

STCE Newsletter

5 Oct 2026 - 11 Oct 2026



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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.

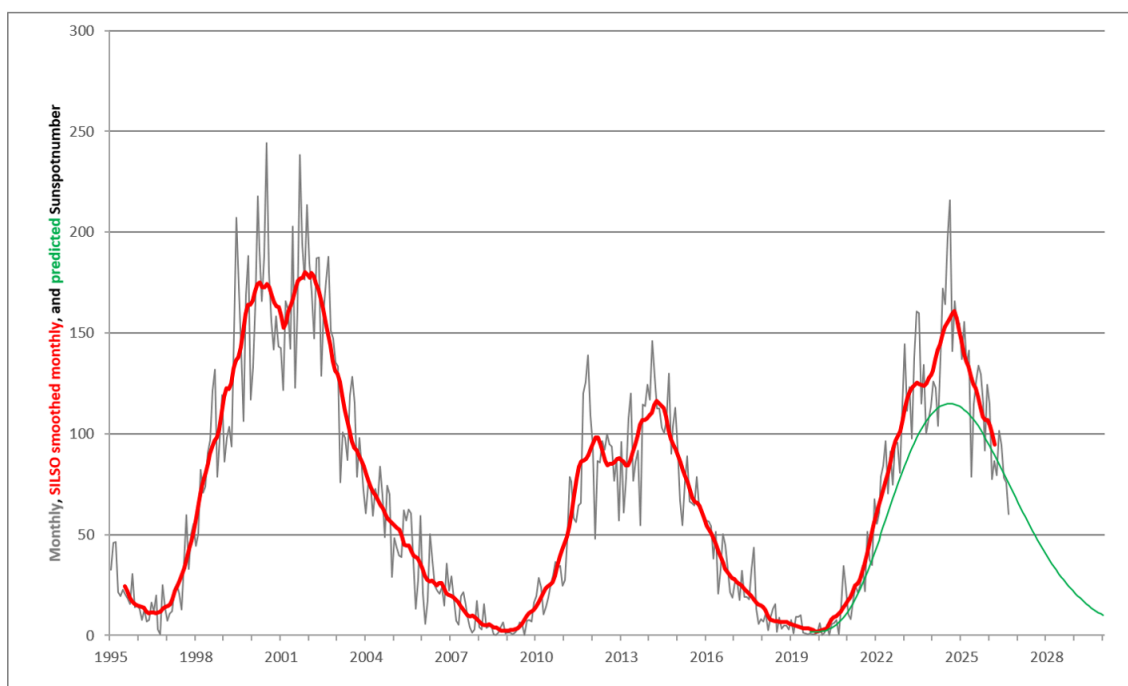
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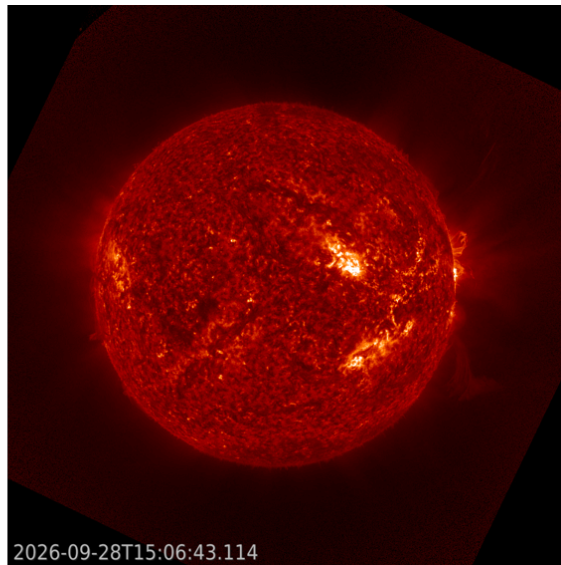
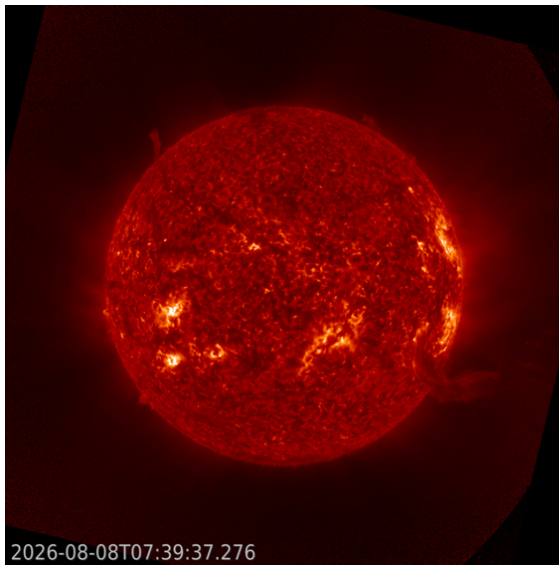
1. Tracking SC25

The STCE's SC25 Tracking page <https://www.stce.be/content/sc25-tracking> has been updated to reflect the latest evolution of some critical space weather parameters for the ongoing solar cycle 25 (SC25). It covers various aspects of space weather, from sunspot numbers over geomagnetic indices all the way to cosmic rays. The multiple graphs allow for a comparison with previous solar cycles at similar stages in their evolution.

