

STCE Newsletter

2 Mar 2026 - 8 Mar 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. Message in a rock

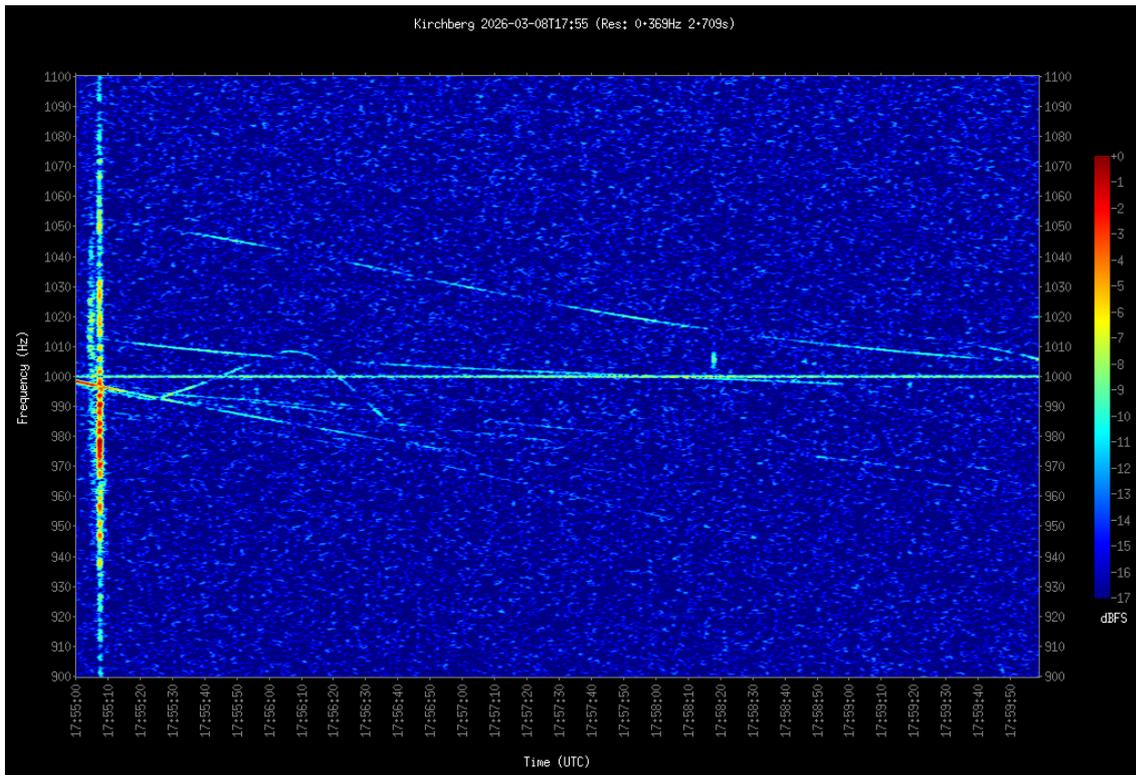
On March 8, several stations from the BRAMS network observed the meteor that became instantaneously famous. From 18:55 CET, people started to post on social media pictures and movies of a bright, exploding meteor. The meteor survived its trip through the atmosphere and touched ground becoming officially a meteorite. A meteorite is in a sense a message in a rock from space. It is literally a fossil from the time that our solar system was born.

BRAMS, Belgian RAdio Meteor Stations

BRAMS can 'see' meteors on their trip through the earth's atmosphere, regardless the weather, day and night. The key is that the meteor material becomes so hot that it evaporates into an electrically charged gas or a plasma.

Hervé Lamy, BRAMS project leader, explains:

Meteors can be detected not only with optical cameras but also using radio techniques. One such method, called forward scatter, relies on a ground-based receiver tuned to a distant radio transmitter. When a meteoroid enters the atmosphere, it produces an ionized trail capable of reflecting radio waves. For a brief moment, the reflected signal becomes detectable. This is known as a meteor echo. By recording these echoes, scientists can count meteors, study their properties, and even remotely measure temperature and wind speeds in the upper atmosphere at altitudes of 80 - 100 km. The BRAMS network continuously monitors meteor activity using a dedicated transmitter and more than 50 receiving stations across Belgium and neighbouring countries. Meteors are relevant for space weather because they modify the upper atmosphere, for example by contributing to persistent metallic layers or high-altitude clouds. They also represent a potential hazard to the growing number of satellites in orbit.



This is a spectrogram showing which frequencies are being reflected as function of time. The horizontal line at 1039 Hz is the frequency of the beacon BRAMS transmitting antenna. The receiving antenna is located in Kirchberg, Germany. When nothing passes or when no echoes are detected, the spectrogram

is dark blue. Echo's are indicated by other colours. Red indicate the most intense echo's. The echo of the March 8 meteor is seen as a vertical line just before 17:55:10 UTC. It spans the whole frequency range from 900 to 1100 Hz and colours nicely red. This meteor clearly pops out of the spectrogram!

