STCE Newsletter

16 Mar 2026 - 22 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. STCE 20 years

In March 2006, 20 years ago, the Minister of Science Policy announced the foundation of the Solar-Terrestrial Centre of Excellence (STCE). The STCE would lift the Sun-Space-Earth research to a higher level by uniting experts in the field. The STCE would become a service centre for the government, citizens and industries vulnerable for the impact of the physical processes triggered by solar activity.

Twenty years later, the STCE has indeed a leading role in this very specific knowledge-based economy, space technology and services and works following a client-tailored methodology.

The STCE is the place for research, services and education about Sun-Space-Earth and their interactions. It builds on the fundaments of the Royal Belgian Institute for Space Aeronomy, the Royal Meteorological Institute of Belgium and the Royal Observatory of Belgium. The centre can rely on a rich history and expertise in solar and terrestrial observations and measurements, both on ground and from space. The STCE connects to users through the Space Weather Service Centre which issues daily space weather bulletins and warnings in case of space storms. The STCE also runs a Space Weather Education Centre which is supported by the firm academic and service experience of more

than 100 people. The education centre has welcomed already more than 300 professionals for whom their understanding of space weather makes a difference.

2. PROBA2 Observations

Solar Activity

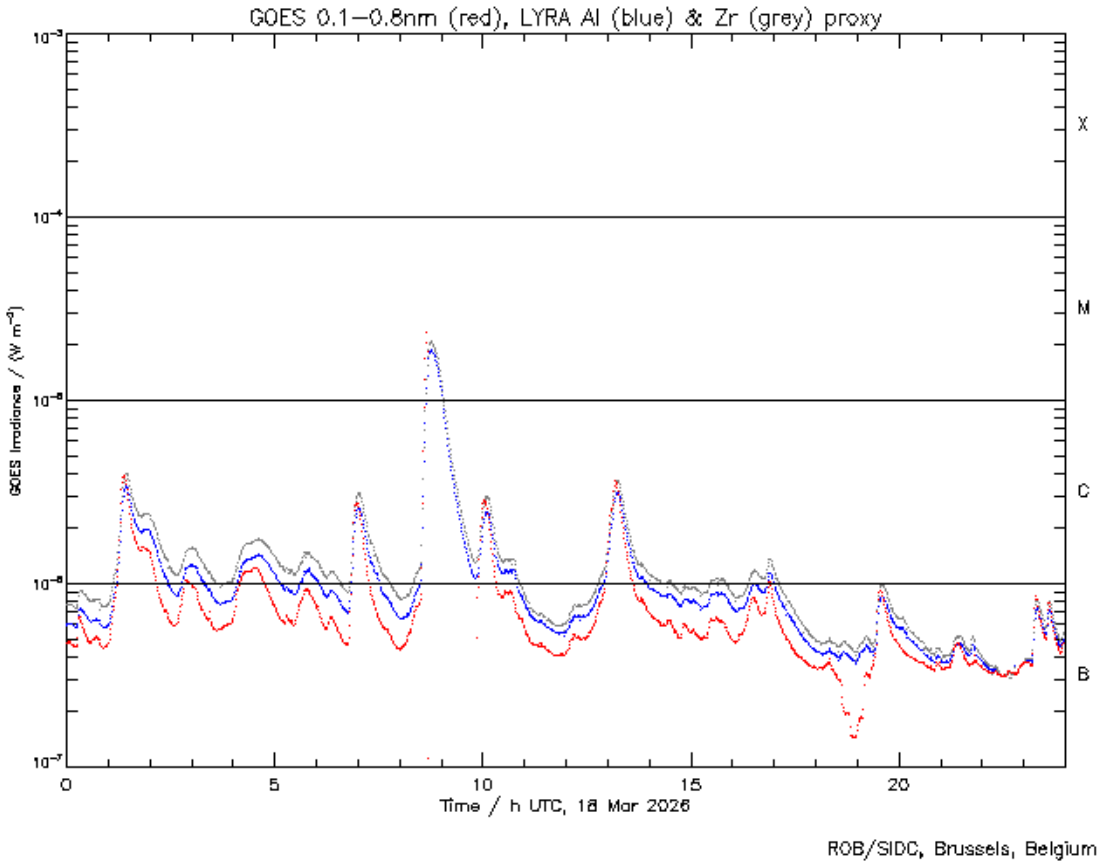
Solar flare activity fluctuated from very low to moderate during the week.
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: https://proba2.oma.be/ssa
This page also lists the recorded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

