



Ruimteweer en de zonnestorm van 19 januari 2026

Jan Janssens – 8 maart 2026



Het ruimteweer

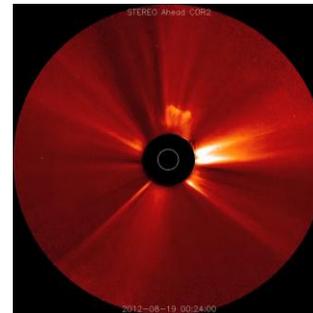
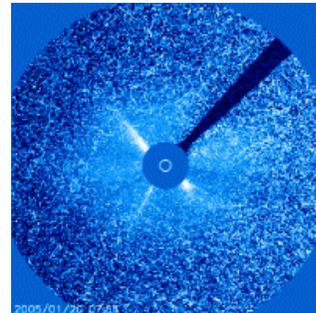
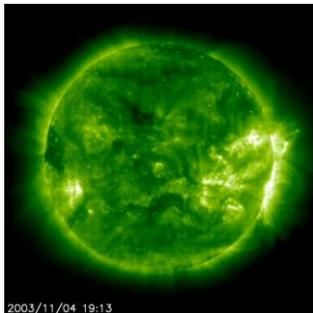
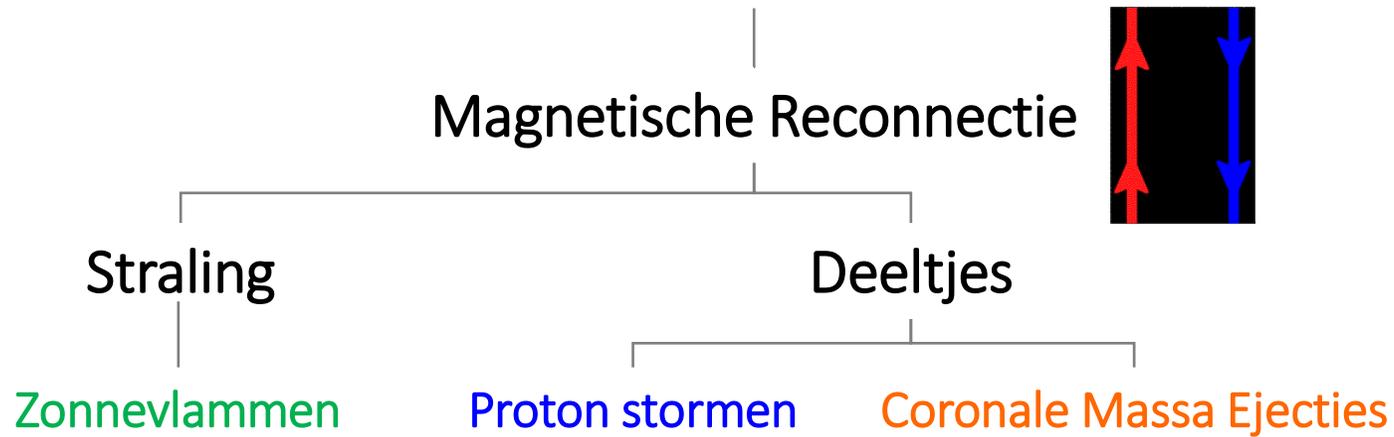
...alle omstandigheden op de zon en in de zonnewind, magnetosfeer, ionosfeer en thermosfeer die de prestaties en de betrouwbaarheid van technologische systemen in de ruimte en op grond kunnen beïnvloeden en die een gevaar kunnen betekenen voor het menselijk leven of de gezondheid.