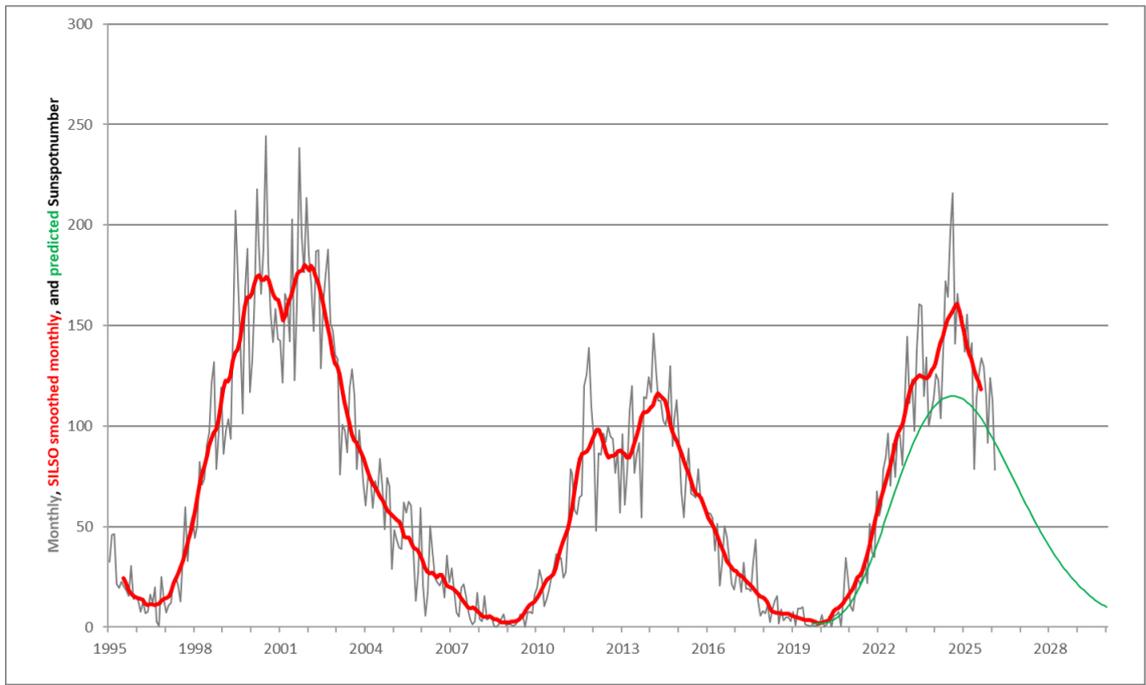


BRAMS (<https://brams.aeronomie.be>) is led by BIRA-IASB and supported by the STCE.

