STCE Newsletter

8 Jun 2026 - 14 Jun 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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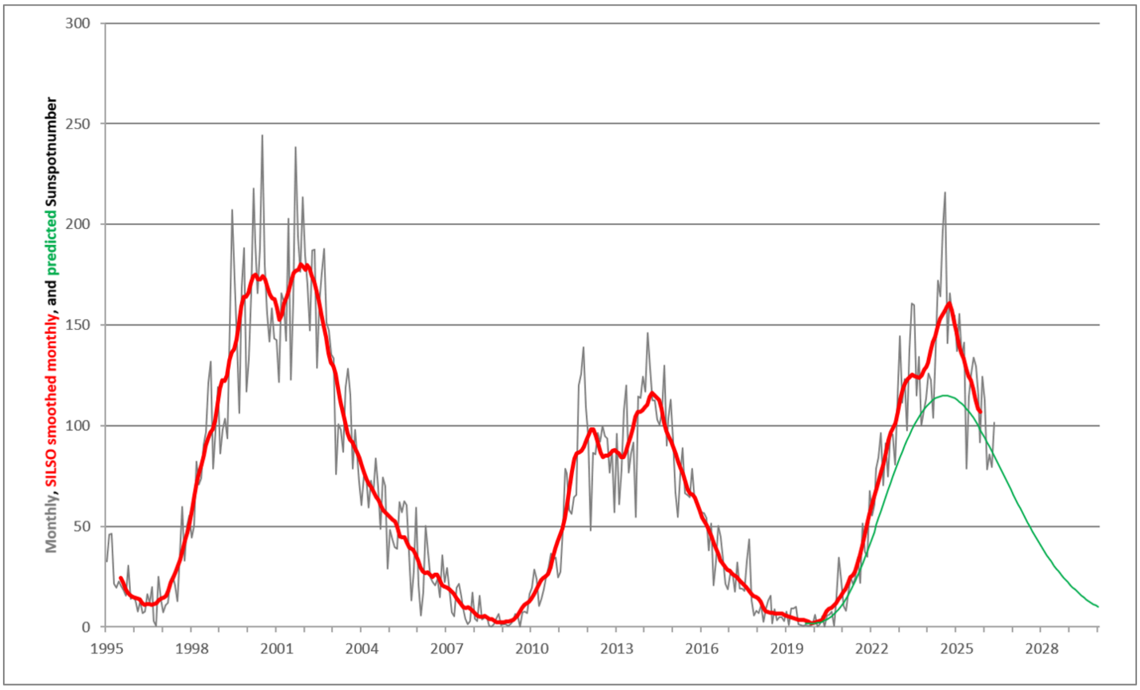
1. Tracking SC25