The graph below shows the monthly and SILSO smoothed monthly sunspot number (SIDC/SILSO <https://www.sidc.be/SILSO/home>) from around the start of SC23 up to the current SC25. The prediction for the ongoing solar cycle 25, which started in December 2019, is displayed in green. Following the maximum of the smoothed monthly sunspot number in October 2024 (SIDC newsitem - <https://www.sidc.be/article/solar-cycle-25-reached-its-maximum-october-2024>), the overall solar activity has been gradually declining. Flaring activity continued but at a lower rate than during the 2024-2025 timeframe. Of note is that the ongoing solar cycle has already more than 2000 M- and X-class flares. For comparison: the previous solar cycle totaled only 1200 such flares over its entire duration! With still 4 to 5 years to go until the next solar minimum, the 2457 M- and X-class flares from SC23 are on the target list as well!



A number of the eruptions were caused by the eruption of filaments, i.e. 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 disc and as bright blobs when seen near the solar limb (then they are called "prominences"). Special filters are required to observe these features. The images underneath show filament eruptions on 8 August (2!) and on 28 September in extreme ultraviolet (GOES/SUVI 304 <https://www.spaceweather.gov/products/goes-solar-ultraviolet-imager-suvi>). Clips are available in the online version of this newsitem at <https://www.stce.be/news/838/welcome.html>



2. Visit our radio astronomy station in Humain

Come and discover our radio astronomy station in Humain (Marche-en-Famenne), its history since its founding in 1953 and its current scientific activities. The guided visit will take about an hour and is open to everyone although it is not specifically suited for young children.

The first tours will be in French on October 28th 10:30 AM and 1:30 PM.

The tour is free of charge, but registration is mandatory:

<https://200year.observatory.be/en-gb/humain>



3. Review of solar and geomagnetic activity

Solar Active Regions (ARs) and flares

The solar flaring activity over the past week varied between low and high levels with daily C-class flaring and 7 M-class flares registered. A total of 10 numbered active regions were identified throughout the

week. The strongest registered solar flaring activity was an M6.7 flare (SIDC Flare 8685) with peak time at 15:48 UTC on October 08. It was produced by SIDC Sunspot group 976 (NOAA Active Region 4549), which was the main driver for the observed flaring activity over the entire week. The region was relatively small and simple on October 05, but rapidly evolved into a large and complex sunspot group, being classified as magnetic type beta-gamma-delta on October 06. It remained the largest and most complex activity region over the entire week and produced several M-class flares including an M6.4 flare (SIDC Flare 8708) with peak time 15:10 UTC on October 10. An isolated M.0-flare (SIDC Flare 8654) peaking at 18:48 UTC on October 05 was produced by SIDC Sunspot group 973 (NOAA Active Region 4545). An M1.3 flare (SIDC Flare 8702) with peak time 14:09 UTC on October 09 was produced by SIDC Sunspot group 975 (NOAA Active Region 4547) once the region had rotated behind the west limb. The remaining regions were predominantly simple and either exhibited some low levels of activity or remained quiet and inactive.

Coronal mass ejections

Multiple partial halo coronal mass ejections (CME) were detected over the past week.

An almost full halo CME (SIDC CME 725) was detected in the LASCO/C2 coronagraph imagery at 07:12 UTC on October 06. The CME was associated with a large dimming and a coronal wave as seen in SDO/AIA 211 Angstrom imagery. It was related to an M1.4 flaring (SIDC Flare 8666), peaking at 06:10 UTC on October 06, produced by SIDC Sunspot Group 976 (NOAA Active Region 4549) near the solar disc centre. Associated type II radio emission was detected around 06:00 UTC. The CME was estimated to have a speed of about 560 km/s and a possible arrival at Earth on October 09 was expected.

A weak, faint and slow partial halo CME (SIDC CME 726) was detected in the LASCO/C2 coronagraph imagery at 14:24 UTC on October 07. The event is linked to the long-duration C7.9 flaring from SIDC Sunspot Group 976 (NOAA Active Region 4549) with a notable EUV dimming and a coronal wave detected in the SDO/AIA data starting around 13:00 UTC on October 07. The CME appeared as a slow and narrow westward eruption in STEREO A/COR2 imagery. The CME speed was estimated to be around 350 km/s and a mild glancing blow was possibly expected at Earth on October 11.