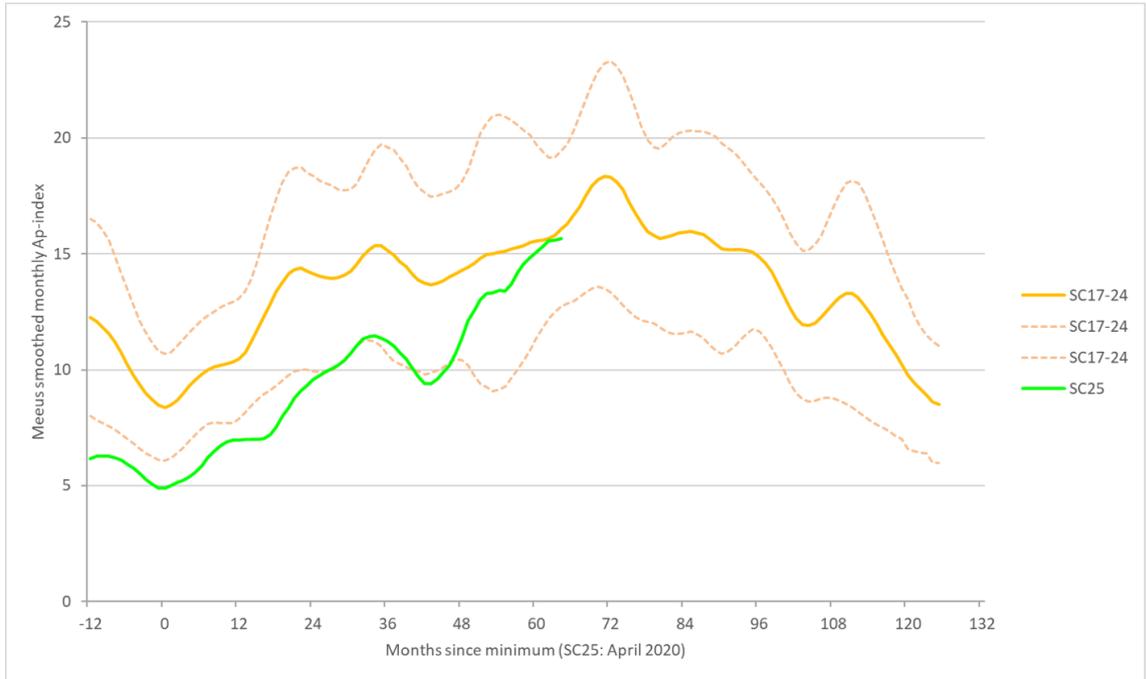
2. Progress of SC25

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, the overall solar activity has been gradually declining. "Declining" does not mean "non-existing". Indeed: over the last 5 months, i.e. from from October 2025 till February 2026, 2 of the 10 strongest X-class flares so far this solar cycle were recorded, as well as one of the most flare-productive sunspot groups in decades. November 2025 saw the strongest Ground Level Enhancement so far SC25, while in January 2026 a severe proton event rich in low-energy protons was registered. And on top of that, November 2025 and January 2026 saw an -almost- extremely severe geomagnetic storm, with aurora spotted over Belgium in both cases. Over the next 2 years, further episodes with very enhanced solar and geomagnetic activity can be expected.



Many other parameters such as the sunspot area and the 10.7cm solar radio flux are following the sunspot number's declining trend. In contrast, some other parameters are exhibiting an overall increase. An example is the planetary A index ("Ap" - see the STCE SWx classification page at <https://www.stce.be/educational/classification#geomag>), which reflects the level of disturbance of the geomagnetic field. Following severe geomagnetic storms in November 2025 and January 2026, this Ap index is now on the rise to a new high for this solar cycle. This can be seen in the graph underneath, with the current evolution in green, the average of the previous 8 solar cycles in orange, and the corresponding standard deviations reflected by the dashed lines.



3. Review of space weather

Solar Active Regions (ARs) and flares

Solar flaring activity has been low, with a few C-class flares. The strongest flare was a C4.5 flare (SIDC Flare 7119), peaking at 04:38 UTC on March 02, associated with SIDC Sunspot Group 805 (NOAA Active Region 4384).

There was a total of 13 numbered active regions on the visible disk, mostly with magnetic types alpha and beta. SIDC Sunspot Group 801 (NOAA Active Region 4378) briefly developed a beta-delta magnetic type on March 06. SIDC Sunspot Group 803 (NOAA Active Region 4381) developed to a beta-gamma magnetic type on March 08.

Coronal mass ejections

A few Coronal Mass Ejections (CMEs) were detected during the week, but none was Earth-directed.

A slow Coronal Mass Ejection (SIDC CME 630) was observed in LASCO/C2 and STEREO-A coronagraph imagery, lifting off from the north limb around 10:30 UTC on March 02. It is associated with a prominence eruption near the northeast limb, observed in SUVI 304 data starting from 09:30 UTC.

A wide CME (SIDC CME 633) was observed in LASCO/C2 and STEREO-A coronagraph imagery, lifting off the east limb around 11:00 UTC on March 03. It was most likely a back-sided event.

A slow, wide Coronal Mass Ejection (SIDC CME 637) was observed in LASCO/C2 and LASCO/C3 coronagraph imagery, lifting off the east limb around 20:55 UTC on March 06. The source region was not very clear, but the CME is likely associated with eruptive activity near the east limb.

Coronal Holes

Four coronal holes crossed the central meridian. The first two were a northern, mid-latitude and a southern, high-latitude coronal holes (SIDC Coronal Holes 152 and 153 respectively) both with positive polarity. In the middle of the week, two negative polarity coronal holes crossed the central meridian: SIDC Coronal Hole 149 (equatorial) and SIDC Coronal Hole 142 (northern, mid-latitude).

Proton flux levels near Earth

The greater than 10 MeV proton flux was below the 10 pfu threshold.

Electron fluxes at GEO

The greater than 2 MeV electron flux as measured by GOES 18 and GOES 19 was above the 1000 pfu threshold at the beginning of the week, having then decreased to normal levels since the middle of the week. The 24-hour electron fluence was at moderate levels until March 04, when it decreased to normal levels.

Solar wind near Earth

The solar wind parameters reflected slow solar wind conditions until March 04, when a possible influence from a mild high-speed stream from either SIDC Coronal Hole 152 (northern, positive polarity) or SIDC Coronal Hole 153 (southern, positive polarity) was recorded.

The solar wind increased to around 450 km/s, returning again to the slow wind regime the following day. Enhanced solar wind conditions were observed again on March 07-08, under the influence of high-speed streams from SIDC Coronal Hole 149 (equatorial, negative polarity) and SIDC Coronal Hole 142 (northern, mid-latitude, negative polarity). Solar wind speed values reached a maximum of around 680 km/s. The interplanetary magnetic field reached a maximum of 12 nT and the Bz component a minimum of -8 nT.

Magnetic conditions on Earth

Global geomagnetic conditions were mostly quiet in the beginning of the week (NOAA Kp 1 to 2).

