SPACE WEATHER INTRODUCTORY COURSE

SWIC

Collaboration of

Solar-Terrestrial Centre of Excellence

Koninklijke luchtmacht

Koninklijk Nederlands Meteorologisch Instituut
Ministerie van Infrastructuur en Milieu

SPACE WEATHER BRIEFING

Sneak preview

Elke D'Huys & Jennifer O'Hara

We will soon take part in the weekly space weather briefing where our forecaster on duty reports on the current and expected space weather conditions.

Topics that will be addressed are the space weather ingredients that were presented in the introduction section of this course: solar activity (active regions, filaments, flares, coronal holes), energetic particles, solar wind, geomagnetic conditions.

SIDC Space Weather Briefing

29 December 2025-04 January 2026

Jennifer O'Hara

& the SIDC forecaster team

Royal Observatory *of* Belgium

Solar Influences
Data analysis Centre
www.sidc.be

Now it is time to dive into the space weather briefing. We take an example from the last week of 2025.
The briefing takes place on Mondays at 11h30 LT and it is when the forecaster of the past week presents an overview of what happened during that week and hands over the duty to the next forecaster.

Summary Report

Solar activity from 2025-12-29 00:00 to 2026-01-04 23:59

Active regions	18 numbered regions over the week, most active were SIDC Sunspot Group 744 (NOAA AR4324) and SIDC Sunspot Group 745 (NOAA AR4325)
Flares	# C-class flare: 35 # M-class flare: 2 # X-class flare: 0
Coronal Holes	Negative polarity CH and a small positive polarity CH transited central meridian
CMEs	3 CMEs with possible Earth directed components observed

Proton flux	Below 10 pfu threshold
Electron flux	Above 1000 Pfu threshold, moderate fluence

Solar wind and geomagnetic conditions

ICMEs	ICME signatures on January 03 - 04
Solar wind conditions	|B|: 1.04 - 12.28 nT //Bz: -8.87 nT to 11.53 nT //Speed: 321.5 – 700.0km/s
Geomagnetic conditions	max KBel: 4.0, max Kp(NOAA): 5.0, Minor Storm conditions

All Quiet Alert: Not quiet

The briefing starts with a summary, an overview of what happened in the past week. All rows in this table will be discussed in more detail during the briefing

Solar Activity

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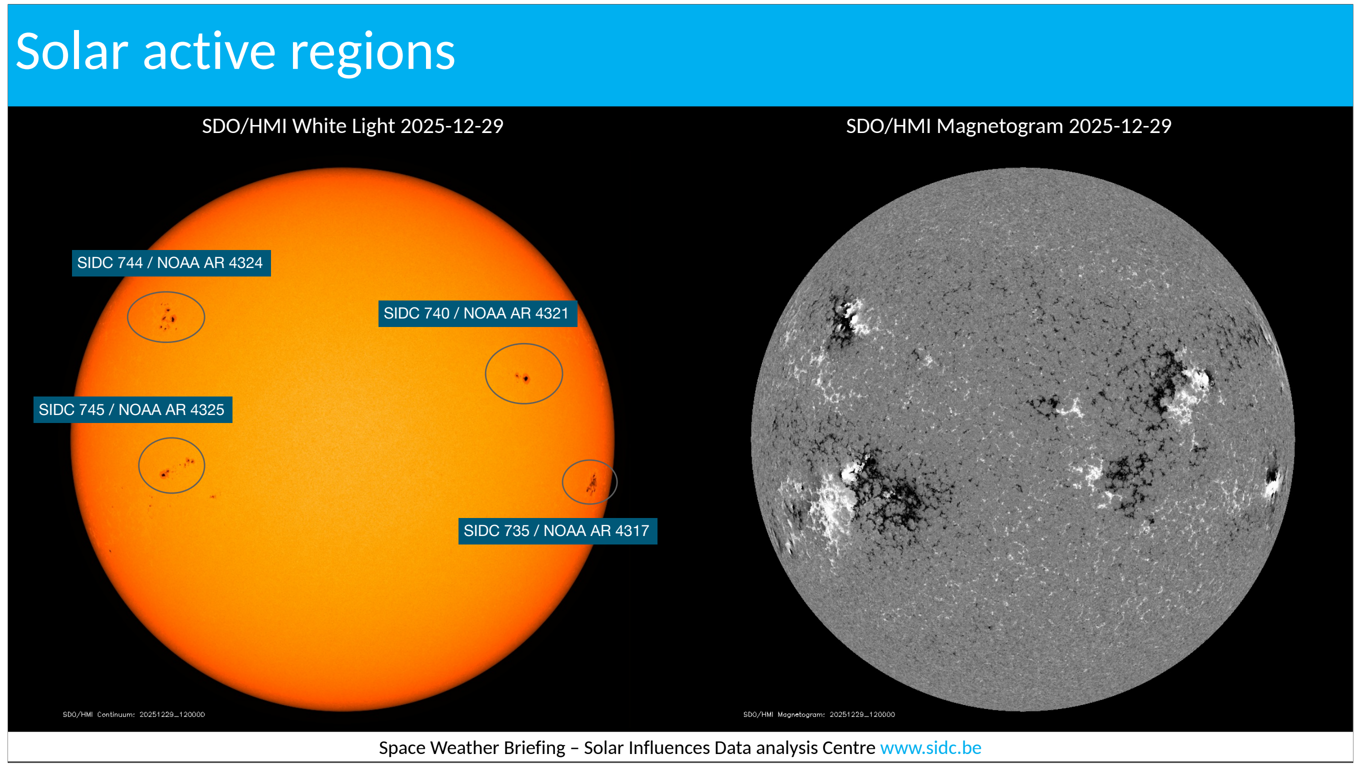


SIDC 740, 744 and 745: Beta – Gamma, M-class flaring
SIDC 740: Beta – Delta, approaching the west limb, quiet

On the right you see a magnetogram, which shows you the strength of the solar magnetic field. You immediately see that the field is very strong at the location of the sunspot seen in the photospheric image to the left.

So both sunspots and active regions are different features indicating the same area of strong magnetic field.

Sunspots can show a variety of complexity. From a single polarity spot to a monster region where polarities are intermixed. There are various systems in place to classify sunspots, which we will discuss later. Know for now that the complexity of a sunspot is related to its likelihood to produce significant solar activity.

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.

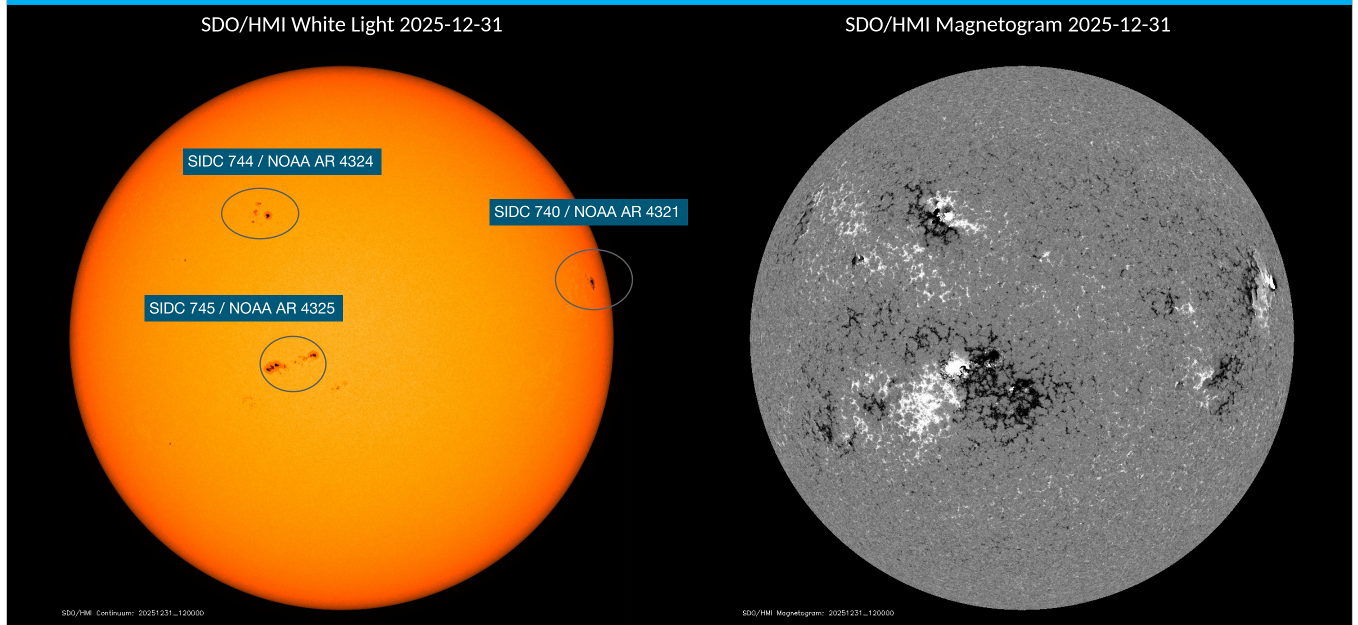
The Catania solar observatory also names regions with sunspots. This sunspot group number can usually be linked to a NOAA AR number, however, sometimes there is an active region without a visible sunspot, or a sunspot without a clear counterpart in EUV. There is no one to one correlation.

http://sidc.oma.be/spaceweatherservices/solarmap/

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

SIDC/SILSO started its own sunspot group numbering around April 2024.

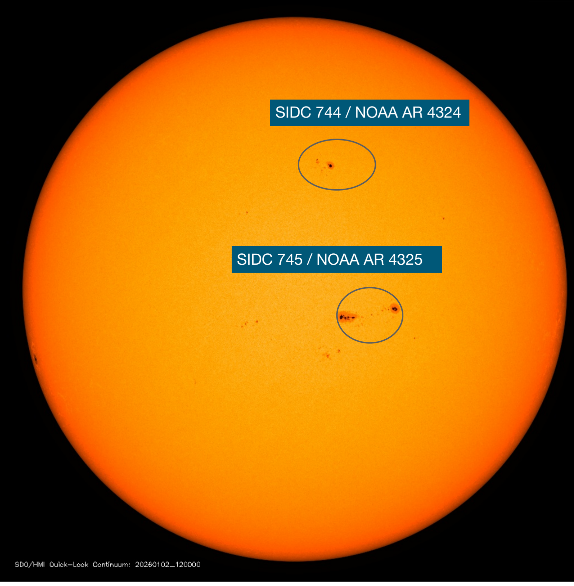
Solar active regions



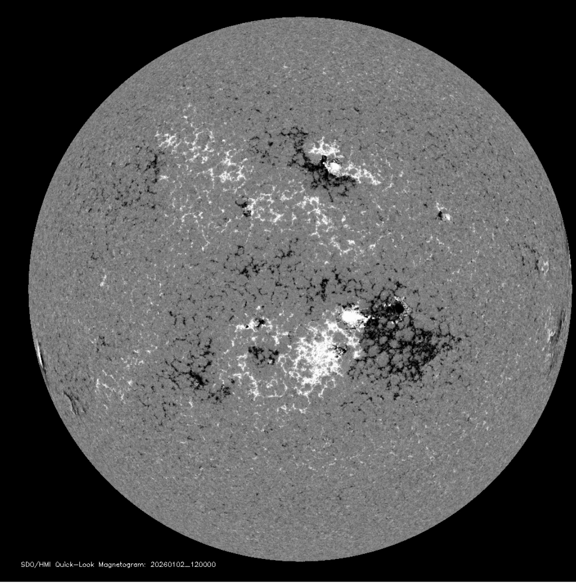
SIDC Sunspot Group 745 (NOAA Active Region 4325): This region is the largest on disk and was responsible for most of the flaring activity (Beta-Delta magnetic configuration).