NSWP, ESA



Verstoord ruimteweer: oorzaken

Zonnewitbarstingen

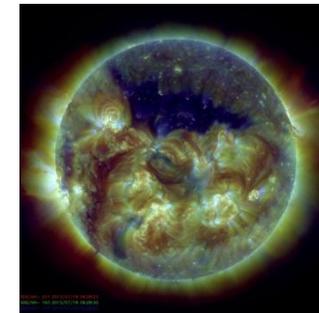


Corona

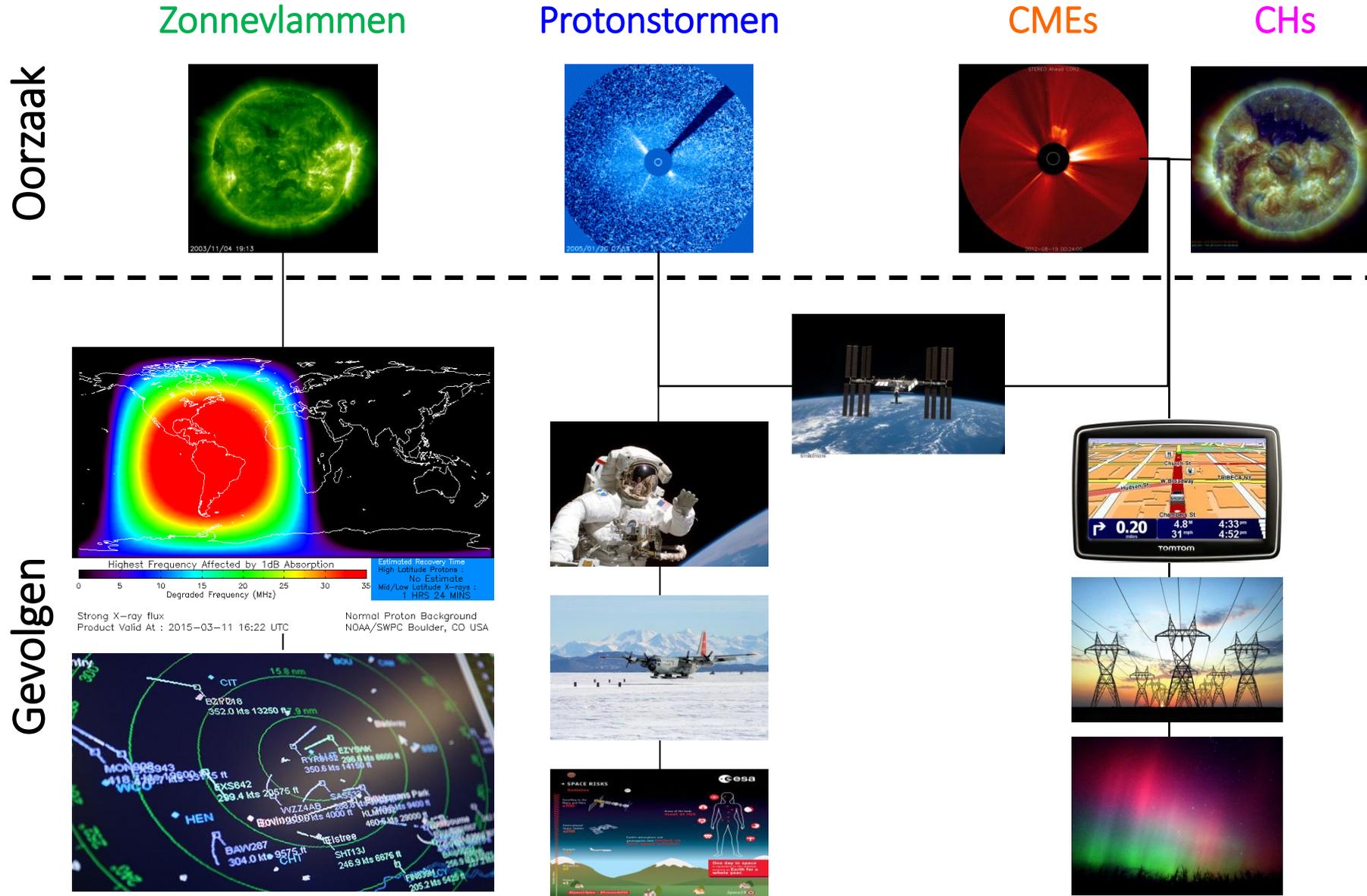
Zonnewind

Deeltjes

Coronale Gat

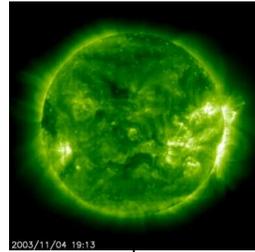


Verstoord ruimteweer: effecten

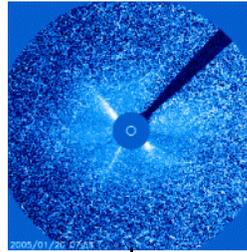


Oorzaak

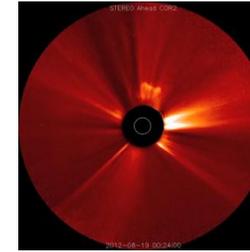
Zonnevlammen



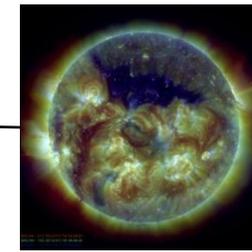
Protonstormen



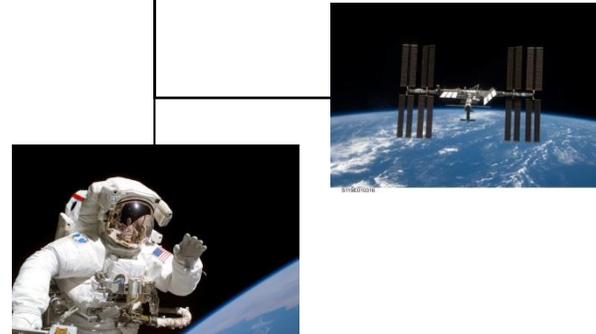
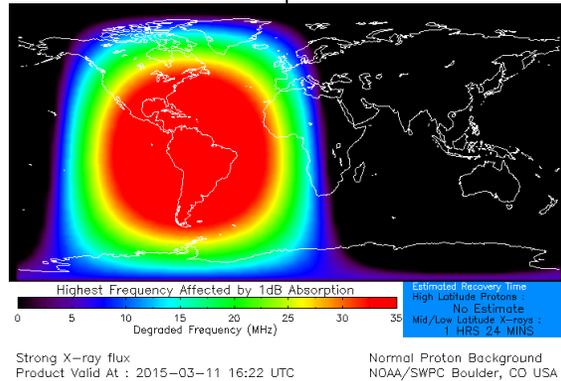
CMEs



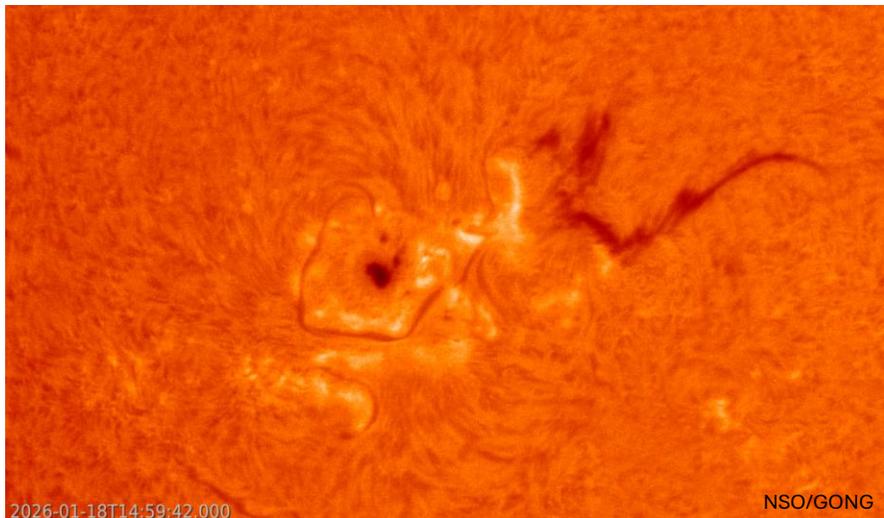
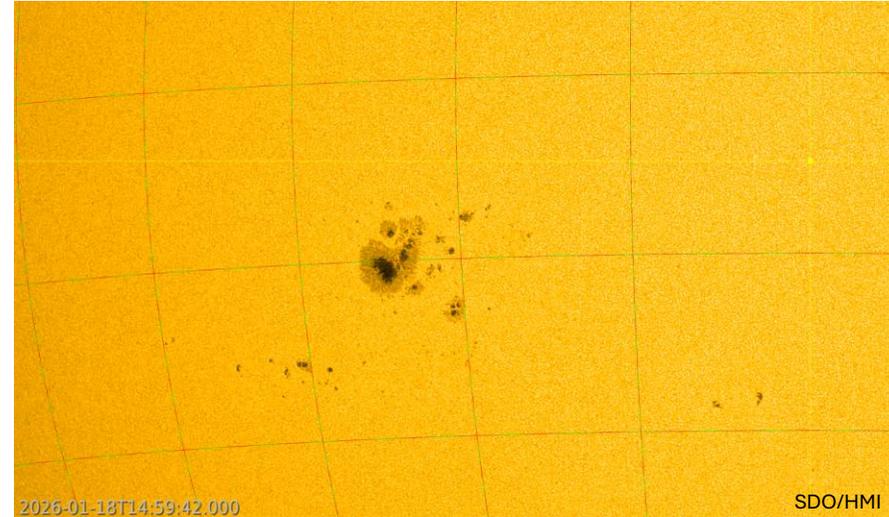
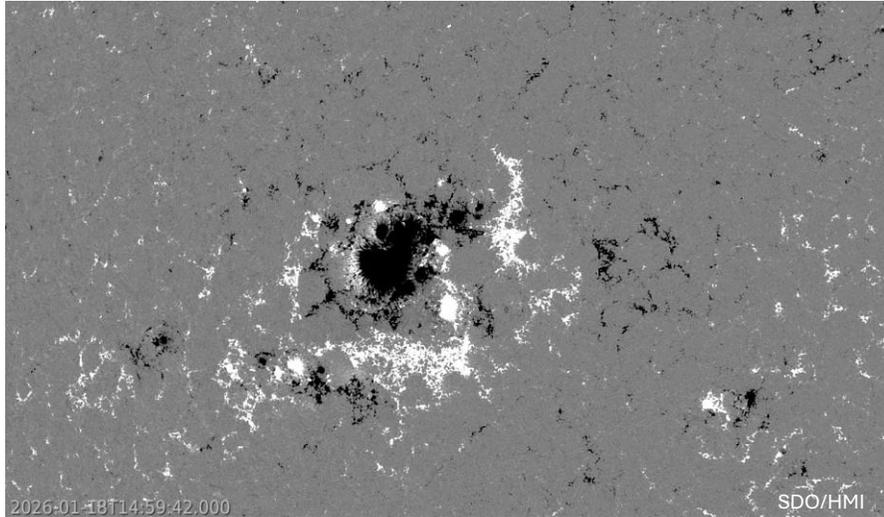
CHs