An isolated minor storm (NOAA Kp 5) was recorded between 21:00 UTC on March 03 and 00:00 UTC on March 04. This was due to a possible mild high-speed stream arrival from SIDC Coronal Holes 152 (northern, positive polarity) or SIDC Coronal Hole 153 (southern, positive polarity).

Mostly active levels (Kp 4), with an isolated minor storm (NOAA Kp 5-) between 00:00 UTC and 03:00 UTC on March 08, were recorded towards the end of the week. The storm was the consequence of high-speed streams from SIDC Coronal Hole 149 (equatorial, negative polarity) and SIDC Coronal Hole 142 (northern, mid-latitude, negative polarity).

4. PROBA2 Observations (2 Mar 2026 - 8 Mar 2026)

Solar Activity

Solar flare activity was at a low level during the week.

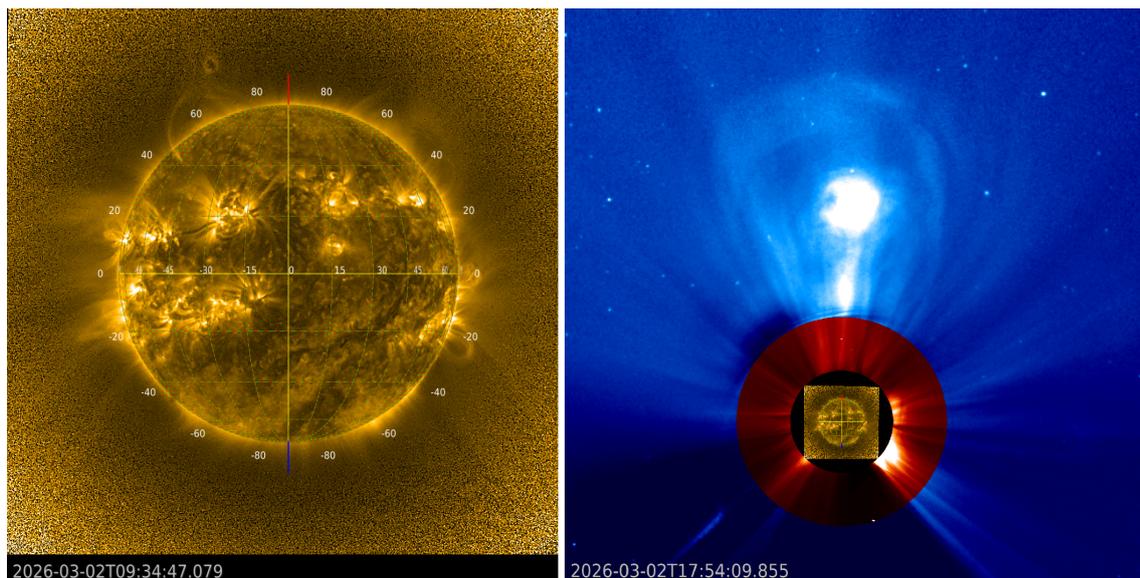
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: <https://proba2.oma.be/ssa>
This page also lists the recorded flaring events.

A weekly overview movie (SWAP week 832) can be found here: https://proba2.sidc.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2026_03_02.mp4.