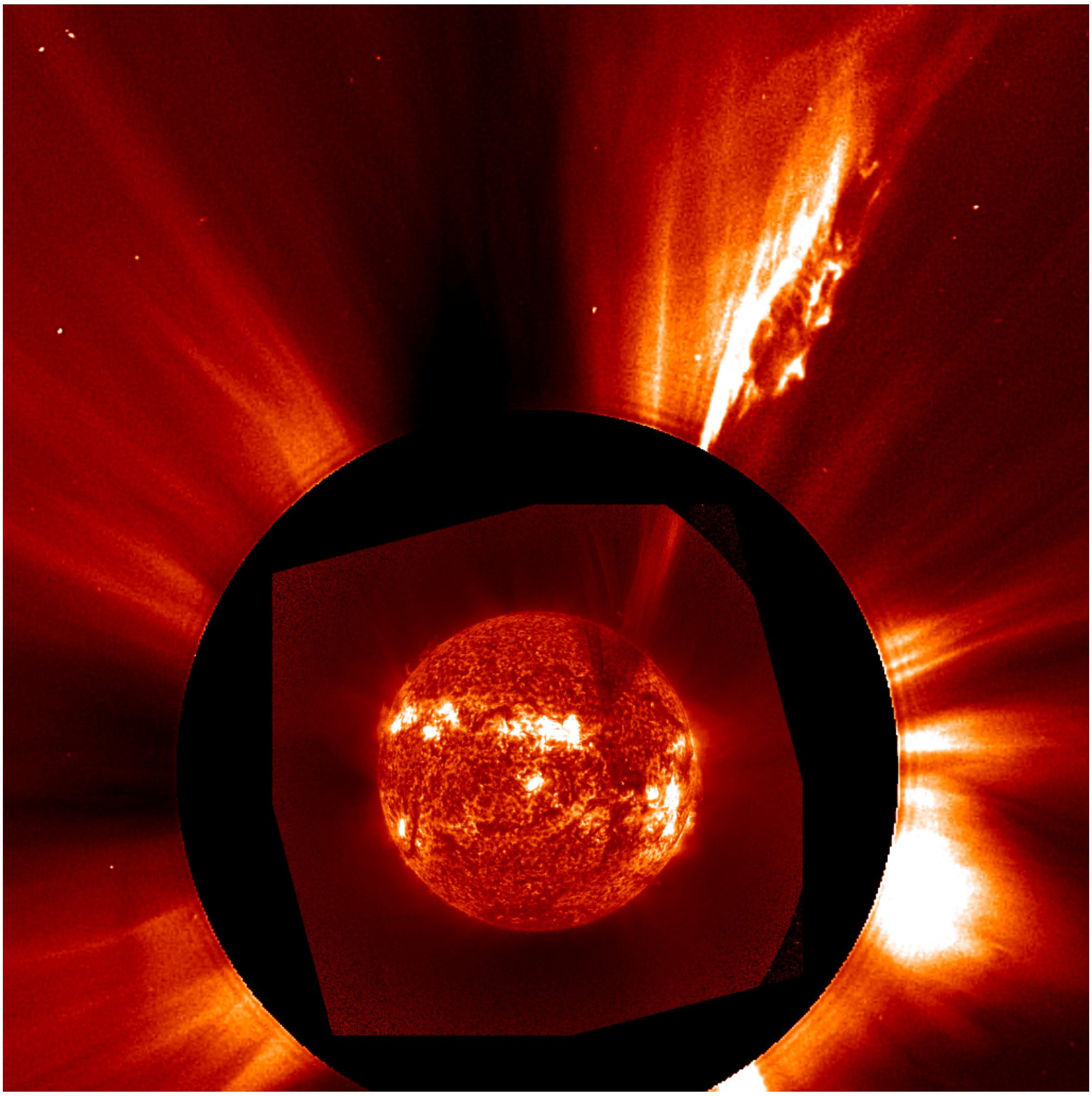
The STCE's SC25 Tracking page (https://www.stce.be/content/sc25-tracking) has been updated to reflect the latest evolution of some critical space weather parameters for the ongoing solar cycle 25 (SC25). It covers various aspects of space weather, from sunspot numbers over geomagnetic indices all the 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) 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. Over the last 3 months, i.e. from from March till May 2026, there were still a few X-class flares. Of note is that the ongoing solar cycle has now 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!



