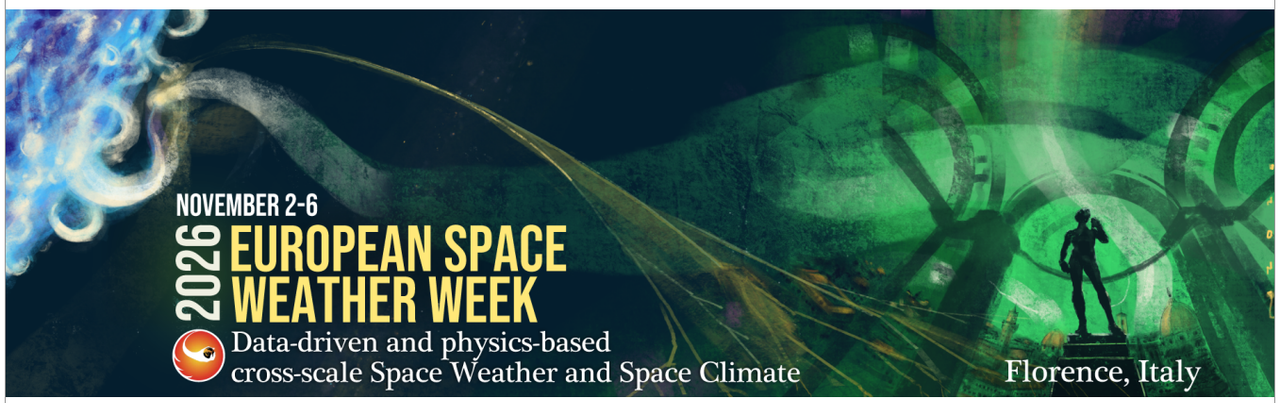
# Space Weather Training Course




Collaboration of

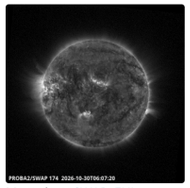
e-SWAN

SWEC
Space Weather Education Centre

COMMUNITY COORDINATED MODELING CENTER

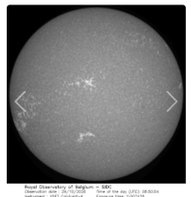
# Observations

## Space Based Imaging



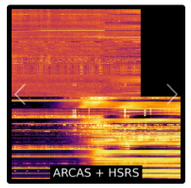

More data: SWAP, EUI

## Ground Based Imaging



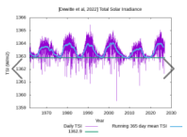
More: H-α, WL, Ca-IIK, Drawings

## Ground Based Radio



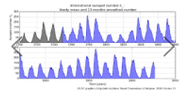

More: ARCAS+HSRS, CALLISTO

## Space Based Timelines



More data: LYRA, TSI

## WDC Sunspot Index



More data: SILSO

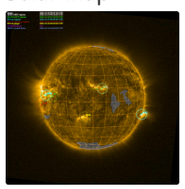
# Space Weather Services

## Detections

**Solardemon**
**2026-10-28 12:54 B1 flare**

**CACTus**
**2026-10-10 15:36 1062km/s**

## Solar Map



## Latest Alerts

None

No alerts since: 2026-10-25

## Forecasts

| | |
|---|---|
| Flare: | Quiet conditions (<50% C-class flares) |
| Protons: | Quiet |
| Geomagnetic: | Quiet (A<20 and K<4) |
| All quiet: | False |
| Provisional SSN: | |

## Solar Activity

URSIgram 2026-10-29

Solar flaring activity was very low over the past 24 hours as the X-ray flux was below C level. The only visible Sunspot Group (SG) was SIDC SG 988 (NOAA Active Region 4563, Beta magnetic configuration) that re-emerged during the past 24 hours. No C-class X-ray activity is expected in the next 24 hours. No Earth-directed Coronal Mass Ejections (CME) were observed in the last 24 hours. The

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URSIgram 2026-10-29

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URSIgram

:Product: documentation at http://www.sidc.be/products/meu
#-----------------------------------------------------------------#
# DAILY BULLETIN ON SOLAR AND GEOMAGNETIC ACTIVITY from the SIDC #
# (RWC Belgium) #
#-----------------------------------------------------------------#
SIDC URSIGRAM 61029
SIDC SOLAR BULLETIN 29 Oct 2026, 1230UT
SIDC FORECAST
SOLAR FLARES : Quiet conditions (<50% probability of C-class flares)
GEOMAGNETISM : Quiet (A<20 and K<4)
SOLAR PROTONS : Quiet
PREDICTIONS FOR 29 Oct 2026 10CM FLUX: 092 / AP: 006
PREDICTIONS FOR 30 Oct 2026 10CM FLUX: 094 / AP: 004
PREDICTIONS FOR 31 Oct 2026 10CM FLUX: 092 / AP: 003

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TODAY'S ESTIMATED ISN : 019, BASED ON 19 STATIONS.

SOLAR INDICES FOR 28 Oct 2026
WOLF NUMBER CATANIA : 035
10CM SOLAR FLUX : 093
AK CHAMBON LA FORET : ///
AK WINGST : 008
ESTIMATED AP : 008
ESTIMATED ISN : 006, BASED ON 26 STATIONS.