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

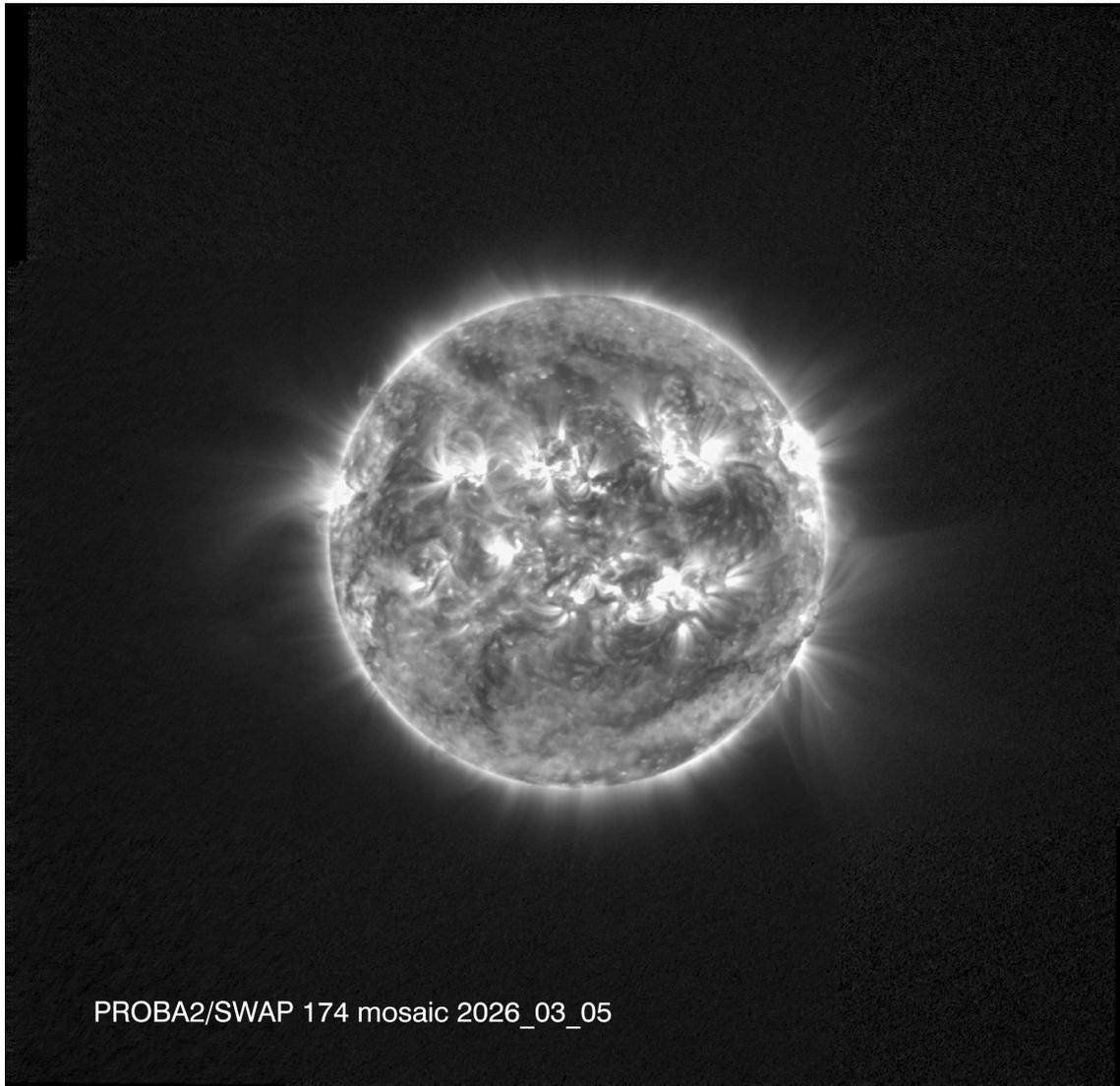
If any of the linked movies are unavailable they can be found in the P2SC movie repository here: <https://proba2.oma.be/swap/data/mpg/movies/>.

Monday March 02



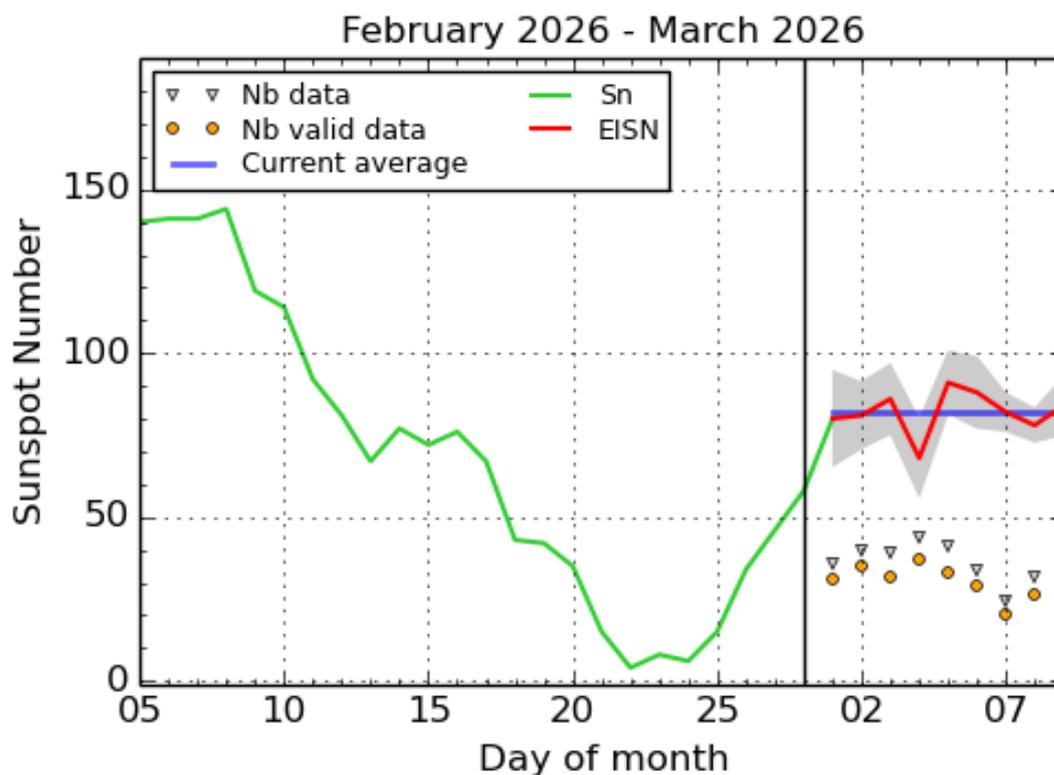
Given the lack of M-class flares during this week, we present one of the more interesting events, which was a slow filament eruption that occurred on 2026-Mar-02, seen in the left panel in an observation taken by SWAP. The eruption resulted in a text-book three-part coronal mass ejection directed northward (right panel), as seen by the LASCO-C2 (in red) and -C3 (in blue) coronagraphs onboard SOHO. Find a SWAP movie of the event here: https://proba2.sidc.be/swap/movies/20260302_swap_movie.mp4.