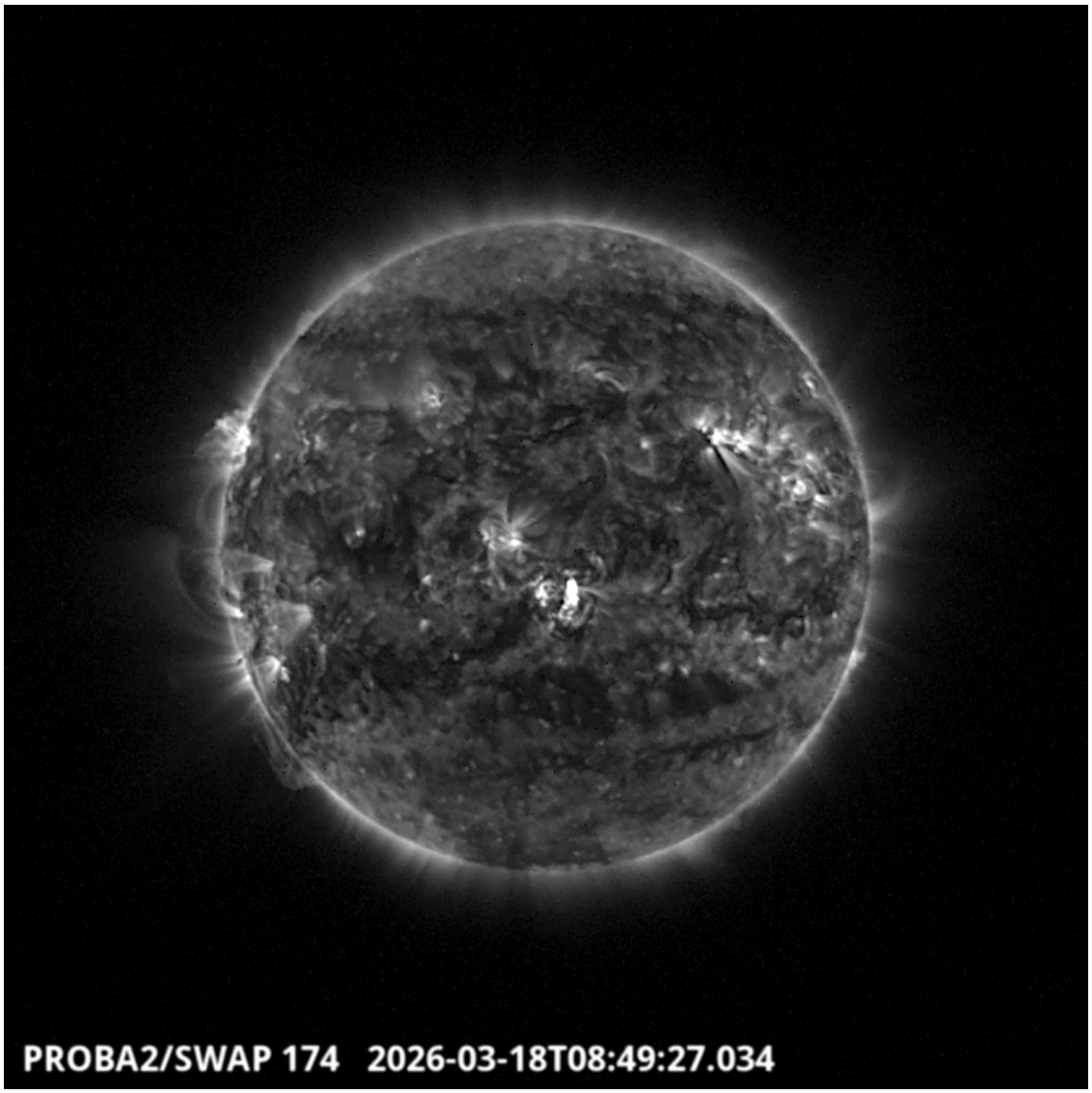
A weekly overview movie (SWAP week 834) can be found here: https://proba2.sidc.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2026_03_16.mp4.

