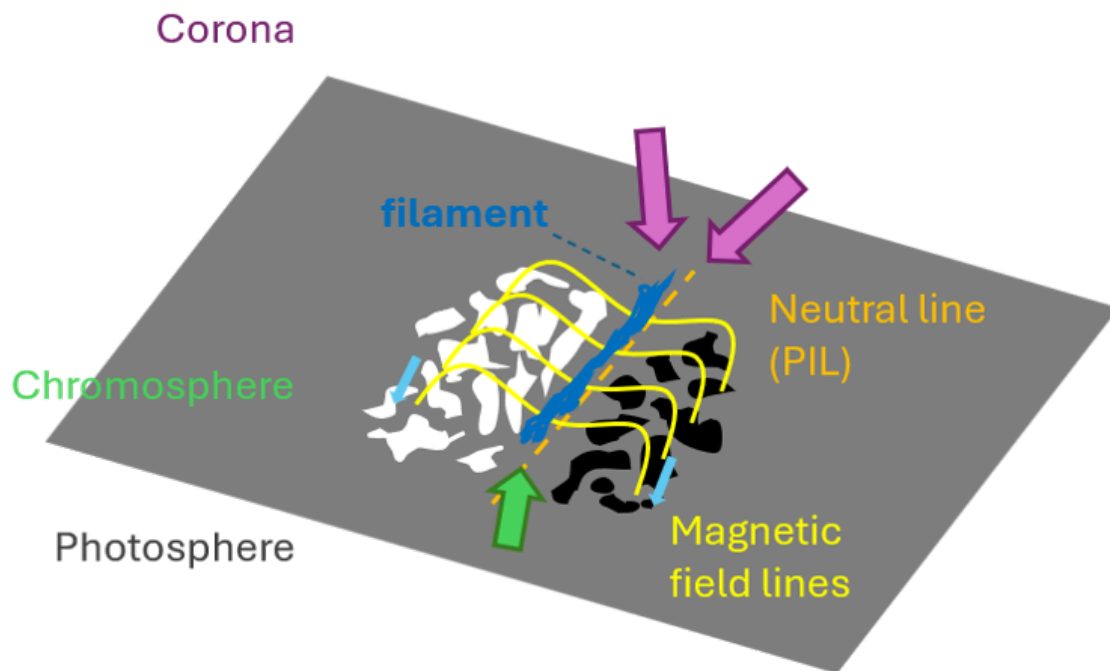
All these observations already indicated that there was a good likelihood that a coronal mass ejection (CME) would be associated with this flare. A fast halo CME was indeed observed in coronagraphic images from around 15:36 UTC onwards, with an estimated plane-of-sky speed of about 1400 km/s. Due to its source location close to the west limb and the estimated propagation direction, the SIDC forecaster (<https://www.sidc.be/index.php>) expected only a low probability for this CME to deliver a glancing blow to the earth environment. In the end, the solar wind parameters did not show an obvious change in their values that would indicate a glancing blow from this CME.

To top it off, this eruption was also associated with a minor proton event. Both the greater than 10 Mev and 100 MeV proton flux briefly reached their alert threshold of respectively 10 and 1 pfu (proton flux units), with peaks of 17 and 1.1 pfu reached about 90 and 30 minutes after the flare's maximum in soft x-rays (see the online GOES chart). This is fast and thus, the proton event cannot be caused by the shock of the associated CME, but is really associated with the eruption itself. The favorable longitude of the sunspot region 68 degrees west of the central meridian helps of course, as it is near the perfect

A circular astronomical image, likely a deep-field exposure, showing a dense field of stars. In the center, there is a bright, circular source with a distinct ring-like structure, possibly a protoplanetary disk or a ringed planet. The background is filled with numerous stars of varying brightness. The image is labeled with the date and time '2026/09/05 17:06' in the bottom left corner.