Solar active regions

SDO/HMI White Light 2026-01-02

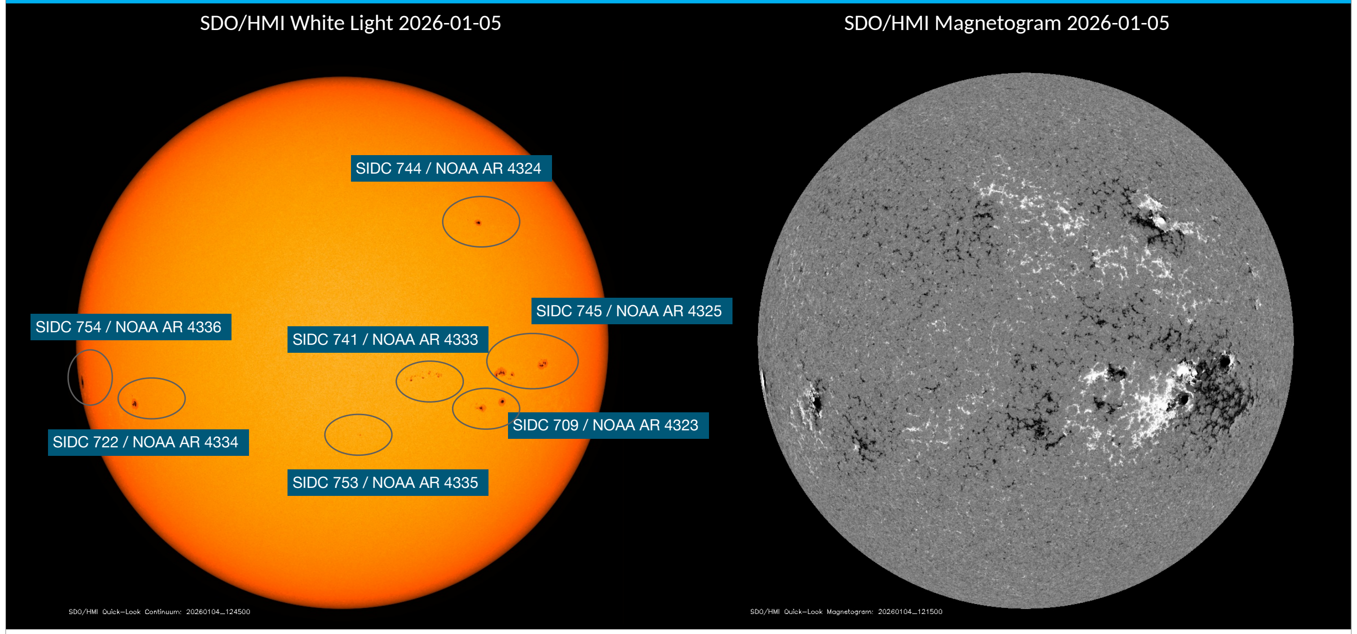


SDO/HMI Magnetogram 2026-01-02



SIDC 744 has decayed to beta-delta magnetic configuration

Solar active regions

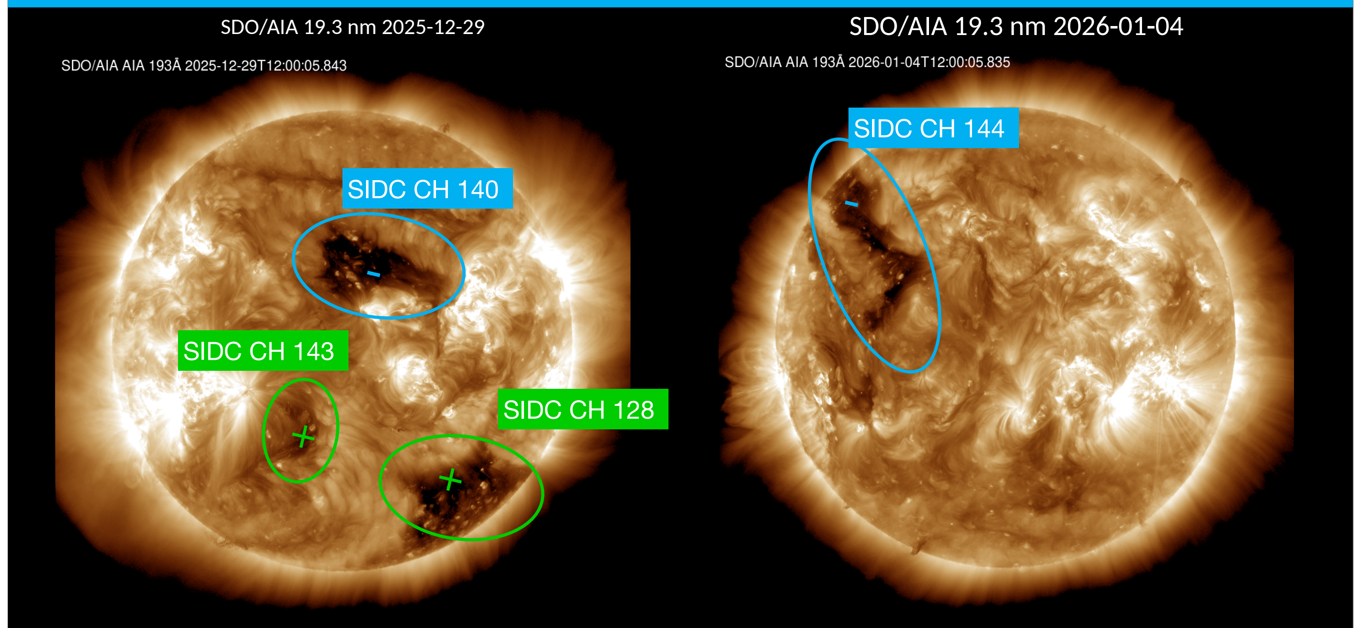


Space Weather Briefing – Solar Influences Data analysis Centre www.sidc.be

There are currently seven numbered active regions on the visible solar disk. SIDC Sunspot Group 745 (NOAA Active Region 4325, magnetic type beta-gamma) remains the largest and most complex active region, but produced only low-level C-class flaring. Low flaring activity was also produced by SIDC Sunspot Group 744 (NOAA Active Region 4324; magnetic type alpha) and by SIDC Sunspot Group 754 (NOAA Active Region 4336; magnetic type beta). The remaining active regions are relatively simple (magnetic type alpha or beta) and did not produce any significant flaring activity.

There were 18 numbered regions on disk over the week, but many of this were magnetically simple.

Coronal holes



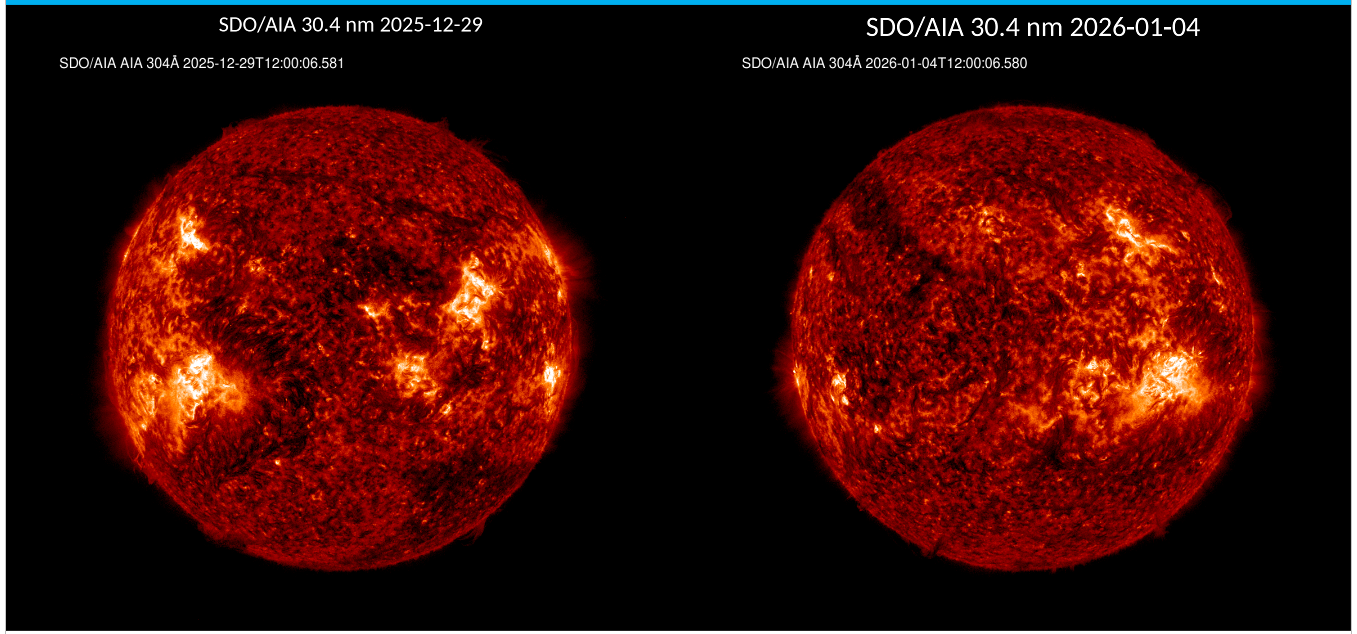
A coronal hole is a structure in the solar corona that you see as a black area in the EUV. In these regions, the magnetic field in less strong and the magnetic field lines are open, which allows plasma to escape.
There is thus less plasma present to radiate and the region appears black in images.

The magnetic field lines of a coronal hole fan out into space, there are no closed magnetic loops above. This gives rise to a solar wind that is faster (~800 km/s) than the regular solar wind (~450 km/s).

In determining how strong the impact of a coronal hole will be, the latitude of the coronal hole on the solar disk is important. It is the plasma that leaves at the central meridian that will reach Earth. Polar coronal holes only have an impact when they extend to lower latitudes.

A negative polarity coronal hole (SIDC Coronal Hole 140) continued to transit the central meridian at the start of the week on December 29. A small positive polarity coronal hole in the southern hemisphere (SIDC Coronal Hole 143) began to transit the central meridian on December 30.

Filaments

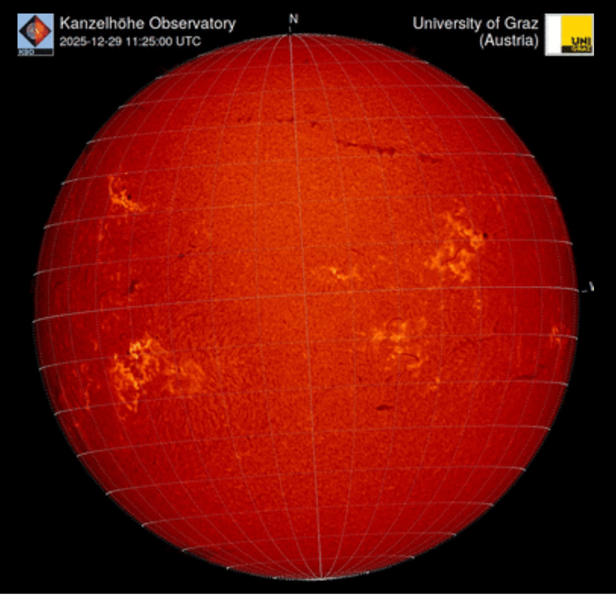


A prominence or filament is a dark loop seen on the edge of the Sun. It shows you the loops of the magnetic field due to the plasma that is glued to it. Filaments appear dark because they are slightly colder than their surroundings. A filament is not made of one single magnetic field line, rather it is a bundle of strands that are entangled.