NOTICEABLE EVENTS SUMMARY
DAY BEGIN MAX END LOC XRAY OP 10CM Catania/NOAA RADIO_BURST_TYPES
NONE
END

BT

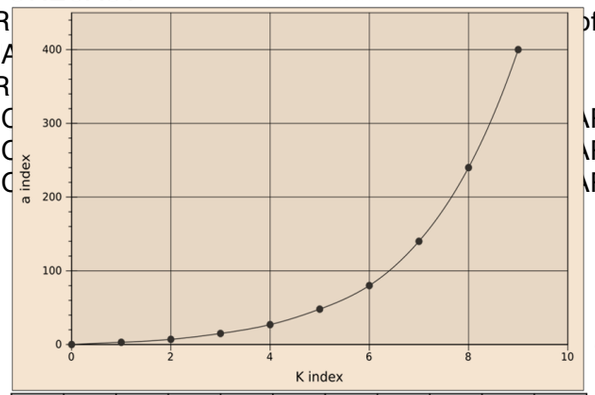
#-----------------------------------------------------------------#
# Solar Influences Data analysis Center - RWC Belgium #
# Royal Observatory of Belgium #
# #
# Website http://www.sidc.be. #
# E-mail sidc-support@oma.be #
# To unsubscribe http://www.sidc.be/registration/unsub.php #
# #
# Legal notices: #
# - Intellectual Property Rights: #
# http://www.astro.oma.be/common/internet/en/data-policy-en.pdf #
# - Liability Disclaimer: #
# http://www.astro.oma.be/common/internet/en/disclaimer-en.pdf #
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SIDC FORECAST
SOLAR
GEOMA
SOLAR
PREDIC
PREDIC
PREDIC

of C-class flares)

AP: 006
AP: 004
AP: 003




| K | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| a | 0 | 3 | 7 | 15 | 27 | 48 | 80 | 140 | 240 | 400 |

*"equivalent amplitude"*

A K-index can be translated in an equivalent a-index value (quasi-logarithmic scale). The average of the a-indices over a day is called an A-index value. Since K-index values are interpreted locally, the computed A-index is also local.

ak index - The local K index is a quasi-logaritmic index, and as such averages cannot be taken. This poses a problem when one wants to express geomagnetic activity over e.g. a day or a month. To this aim, a 3-hourly "equivalent amplitude" index of local geomagnetic activity was established, with "ak" related to the 3-hourly K index according to the scale on https://stce.be/educational/classification#geomag

URSIgram

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# To unsubscribe http://www.sidc.be/registration/unsub.php #
# #
# Legal notices: #
# - Intellectual Property Rights: #
# http://www.astro.oma.be/common/internet/en/data-policy-en.pdf #
# - Liability Disclaimer: #
# http://www.astro.oma.be/common/internet/en/disclaimer-en.pdf #
# - Use and processing of your personal information: #
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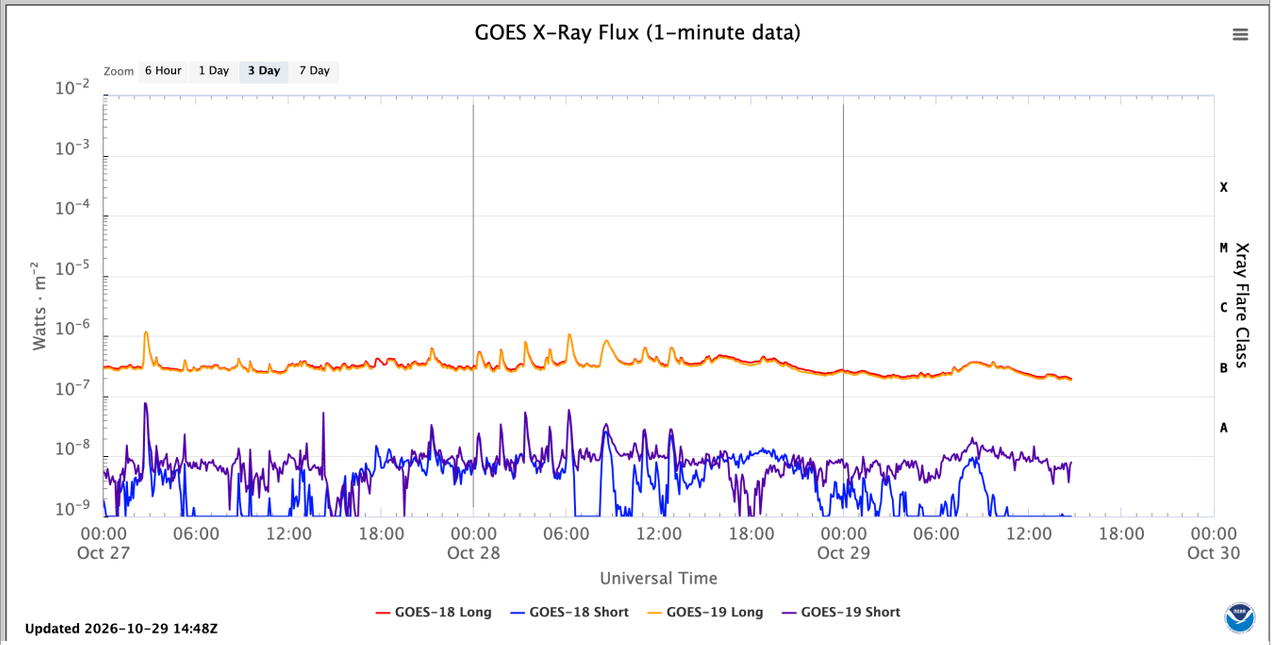
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https://www.spaceweather.gov/products/goes-x-ray-flux