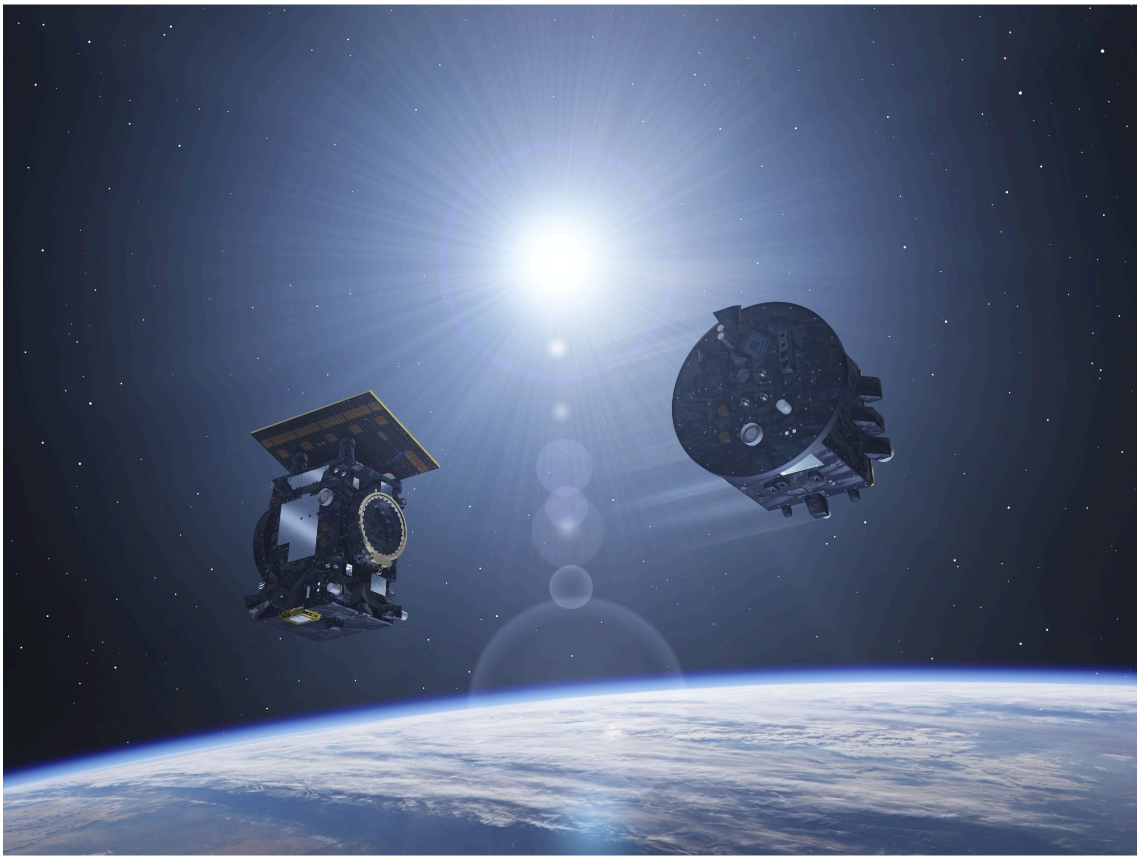
Many other parameters such as the sunspot area and the 10.7cm solar radio flux are following the sunspot number's declining trend. In contrast, some other parameters are exhibiting an overall increase. Examples are the interplanetary A index ("Ap" - see the STCE SWx classification page at https://www.stce.be/educational/classification#geomag) which reflects the level of disturbance of the geomagnetic field, and the neutron count, which reflects the amount of cosmic rays and solar energetic particles that reach the earth environment.

The imagery underneath is a combination of an extreme ultraviolet image (GOES/SUVI 304) of a solar eruption on 3 June and the associated coronal mass ejection (white light; SOHO/LASCO C2).



2. Successful Proba-3 mission extended until 2028

The European Space Agency's (ESA) Proba-3 mission is extended until August 2028. This space mission, involving a significant Belgian contribution, is studying the lower layers of the Sun's corona. The pair of satellites were originally due to complete their mission at the end of this year. Thanks to the exceptional scientific and technological results already achieved by this space mission, it was decided to allow the two satellites to continue their work until 31 August 2028 in order to carry out more extensive research.



The lifespan of satellite missions can vary greatly, from a few years to decades. This depends mainly on their objective, but also on the orbit in which they are situated, and how precisely they are placed into orbit by the launcher. Normally, an initial duration is planned for each mission, which can then be extended if the ESA member states wish to do so, there is a budget for it and the satellite is still in good condition. An extension thus provides additional scientific value and maximises the return on investment.

This is also the case for Proba-3. This mission was launched on 5 December 2024 with the aim of creating artificial solar eclipses using two satellites. This allows them to study the solar corona, which is otherwise only briefly visible during natural solar eclipses.

'Since the start of operations, the satellite constellation has already delivered a large amount of high-quality data,' says Ronald Van der Linden, Director of the Royal Observatory of Belgium. 'The unique formation is working exceptionally well. This allows us to study the lower layers of the solar corona in great detail, something that was previously impossible. Now that the satellites will be operational for longer, we can continue these important studies. Among other things, this helps us to better understand the Sun's activity and to predict solar storms and streams of fast solar wind. In this way, we can better protect terrestrial technologies, our space infrastructure and astronauts from the dangerous consequences of these phenomena.'