Another partial halo CME (SIDC CME 727) was observed by LASCO/C2 to lift off the solar surface around 16:12 UTC on October 08 with a distinct white-light shock and an estimated projected speed of around 500 km/s. The eruption is likely linked to the M6.7 flaring from SIDC Sunspot Group 976 (NOAA Active Region 4549) with peak time at 15:48 UTC on October 08. An associated EUV dimming and a coronal wave were detected in the SDO/AIA data around 16:33 UTC on October 08. Related type II and type IV solar radio emissions were detected at 15:42 UTC and 16:12 UTC on October 08. SIDC CME 727 was estimated to have an Earth-directed component with a possible arrival time late UTC on October 11 to early UTC on October 12. The CME is believed to have arrived at Earth early, in the UTC afternoon on October 10.

Coronal Holes

Several coronal holes were present on the visible disc throughout the week. A positive polarity coronal hole (SIDC Coronal Hole 179) had crossed the central meridian on September 30 and an associated high-speed stream had reached the Earth at the beginning of the forecasting week. SIDC Coronal Hole 182 (a small equatorial coronal hole with a positive polarity) reached the central meridian on October 04, but no associated high-speed stream related to it was detected at Earth. Two large recurrent negative-polarity coronal holes, namely SIDC Coronal Hole 149 and SIDC Coronal Hole 142, crossed the central meridian respectively on October 07 and October 10. A possible high-speed stream arrival related to SIDC Coronal Hole 149 was expected from late October 09 onwards. No clear signatures supporting an arrival at Earth were observed, most probably due to the fast wind being pushed aside by several coronal mass ejections. A high-speed stream associated with SIDC Coronal Hole 142 was expected at Earth for October 13.

Proton flux levels

The greater than 10 MeV GOES proton flux as measured by GOES 18 was predominantly at nominal levels throughout the week with small enhancements related to the strong flaring from SIDC Sunspot group 976 (NOAA Active Region 4549) and associated coronal mass ejections.

Electron fluxes at GEO

The greater than 2 MeV electron flux as measured by GOES 19 started the week below the 1000 pfu threshold, after which it increased up to above 10000 pfu on October 06, 07 and 08. The greater than 2 MeV electron flux decreased below the 1000 pfu threshold late on October 08 and remained low throughout most of the rest of the week with the exception of a brief interval after the solar wind shock arrival on October 10. The 24-hour electron fluence was at moderate levels on October 06, 07, 08 and 09 and at nominal levels throughout the rest of the week.