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 March 18





The largest flares of this week were two M2.7 on March 16 and 18, originating from the same NOAA4392 active region. We present here the one on 2026-Mar-18, observed by LYRA (top panel) and SWAP (bottom panel). The flare peaked at 08:42 UT and occurred close to the center of the Sun.
Find a SWAP movie of the event here: https://proba2.sidc.be/swap/movies/20260318_swap_movie.mp4.

3. Review of space weather

Solar Active Regions (ARs) and flares

Solar flaring activity was very low to moderate over the week. There were 14 numbered regions on the Sun, many magnetically simple. The largest and most complex region was SIDC Sunspot Group 820 (NOAA Active Region 4392). This region was responsible for most of the flares in the first half of the week. Three (3) M-class flares were associated with this active region. The largest flares were an M2.7 flare (SIDC Flare 7220) peaking on March 16 at 12:15 UTC and an M2.7 flare (SIDC Flare 7228) peaking on March 18 at 08:42 UTC. From March 19, the solar activity became very low and returned to low conditions with C-class flares on March 22.

Coronal mass ejections

Three Coronal Mass Ejections (CMEs) with possible Earth-directed components were identified.
The first CME (SIDC CME 639), an asymmetric halo CME, was detected in LASCO-C2 data from 12:36 UTC on March 16. This was associated with an M2.7 flare (SIDC Flare 7220) with peak time 12:15 UTC March 16.
The second (SIDC CME 640) was associated with a filament that began to lift off around 03:00 UTC March 17. An associated narrow CME became visible in STEREO COR2 at 17 08:38 UTC to the east.
The third CME (SIDC CME 641), directed to the west, was first seen in LACSCO-C2 data from 09:24 UTC on March 18. This was associated with the M2.7 flare (SIDC Flare 7228) from SIDC sunspot group 820 (NOAA Active Region 4392). This event was associated with a large dimming, EUV wave and Type II radio burst.

Coronal Holes

A southern midlatitude extension of the large positive polarity coronal hole (SIDC Coronal Hole 154) continued to cross the central meridian during the week. From March 19, a negative polarity equatorial coronal hole (SIDC Coronal Hole 147) began to transit the central meridian.

Proton flux levels

The greater than 10 MeV proton flux was at background level.

Electron fluxes at GEO

The greater than 2 MeV electron flux measured by GOES 19 and 18 was above the 1000 pfu threshold during the first half of the week, due to the influence of the high-speed stream from the previous week. The flux decreased from March 20, due to the CME arrival and disturbed geomagnetic conditions.