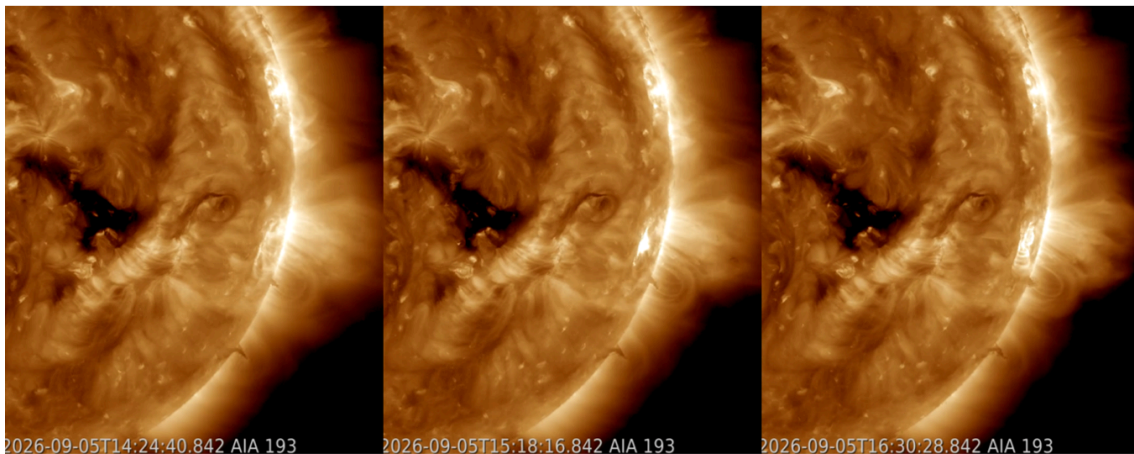
Step A. In its simplest form, a filament channel is a magnetic structure consisting of a series of magnetic loops that are hanging over a magnetic polarity inversion line (Parenti 2014 - <https://link.springer.com/article/10.12942/irsp-2014-1>). This "PIL", also called neutral line, separates areas of opposite magnetic polarity, i.e. the white and black areas in the highly simplified sketch underneath. The neutral line itself is indicated as a dashed orange line, and the magnetic field lines are marked in yellow. Note the dip in these magnetic field lines, i.e. the top of the loops is curved downward. This allows the structure to

function as a "cradle" for the material that later may make up the filament. More complex forms such as a corkscrew configuration are possible too.



Step B. According to a recent study (Zessner et al. 2026 - <https://www.nature.com/articles/s41550-026-02840-7>), random motions in the chromosphere (the Sun's lower atmosphere), may inject a small blob of cool chromospheric material into the magnetic dips. This is the start of the development of the filament (the blue structure in the sketch above), which can then grow from the continued supply of plasma by condensation from the corona (the Sun's hot upper atmosphere) above and/or the continued injections from the chromosphere below. At the same time, material can also drain away from the filament. Indeed, as the filament structure is continuously swaying from side to side, cool plasma can now-and-then rain down along the magnetic field lines from the top of the prominence to the solar surface. In the sketch, the mass supply from the corona and the chromosphere is indicated by respectively the thick pink and green arrows, while the mass drain towards the chromosphere is indicated by the thin cyan blue arrows. It may be clear that this whole structure is very dynamic!

Step C. In the case of spotless NOAA 4520, the absence of a filament in this region suggests that the filament channel was empty. So, no plasma injection from the chromosphere had taken place yet, maybe because the magnetic structure was still in its early formation, or because it was more complex than discussed above and prevented the upload of chromospheric plasma. Local dynamics may then have contributed to the destabilisation and subsequent violent eruption of the filament channel. It's virtually certain that a magnetic structure was present in this region as can be gauged from the series of coronal loops that can be seen developing over the neutral line in this region after the eruption took place (EUV images below). Eruptions of (nearly) empty filament channels in (nearly) spotless regions have been discussed in earlier STCE newsitems such as <https://www.stce.be/news/618/welcome.html>, <https://www.stce.be/news/681/welcome.html> and <https://www.stce.be/news/578/welcome.html> - so this kind of eruptions may not be that uncommon. Nonetheless, it remains quite a feat to have an M-class flare, a fast CME and a minor proton event from an eruption in a spotless region.