Thursday March 05



We perform weekly mosaics with SWAP, meaning that we acquire off-pointed observations in four directions during one hour in total, then merge them in order to obtain an extended field of view. The above figure shows the configuration of the corona seen in such a mosaic on 2026-Mar-05.

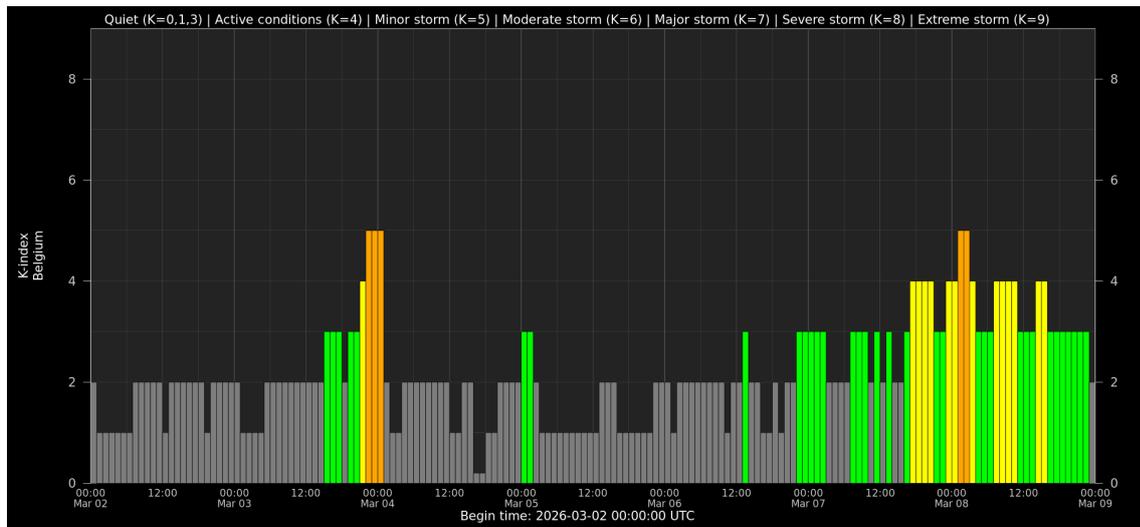
5. International Sunspot Number by SILSO