Solar wind

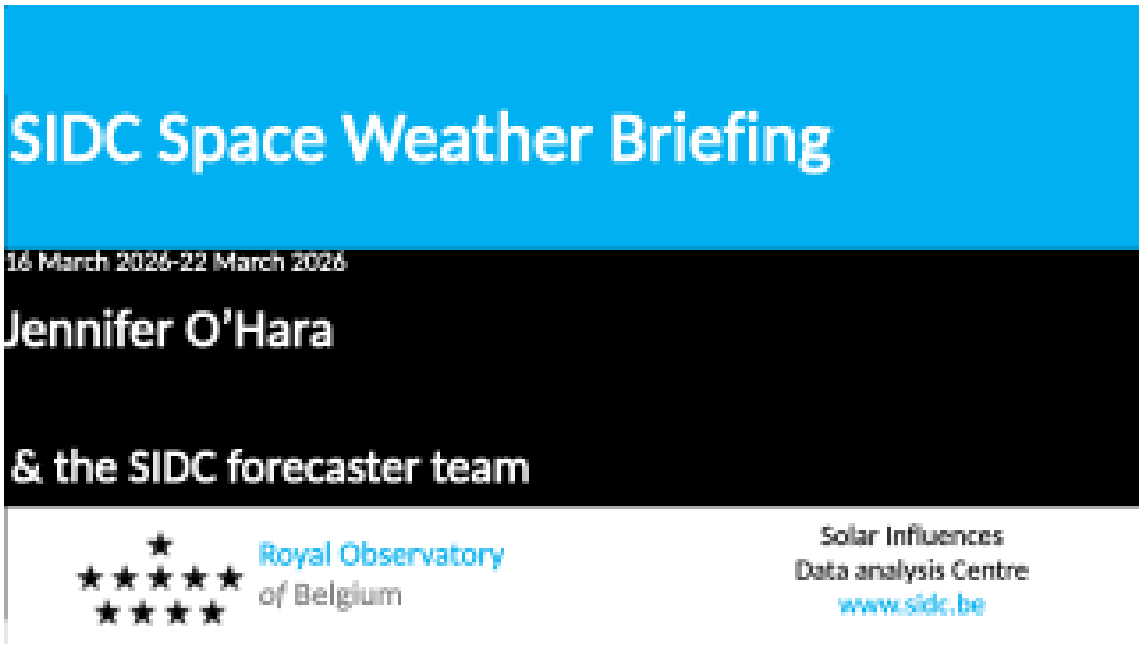
Between March 15 and March 19, the solar wind parameters reflected the waning influence from a high speed stream and the solar wind speed showed a decreasing trend.
Around 01:30 UTC on March 20 an ICME was observed (associated with SIDC CME 639 of March 16). The solar wind speed increased from around 330 km/s to 470 km/s and the total magnetic field increased from 5 nT to a maximum of 19nT at 11:40 UTC March 20. Bz had a minimum value of -11 nT at 04:45 UTC but was predominantly positive.
Later on March 20, at 20:17 UTC, a fast forward shock was detected in the solar wind data (DSCOVR), from another ICME (SIDC CME 641 of March 18). The interplanetary magnetic field jumped from about 21 nT to 28 nT, briefly reaching values up to 37 nT. The solar wind speed jumped from approximately 480 km/s to 506 km/s. There were multiple long periods negative Bz values between 19:50 UTC on March 20 to 08:35 UTC on March 21. Bz reached a minimum value of -28 nT at 21:04 UTC on March 20. The interplanetary magnetic field continued to increase and reached a maximum of 39 nT at 15:24 UTC March 21. The solar wind speed also increased further due to the high speed stream influence (associated with SIDC Coronal Hole 147).
At the end of the week the interplanetary magnetic field strength was stable around 15 nT and the solar wind speed was around 650 to 700 km/s.