Belgium's key role

Belgium plays a central role in this space mission, with a contribution of approximately 66 million euros out of a total budget of 166 million euros, funded via the Federal Public Service for Science Policy (BELSPO) through Belgium's contribution to ESA. The chairman of BELSPO, Arnaud Vajda, is pleased: 'The two satellites have proven their robustness. Earlier this year, we briefly lost contact, but this was restored and operations were able to resume in full. The extension of the mission demonstrates that this feat of technology is worth continuing to develop. It confirms the success of this ambitious mission and Belgium's strong position within European space activities.'

The extension is funded through ESA's science programme, a mandatory programme run by the agency, and therefore does not require any new investment from our country.

The STCE leads the scientific operation of the coronagraph, which is the mission's core task. Other instruments have also been installed on the satellites, such as 3DEES, in which the Royal Belgian Institute for Space Aeronomy is involved. This instrument measures high-energy particles around the Earth to better understand radiation in space. Thanks to this knowledge, we can better protect space infrastructure such as satellites, but also astronauts, especially if they were to travel to the Moon or eventually to Mars.

3. Review of Solar and Geomagnetic Activity

WEEK 1328 from 2026 Jun 08

Solar Active Regions (ARs) and flares

Solar flaring activity was low throughout the week. There were twelve numbered active regions on the visible solar disk over the week, but most of them were magnetically simple.

SIDC Sunspot Group 870 (NOAA Active Region 4465), which was the most complex region on the disk, was the main driver of the flaring activity observed until June 12. The region rotated onto the visible disk from behind the northeast limb at the beginning of the week and became more magnetically complex, with a newly emerging bipolar magnetic structure close to the main spot, possibly showing anti-Hale orientation. It reached a beta-gamma-delta magnetic configuration on June 10, before later showing signs of decay and decreasing in magnetic complexity to a beta configuration towards the end of the week.

Over the course of the week, forty-nine C-class flares were recorded. The largest flare was a C9.0 flare (SIDC Flare 7927), peaking at 08:28 UTC on June 11, associated with SIDC Sunspot Group 870.

Coronal mass ejections

Several Coronal Mass Ejections (CMEs) were detected in the available coronagraph imagery over the past week. Of these, SIDC CME 673, SIDC CME 675 and SIDC CME 676 were considered to have possible Earth-directed components, mainly with possible glancing-blow impacts.

A slow CME (SIDC CME 673) was first observed in SOHO/LASCO-C2 imagery from around 16:36 UTC on June 9, directed primarily towards the northeast from Earth's perspective. It was associated with a filament eruption observed from around 15:00 UTC on June 9 in the vicinity of SIDC Sunspot Group 825 (NOAA Active Region 4463), together with a coronal dimming. A glancing blow at Earth around June 13 was predicted to be possible, although with low confidence; however, no clear arrival signature associated with this CME was identified in the solar wind data.

A halo CME (SIDC CME 675) was detected in SOHO/LASCO-C2 data from 00:36 UTC on June 11. The CME was directed primarily towards the northeast from Earth's perspective and was associated with a long-duration C6.7 flare (SIDC Flare 7923), peaking at 00:02 UTC on June 11, produced by SIDC Sunspot Group 870 (NOAA Active Region 4465). Type II and Type IV radio emissions were detected at 00:13 UTC and 00:28 UTC, respectively, and associated coronal dimming and an EUV wave were observed. The bulk of the ejecta was expected to miss Earth, although a glancing blow was possible. A likely corresponding shock arrival was detected in the solar wind on June 13 at 09:51 UTC.

A faint CME (SIDC CME 676) was first observed in SOHO/LASCO-C2 imagery from around 16:36 UTC on June 12, directed primarily towards the northeast from Earth's perspective. It was likely associated with a filament eruption observed from around 16:05 UTC on June 12 near N00E35. The bulk of the ejecta was expected to miss Earth, although a glancing blow was possible from late on June 14.