# Solar Active Regions and Flaring

**GOES X-RAY FLUX**



URSIgram

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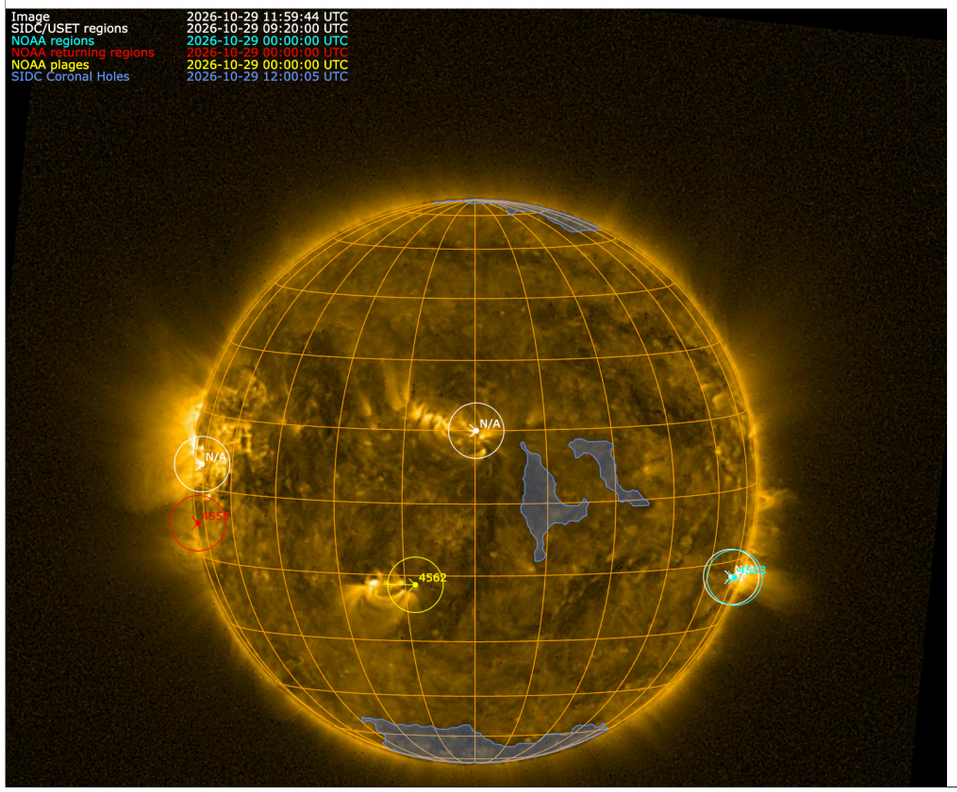
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https://www.sidc.be/spaceweatherservices/applications/solarmap/

# Regions - Solar Map

https://solarmonitor.org/

<27d <7d <1d <1h 2026-10-29T14:58:45Z Submit Now >1h >1d >7d >27d Download -- select a vie




Location

Pre-defined location

Mars

User-defined location

Long: 10 Lat: 10

Sunspot groups and Regions

SIDC/USET Sunspot group

Longitude : 72° Latitude : -18.6°
Comp. Longitude : 75.2° Comp. Latitude : -18.6°
Time: 2026-10-29 09:20:00 UTC

Longitude : -1.3° Latitude : 15°
Comp. Longitude : 1.9° Comp. Latitude : 15°
Time: 2026-10-29 09:20:00 UTC

Longitude : -77.9° Latitude : 4.6°
Comp. Longitude : -74.6° Comp. Latitude : 4.6°
Time: 2026-10-29 09:20:00 UTC

INAF/OACT Sunspot group

Longitude : 72° Latitude : -18°
Comp. Longitude : 78° Comp. Latitude : -18°
Time: 2026-10-29 07:00:00 UTC

Longitude : -3° Latitude : 15°
Comp. Longitude : 3° Comp. Latitude : 15°
Time: 2026-10-29 07:00:00 UTC

Longitude : -65° Latitude : 5°
Comp. Longitude : -58.9° Comp. Latitude : 5°
Time: 2026-10-29 07:00:00 UTC

Longitude : -79° Latitude : 5°
Comp. Longitude : -72.9° Comp. Latitude : 5°
Time: 2026-10-29 07:00:00 UTC

NOAA Active Regions

Longitude : 70° Latitude : -19°
Comp. Longitude : 84.4° Comp. Latitude : -19°
Time: 2026-10-29 00:00:00 UTC

NOAA Expected Active Regions

An active region is an area on the Sun with especially strong magnetic field. In white light images we often see sunspots on these locations, in EUV it is a bright region with visible plasma loops.