Geomagnetism

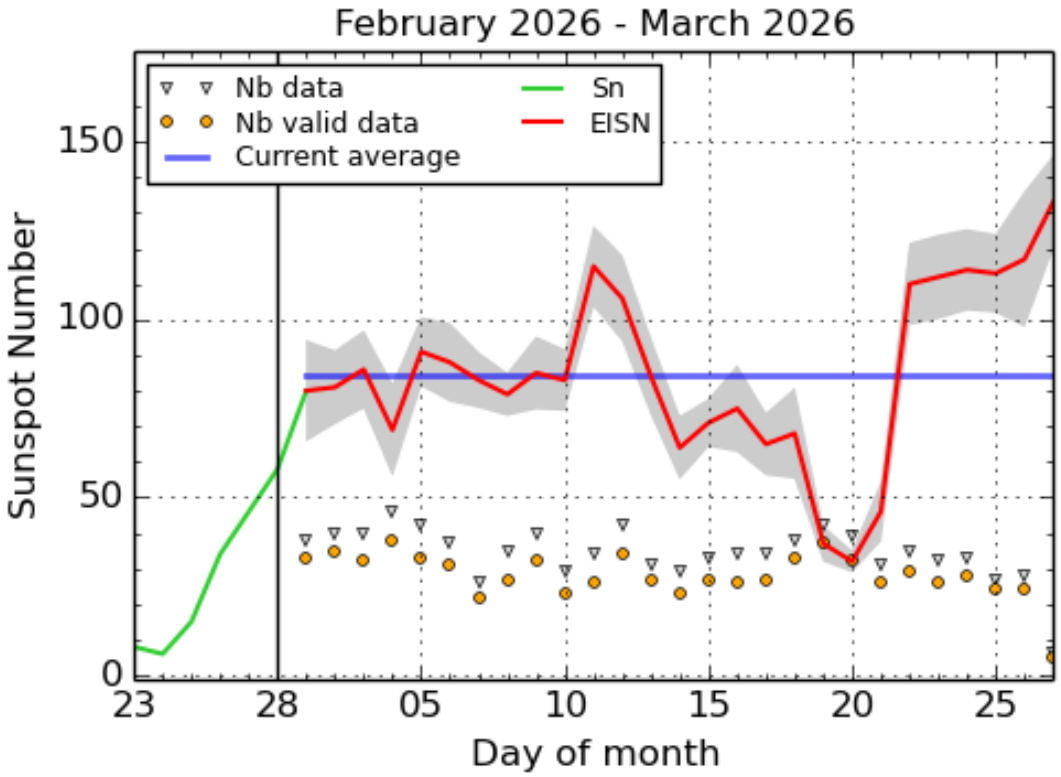
Geomagnetic conditions were unsettled to active at the start of the week on March 15 and then decreased to quiet on March 16 to March 19. On March 20 between 06:00 and 12:00 UTC active conditions were reached in response to the first ICME arrival. This increased to a moderate storm and then to a major storm (NOAA KP 7) from 21:00 UTC on March 20, in response to the second ICME arrival. Locally, a minor storm was observed (K-Bel = 5).
The geomagnetic conditions then briefly returned to unsettled and active before increasing to a minor storm globally between 03:00 and 09:00 UTC on March 22 and then became a major storm globally (NOAA KP 7-) from 09:00 UTC on March 22. Locally, a moderate storm was observed (K-Bel = 6). This was in response to the high speed stream and an extended period of negative Bz.

4. the SIDC space weather Briefing

The forecaster on duty presented the SIDC briefing that gives an overview of space weather from Mar 16 to 22, 2026.
The pdf of the presentation: https://www.stce.be/briefings/20260323_SWbriefing.pdf



5. International Sunspot Number by SILSO



SILSO graphics (http://sidc.be/silso) Royal Observatory of Belgium, 2026 March 27

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.