Coronal Holes

An equatorial negative polarity coronal hole (SIDC Coronal Hole 147) started to cross the central meridian on June 9. The associated high-speed stream started to influence the near-Earth solar wind environment from afternoon, June 11.
A small positive polarity coronal hole (SIDC Coronal Hole 168) started to cross the central meridian on June 13.

Proton flux levels

The greater than 10 MeV proton flux, as measured by GOES-18, remained below the 10 pfu threshold throughout the week. It was slightly elevated at the beginning of the week, but stayed well below the threshold and returned to near-background levels by mid-week.

Electron fluxes at GEO

The greater than 2 MeV electron flux, as measured by GOES-19, intermittently exceeded the 1000 pfu alert threshold during the week, mainly on June 8-10 and again from June 13.
The 24-hour electron fluence was at normal to moderate levels throughout the week.

Solar wind

At the beginning of the week, solar wind parameters reflected the waning influence of an ICME, probably mixed with high-speed stream influences. The solar wind speed decreased from about 560 km/s to 420 km/s by June 9, while the interplanetary magnetic field remained weak, below 5 nT.

A shock-like structure was detected in the solar wind data at 09:53 UTC on June 9, possibly related to the late arrival of the ICME associated with the June 6 CME (SIDC CME 672). The interplanetary magnetic field jumped from about 6 nT to 10 nT, while the solar wind speed increased from approximately 420 km/s to 470 km/s. Solar wind parameters then gradually returned towards the slow solar wind regime by June 10, with speeds decreasing to around 390 km/s and the interplanetary magnetic field remaining below 6 nT.

From late on June 11, solar wind conditions became slightly enhanced again due to the arrival of a high-speed stream from the equatorial negative polarity coronal hole (SIDC CH 147). The solar wind speed increased from about 370 km/s to around 630 km/s, while the interplanetary magnetic field reached values up to 17 nT and the Bz component reached negative values down to about -13 nT.

A mild shock was detected in the solar wind data at 09:51 UTC on June 13, probably associated with the arrival of the June 11 CME (SIDC CME 675). The interplanetary magnetic field increased from about 5 nT to 8 nT, while the solar wind speed increased from about 550 km/s to 580 km/s, later reaching values up to around 670 km/s.

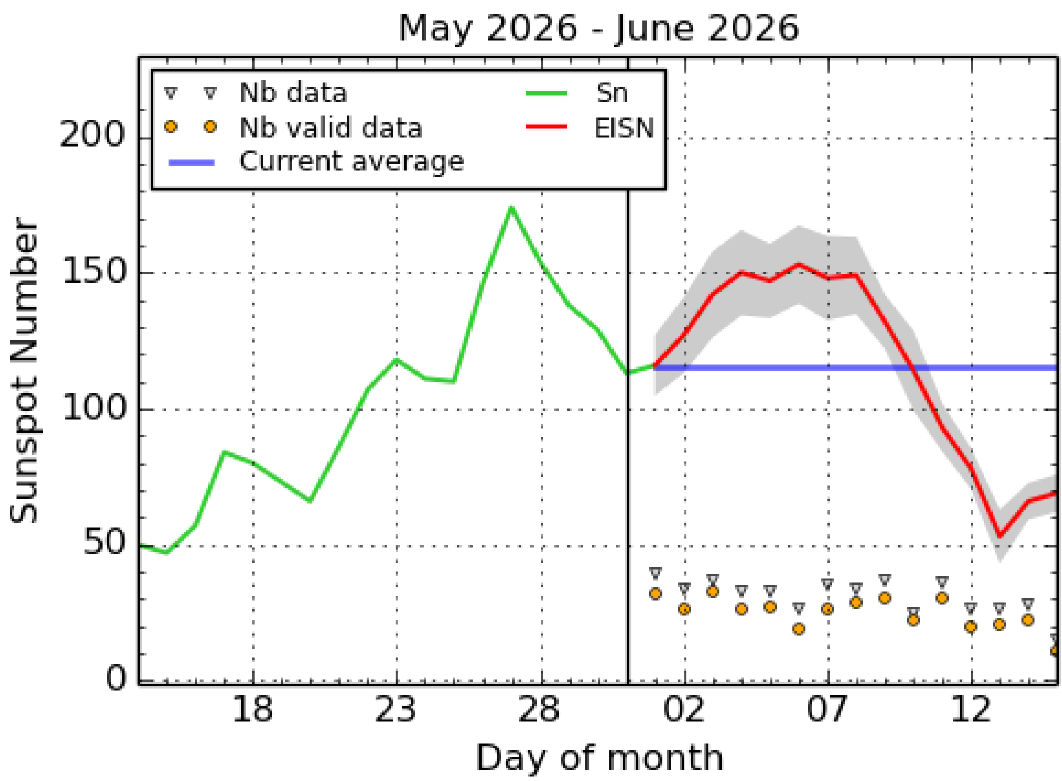
During the rest of the week, solar wind parameters reflected a probable mixture of the waning high-speed stream influence from SIDC CH 147 and the glancing-blow ICME arrival associated with SIDC CME 675, with the solar wind speed gradually decreasing to about 470 km/s by June 14.