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

6. Geomagnetic Observations in Belgium

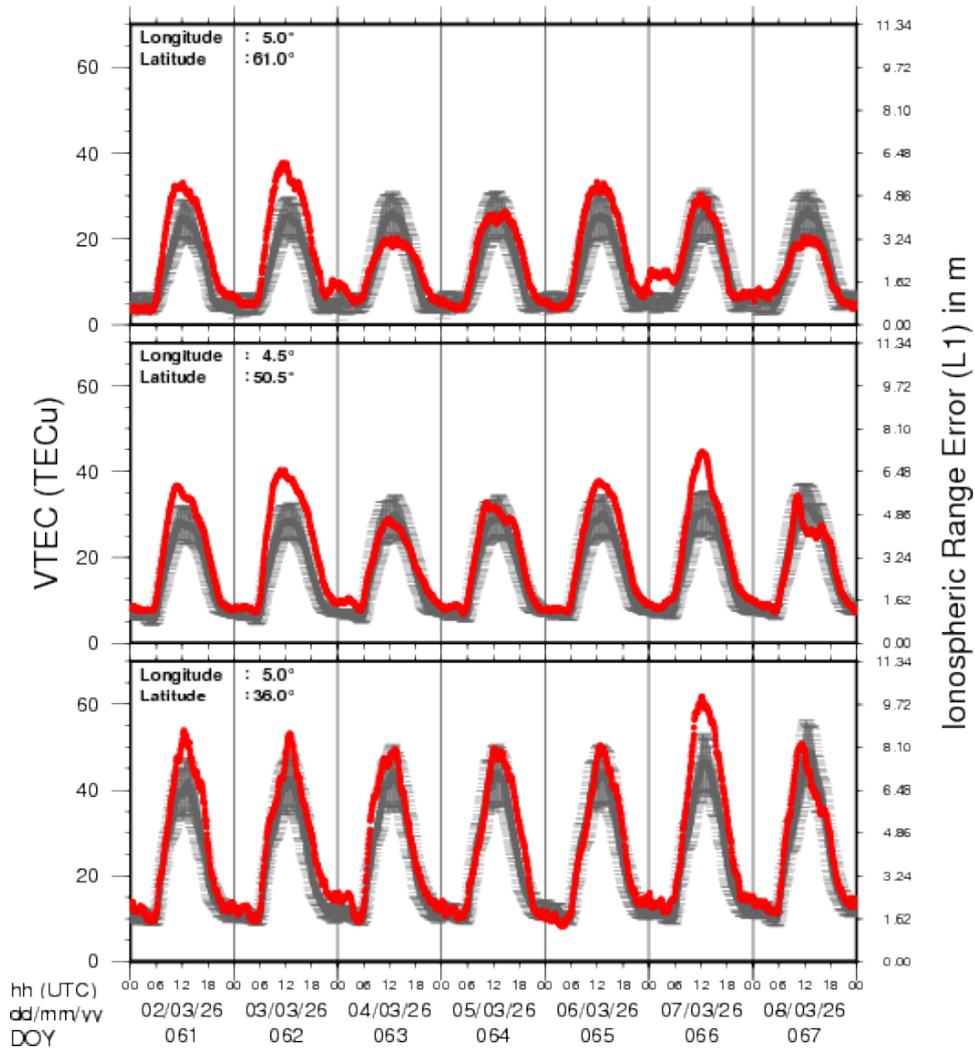


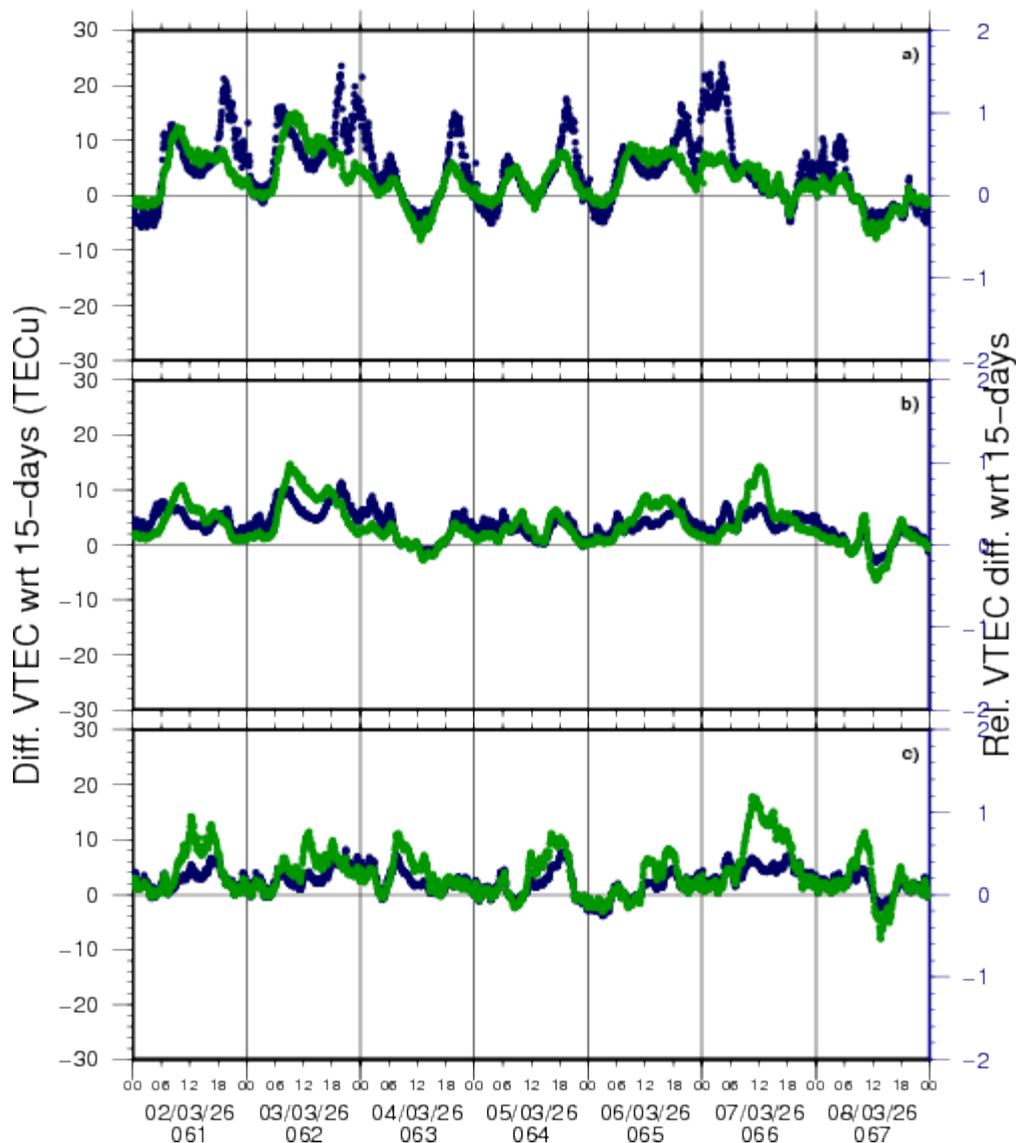
Local K-type magnetic activity index for Belgium based on data from Dourbes (DOU) and Manhay (MAB). Comparing the data from both measurement stations allows to reliably remove outliers from the magnetic data. At the same time the operational service availability is improved: whenever data from one observatory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