2. STCE hosts MILSWx-10

From September 7 to 10, military and civilian space weather experts gathered at the STCE to discuss key advances and challenges in military space weather. The STCE, in collaboration with the METEOWING of the Belgian Armed Forces, had the pleasure of hosting the 10th edition on the NATO Military Space Weather Technical Panel meeting (MILSWx-10) at their premises in Uccle (Brussels).

During this meeting representative of different nations come together to tackle military space weather challenges: they share their knowledge on the impacts of space weather on military operations and exchange best practices in order to build space weather services at the NATO level.

The participants of MILSWx-10 also enjoyed a tour of the STCE, where they could get acquainted with the vast range of activities we have in the field of space weather. This tour included visits to the solar dome and the space weather operations room, as well as explanations on our solar radio observations and the various solar missions the STCE participates in.



3. Review of Solar and Geomagnetic Activity

Solar Active Regions (ARs) and flares

Solar flaring activity ranged from low to moderate over the week. Three M-class flares were recorded. An M3.0 flare (SIDC Flare 8507) peaked at 19:20 UTC on September 2 and an M1.2 flare (SIDC Flare 8523) peaked at 07:53 UTC on September 4, both produced by the returning SIDC Sunspot Group 943 (NOAA Active Region 4524). This region was also responsible for numerous C-class flares and remained the main source of flaring activity during the second half of the week.

Despite having decayed near the west limb, SIDC Sunspot Group 951 (NOAA Active Region 4520) produced an M1.0 flare (SIDC Flare 8533) peaking at 15:18 UTC on September 5. The flare was associated with strong coronal dimming, a fast halo coronal mass ejection (CME), and a proton event.

Coronal mass ejections

Several coronal mass ejections were observed during the week. Early in the week, multiple CMEs propagated predominantly towards the east and northeast and were associated with activity from SIDC Sunspot Group 943 (NOAA Active Region 4524), including a halo CME associated with the M3.0 flare on September 2 and further CMEs associated with C-class flaring and Type II and Type IV radio emissions. A fast halo CME was observed from around 15:36 UTC on September 5 following the M1.0 flare from the decayed SIDC Sunspot Group 951 (NOAA Active Region 4520) near the west limb. The CME had an estimated plane-of-sky speed of about 1400 km/s.

Coronal Holes

SIDC Coronal Hole 179, an equatorial coronal hole with positive polarity, was identified near the central part of the solar disk during the week. It reached the central meridian around September 3 and subsequently moved towards the western side of the solar disk.

Proton flux levels

The greater than 10 MeV GOES proton flux remained at background levels and well below the 10 pfu threshold during most of the week. Following the M1.0 flare from the decayed SIDC Sunspot Group 951 (NOAA Active Region 4520) on September 5 and the associated fast halo CME, the greater than 10 MeV proton flux increased and crossed the 10 pfu alert threshold at 16:15 UTC. The proton flux subsequently decreased and was below the 10 pfu threshold by September 6.

Electron fluxes at GEO

The greater than 2 MeV electron flux was enhanced at the beginning of the week, fluctuating around and at times above the 1000 pfu alert threshold, likely in response to the high-speed stream influencing Earth during the preceding days.

The 24-hour electron fluence reached moderate levels. Electron flux levels subsequently decreased, remaining mostly below the alert threshold towards the end of the week, while the electron fluence returned towards normal levels.