Active regions are numbered by the US National Oceanic and Atmospheric Administration (NOAA). The present numbering system started on January 5, 1972, and has been consecutive since then. An example of an active region "name" is "AR5128" (AR for Active Region) or "NOAA Region 5128". Since we only see active regions when they are on the side of the Sun facing the Earth, and the Sun rotates approximately once every 27 days (the equator rotates faster than the poles), the same active region may be seen more than once (if it lasts long enough). In this case the region will be given a new number. Hence, a long-lived active region may get several numbers.
On June 14, 2002, active region number 10000 was reached. For practical, computational reasons, active region numbers continue to have only four digits. Therefore, the sequence of numbers is 9998, 9999, 0000, 0001, and so on. Active region number 10030, for example, is AR0030. This region will often simply be referred to as region number 30, with 10030 implied.

The Catania solar observatory also names regions with sunspots. This sunspot group number can usually be linked to a NOAA AR number, however, sometimes there is an active region without a visible sunspot, or a sunspot without a clear counterpart in EUV. There is no one to one correlation.

Source: https://hesperia.gsfc.nasa.gov/sftheory/questions.htm#AR_numbers

URSIgram

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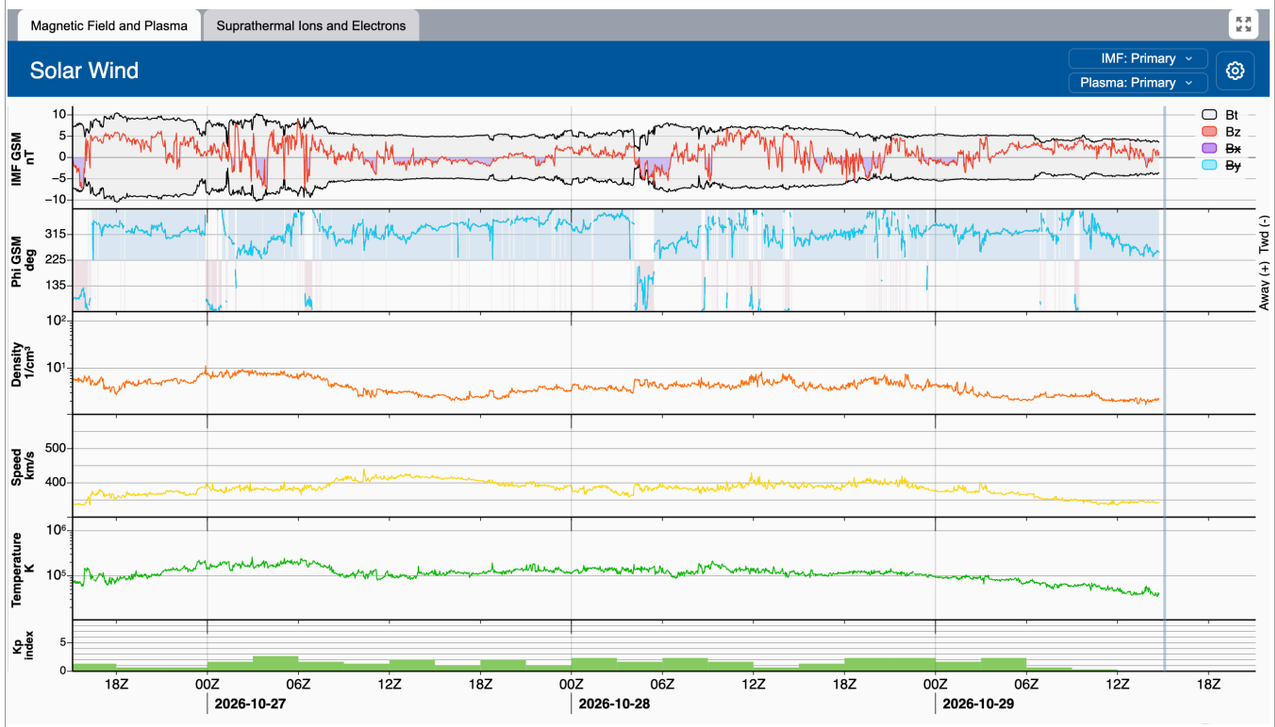
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https://www.spaceweather.gov/products/solar-wind