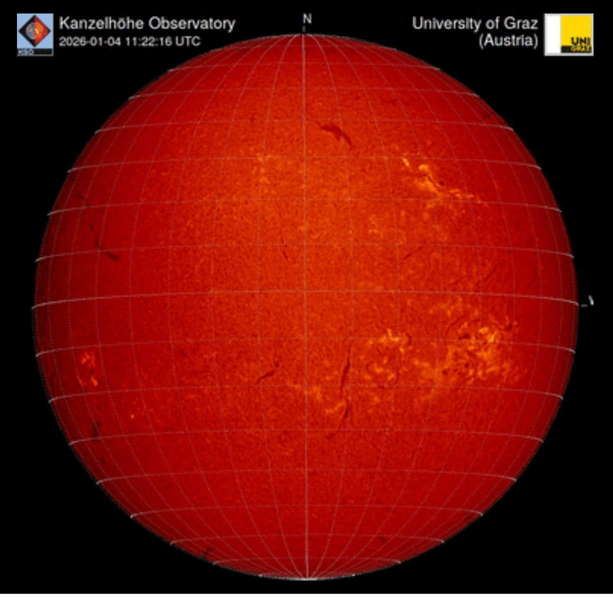
When prominences are observed face on, they look like dark snake-like structures on the solar disk, and they were called filaments. Both are names for the same feature. When a filament becomes unstable and erupts due to reconnection of its magnetic field, its is hurled into space and takes the plasma with it, forming a plasma cloud or coronal mass ejection.

Filaments & Filament eruptions

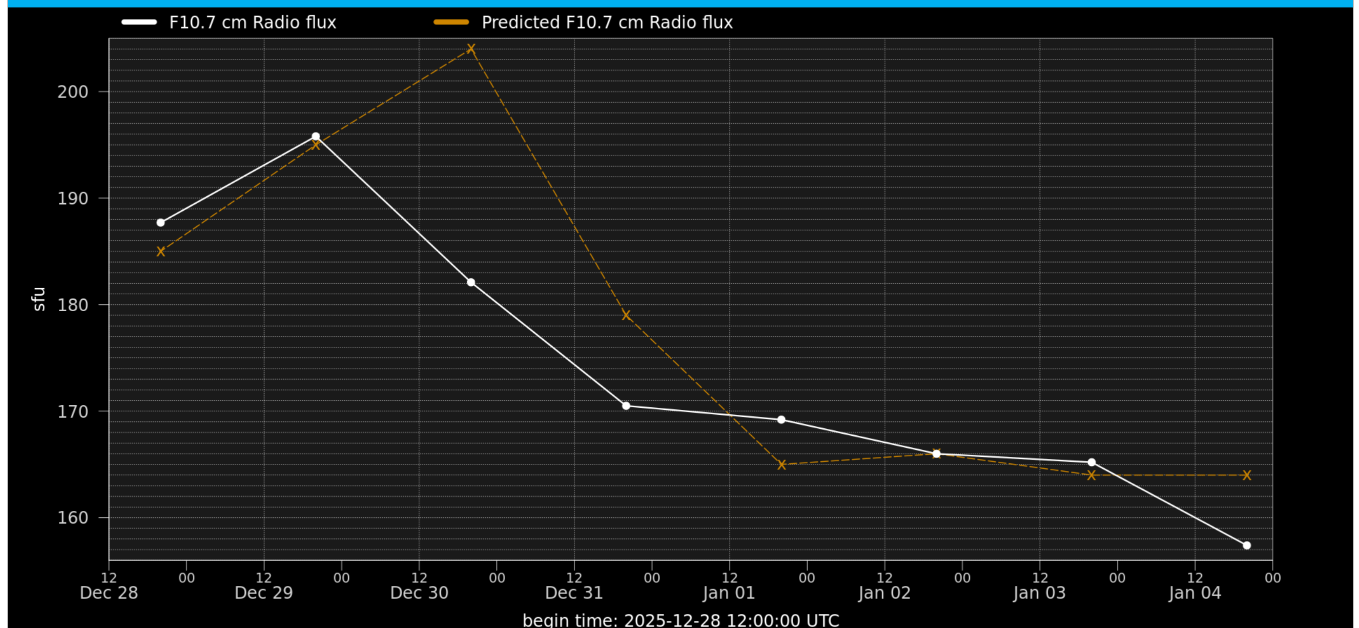
H-alpha 2025-12-29



H-alpha 2026-01-04



Solar F10.7cm radio flux



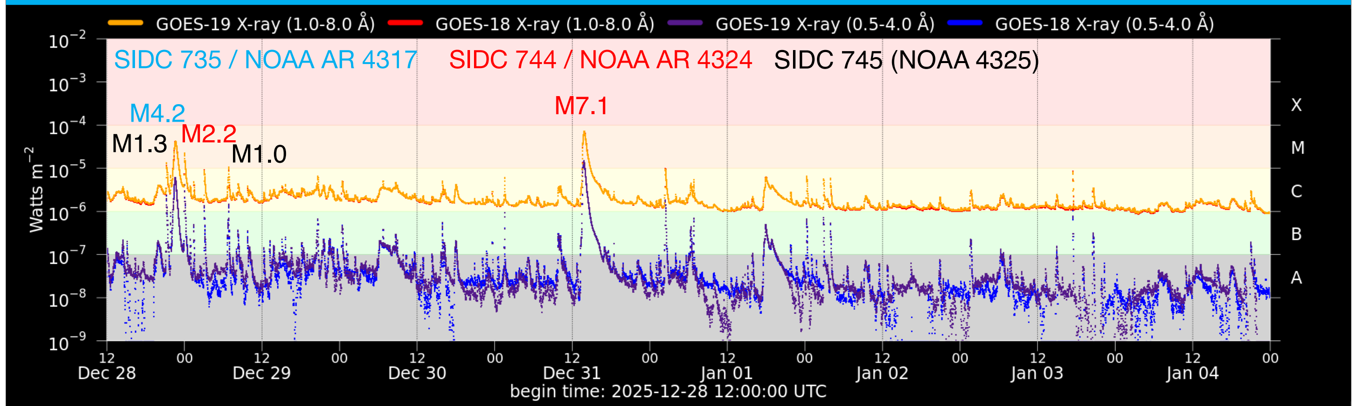
A 10.7 cm solar flux measurement is a determination of the strength of solar radio emission in a 100 MHz-wide band centered on 2800 MHz (a wavelength of 10.7 cm), averaged over an hour. It is expressed in solar flux units (sfu), where 1 sfu = 10-22 W m-2 Hz-1.
The F10.7 is well correlated with the sunspot number, and thus a good indicator of the level of solar activity.

Three flux determinations are made each day, at 1700, 2000, and 2300 UT, except during the winter months, where the low elevation of the Sun (the Dominion Radio Astrophysical Observatory, DRAO, lies at +50° latitude) and the hilly terrain, forces the times to be changed to 1800, 2000, and 2200 UT. Each flux determination takes 1 h and takes no account of the solar radio emissions recorded outside the intervals covered by the measurements. Since the active region emissions contributing to the slowly varying emission (and F10.7) may vary over hours or less, there may be a significant degree of undersampling. In addition, there could be a contribution by a burst. The undersampling means there is a possible error if one uses a flux value in an application involving a different time from that at which the flux measurement is made.

See notes at:
STCE news item: http://www.stce.be/news/374/welcome.html
SWS: http://www.sws.bom.gov.au/Educational/2/2/5
SWS: http://www.sws.bom.gov.au/Educational/2/2/6

Tapping, K. (2013): The 10.7 cm solar radio flux ($F_{10.7}$)
http://adsabs.harvard.edu/abs/2013SpWea..11..394T

Flaring activity



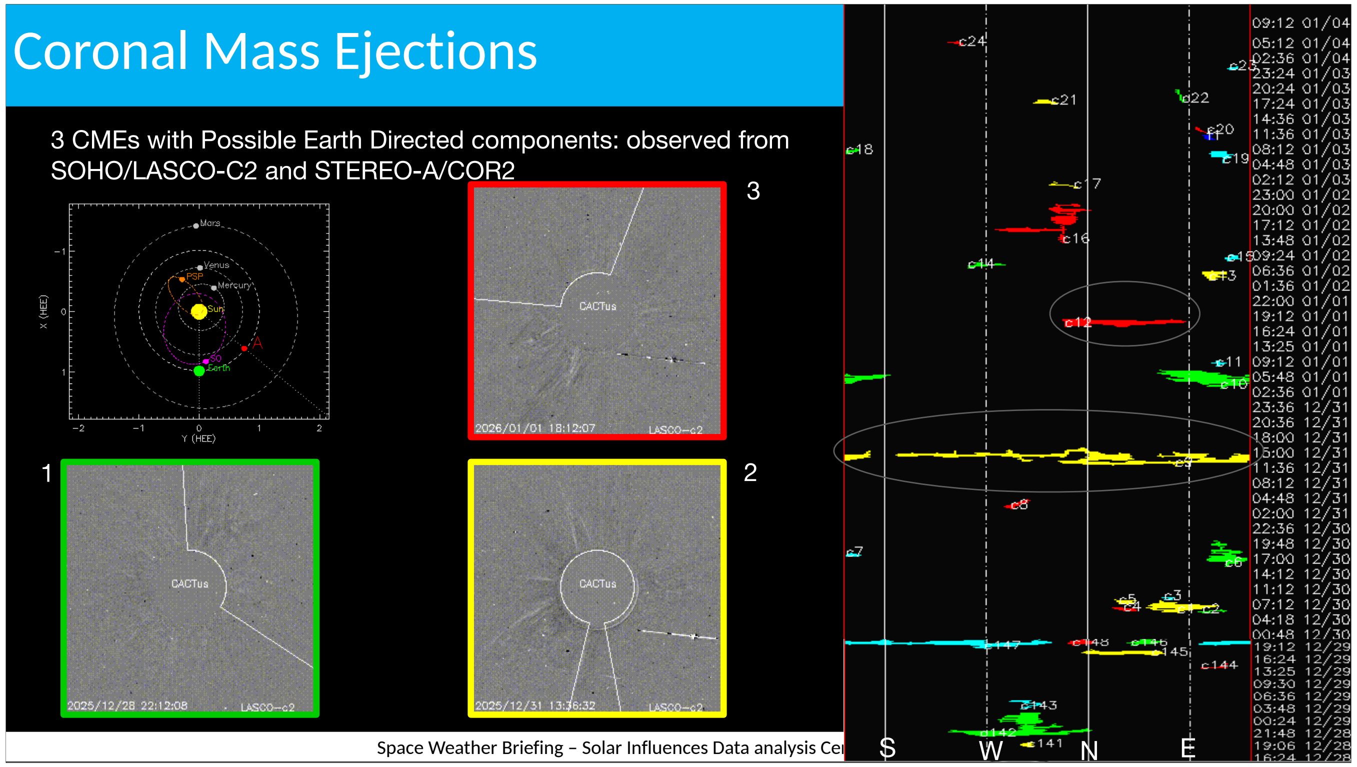
Probabilities (%) and occurrences (#) of C/M/X-flares daily, from noon to noon:

Issue date	2025-12-28	2025-12-29	2025-12-30	2025-12-31	2026-01-01	2026-01-02	2026-01-03	2026-01-04
Probability (%)	90|49|25	99|80|15	99|75|15	99|55|10	99|69|10	99|60|10	99|60|05	99|60|05
Observed (#)	07|04|00	06|00|00	05|00|00	04|01|00	06|00|00	02|00|00	04|00|00	01|00|00

A solar flare is a bright flash of light, caused by a reconfiguration of the solar magnetic field. This so-called reconnection can also send a plasma cloud into space. Solar flares and coronal mass ejections often, but not always, form part of one event.