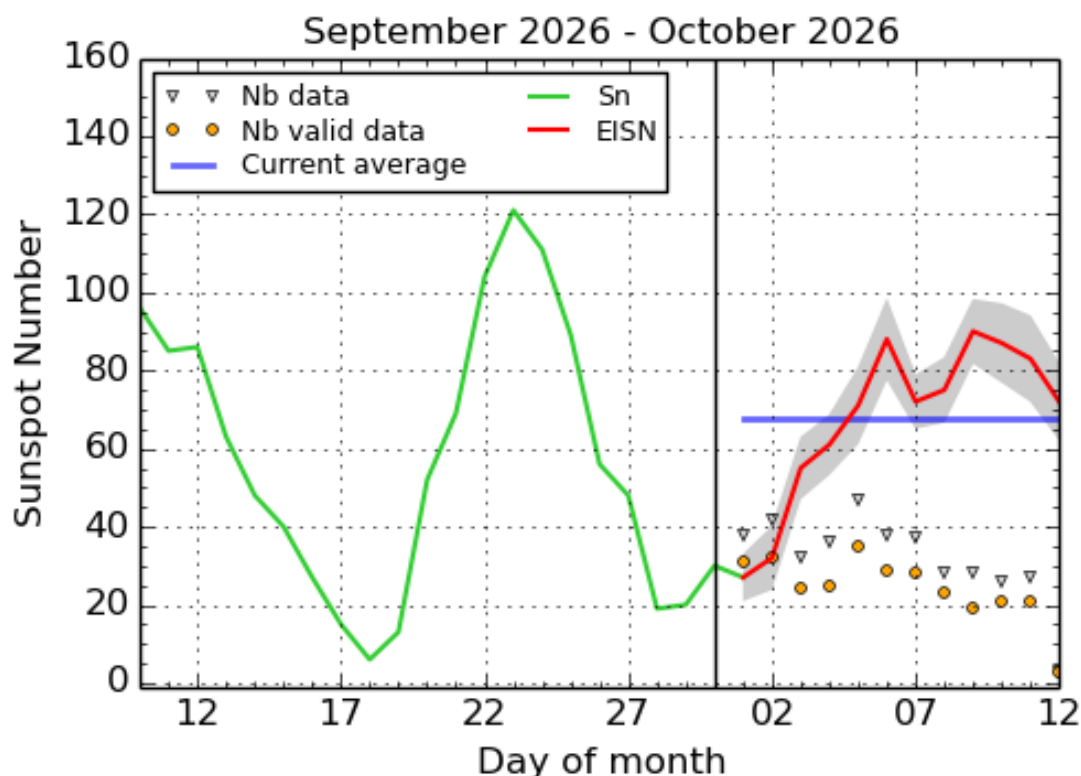
Solar wind

The solar wind conditions (as measured by ACE) at the beginning of the week reflected the influence of a high-speed stream arrival related to the positive polarity SIDC Coronal Hole 179. Related to this arrival the magnitude of the interplanetary magnetic field (B) reached 22 nT with a minimum north-south component (Bz) decreasing to -20 nT. The corresponding solar wind speed increased to close to 650 km/s on October 04 and was close to 600 km/s on October 05. The solar wind parameters returned to nominal slow solar wind regime by October 07 and remained at nominal levels until the arrival of a weak transient on October 09, possibly linked to a weak glancing blow arrival of SIDC CME 725. Further perturbations of the solar wind parameters were registered on October 10 with a strong interplanetary shock arrival at 14:41 UTC, possibly marking an early arrival of SIDC CME 727 or a mix of SIDC CME 726 and SIDC CME 727. The magnitude of B increased up to 46 nT and Bz later on reached - 29 nT. The solar wind speed peaked at 904 km/s and later relaxed to around 600 km/s. The solar wind parameters continued to register a waning influence of the ICME arrival(s) on October 11 with decreasing B values and speeds declining towards 500 km/s by the end of the week.

Geomagnetism

The geomagnetic conditions at the beginning of the week registered globally moderate storm levels in response of an ongoing high-speed stream related to SIDC Coronal Hole 179. The corresponding NOAA Kp index reached 6- late UTC on October 04, while locally over Belgium only minor storm levels were observed. The geomagnetic conditions were predominantly unsettled to active on October 05 and returned to quiet levels throughout October 08. Isolated active periods were recorded in relation to a mild transient on October 09 (a possible mild glancing blow from SIDC CME 725) and major storm levels were reached on October 10 with a strong ICME arrival possibly related to SIDC CME 727 or a combination of SIDC CME 726 and SIDC CME 727.

4. International Sunspot Number by SILSO



SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium, 2026 October 12

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.

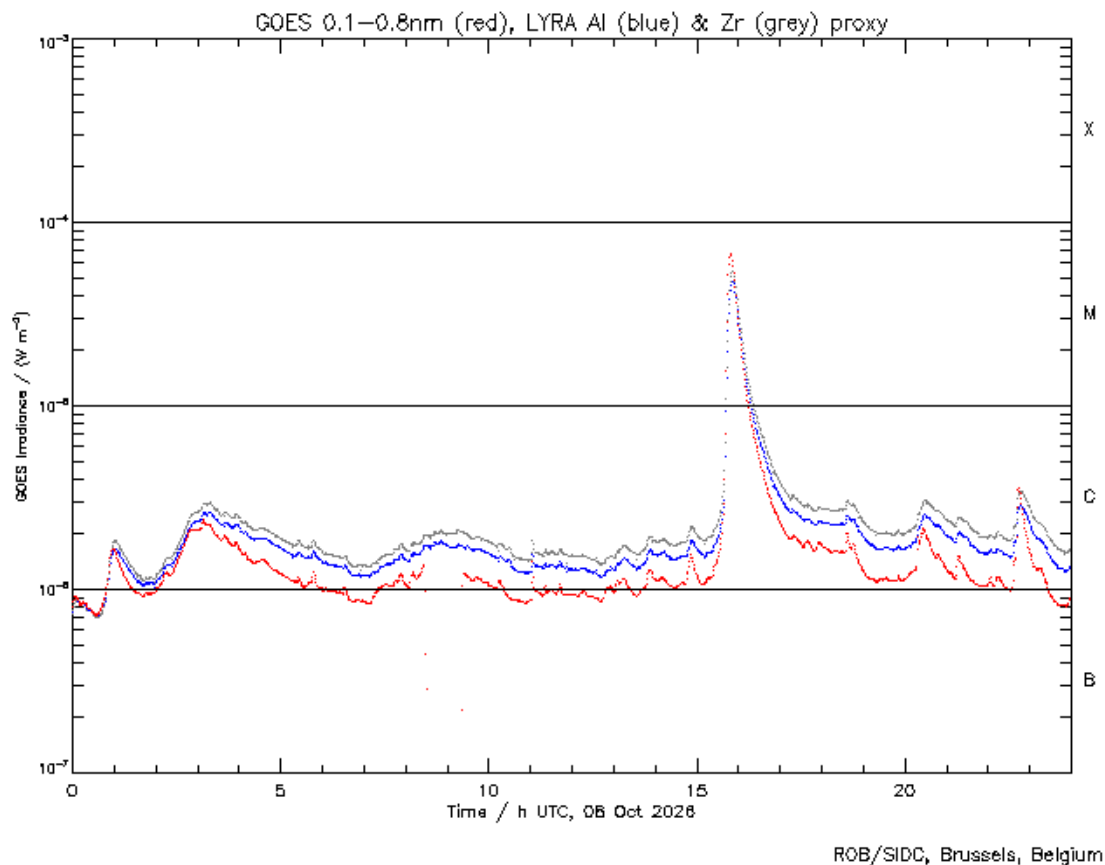
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: <https://proba2.oma.be/ssa>
This page also lists the recorded flaring events.