# Solar Wind



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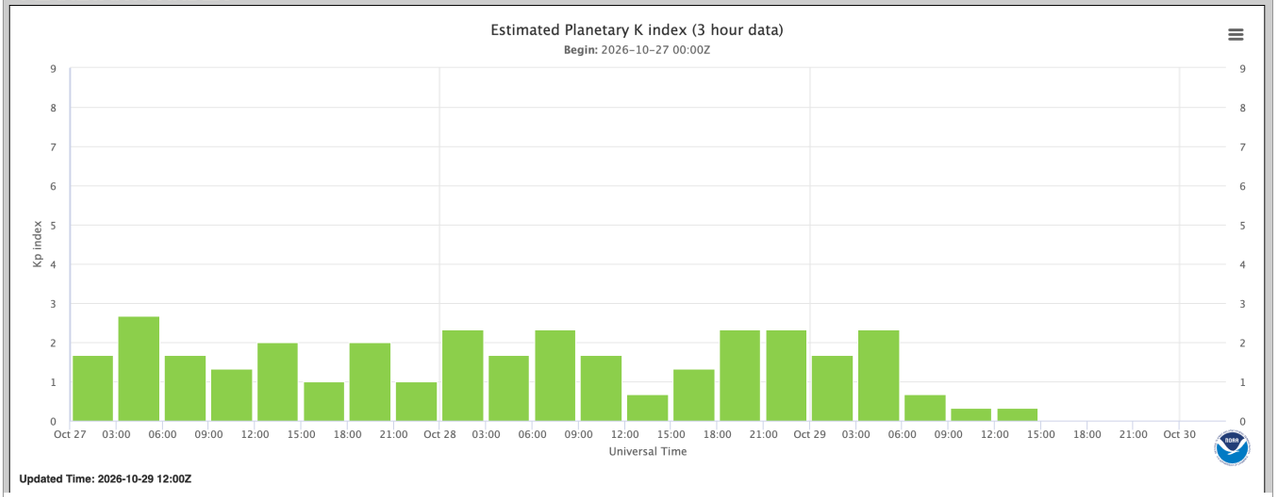
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https://www.spaceweather.gov/products/planetary-k-index

# Geomagnetism

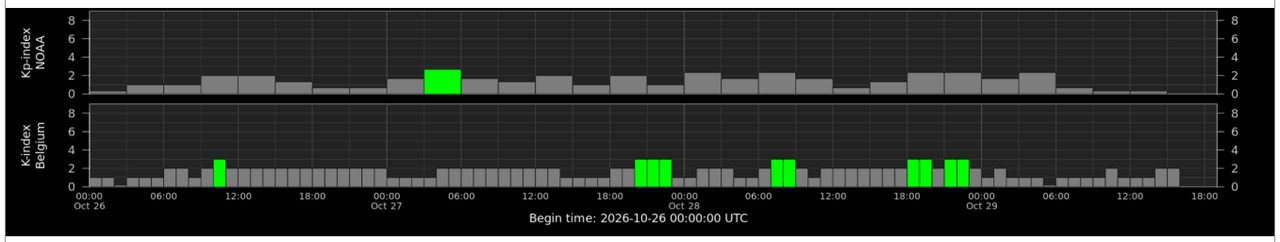
## PLANETARY K-INDEX




**Updated Time: 2026-10-29 12:00Z**

# Geomagnetism

http://ionosphere.meteo.be/geomagnetism/K_BEL/



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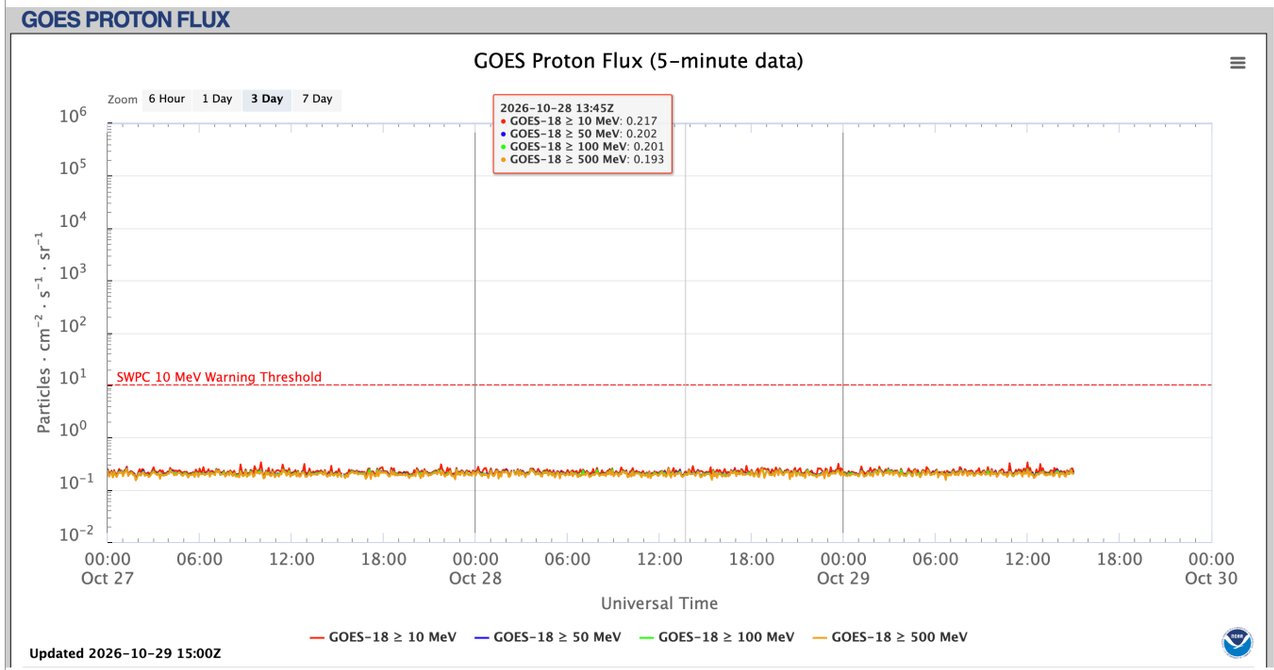
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**Proton flux levels:** The greater than 10 MeV proton flux, as measured by GOES-19, was at nominal levels over the past 24 hours and is expected to remain so over the next 24 hours.