Chances for a strong flare are highest when the Sun is very active. Solar flares often occur in regions with rapidly changing and complex magnetic field, which we can see in the magnetogram observations.

Solar flaring activity was low to high over the week. There were 18 numbered regions on disk over the week, but many of this were magnetically simple. The largest regions on disk were SIDC Sunspot Groups 744 and 745 (NOAA Active Regions 4324 and 4325) and these were responsible for most of the flaring activity. The largest flare was a M7.1 flare (SIDC Flare 6547) peaking on December 31 at 13:51 UTC, which was produced by SIDC Sunspot Group 744 (NOAA Active Region 4324). After January 01, the flaring activity decreased to low levels for the rest of the week.



These coronagraph images show coronal mass ejections (CMEs) which are huge clouds of highly energised plasma that are hurled away into space. When these are directed towards Earth, they may have all kinds of space weather effects.

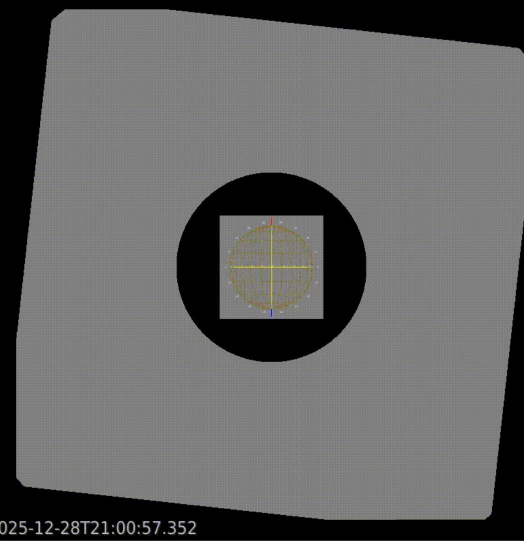
To really be able to estimate the direction and speed of CMEs we need observations from two different view points. This is where the STEREO A and STEREO B spacecraft come in. These spacecraft are in the same orbit as Earth, but one is lagging behind, while the other is ahead of Earth. This is how we can get a side view of plasma clouds. Unfortunately, contact with STEREO B was lost on October 1, 2014.
https://stereo-ssc.nascom.nasa.gov/where.shtml

Very fast plasma clouds may bridge the distance from Sun to Earth in less than a day. These are exceptional, fortunately. Most often plasma clouds take around 3 days to reach us, the slow ones up to 5 days.

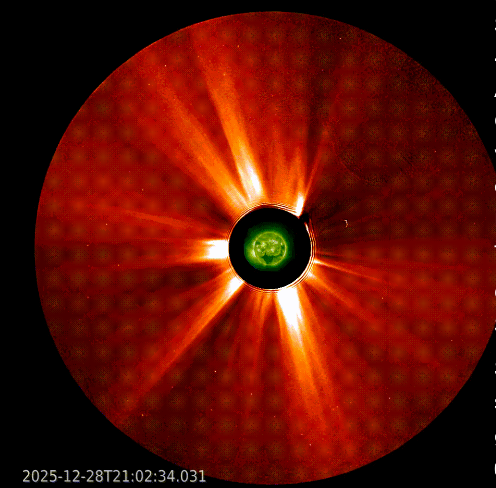
Coronal Mass Ejections

CME 1 Dec 28:

SOHO/LASCO-C2



STEREO-A/COR2



Associated with an M4.2 flare (SIDC Flare 6518) on December 28 at 22:39 UTC, SIDC SG735 (NOAA AR 4317).
Associated dimming.
CME to north-west, with a width of 120 degrees, was detected in LASCO-C2 data from 23:00 UTC.

CME to north-east in STEREO A.

Speed around 450 km/s **predicted possible glancing blow on Jan 01.**

A coronagraph is a telescope with a plate that covers the Sun to block the overpowering light of the solar disk. This allows us to image the solar surroundings, it's corona. The white circle in the middle indicates the position and size of the Sun, and can be overlapped with an actual solar image from another telescope. A coronagraph creates an artificial eclipse, allowing us to study the far corona without having to wait and travel for an eclipse that can be observed from ground.

Three Coronal Mass Ejections (CMEs) with possible Earth-directed components were identified. The first CME (SIDC CME 616), directed to the north-west, was detected in LASCO-C2 data from 23:00 UTC on December 28. This was associated with an M4.2 flare (SIDC Flare 6518) peaking on December 28 at 22:39 UTC.

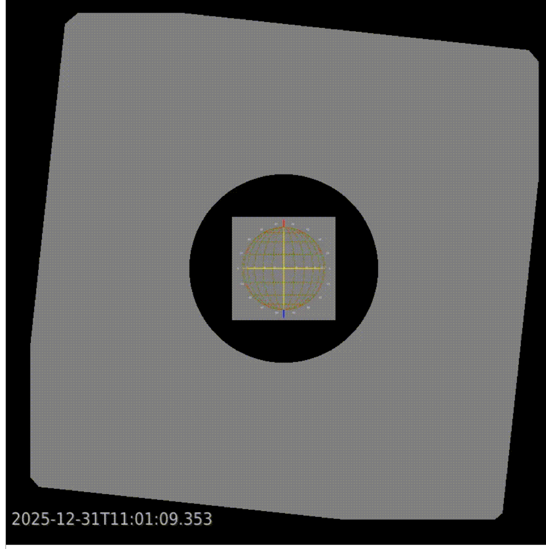
The second was a partial halo CME (SIDC CME 617), predominantly directed to the north-east, was observed in LASCO-C2 data from 14:12 UTC on December 31 and was associated with an M7.1 flare. This eruption had an associated on disk dimming and a Type II and Type IV radio emission.

The third CME (SIDC CME 618), directed to the north-east, was first seen in LACSCO-C2 data from 18:48 UTC on January 01. This was associated with a C6.2 flare from SIDC Sunspot Group 744 (NOAA Active Region 4324), with peak time 17:59 UTC.

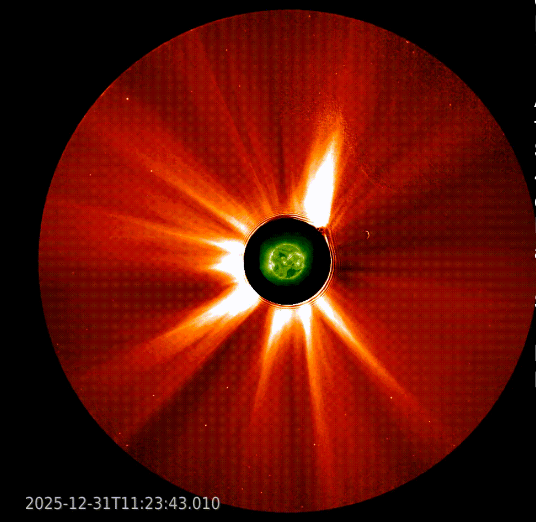
Coronal Mass Ejections

CME 2 Dec 31:

SOHO/LASCO-C2



STEREO-A/COR2



A partial halo, north-east, was observed in LASCO-C2 data from 14:12 UTC on Dec 31.

Associated with M7.1 flare at 13:51 UTC from SIDC SG 744 (NOAA AR 4324) in the north-east quadrant.
Dimming and Type II and IV radio emission ,

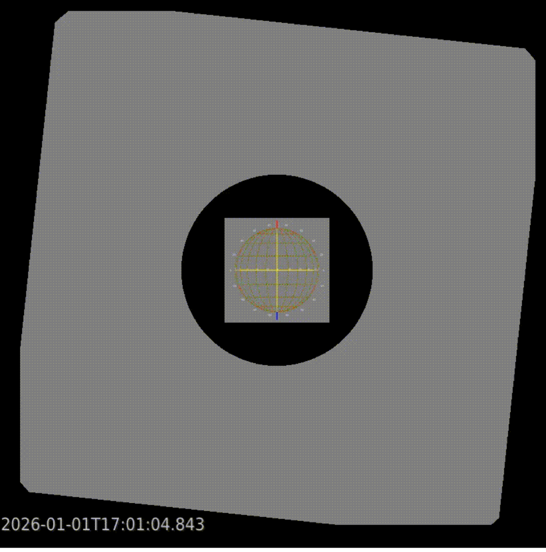
Speed around 800 km/s

Predicted to arrive at Earth early Jan 03.

Coronal Mass Ejections

CME 3 on January 01/02:

SOHO/LASCO-C2



A partial halo CME directed to the north-east . First seen in LACSCO-C2 data from 18:48 UTC on January 01.

Associated with the C6.2 flare from SIDC SG 744 (NOAA AR 4324), with peak time 17:59 UTC.

Speed around 530 km/s.

Predicted possible glancing blow early Jan 05.

Solar Wind and

Geomagnetic Activity

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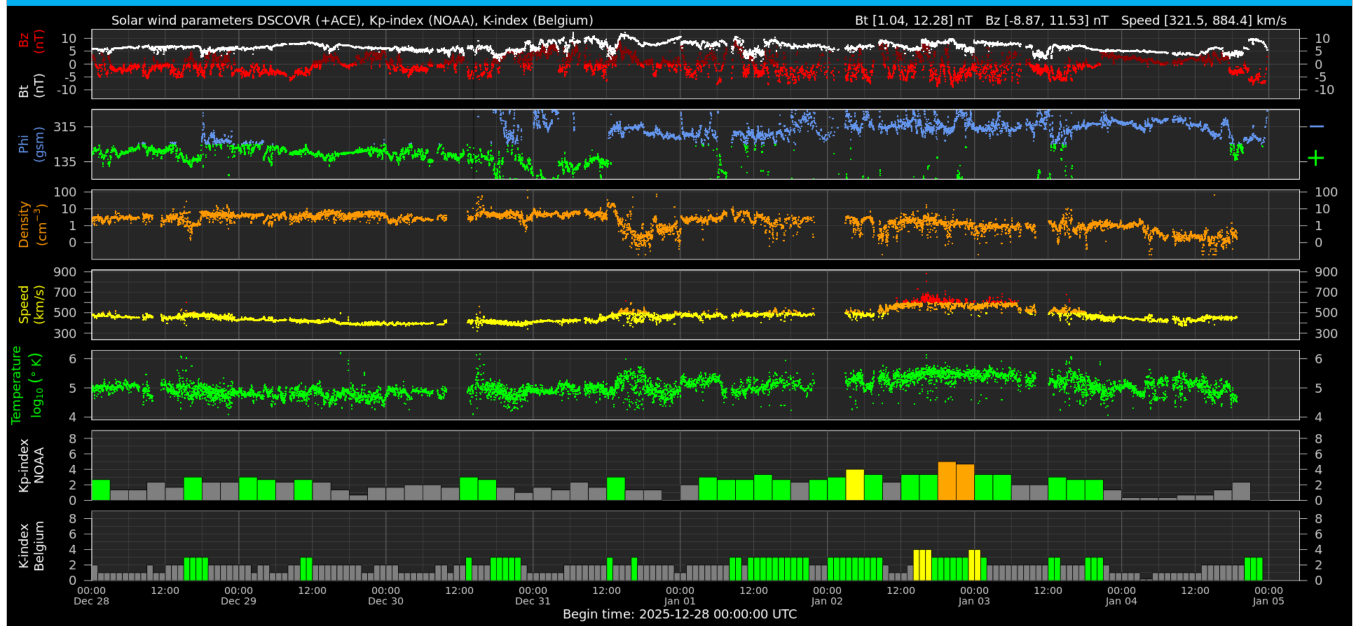
Solar wind parameters

Space Weather Briefing – Solar Influences Data analysis Centre www.sidc.be

These measurements are made by the DSCOVR satellite. They characterise the solar wind.
From top to bottom there are measurements of: the magnetic field, the phi angle, the density, the speed, and the temperature.