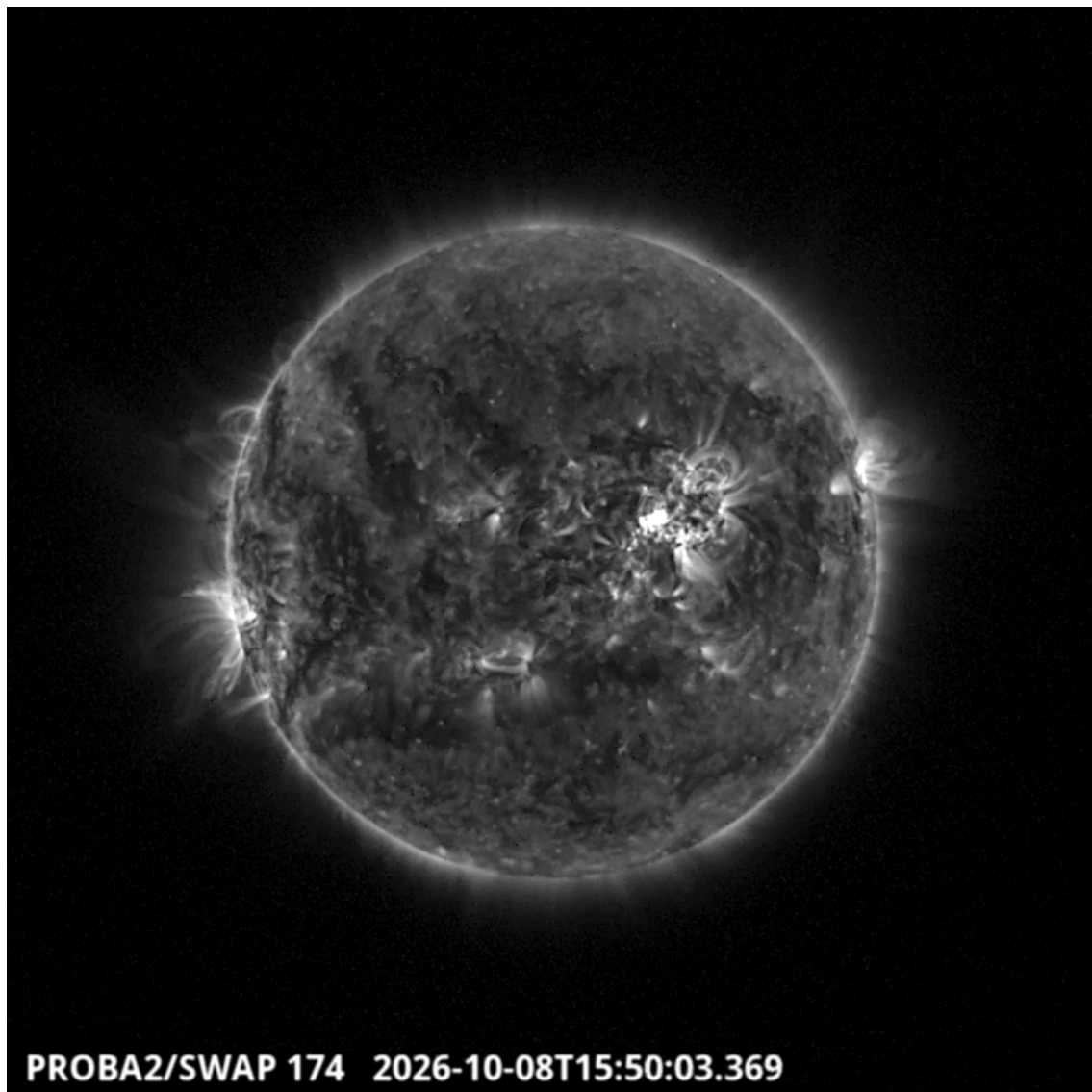
A weekly overview movie (SWAP week 863) can be found here: https://proba2.sidc.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2026_10_05.mp4.

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/>.

Thursday October 08





The largest flare of this week was an M6.7, and it was observed by LYRA (top panel) and SWAP (bottom panel). The flare peaked on 2026-Oct-08 at 15:48 UT and occurred westward of the center of the Sun, originating from active region NOAA4549 (SIDC 976).