**Electron fluxes at GEO:** During the past 24 hours, the greater than 2 MeV electron flux (as measured by GOES 19) peaked at 2500 pfu on 28 Oct at 18:05 UTC, but dropped below the 1000 pfu alert threshold the same day at 20:35 UTC. It is expected to remain at similar levels in the next 24 hours, though probably below the alert level.
The 24-hour electron fluence was at moderate levels during the past 24 hours but it is expected to drop to normal levels over the next day.

https://www.spaceweather.gov/products/goes-proton-flux

# Proton flux levels



URSIgram

**Solar Active Regions and flaring:** Solar flaring activity was very low over the past 24 hours as the X-ray flux was below C level. The only visible Sunspot Group (SG) was SIDC SG 988 (NOAA Active Region 4563, Beta magnetic configuration) that re-emerged during the past 24 hours. No C-class X-ray activity is expected in the next 24 hours.

**Coronal mass ejections:** No Earth-directed Coronal Mass Ejections (CME) were observed in the last 24 hours.

**Solar wind:** The Solar Wind (SW) conditions of the past 24 hours featured a typical slow SW regime. The SW speed ranged from 340 to 430 km/s, the interplanetary magnetic field (B) varied between 4 and 8 nT, and its North- South component (Bz) ranged from -6 to 7 nT. Similar conditions are expected for the next 24 hours.

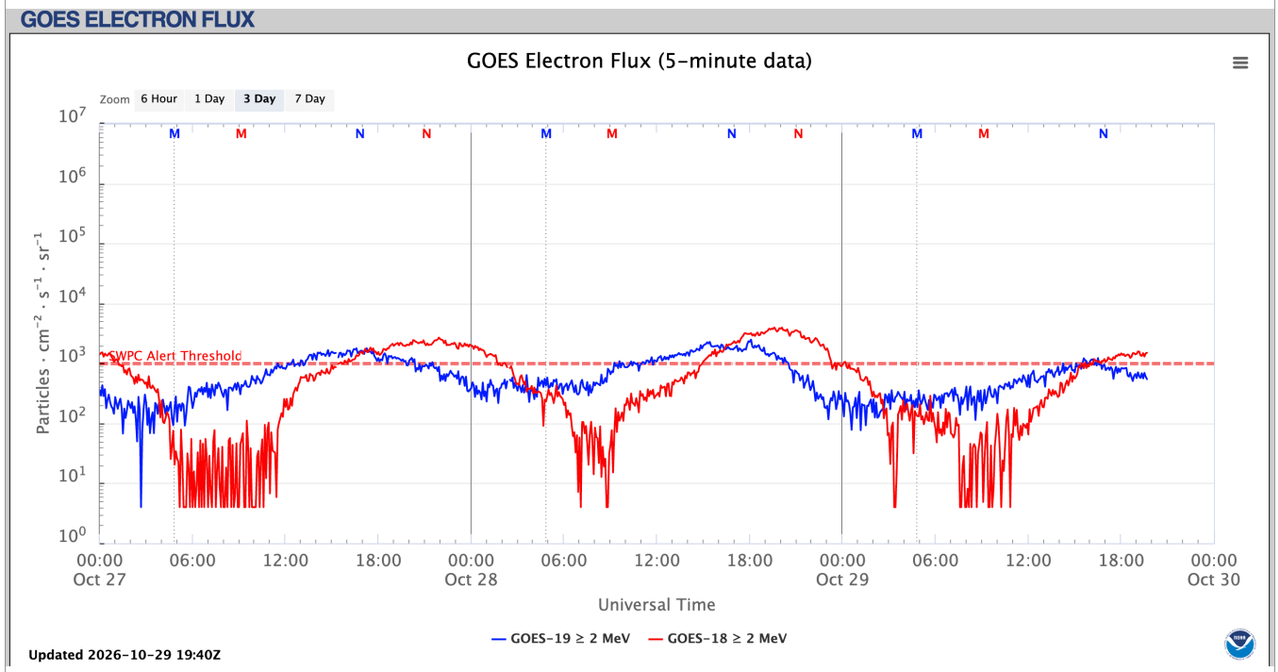
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https://www.spaceweather.gov/products/goes-electron-flux

# Electron fluxes at GEO




**fluence = flux accumulation over 24 hours**

The >2 MeV electron flux in the outer radiation belt can be significantly influenced by strong interplanetary CMEs and high speed solar wind streams (HSS) impacting the Earth's magnetosphere (Kavanagh and Denton, 2007). It is measured by the GOES satellites in their geostationary orbit, which is located in the Earth's outer radiation belt. High fluxes of energetic electrons are associated with a type of spacecraft charging referred to as deep-dielectric charging.