Between December 28 and 31, the solar wind parameters reflected the gradual decline towards a slow solar wind regime. From 12:00 UTC on December 31, the solar wind speed began to increase gradually to values above 500 km/s. The interplanetary magnetic field phi angle switched from the positive to the negative sector (directed towards the Sun) from around this time on December 31, indicating a likely connection with the solar wind from SIDC Coronal Hole 140. The solar wind speed increased further on January 02, reaching a maximum of near 700 km/s. The magnetic field ranged between 2 and 12 nT. From January 03, the solar wind speed began to decrease but structures in the magnetic field indicated a possible weak ICME signature. A shock was registered in the solar wind data around 20:40 UTC on January 04, likely associated with a CME that lifted off the solar surface at around 18:50 on January 01 (SIDC CME 618). The interplanetary magnetic field quickly jumped from 440 to 470 km/s. The southward component of the interplanetary magnetic field reached minimum values −10 nT.

Solar wind parameters & K-indices



Geomagnetic conditions were at **quiet to unsettled** levels at the start of the week and then increased, due to the high speed stream influence, to reach **minor storm levels globally** (NOAA Kp 5) and **active levels locally** (K BEL 4) on January 02. Quiet to unsettled conditions then returned by the end of the week on January 04.

Energetic Particles

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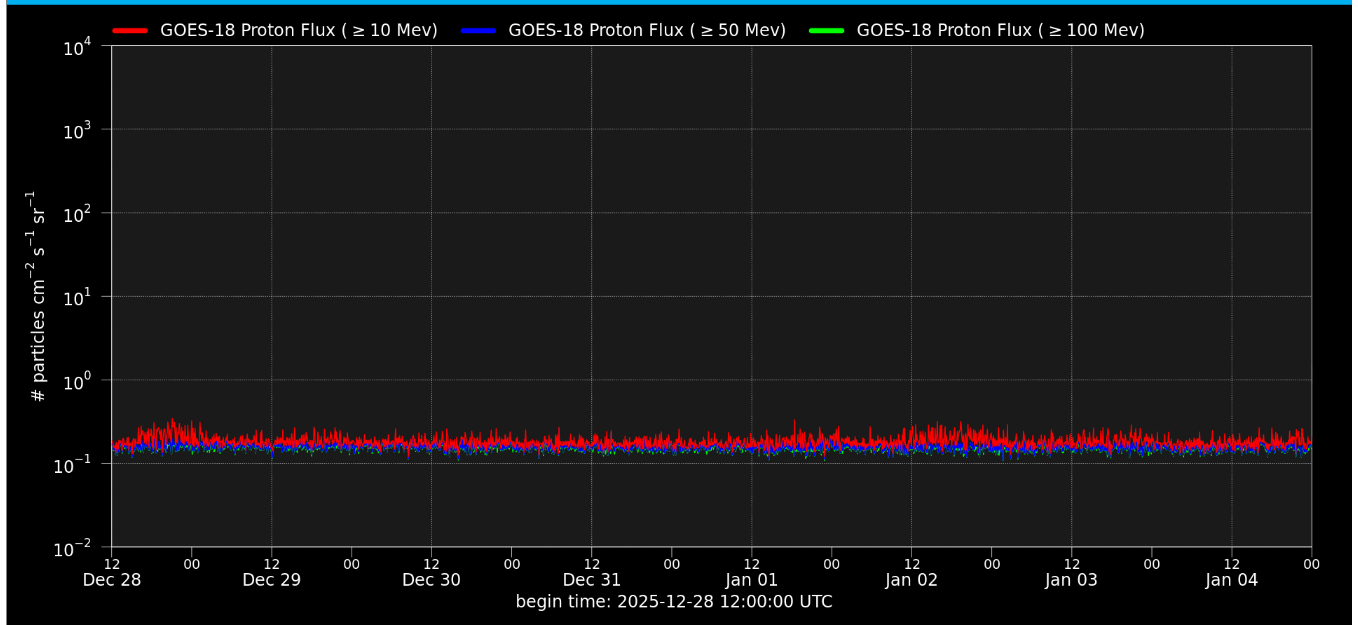
Solar proton flux



Along with the ejected plasma, highly energetic and very fast particles may escape into space during a solar eruption. Because they are charged particles, they follow the interplanetary magnetic field lines.

Solar radiation storms occur when a large-scale magnetic eruption, often causing a coronal mass ejection and associated solar flare, accelerates charged particles in the solar atmosphere to very high velocities. The most important particles are protons which can get accelerated to 1/3 the speed of light or 100,000 km/sec. At these speeds, the protons can traverse the 150 million km from Sun to Earth in just 30 minutes.

The GOES satellite is a geostationary satellite that measures the protons at different energy levels.
http://www.swpc.noaa.gov/products/goes-proton-flux

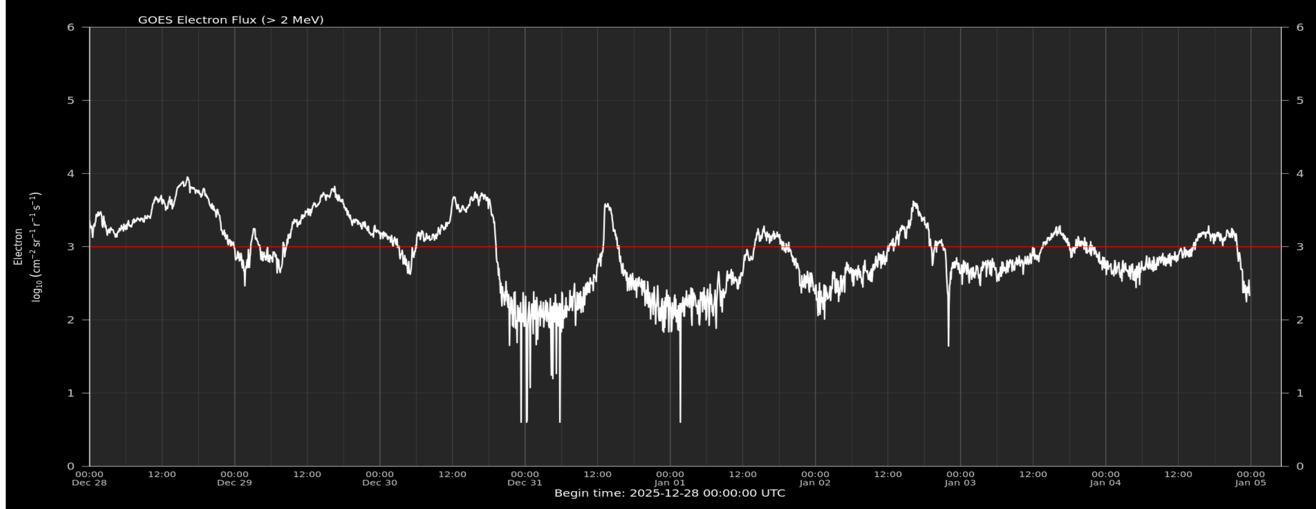
The protons may be accelerated by a the shock of a coronal mass ejection (gradual event) or a flare (impulsive event). Some solar energetic particle events have two peaks- a prompt one arriving 10s of minutes after the solar activity, and a second one, arriving with the interplanetary CME shock.

The greater than 10 MeV proton flux was at background levels throughout the week.

Electron flux at GEO

www.stce.be/educational/classification#electrons

www.spaceweather.gc.ca/forecast-prevision/space-spatiale/sffl-en.php



The greater than 2 MeV electron flux measured by GOES 19 and 18 was above the 1000 pfu threshold for a period on every day of the week, due to the influence of the **high-speed stream** from the previous week.
The strongest electron flux values were recorded at the start of the week with a maximum value of 6980 pfu at 21:20 UTC on December 29, and then gradually decreases over the week. The 24-hour electron fluence was at moderate levels.

www.stce.be/educational/classification#electrons
www.spaceweather.gc.ca/forecast-prevision/space-spatiale/sffl-en.php

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.