Geomagnetism

At the beginning of the week, geomagnetic conditions were quiet to unsettled both globally and locally over Belgium (NOAA Kp = 1 to 3, K-Bel = 1 to 3). A brief active interval (K-Bel = 4) was observed locally over Belgium between 15:00 and 18:00 UTC on June 9, possibly associated with the late arrival of the ICME from the June 6 CME (SIDC CME 672). Following the arrival of the high-speed stream from the equatorial negative polarity coronal hole (SIDC CH 147), geomagnetic conditions increased to unsettled to active levels, with a minor storm interval observed globally (NOAA Kp = 5) between 18:00 and 21:00 UTC on June 11. Locally over Belgium, unsettled to active conditions were observed (K-Bel = 3 to 4).

By midday on June 12, geomagnetic conditions returned to quiet to unsettled levels, before active conditions were reached globally again (NOAA Kp = 4) between 18:00 and 21:00 UTC on June 13. This was likely related to the combined influence of the waning high-speed stream and the glancing-blow ICME arrival associated with the June 11 CME (SIDC CME 675). Locally over Belgium, conditions remained quiet to unsettled during this later interval.

4. International Sunspot Number by SILSO



SILSO graphics (http://sidc.be/silso) Royal Observatory of Belgium, 2026 June 15

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

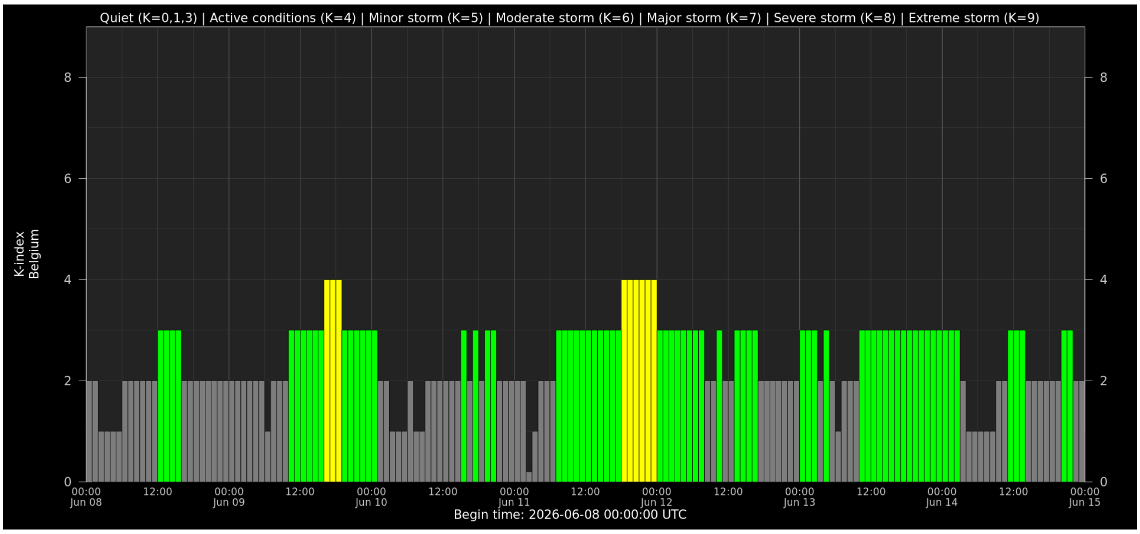
Solar flare activity was low during the week.
In order to view the activity of this week in more detail, we suggest to go to the following website from which all the daily (normal and difference) movies can be accessed: https://proba2.oma.be/ssa