URSIgram

:Product: documentation at http://www.sidc.be/products/meu
#-----------------------------------------------------------------#
# DAILY BULLETIN ON SOLAR AND GEOMAGNETIC ACTIVITY from the SIDC #
# (RWC Belgium) #
#-----------------------------------------------------------------#
SIDC URSIGRAM 61029
SIDC SOLAR BULLETIN 29 Oct 2026, 1230UT
SIDC FORECAST
SOLAR FLARES : Quiet conditions (<50% probability of C-class flares)
GEOMAGNETISM : Quiet (A<20 and K<4)
SOLAR PROTONS : Quiet
PREDICTIONS FOR 29 Oct 2026 10CM FLUX: 092 / AP: 006
PREDICTIONS FOR 30 Oct 2026 10CM FLUX: 094 / AP: 004
PREDICTIONS FOR 31 Oct 2026 10CM FLUX: 092 / AP: 003

Solar Active Regions and flaring: Solar flaring activity was very low over the past 24 hours as the X-ray flux was below C level. The only visible Sunspot Group (SG) was SIDC SG 988 (NOAA Active Region 4563, Beta magnetic configuration) that re-emerged during the past 24 hours. No C-class X-ray activity is expected in the next 24 hours.

Coronal mass ejections: No Earth-directed Coronal Mass Ejections (CME) were observed in the last 24 hours.

Solar wind: The Solar Wind (SW) conditions of the past 24 hours featured a typical slow SW regime. The SW speed ranged from 340 to 430 km/s, the interplanetary magnetic field (B) varied between 4 and 8 nT, and its North- South component (Bz) ranged from -6 to 7 nT. Similar conditions are expected for the next 24 hours.

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Proton flux levels: The greater than 10 MeV proton flux, as measured by GOES-19, was at nominal levels over the past 24 hours and is expected to remain so over the next 24 hours.

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The 24-hour electron fluence was at moderate levels during the past 24 hours but it is expected to drop to normal levels over the next day.

TODAY'S ESTIMATED ISN : 019, BASED ON 19 STATIONS.

SOLAR INDICES FOR 28 Oct 2026
WOLF NUMBER CATANIA : 035
10CM SOLAR FLUX : 093
AK CHAMBON LA FORET : ///
AK WINGST : 008
ESTIMATED AP : 008
ESTIMATED ISN : 006, BASED ON 26 STATIONS.

NOTICEABLE EVENTS SUMMARY
DAY BEGIN MAX END LOC XRAY OP 10CM Catania/NOAA RADIO_BURST_TYPES
NONE
END

BT

#-----------------------------------------------------------------#
# Solar Influences Data analysis Center - RWC Belgium #
# Royal Observatory of Belgium #
# #
# Website http://www.sidc.be. #
# E-mail sidc-support@oma.be #
# To unsubscribe http://www.sidc.be/registration/unsub.php #
# #
# Legal notices: #
# - Intellectual Property Rights: #
# http://www.astro.oma.be/common/internet/en/data-policy-en.pdf #
# - Liability Disclaimer: #
# http://www.astro.oma.be/common/internet/en/disclaimer-en.pdf #
# - Use and processing of your personal information: #
# http://www.astro.oma.be/common/internet/en/privacy-policy-en.pdf #
#-----------------------------------------------------------------#

URSIgram

TODAY'S ESTIMATED ISN : 019, BASED ON 19 STATIONS.

SOLAR INDICES FOR 28 Oct 2026
WOLF NUMBER CATANIA : 035
10CM SOLAR FLUX : 093
AK CHAMBON LA FORET : ///
AK WINGST : 008
ESTIMATED AP : 008
ESTIMATED ISN : 006, BASED ON 26 STATIONS.

NOTICEABLE EVENTS SUMMARY
DAY BEGIN MAX END LOC XRAY OP 10CM Catania/NOAA RADIO_BURST_TYPES
NONE
END

The Geomagnetic Observatory Wingst (IAGA code: WNG) is a scientific monitoring station in Wingst, Germany

CHAMBON LA FORET is in France

:Issued: 2026 Oct 09 1254 UTC
:Product: documentation at http://www.sidc.be/products/meu
#-----------------------------------------------------------------#
# DAILY BULLETIN ON SOLAR AND GEOMAGNETIC ACTIVITY from the SIDC #
# (RWC Belgium) #
#-----------------------------------------------------------------#

# 9 October 2026

SIDC URSIGRAM 61009
SIDC SOLAR BULLETIN 09 Oct 2026, 1253UT
SIDC FORECAST
SOLAR FLARES : M-class flares expected (probability >=50%)
GEOMAGNETISM : Minor storm expected (A>=30 or K=5)
SOLAR PROTONS : Warning condition (activity levels expected to increase, but no numeric forecast given)
PREDICTIONS FOR 09 Oct 2026 10CM FLUX: 122 / AP: 021
PREDICTIONS FOR 10 Oct 2026 10CM FLUX: 124 / AP: 022
PREDICTIONS FOR 11 Oct 2026 10CM FLUX: 126 / AP: 015