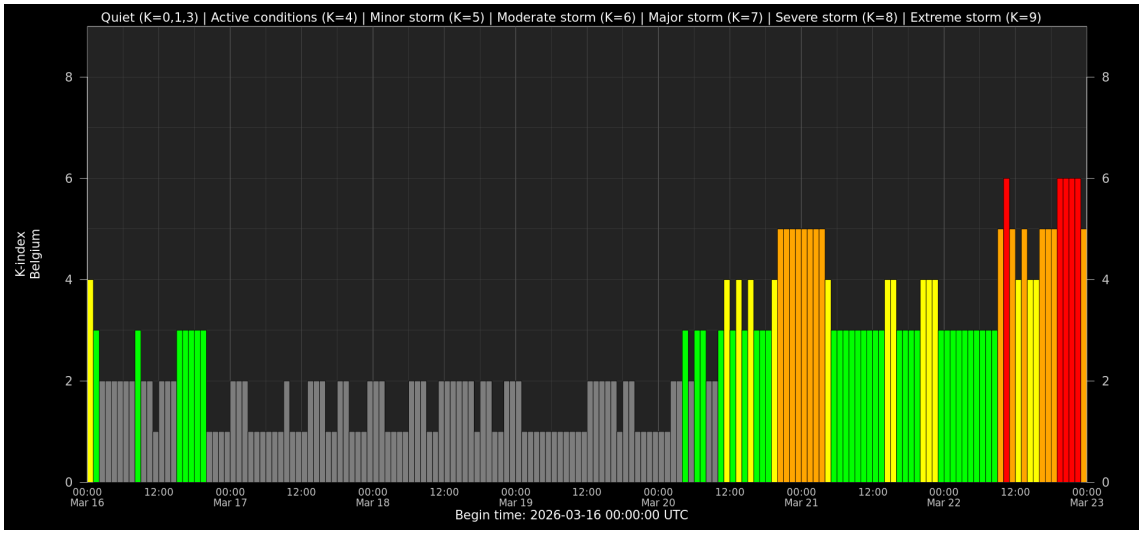
6. Noticeable Solar Events

DAY	BEGIN	MAX	END	LOC	XRAY	OP	10CM	TYPE	Cat	NOAA
16	1200	1215	1224		M2.7			III/2II/3IV/1	54	4392
17	0855	0904	0909	S14E12	M1.3	SN		III/2	54	4392
18	0826	0842	0857	S14W5	M2.7	1N		III/2II/2	54	4392

LOC: approximate heliographic location
XRAY: X-ray flare class
OP: optical flare class
10CM: peak 10 cm radio flux

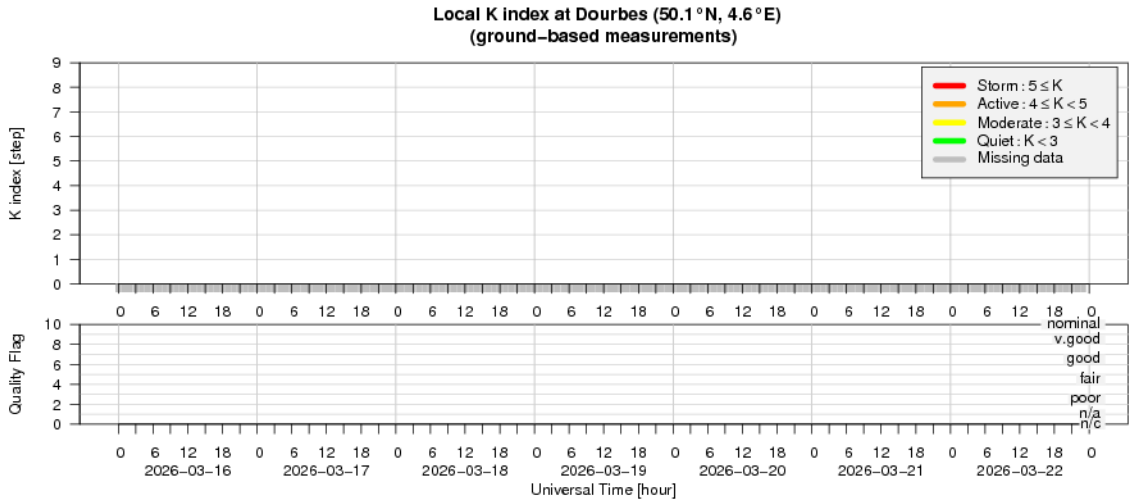
TYPE: radio burst type
Cat: Catania sunspot group number
NOAA: NOAA active region number