Gevolgen



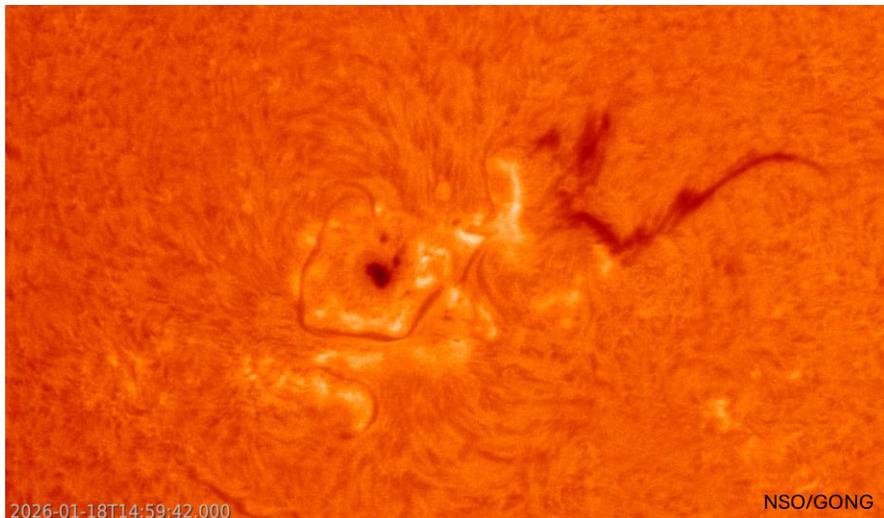
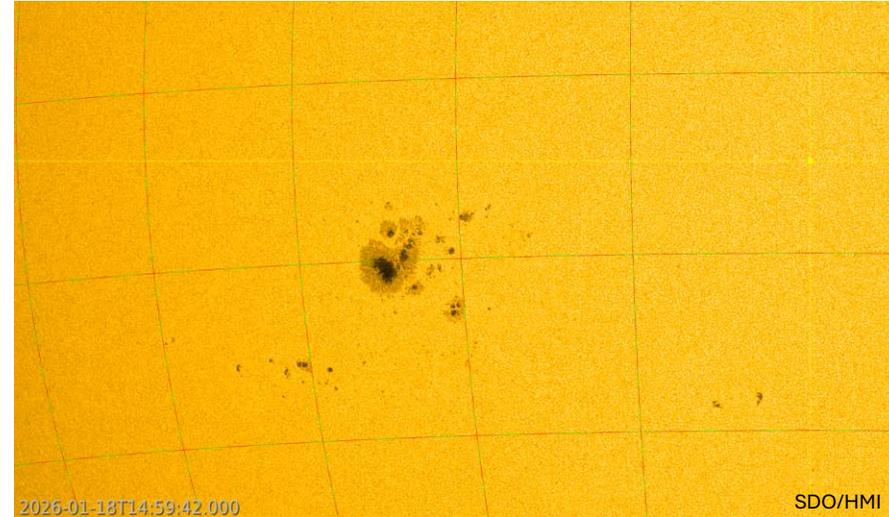
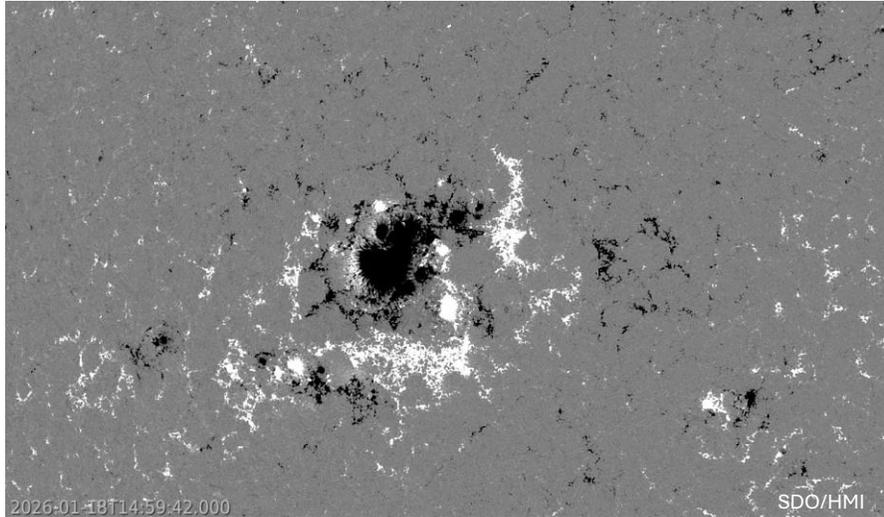
Zonnevlekkengroep NOAA 4341



- Voorspelling zonnevlammen
 - McIntosh: Dkc (*Dki*)
 - M+ / X: 77% / 22% (48% / 6%)
 - Mount Wilson: Beta Gamma
 - Geen delta
 - Andere
 - Zonnevlam historiek, groep filament,...