Solar wind

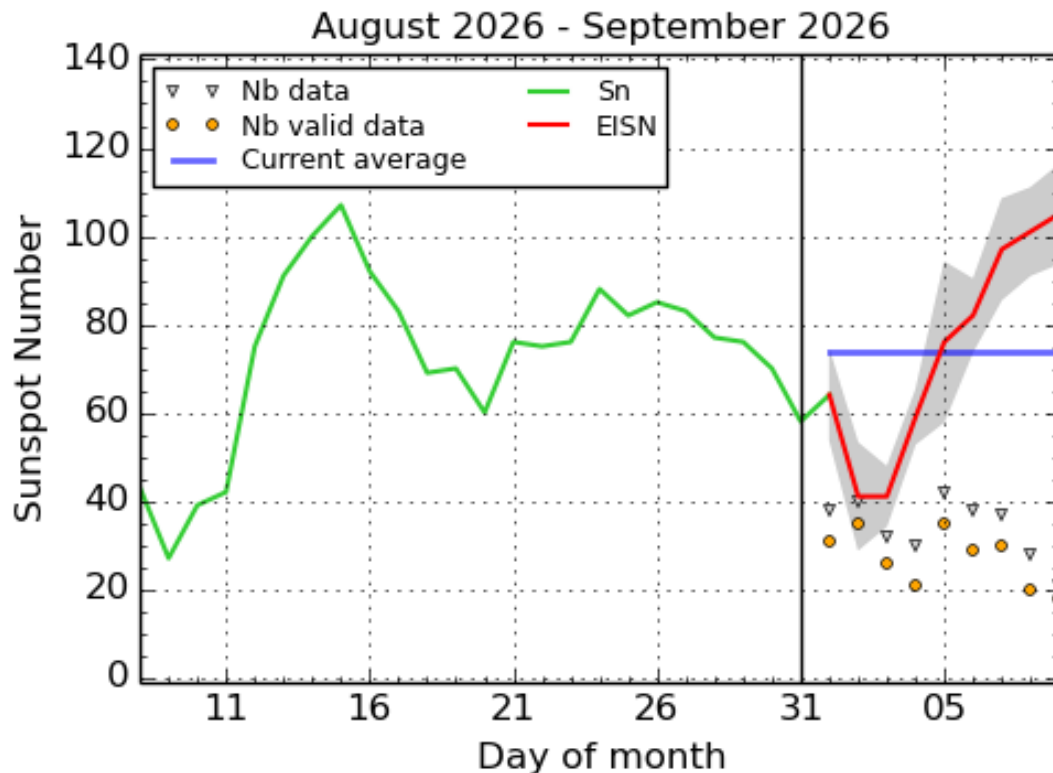
Solar wind conditions were mildly enhanced at the beginning of the week due to the remaining influence of a high-speed stream, with solar wind speeds around 415 to 485 km/s on August 31.

The solar wind speed subsequently decreased and slow solar wind conditions prevailed for most of the week, generally between about 320 km/s and 450 km/s.

Geomagnetism

Geomagnetic conditions were mostly quiet to unsettled throughout the week. An isolated active period was observed locally over Belgium at the beginning of the week, with K-Bel reaching 4, while conditions during the remainder of the week were predominantly quiet to unsettled.

4. International Sunspot Number by SILSO



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium, 2026 September 9

The daily Estimated International Sunspot Number (EISN, red curve with shaded error) derived by a simplified method from real-time data from the worldwide SILSO network. It extends the official Sunspot Number from the full processing of the preceding month (green line), a few days more than one solar rotation. The horizontal blue line shows the current monthly average. The yellow dots give the number of stations that provided valid data. Valid data are used to calculate the EISN. The triangle gives the number of stations providing data. When a triangle and a yellow dot coincide, it means that all the data is used to calculate the EISN of that day.

5. PROBA2 Observations

Solar Activity

Solar flare activity fluctuated from low to moderate during the week.