Find a SWAP movie of the event here: https://proba2.sidc.be/swap/movies/20261008_swap_movie.mp4.

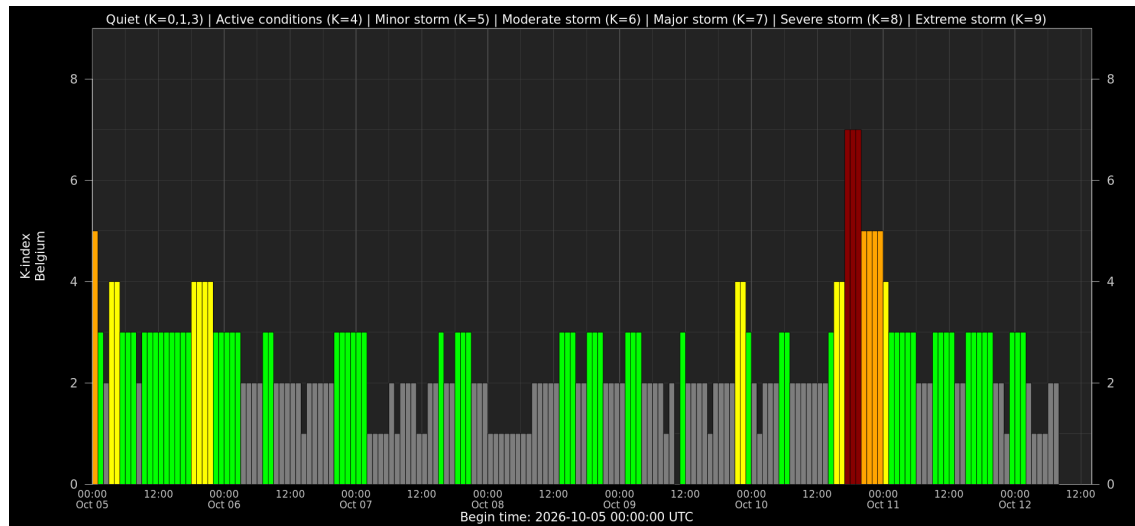
6. Noticeable Solar Events

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
05	1836	1848	1857		M1.0				53	4545
06	0538	0610	0651	N11E10	M1.4	1F		I/3 9	57	4549
06	0747	0805	0813	N9E7	M1.8	SF		II/2	57	4549
08	1529	1548	1558	N12W20	M6.7	2B		I/3 4	57	4549
09	1355	1409	1417		M1.3					4547
10	1356	1412	1427	N11W46	M1.2	1			57	4549
10	1458	1510	1520	N8W56	M6.4	1N		III/2II/1	57	4549