<https://www.stce.be/educational/classification>

Zonnevlekkengroep NOAA 4341

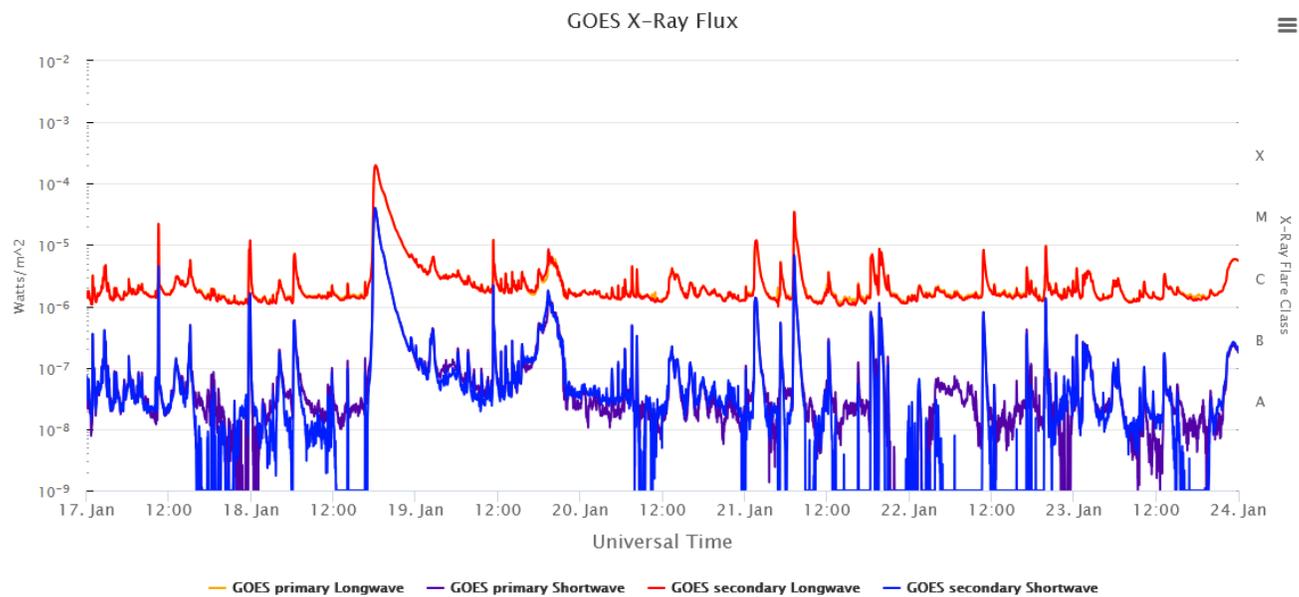


- SIDC SWx voorspeller
 - URSIgram 18 Jan 2026:
 - ... *Solar flaring activity is expected to be moderate over the next 24 hours, with M-class flares very likely and a small chance for X-class flares. ...*

<https://www.stce.be/educational/classification>

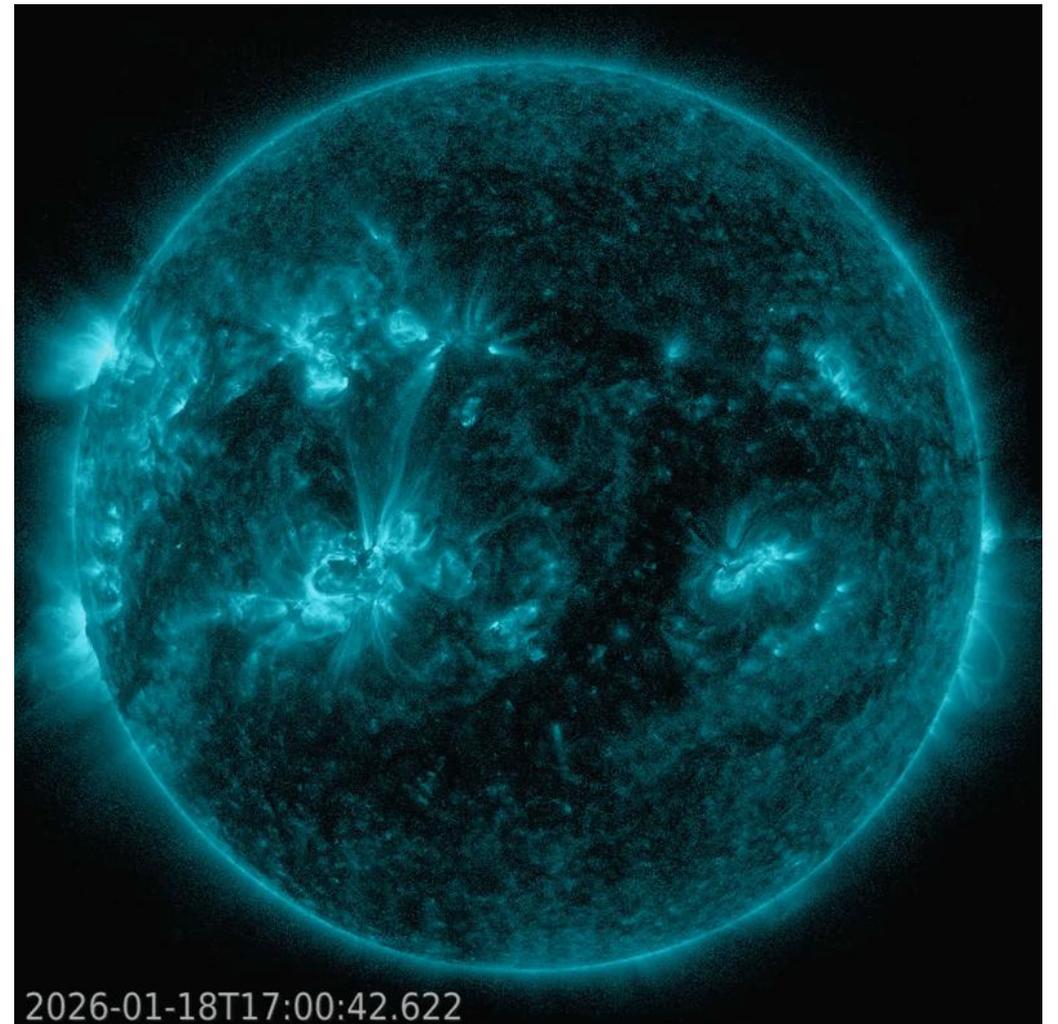
X1.9 zonnevlam van NOAA 4341 (18 Jan/18:09 UTC ; 3B)