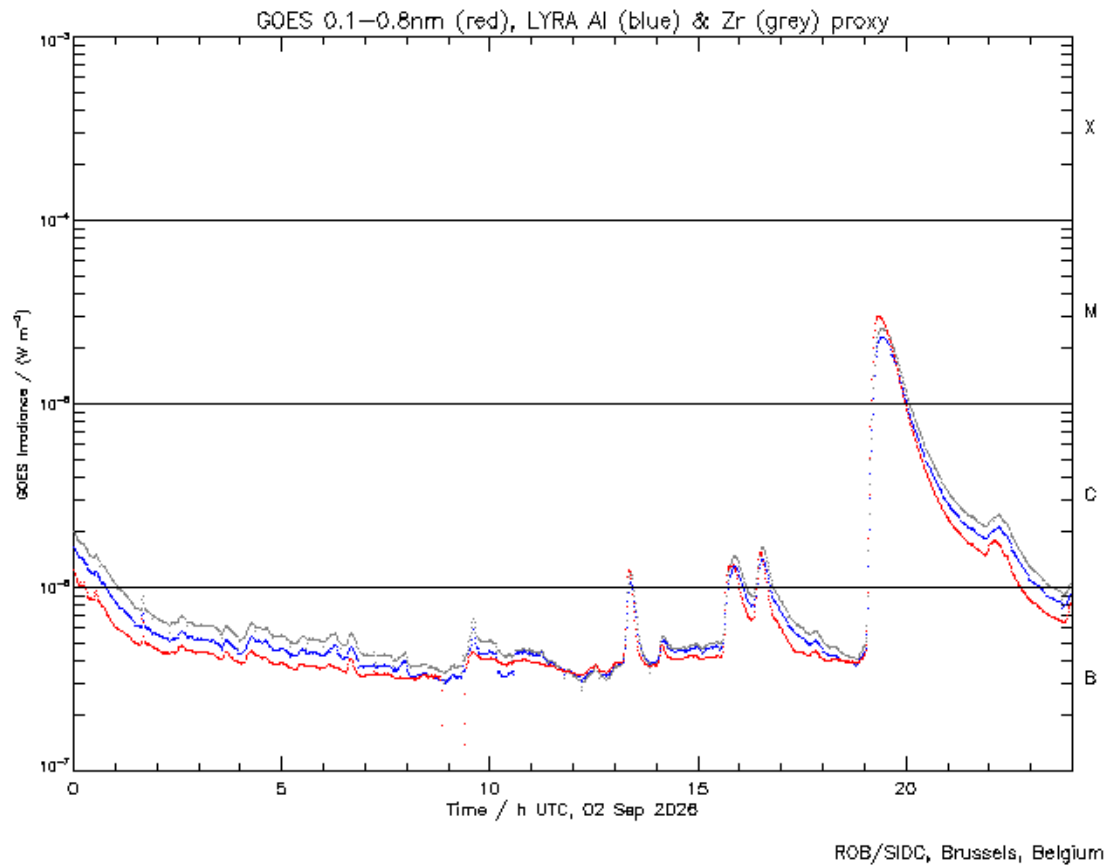
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: <https://proba2.oma.be/ssa>
This page also lists the recorded flaring events.