Outlook

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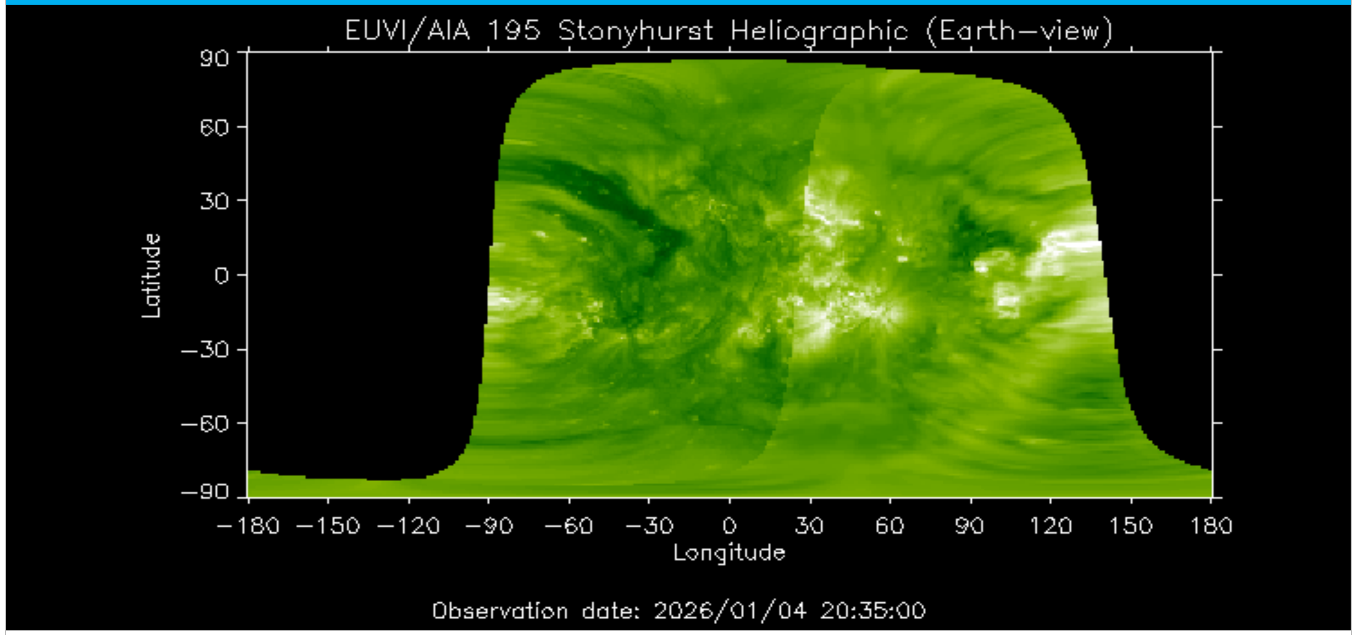
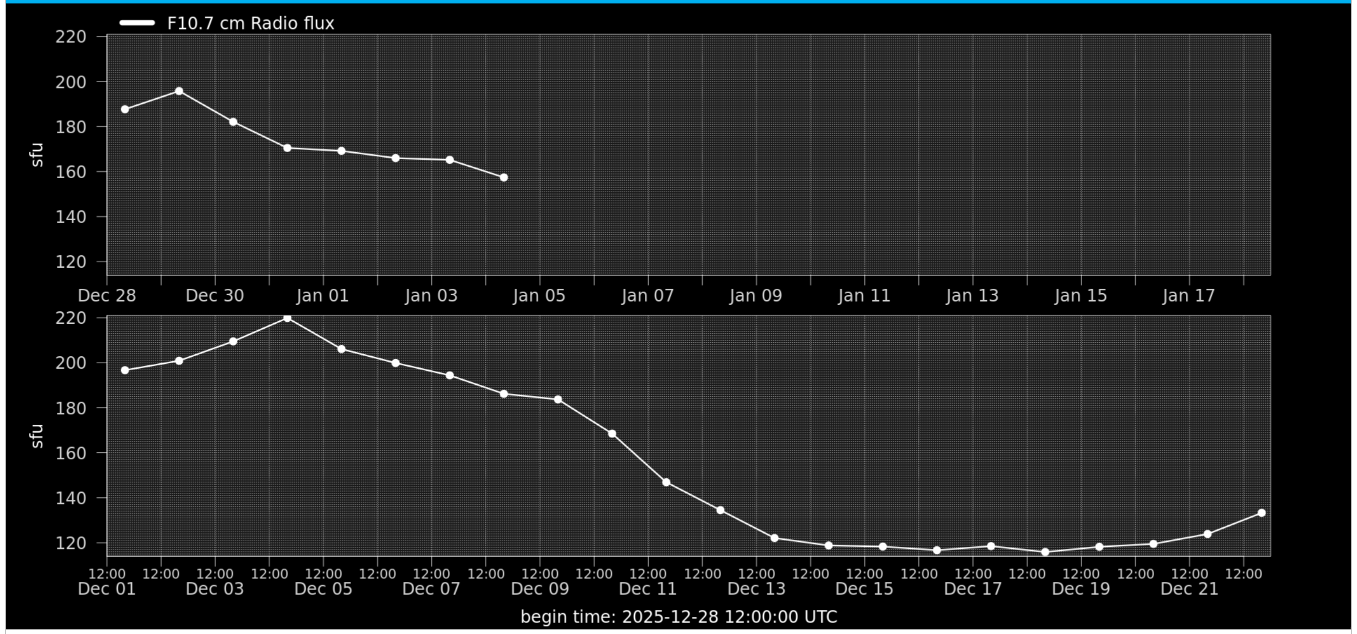
Outlook: Solar activity



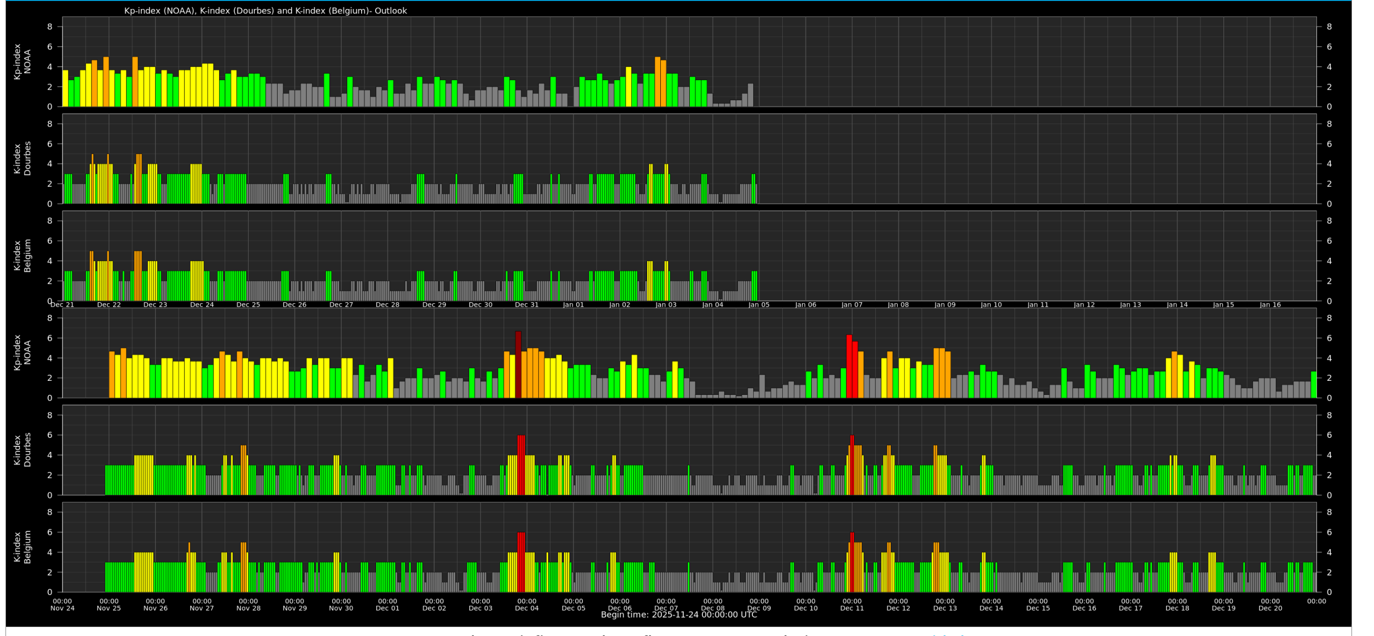
A synoptic map is an attempt to represent full surface of the Sun but using only observations from the Earth's viewing direction.
https://nso.edu/data/nisp-data/synoptic-maps/

Outlook: Solar F10.7cm radio flux

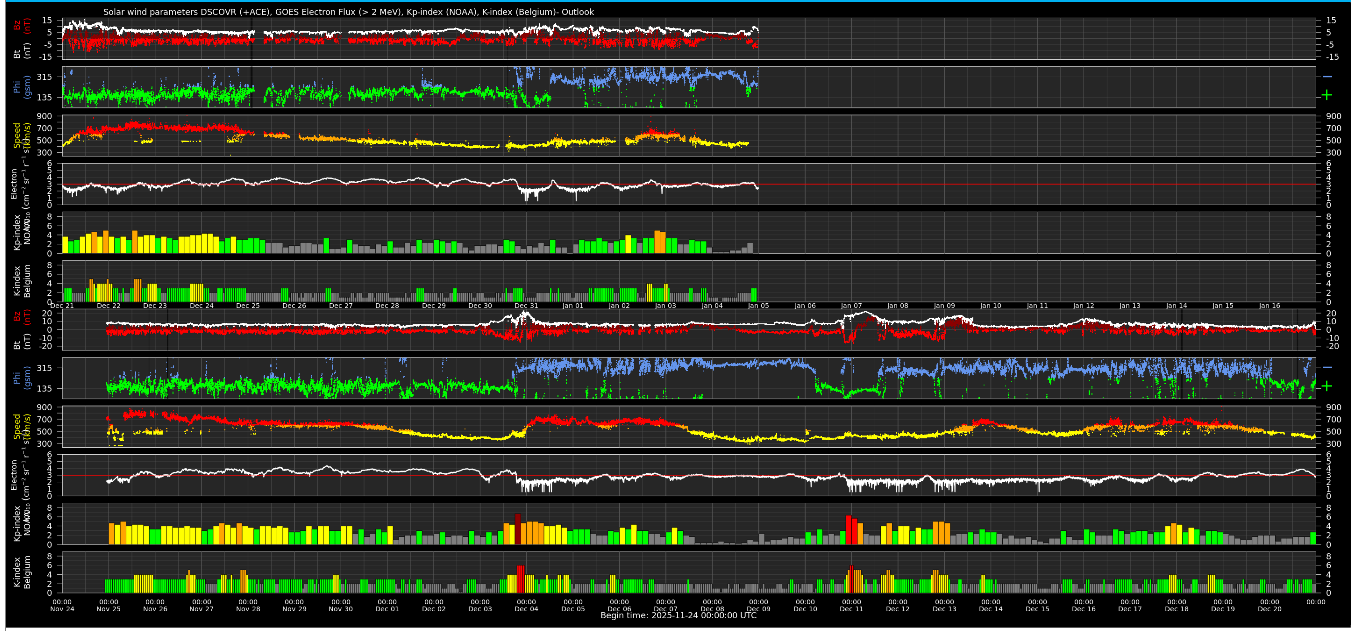


Outlook: Solar wind parameters

Outlook: Geomagnetic activity



Outlook: Electron Flux at GEO Outlook



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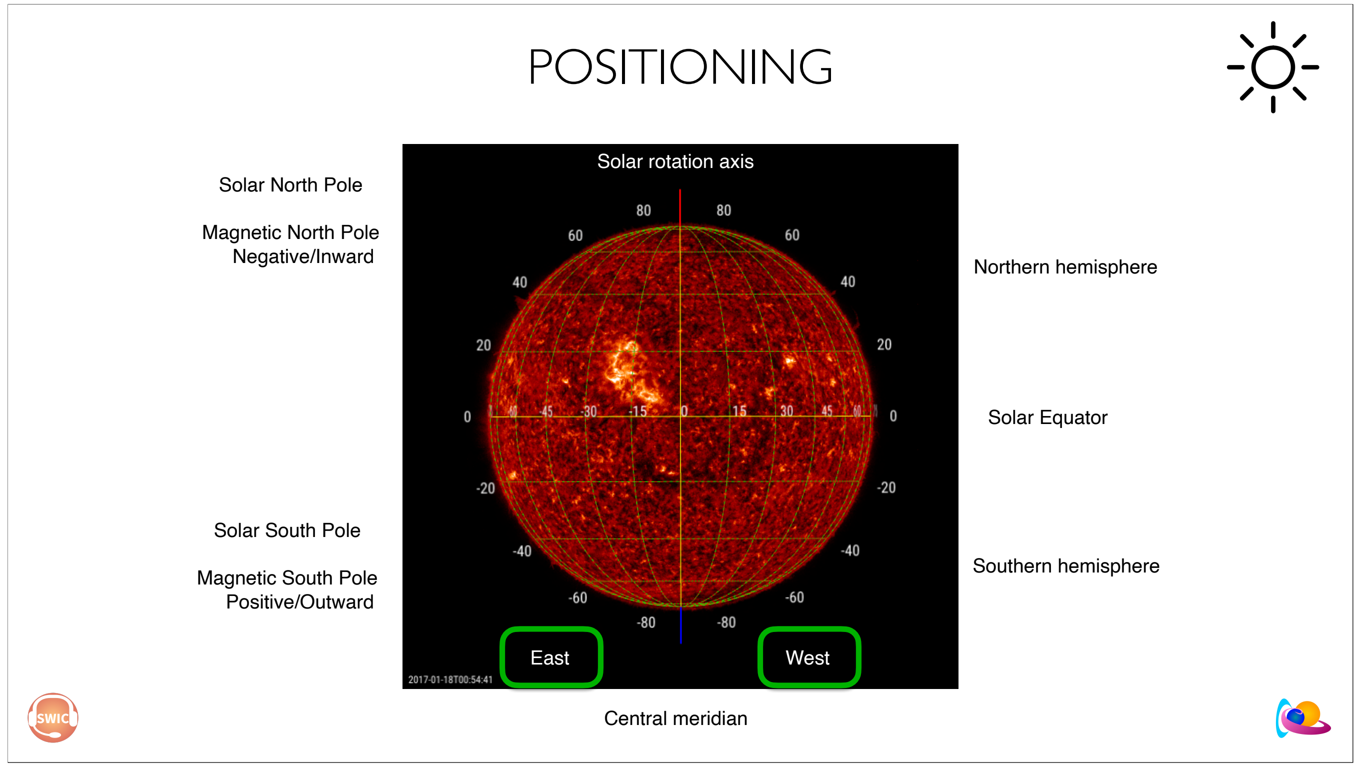
SPACE WEATHER