SDO/AIA 131 - EUV



SWx TREC
Highcharts.com

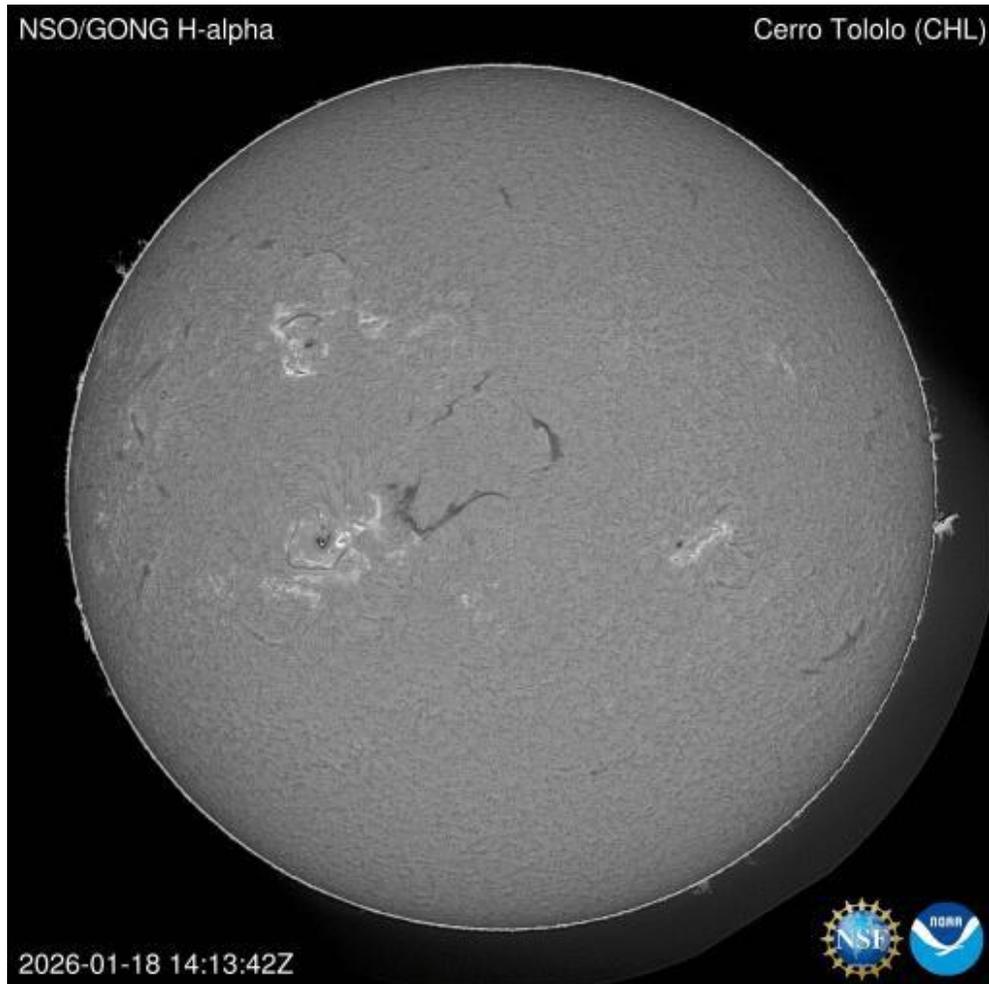
<https://www.stce.be/news/800/welcome.html>



X1.9 zonnevlam van NOAA 4341 (18 Jan/18:09 UTC ; 3B)

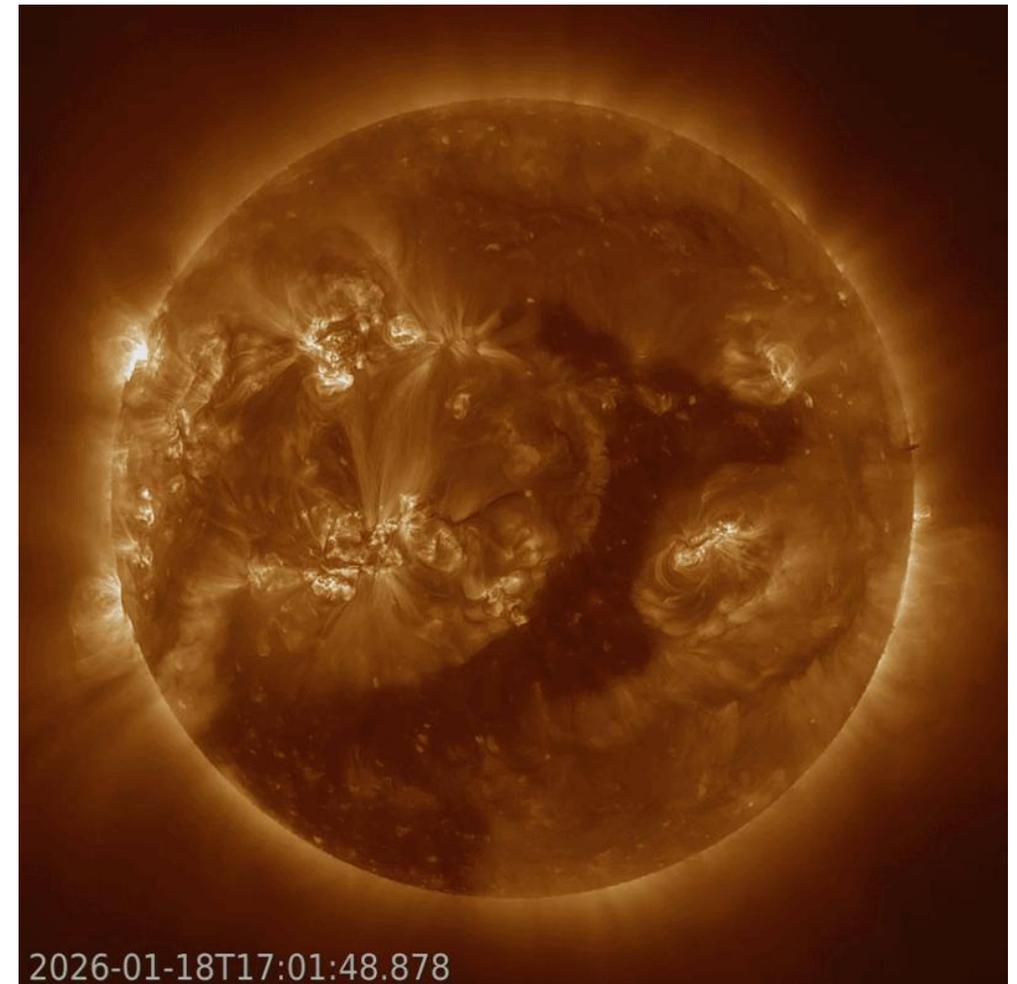
Filamenten zijn "verdwenen"