**Solar Active Regions and flaring:** The solar flaring activity over the past 24 hours reached high levels with background C-class flaring and one registered M-flare. The strongest recorded activity was a M6.7 flare (SIDC Flare 8685) with peak time at 15:48 UTC on October 08. The flare was produced within SIDC Sunspot Group 976 (NOAA Active Region 4549) currently located at N10W31. A total of 5 numbered sunspot groups were identified on the visible solar disk with SIDC Sunspot Group 976 remaining the largest and most complex region. It continues to be classified as magnetic type beta-gamma-delta and was the main contributor to the observed flaring activity over the past 24 hours. SIDC Sunspot Group 973 (NOAA Active Region 4545), currently located at N18W37, has exhibited some decay. It is classified as magnetic type beta and remained quiet. A new region has emerged on disc SIDC Sunspot Group 979, currently located at N22W11, and another one, SIDC Sunspot Group 980, is rotating from behind the south-east limb. Both are classified as magnetic type beta and the latter one has exhibited some low flaring activity while behind the east limb. The solar flaring activity is expected to be at moderate over the next 24 hours with likely M-class flaring and chances for an X-class flare.

**Coronal mass ejections:** A wide coronal mass ejection (SIDC CME 727) was observed by LASCO/C2 to lift off the solar surface around 16:12 UTC on October 08 with a 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 an associated EUV dimming and a coronal wave 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 respectively. SIDC CME 727 is estimated to have an Earth-directed component and current analysis suggests a possible arrival time late UTC on October 11 to early UTC on October 12. Another EUV dimming and a small coronal wave were observed in the SDO/AIA imagery starting at 17:36 UTC on October 08, seemingly related to a filament eruption in the south-eastern quadrant triggered by the same event chain. A faint eastward eruption is visible in the LASCO/C2 around 17:00 UTC, but is expected to travel off the Sun-Earth line.

**Coronal holes:** SIDC Coronal Hole 149 (a recurrent mid-latitude coronal hole with a negative polarity) continues to reside on the central meridian. A high-speed stream related to it might be expected at Earth on October 09, possibly mixed with anticipated ICME arrival signatures related to SIDC CME 725.

**Solar wind:** Over the past 24 hours the solar wind parameters (as measured by ACE at L1) registered some enhancements, possibly the precursor of a high-speed stream arrival related to SIDC Coronal Hole 149. The solar wind speed remained slow, varying in the range of 333 to 390 km/s. The interplanetary magnetic field (B) registered a maximum value of 12.7 nT with a north-south (Bz) component down to - 7 nT. The B field phi angle switched from the positive to the negative sector (directed towards the Sun). The solar wind parameters are expected to be perturbed over the next 24 hours with an anticipated arrival of a high-speed stream possibly mixed with an ICME arrival related to SIDC CME 725. Perturbed solar wind conditions are expected to continue on October 10 with anticipated high- speed stream influence and possible waning ICME influence. A mild glancing blow arrival related to SIDC CME 726 could be expected on October 11 with the possibility of another ICME arrival late UTC on October 11 or early UTC on October 12 related to SIDC CME 727.

**Geomagnetism:** The geomagnetic conditions over the past 24 hours were locally (over Belgium) quiet to unsettled and globally quiet to active with NOAA Kp reaching 4 in the period 9-12 UTC on October 09. Unsettled conditions to minor storm levels are expected over the next 24 hours with chances for isolated moderate storms. Unsettled to active conditions with chances for more minor storm levels can continue on October 10, October 11 and October 12.

**Proton flux levels:** Over the past 24 hours the greater than 10 MeV GOES proton flux remained at close to nominal levels, while exhibiting some further enhancements related to activity from SIDC Sunspot Group 976 (NOAA Active Region 4549). The greater than 10 MeV GOES proton flux is expected to further increase over the next 24 hours with chances of reaching the 10 pfu proton event threshold.

**Electron fluxes at GEO:** The greater than 2 MeV electron flux as measured by GOES 18 and GOES 19 has exceeded the 1000 pfu threshold over the past 24 hours and is expected to be predominantly below the 1000 pfu threshold over the next 24 hours. The 24-hour electron fluence was at moderate levels and is expected to decrease to nominal levels over the next 24 hours.

TODAY'S ESTIMATED ISN : 086, BASED ON 07 STATIONS.

SOLAR INDICES FOR 08 Oct 2026
WOLF NUMBER CATANIA : 089
10CM SOLAR FLUX : ///
AK CHAMBON LA FORET : 017
AK WINGST : 006
ESTIMATED AP : 006
ESTIMATED ISN : 075, BASED ON 18 STATIONS.

NOTICEABLE EVENTS SUMMARY
DAY BEGIN MAX END LOC XRAY OP 10CM Catania/NOAA RADIO_BURST_TYPES
08 1529 1548 1558 N12W20 M6.7 2B 57/4549 I/3
END

:Issued: 2026 Oct 09 1254 UTC
:Product: documentation at http://www.sidc.be/products/meu
#-----------------------------------------------------------------#
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# (RWC Belgium) #
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# 9 October 2026

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SIDC SOLAR BULLETIN 09 Oct 2026, 1253UT
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08 1529 1548 1558 N12W20 M6.7 2B 57/4549 I/3
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Importance: weak - normal - strong