7. Geomagnetic Observations in Belgium

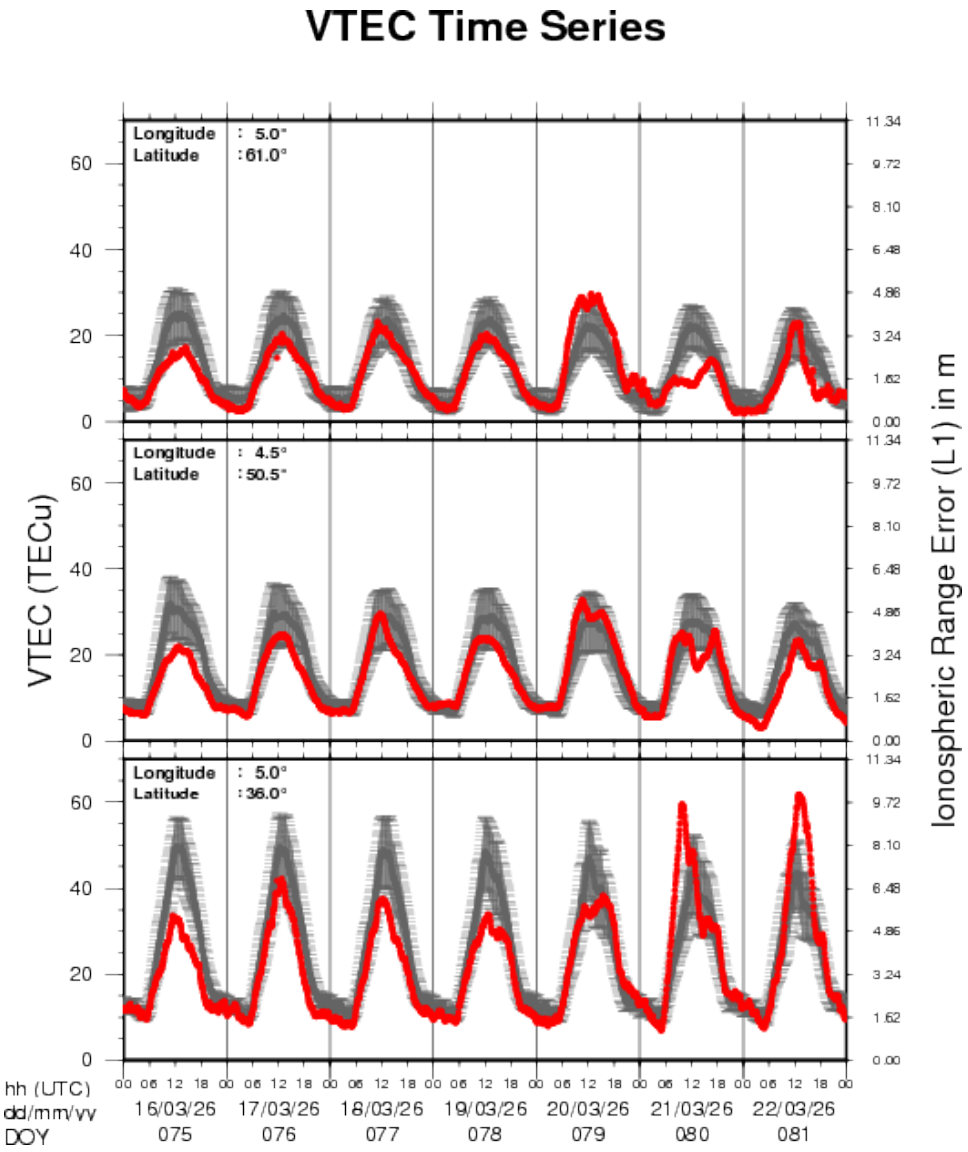


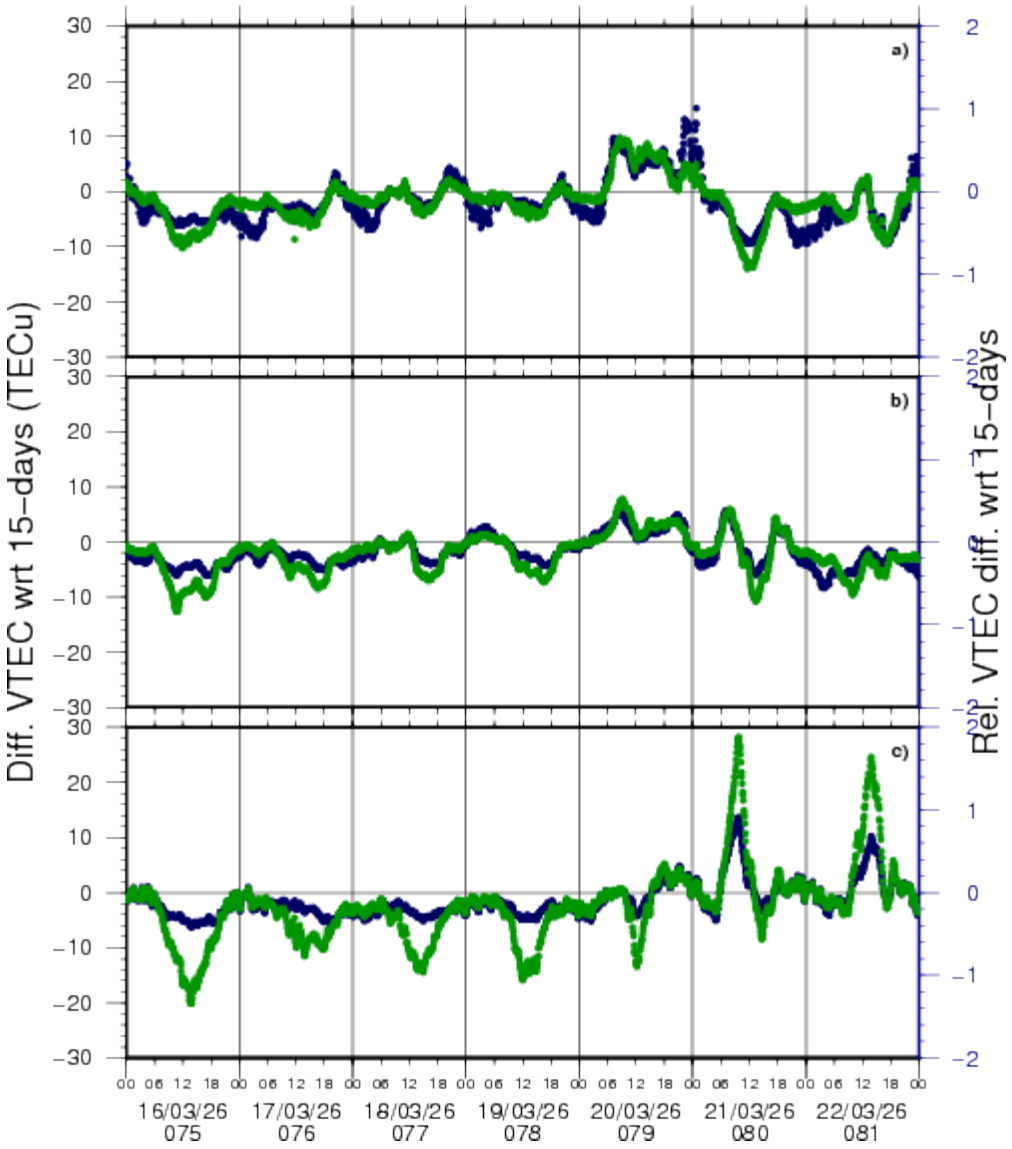
Local K-type magnetic activity index for Belgium based on data from Dourbes (DOU) and Manhay (MAB). Comparing the data from both measurement stations allows to reliably remove outliers from the magnetic data. At the same time the operational service availability is improved: whenever data from one observatory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



9. Review of Ionospheric Activity





VTEC time series at 3 locations in Europe from 16 Mar 2026 till 22 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 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

10. Training courses and conferences

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.

* Apr 20-21, 2026, STCE cursus: inleiding tot het ruimteweer, voor leden van volkssterrenwachten, Brussels, Belgium - register: https://events.spacepole.be/event/260/
* 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/ - Reserved
* Oct 29-Nov 1, 2026, Prior to ESWW2026 - Space Weather Training Course, Florence, Italy, more soon
* Nov 2-6, 2026, European Space Weather Week, Florence, Italy, https://esww2026.eswan.eu/
* 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

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