NSO/GONG – H-alpha



Nabijheid coronaal gat

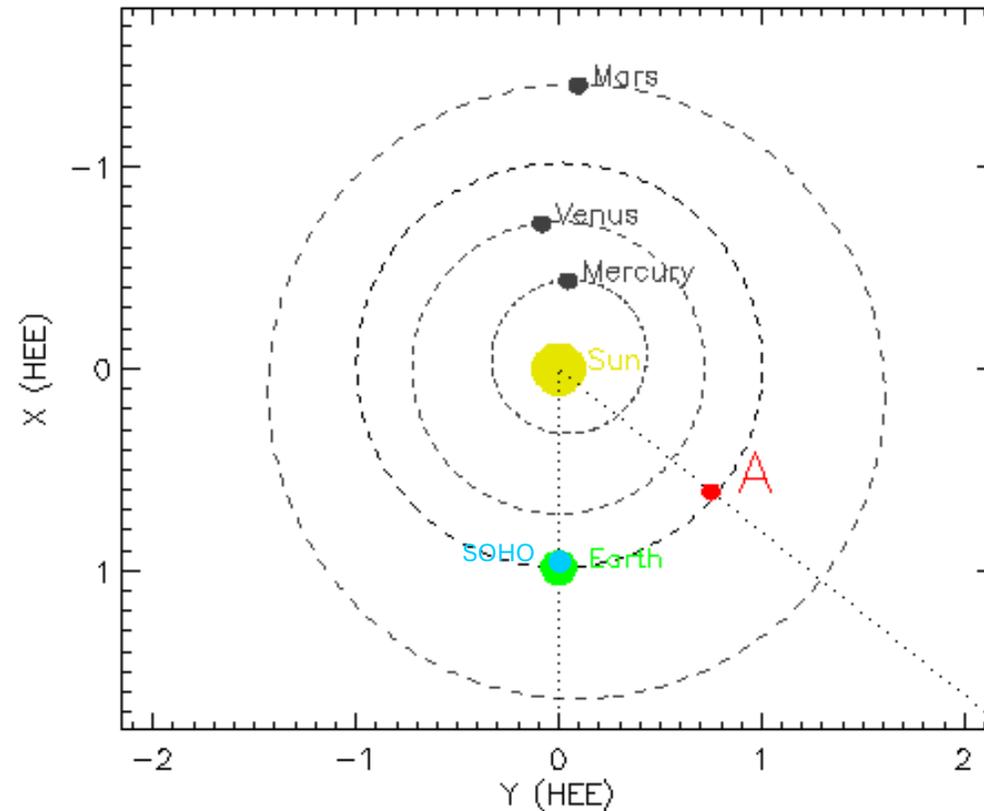
GOES/SUVI 195 - EUV



Coronale Massa Ejectie (18 Jan/18:09 UTC ; 3B)