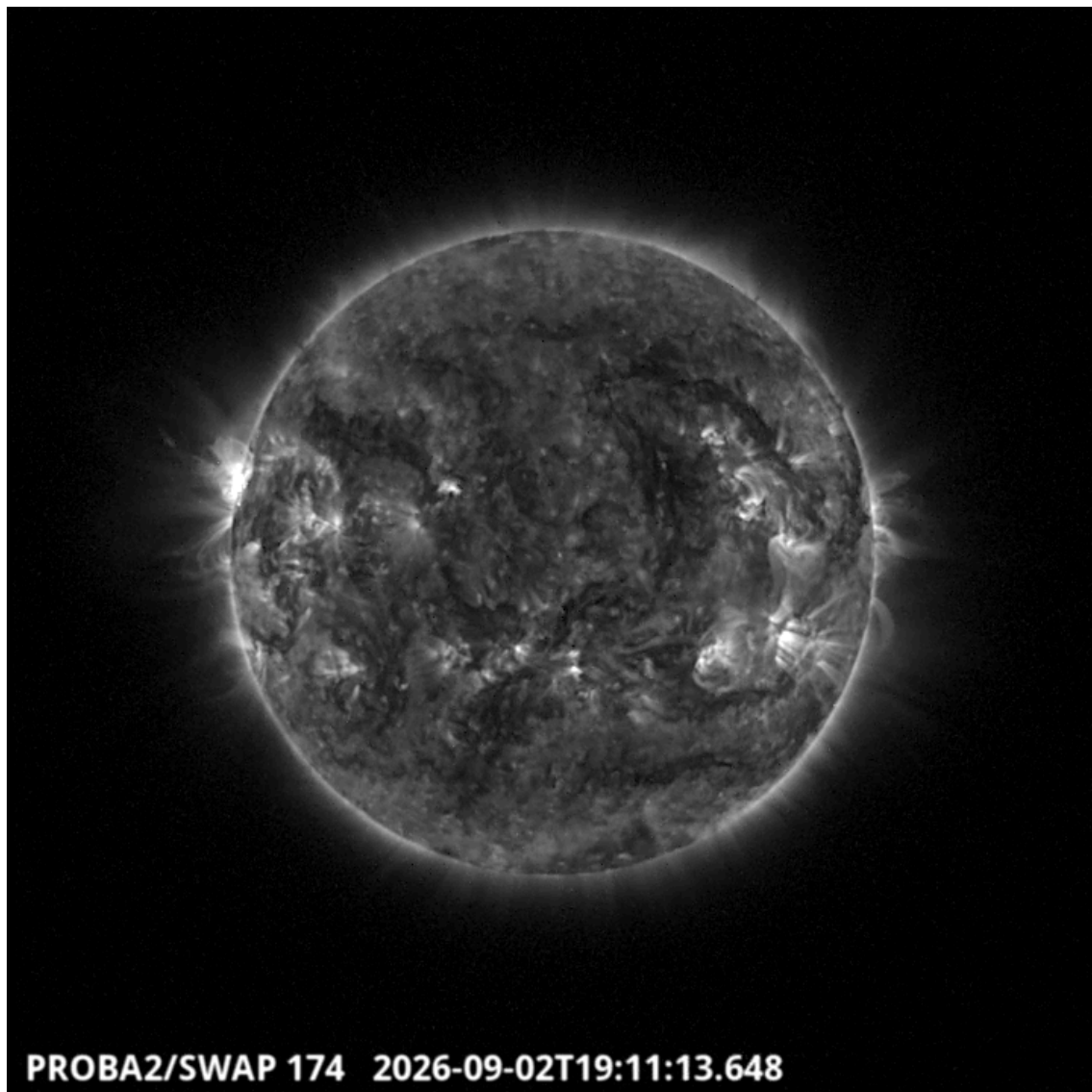
A weekly overview movie (SWAP week 858) can be found here: https://proba2.sidc.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2026_08_31.mp4.

Details about some of this week's events can be found further below.

If any of the linked movies are unavailable they can be found in the P2SC movie repository here: <https://proba2.oma.be/swap/data/mpg/movies/>.

Wednesday September 02





The largest flare of this week was an M3.0, and it was observed by LYRA (top panel) and SWAP (bottom panel). The flare peaked on 2026-Sep-02 at 19:20 UT and occurred at the north-eastern limb of the Sun, originating from active region NOAA4524 (SIDC 943).

Find a SWAP movie of the event here: https://proba2.sidc.be/swap/movies/20260902_swap_movie.mp4.

6. Noticeable Solar Events

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
02	1857	1920	1948		M3.0			III/2II/2IV/2		4524
04	0745	0753	0800	N14E71	M1.2	1N			25	4524
05	1504	1518	1527	S12W65	M1.0	1F		VI/3		4520