This page also lists the recorded flaring events.

A weekly overview movie can be found here (SWAP week 846). https://proba2.sidc.be/swap/data/mpg/movies/weekly_movies/weekly_movie_2026_06_08.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.sidc.be/swap/data/mpg/movies/

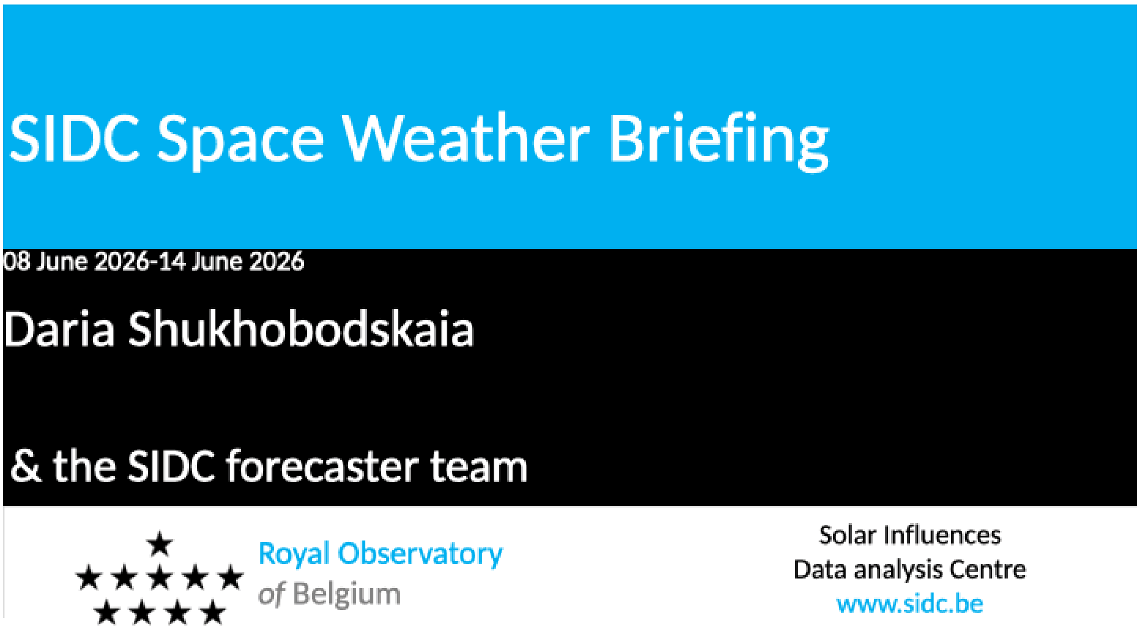
6. Geomagnetic Observations in Belgium



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. The SIDC Space Weather Briefing

The forecaster on duty presented the SIDC briefing that gives an overview of space weather from June 8 to 14.
The pdf of the presentation: https://www.stce.be/briefings/20260615_SWbriefing.pdf



8. 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.

* July 8, 2026, Watching the Sun: a 200 year journey, public visits of the solar physics and space weather department, NL/FR/EN, Brussels, Belgium - book: https://200year.observatory.be/en-gb/coupole

* Aug 6, 2026, Watching the Sun: a 200 year journey, public visits of the solar physics and space weather department, NL/FR/EN, Brussels, Belgium - book: https://200year.observatory.be/en-gb/coupole

* 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 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 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

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