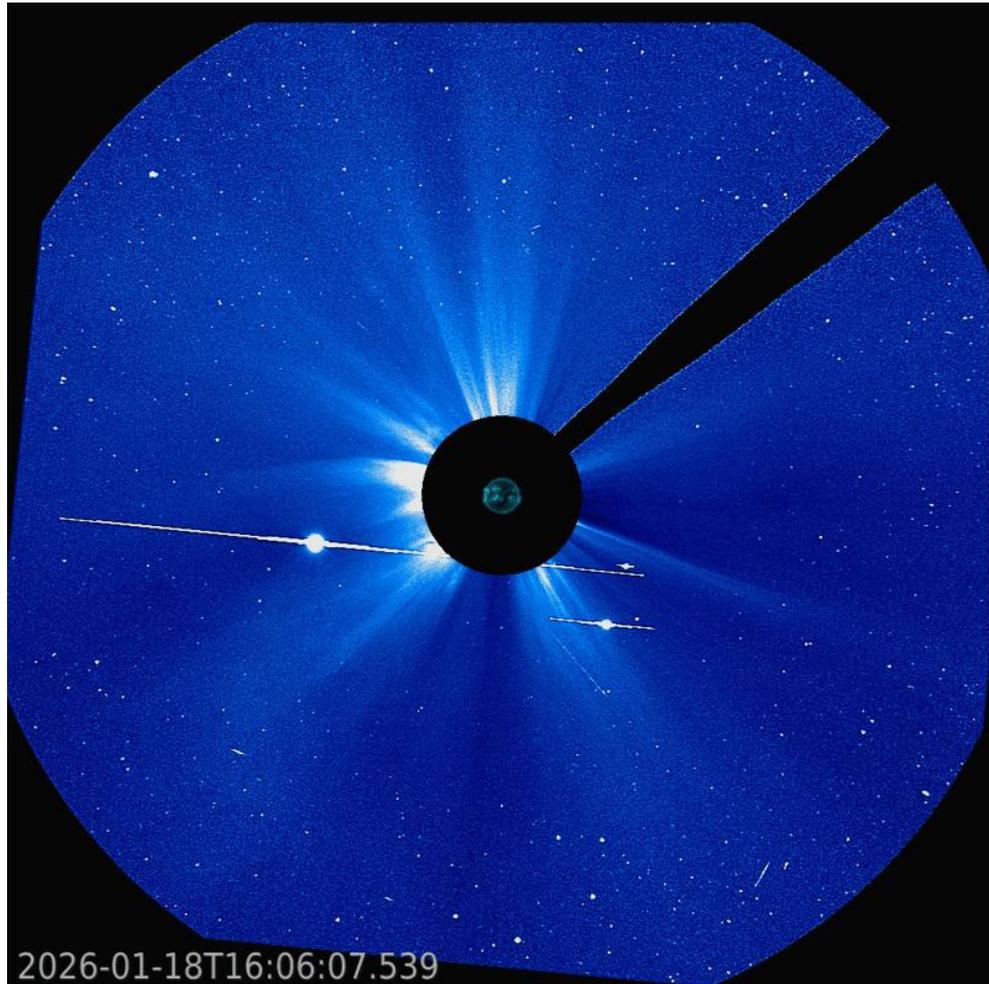
SOHO / LASCO C3

STEREO-A / COR2

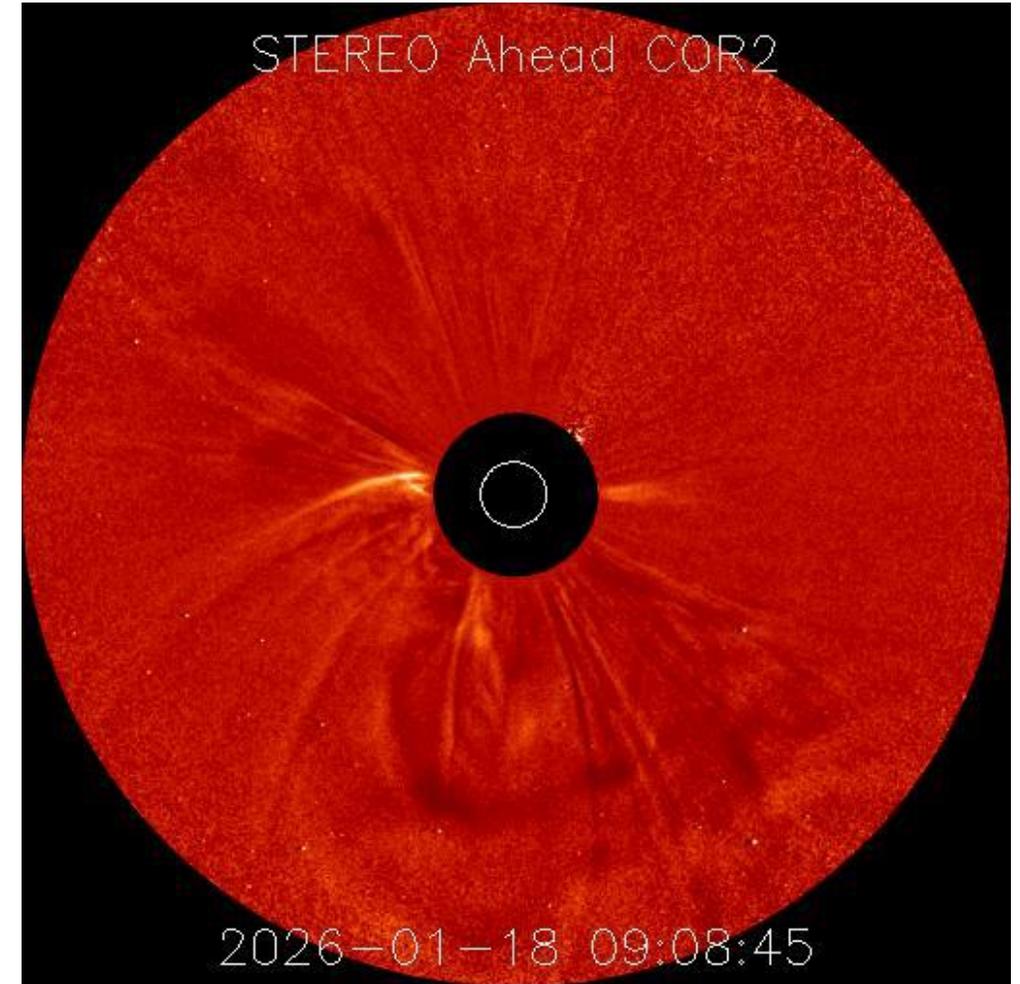


Coronale Massa Ejectie (18 Jan/18:12 UTC)