LOC: approximate heliographic location

XRAY: X-ray flare class

OP: optical flare class

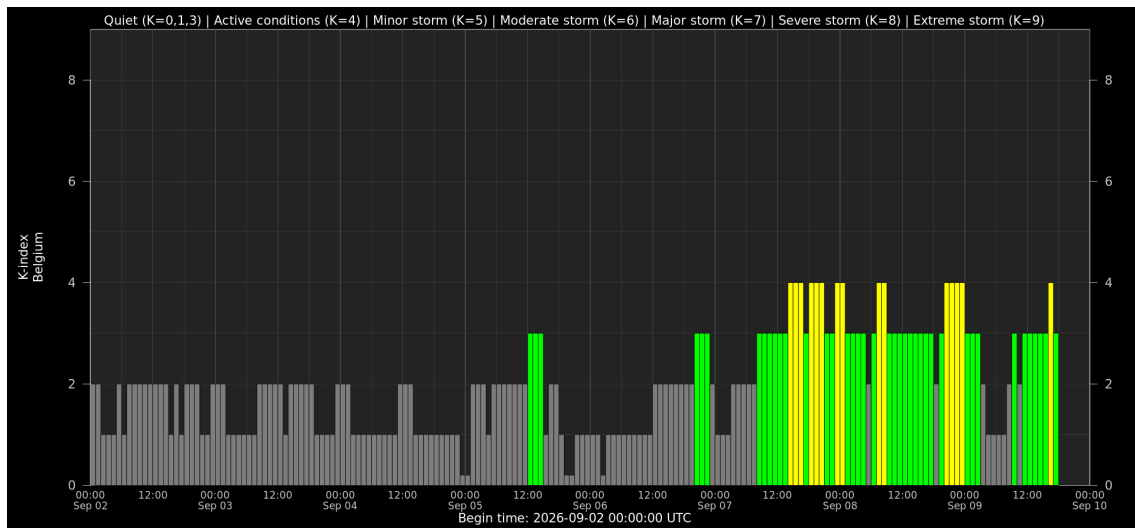
10CM: peak 10 cm radio flux

TYPE: radio burst type

Cat: Catania sunspot group number

NOAA: NOAA active region number

7. Geomagnetic Observations in Belgium



Local K-type magnetic activity index for Belgium based on data from Dourbes (DOU) and Manhay (MAB). Comparing the data from both measurement stations allows to reliably remove outliers from the magnetic data. At the same time the operational service availability is improved: whenever data from one observatory is not available, the single-station index obtained from the other can be used as a fallback system.

Both the two-station index and the single station indices are available here: http://ionosphere.meteo.be/geomagnetism/K_BEL/

8. The SIDC Space Weather Briefing (31 Aug 2026 - 6 Sep 2026)

The forecaster on duty presented the SIDC briefing that gives an overview of space weather from August 31 to September 6.

The pdf of the presentation: https://www.stce.be/briefings/20260907_SWbriefing.pdf

SIDC Space Weather Briefing

31 August 2026-06 September 2026

de Patoul Judith

& the SIDC forecaster team



Solar Influences
Data analysis Centre
www.sidc.be

9. Upcoming Activities

Courses, seminars and events with the Sun-Space-Earth system and Space Weather as the main theme. We provide occasions to get submerged in our world through educational, informative and instructive activities.

- * Sep 26-27, 2026, Open Days at the Space Pole, Ukkel, Belgium - <https://spacepole.be/en/open-days>
- * Oct 12-14, 2026, STCE Space Weather Introductory Course, Brussels, Belgium - register: <https://events.spacepole.be/event/257/> - Fully booked
- * Oct 15, 2026, Post Space Weather Introductory Course, Brussels, Belgium - register: <https://events.spacepole.be/event/286/>
- * Oct 16, 2026, Watching the Sun: a 200-year journey, guided tour Solar Physics, Ukkel, Belgium - register <https://events.spacepole.be/category/2/>
- * Oct 29 - Nov 1, 2026, Prior to ESWW2026 - Space Weather Training Course in Firenze, Italy - Applications closed
- * Nov 2-6, 2026, European Space Weather Week, Florence, Italy, <https://esww2026.eswan.eu/>
- * Nov 13, 2026, Watching the Sun: a 200-year journey, guided tour Solar Physics, Ukkel, Belgium - register <https://events.spacepole.be/category/2/>
- * Nov 23-25, 2026, STCE course: Role of the ionosphere and space weather in military communications, Brussels, Belgium - register: <https://events.spacepole.be/event/259/>
- * Nov 30, 2026, Watching the Sun: a 200-year journey, guided tour Solar Physics, Ukkel, Belgium - register <https://events.spacepole.be/category/2/>
- * Dec 7-9, 2026, STCE Space Weather Introductory Course for Aviation, Brussels, Belgium - register: <https://events.spacepole.be/event/262/> - Fully booked

To register for a course and check the seminar details, navigate to the STCE Space Weather Education Center: <https://www.stce.be/SWEC>

If you want your event in the STCE newsletter, contact us: stce_coordination@stce.be



Space Weather Education Centre

Website: <https://www.stce.be/SWEC>