7. Review of Ionospheric Activity

VTEC Time Series





VTEC time series at 3 locations in Europe from 2 Mar 2026 till 8 Mar 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 $1\text{TECu}=10^{16}$ electrons per square meter) and is directly related to the signal propagation delay due to the ionosphere (in figure: delay on GPS L1 frequency).

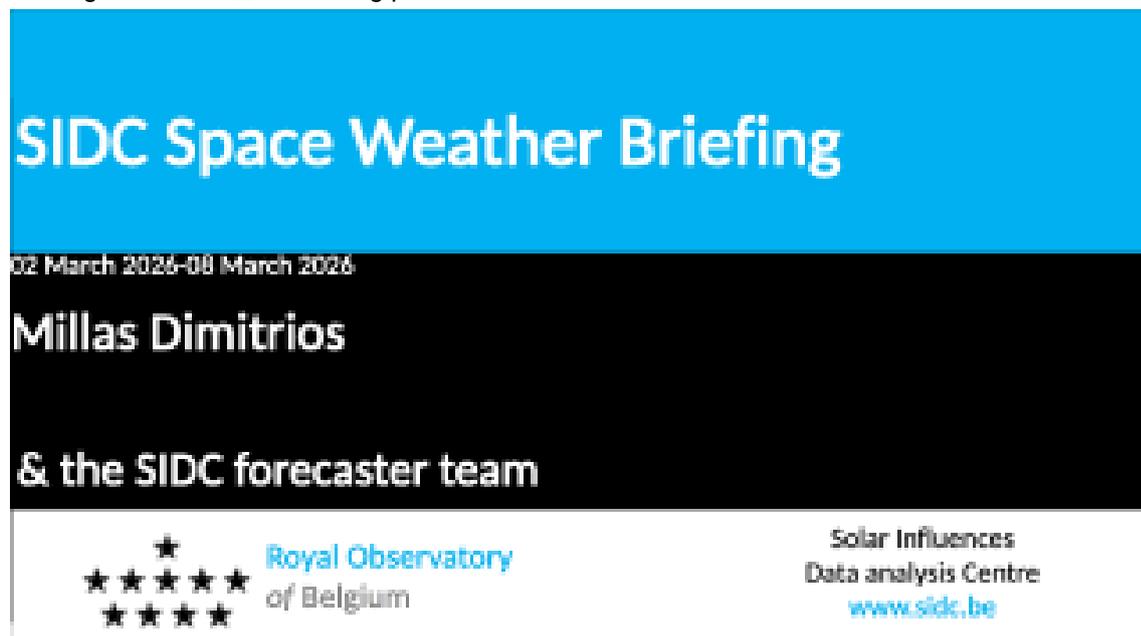
The Sun's radiation ionizes the Earth's upper atmosphere, the ionosphere, located from about 60km to 1000km above the Earth's surface. The ionization process in the ionosphere produces ions and free electrons. These electrons perturb the propagation of the GNSS (Global Navigation Satellite System) signals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

8. The SIDC Space Weather Briefing

The forecaster on duty presented the SIDC briefing that gives an overview of space weather from Mar 2 to 8.

The pdf of the presentation: https://www.stce.be/briefings/https://www.stce.be/briefings/20260309_SWbriefing.pdf



9. STCE training courses and lectures

Courses, seminars, presentations 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.

* Mar 16-18, 2026, STCE course: Role of the ionosphere and space weather in military communications, Brussels, Belgium - full

* Apr 20-21, 2026, STCE cursus: inleiding tot het ruimteweer, voor leden van volkssterrenwachten, Brussels, Belgium - register: <https://events.spacepole.be/event/260/>

* Mar 23, 2026, STCE lecture: From physics to forecasting, Space Weather course by ESA Academy, Redu, Belgium

* Mar 25, 2026, The Belgian Space Weather centre, Space Weather course by ESA Academy, Brussels, Belgium

* Jun 15-17, 2026, STCE Space Weather Introductory Course, Brussels, Belgium - register: <https://events.spacepole.be/event/256/>

* Oct 12-14, 2026, STCE Space Weather Introductory Course, Brussels, Belgium - register: <https://events.spacepole.be/event/257/>

* 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/>

* Dec 7-9, 2026, STCE Space Weather Introductory Course for Aviation, Brussels, Belgium - register: <https://events.spacepole.be/event/262/>

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>