Basic Concepts



Before going into more detail of the space weather ingredients, we have to be able to ‘navigate’ on the sun.
Two important lines are the central meridian and the solar equator. With these, you determine positions on the solar surface (east/west and north/south, respectively).

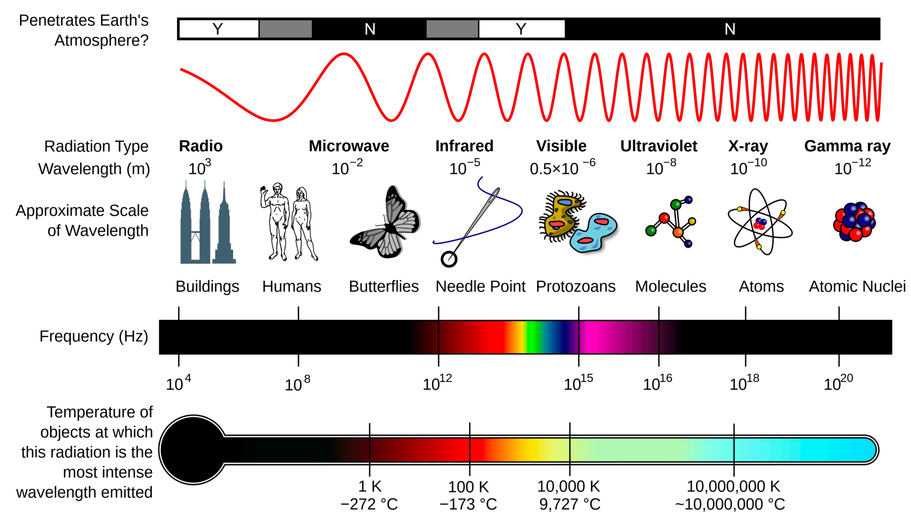
Currently (early 2025), the solar north pole is the magnetic north pole, which means the magnetic field there is negative and inward directed. (See e.g.
)
Every 11 years, there is a magnetic field reversal where the magnetic north pole becomes the magnetic south pole (and vice versa). This happens at the time of solar maximum. This leads to a full magnetic cycle of 22 years (return to original polarities).

During the previous solar cycle (SC 24), there was an unusually long reversal in the field in the northern solar hemisphere: this started as early as June 2012, was followed by a sustained period of near-zero field strength lasting until the end of 2014. Meanwhile, the southern solar hemisphere unambiguously reversed polarity in mid-2013 already.
(https://www.aanda.org/articles/aa/full_html/2018/10/aa32981-18/aa32981-18.html)

The Sun rotates from (solar) East to West, so left to right in approximately 27 days (at the equator, 35 days at poles). We can see (some types of) activity coming on the East limb and predict the effects of possible related space weather.

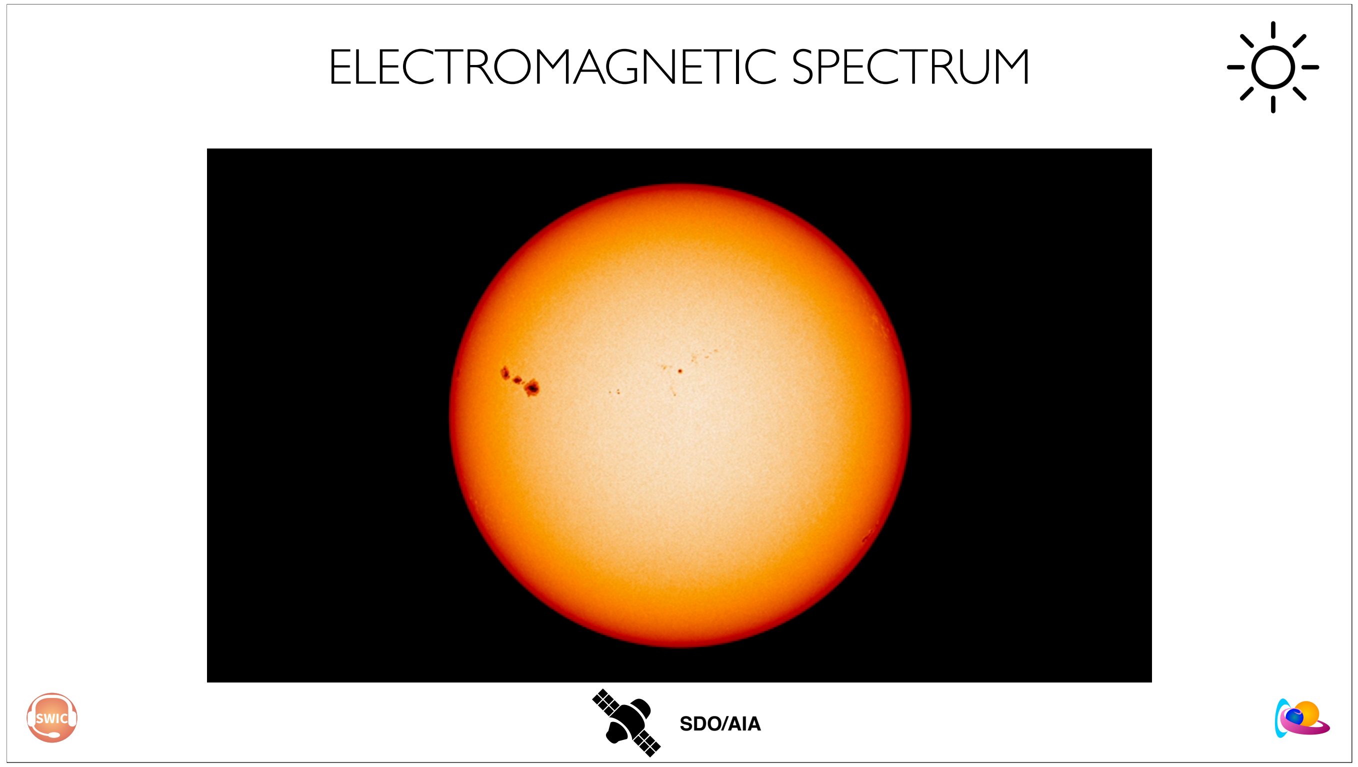
Since the Sun is a ball of gas/plasma, it does not have to rotate rigidly like the solid planets and moons do. In fact, the Sun’s equatorial regions rotate faster (taking only about 24 days) than the polar regions (which rotate once in more than 30 days). The source of this “differential rotation” is an area of current research in solar astronomy.”

ELECTROMAGNETIC SPECTRUM



The electromagnetic spectrum ranges from radio waves to gamma rays.
As we move to higher temperatures, the wavelengths get shorter.
We can only use longer wavelengths such as radio and visible light to observe the Sun from ground, (E)UV wavelengths are absorbed by the atmosphere. We need satellites to observe in EUV.
Once the space age began, we were given a completely new view of the Sun.

H-alpha 656.28 nm - red - 9000 °K
C II K 3933.7Å - 393.37 nm - blue
Visible light: 780 - 380 nm / 7800- 3800 Angstrom / rainbow
UV: 380 - 10 nm / 3800 - 100 Angstrom
EUV: 100 - 10 nm / 1000 - 100 Angstrom



The Sun has a hidden region that became only visible at the start of the space age. From the moment we could inspect the Sun in other wavelengths, the Sun showed its dynamic, explosive and magnetic personality.

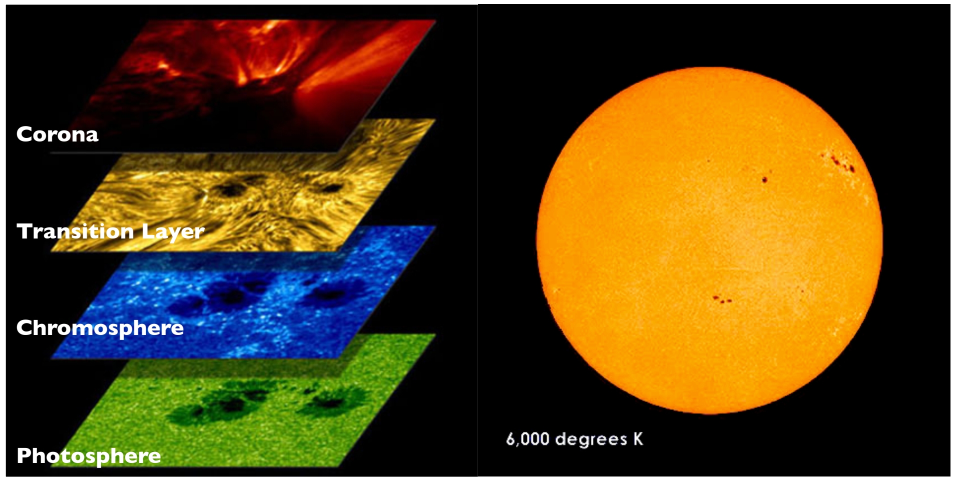
We use many tricks to observe the Sun and its activity. One of them is to look at the Sun using different parts of the light spectrum, thus in different wavelengths. From Earth, with the naked eye, we see the surface of the Sun in white light like this.

However, when the movie starts, you can see how looking at the Sun in other wavelengths (from space) reveals very different structures and complexity. For this we mainly use extreme ultraviolet wavelengths because we are studying the hot outer region of the Sun, the corona. We see active regions, these are the bright patches, that show up in EUV wavelengths where the sunspots were first seen in white light. We also see the effects of the sun's magnetic field in the many loops above these sunspots. Each wavelength shows us different aspects and different layers of the solar atmosphere and by combining them, we try to build a complete picture of the solar activity.

Therefore, we have many instruments in space to observe the solar atmosphere.