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

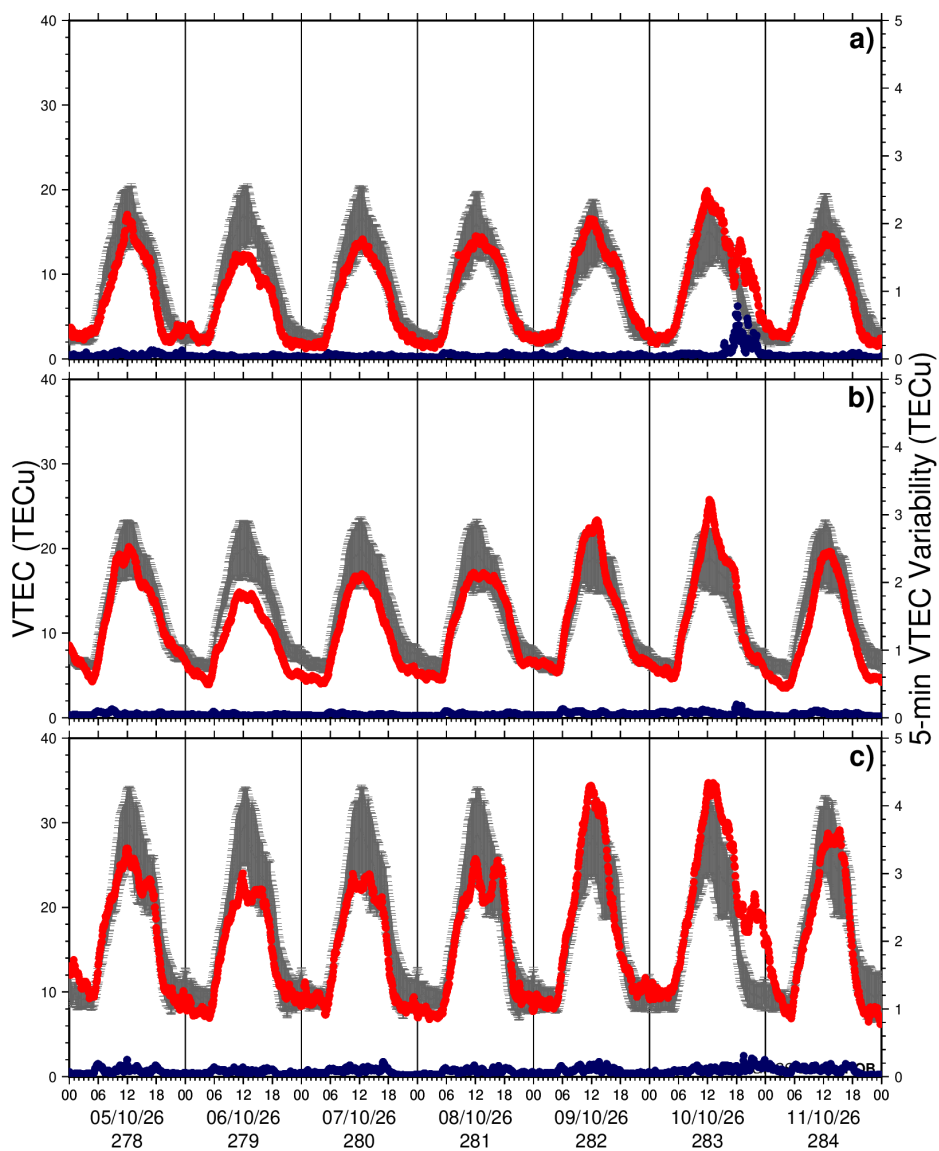
7. Geomagnetic Observations in Belgium

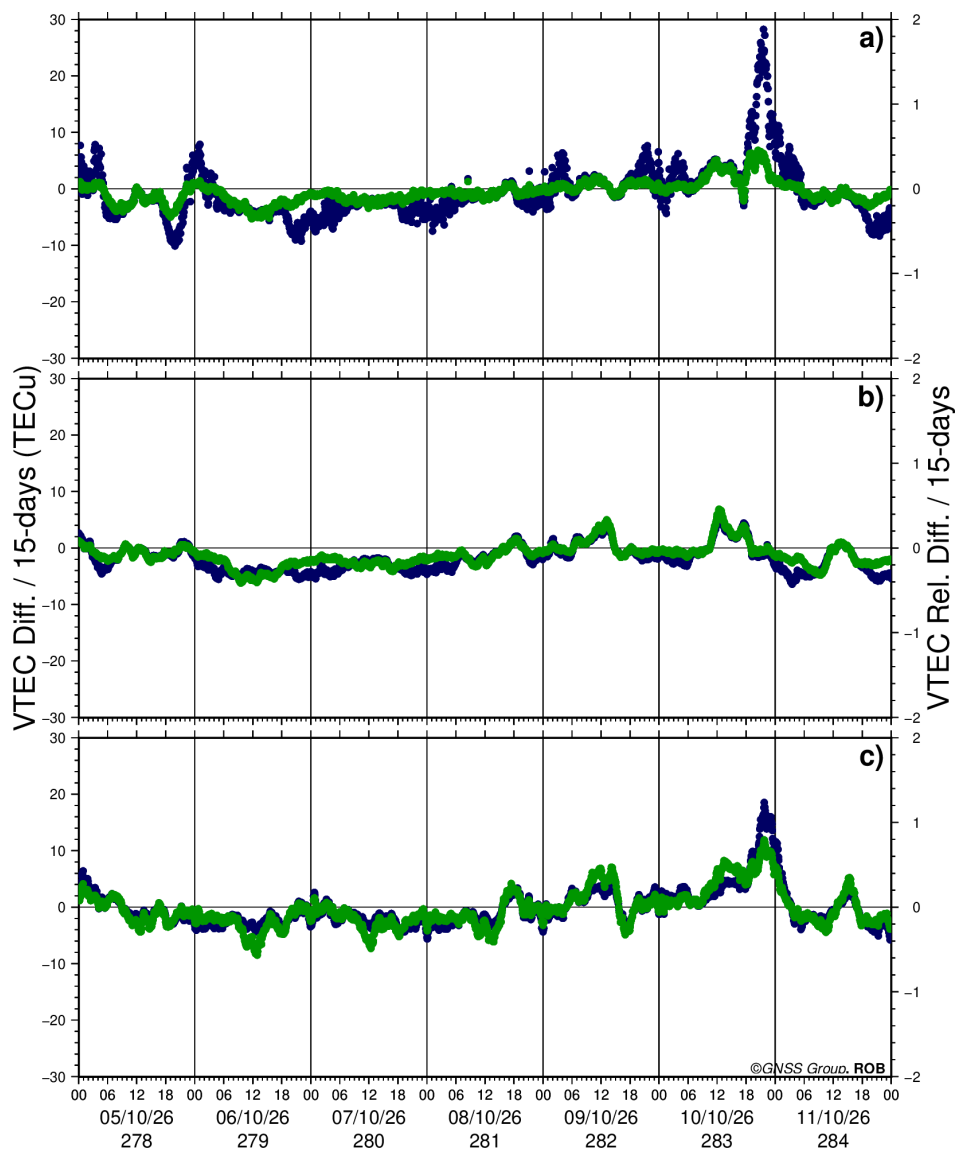


Local K-type magnetic activity index for Belgium based on data from Dourbes (DOU) and Manhay (MAB). Comparing the data from both measurement stations allows to reliably remove outliers from the magnetic data. At the same time the operational service availability is improved: whenever data from one observatory 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. Review of Ionospheric Activity





VTEC time series at 3 locations in Europe from 5 Oct 2026 till 11 Oct 2026

The top figure shows the time evolution of the Vertical Total Electron Content (VTEC) (in red) during the last week at three locations:

- a) in the northern part of Europe(N 61deg E 5deg)
- b) above Brussels(N 50.5deg, E 4.5 deg)
- c) in the southern part of Europe(N 36 deg, E 5deg)

This top figure also shows (in grey) the normal ionospheric behaviour expected based on the median VTEC from the 15 previous days.

The time series below shows the VTEC difference (in green) and relative difference (in blue) with respect to the median of the last 15 days in the North, Mid (above Brussels) and South of Europe. It thus illustrates the VTEC deviation from normal quiet behaviour.

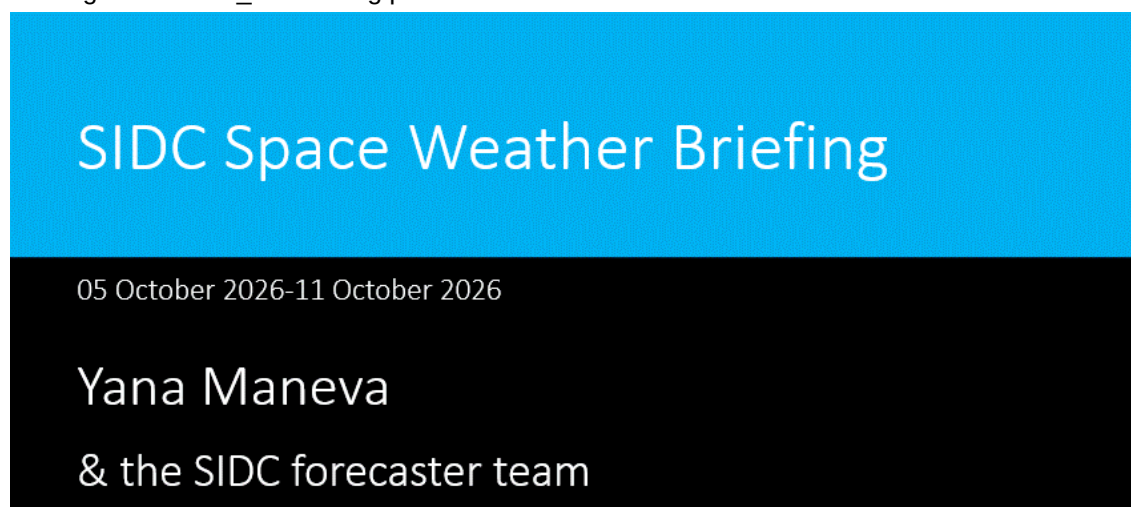
The VTEC is expressed in TECu (with $\text{TECu} = 10^{16}$ electrons per square meter) and is directly related to the signal propagation delay due to the ionosphere (in figure: delay on GPS L1 frequency).

The Sun's radiation ionizes the Earth's upper atmosphere, the ionosphere, located from about 60km to 1000km above the Earth's surface. The ionization process in the ionosphere produces ions and free electrons. These electrons perturb the propagation of the GNSS (Global Navigation Satellite System) signals by inducing a so-called ionospheric delay.

See http://stce.be/newsletter/GNSS_final.pdf for some more explanations; for more information, see <https://gnss.be/SpaceWeather>

9. SIDC Space Weather Briefing

The SIDC briefing presented by the forecaster on duty giving an overview of space weather from 05 to 11 October 2026. The pdf of the presentation can be found here: https://stce.be/briefings/20261012_SWbriefing.pdf



Solar Influences
Data analysis Centre
www.sidc.be

10. 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.

- * Oct 16, 2026, Watching the Sun: a 200-year journey, guided tour Solar Physics, Ukkel, Belgium - register <https://events.spacepole.be/category/2/>
- * Oct 28, 2026, Visit Radio Astronomy station Humain: a 200-year journey, guided tour Radio Astronomie Station, Humain, Belgium - register <https://200year.observatory.be/index.php/en-gb/humain>
- * 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 at stce.be](mailto:stce_coordination@stce.be)



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