Credits: This movie was made combining different observations from the Atmospheric Imaging Assembly (AIA) telescope on board the Solar Dynamics Observatory (SDO).
https://youtu.be/g08XKIz2SD0

LAYERS OF THE SUN

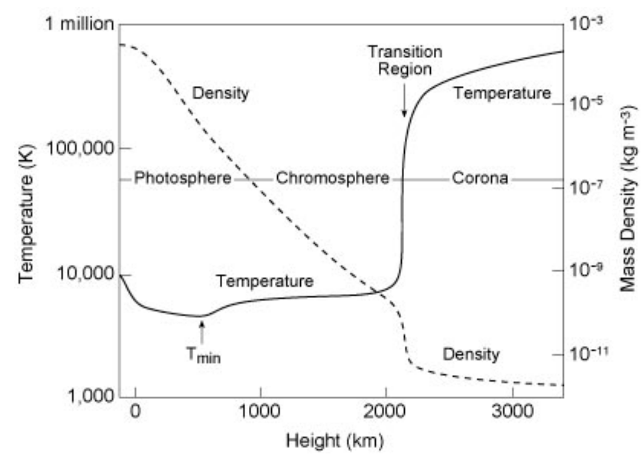


The solar atmosphere is formed by the most outer layers of the Sun from where the solar radiation can escape freely, in contrast to the non-transparant inner layers.
The solar atmosphere has 4 basic layers: photosphere - chromosphere - transition layer - corona.

Temperature increases as you go higher up to the outer layers, which is sort of strange. Normally you would think that the temperature decreases if you go further away from the heat source. Why is the corona so hot? This is a hot topic in solar research and still subject of debate.

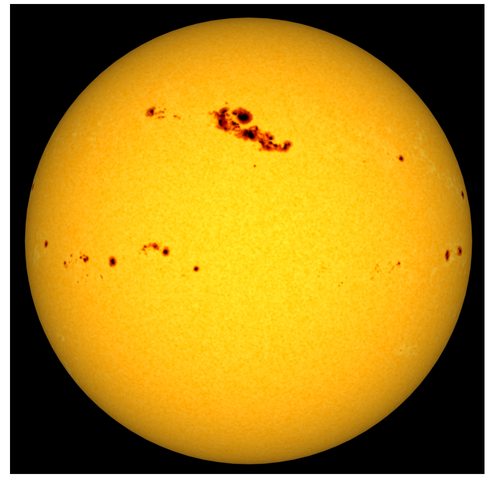
The name photosphere comes from the greek work photon which means ‘light’. The photosphere radiates mostly in visible light, which we can see from ground.
In contrast, the corona radiates in (E)UV and X-rays, wavelengths which we can not see with our eyes. That’s why we see the Sun as a non-dynamic structure. The coronal loops and dynamic structures in the corona are invisible to us unless we observe them in the EUV using special filters translating the EUV into a picture which we can see.

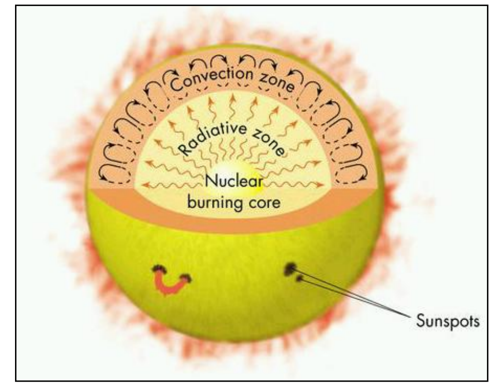
LAYERS OF THE SUN



But, although the corona is a million degrees Kelvin hot, satellites don't burn up. This is because the corona is not dense at all. Compare this with a sauna and a bath. You can sit in a sauna of 90°C but not take a bath of 90°C. The air is the sauna is less dense than the water in the bath, which is why you don't get burnt in the sauna.

SUNSPOTS





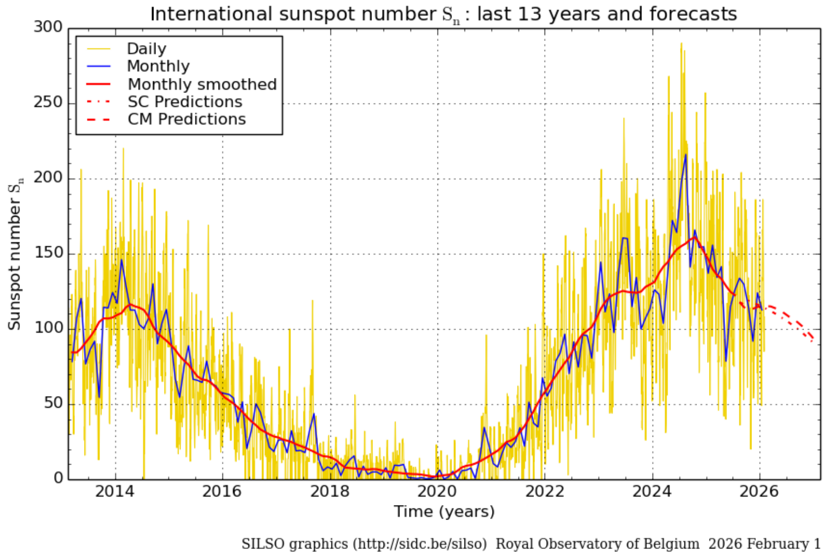
From ground we can image the photosphere in white light. The Sun then appears as a rather dull yellow ball, but sometimes shows dark spots called sunspots.

Sunspots are relatively dark area's on the solar surface that indicate cooler regions in the solar photosphere. These area's are slightly cooler compared to their surroundings because the intense magnetic fields in these regions inhibit the convection of plasma. This means that the heat that is produced in the core of the Sun is radiated outwards less efficiently in these locations, and thus they are somewhat cooler and appear dark. Note that sunspots are still very hot: their dark core has a temperature of ~4000K, while the bright photosphere has one of ~5800K.

Sunspots appear, change and evolve and then disappear again in time spans of days up to months. They usually come in pairs, each with a different polarity. The number of sunspots on the solar disk is an important measure of solar activity.

SUNSPOT NUMBER AND SOLAR CYCLE

$$R = K\,(10g + s)$$



Every day we count the number of sunspots, combining different observations on different locations and correcting for the specifics of the observations. This is a weighted count: one single sunspot has much less weight than a complex group (the complex group is much more likely to cause activity).

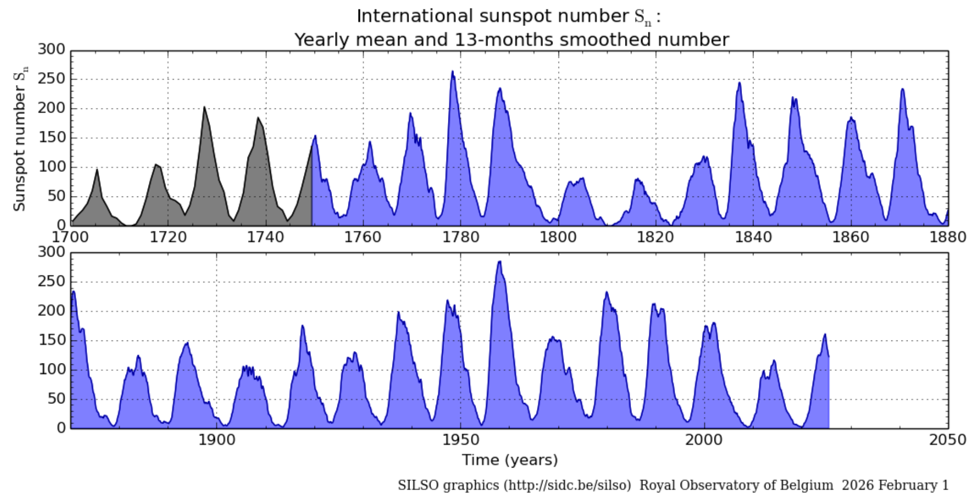
The relative sunspot number is defined as R = K (10g + s), where g is the number of sunspot groups and s is the total number of distinct spots. The scale factor K (usually less than unity) depends on the observer and is intended to convert the observation back to the scale originated by Wolf in 1848. This weighing factor combines corrections for the observer, location, and instrumentation.

Combining all observations leads to a daily sunspot number. When we plot this number over time, we see a clear cyclical behaviour. The solar activity, for which the sunspot number is a proxy, increases and decreases over a time span of approximately 11 years. This is called the solar cycle.

The red lines indicate different predictions for the behaviour of the next solar cycle. At the start of each new cycle, there is quite some discrepancy/uncertainty for the various predictions.

See: https://www.sidc.be/article/solar-cycle-25-maximum

LONG TERM SOLAR ACTIVITY

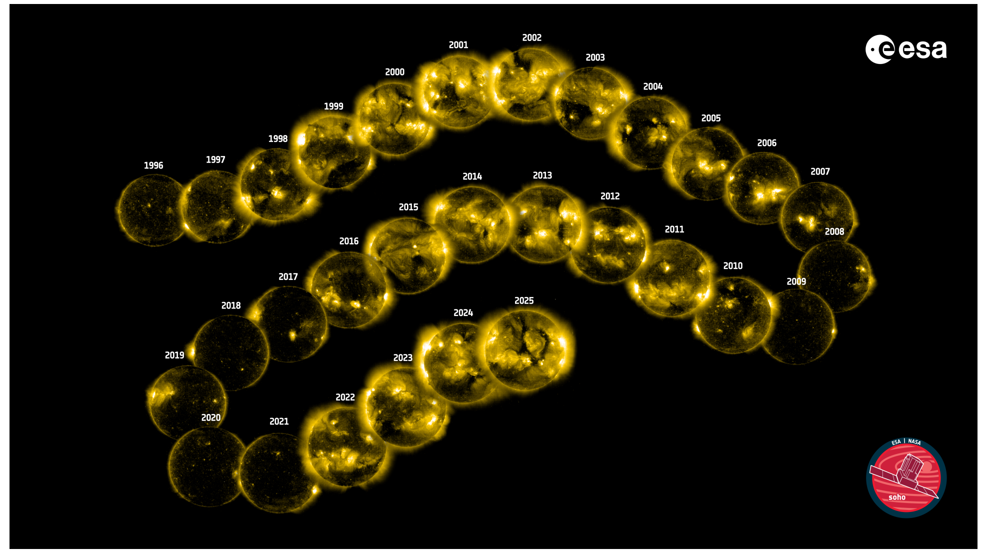


This graph shows you the solar activity over the last three centuries. Clearly, there is a large variation in solar cycles, some are shorter that others (more narrow), some are much stronger than others (higher).

To create this type of graph, we rely heavily on the old sunspot drawings as these are our main indication of how active the Sun was in the distant past.

SOHO/EIT

SOLAR CYCLE



30 years of SOHO observations:
https://www.esa.int/Science_Exploration/Space_Science/SOHO/Sun-watcher_SOHO_celebrates_thirty_years

The ESA/NASA Solar and Heliospheric Observatory (SOHO) has been observing the Sun for 30 years. In that time, SOHO has observed nearly three of the Sun's 11-year solar cycles, throughout which solar activity waxes and wanes.

This montage of 30 images captured by the spacecraft's Extreme Ultraviolet Imaging Telescope provides a snapshot of the changing face of our Sun. The brightest images occur around the time of solar maximum, when the Sun's magnetic field is twisting and reshaping itself. Thanks to this magnetic activity, the Sun shines more brightly in extreme ultraviolet light, and also sends out streams of charged particles into space more often.

The individual images were taken at a wavelength of 28.4 nanometres and show gas with a temperature of about two million degrees Celsius in the Sun's atmosphere, or corona.