SOHO / LASCO C3

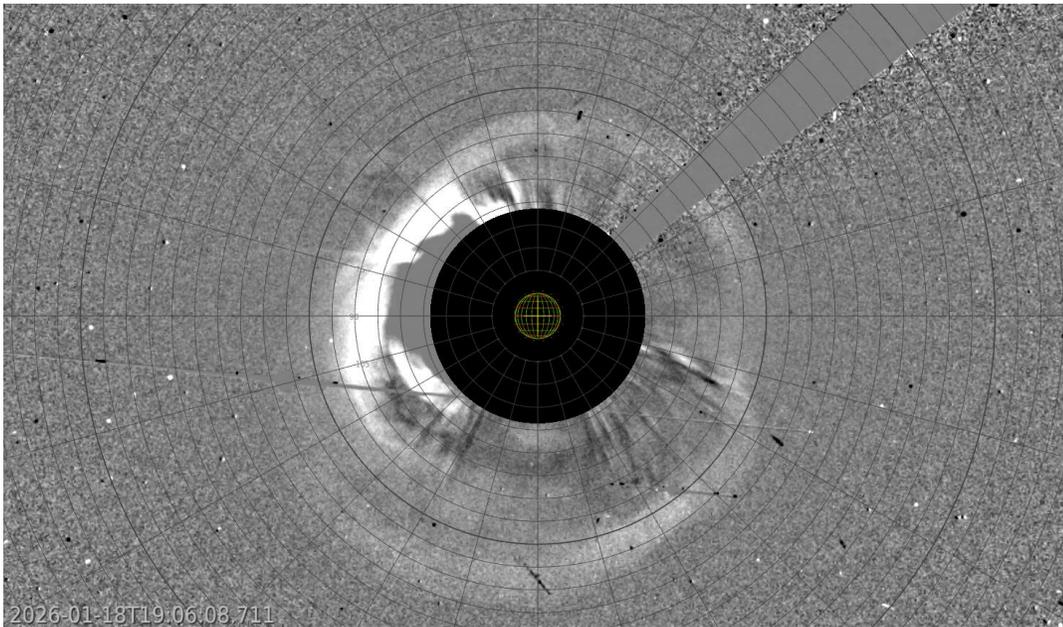


STEREO-A / COR2



Coronale Massa Ejectie - snelheid

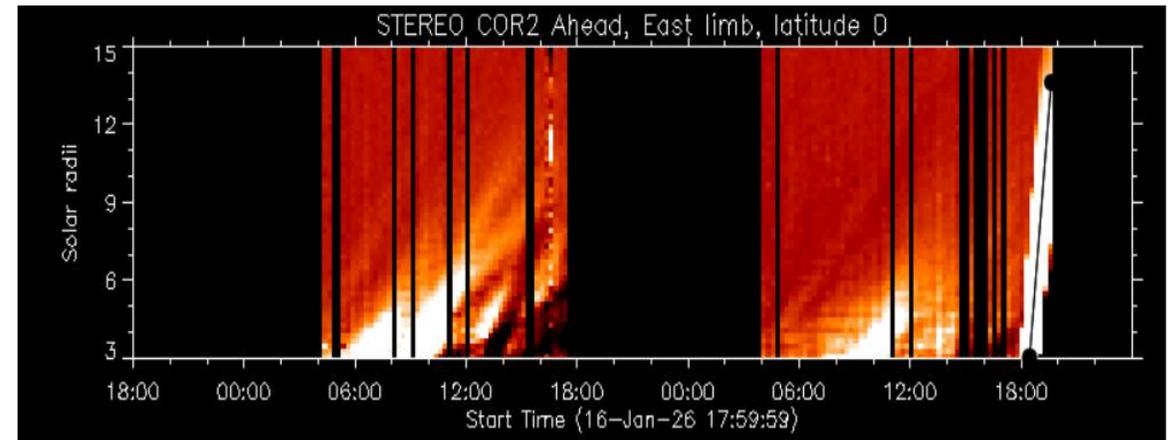
SOHO / LASCO C3



- SIDC SWx voorspeller
 - 1000-1500 km/s
 - 1400 km/s

STEREO-A / COR2

Select the satellite and date:

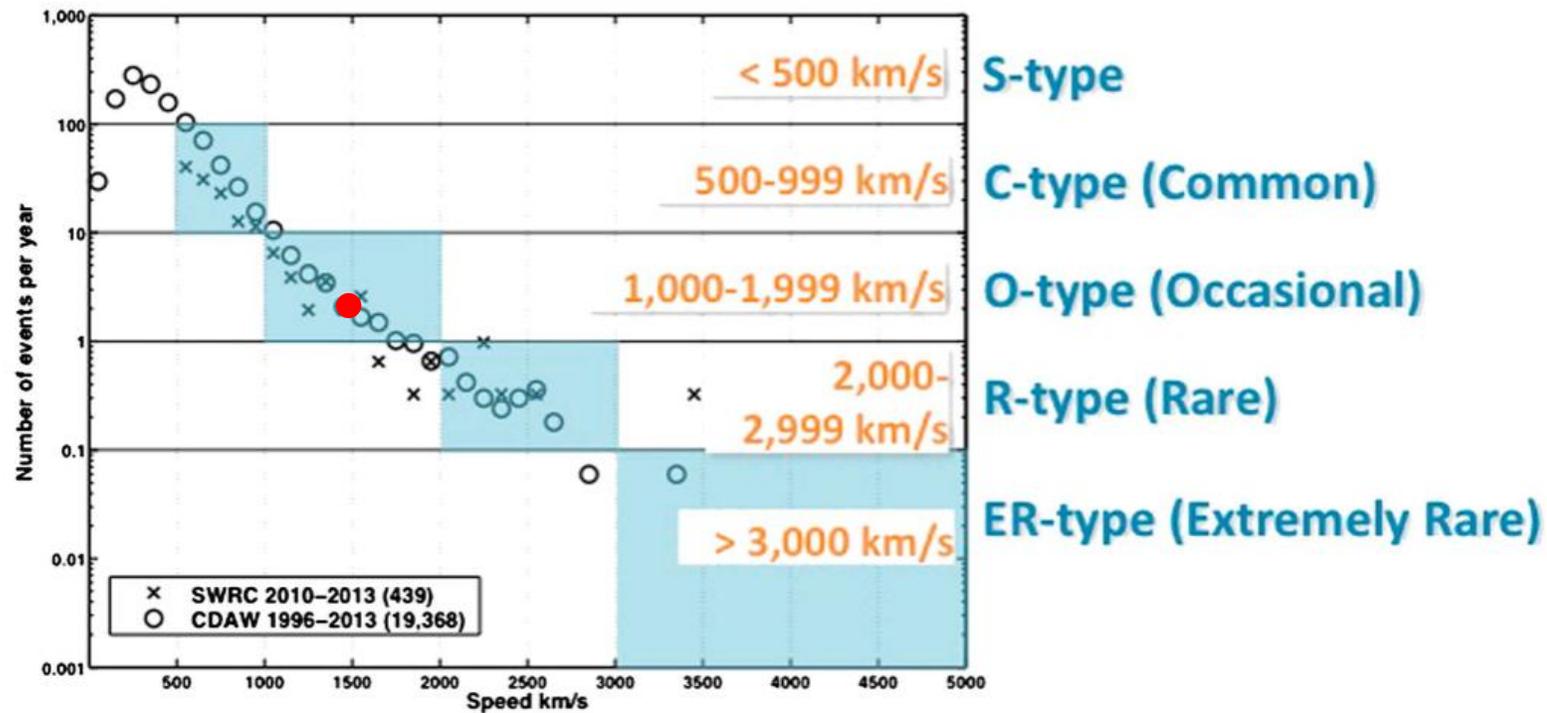


Speed : 1754 km/s
This work has received funding from the European Commission FP7 Project COMESEP (263252).

- STEREO-A (ecliptica, meer aarde-gericht)
 - 1600-1900 km/s
 - 1700 km/s

Coronale Massa Ejectie - snelheid

Space Weather Research Center CME SCORE Scale



Evans et al. 2015 - <https://doi.org/10.1002/swe.20058>

CME – Aankomsttijd: (1) Hvar DBM

Basic DBM | **Advanced DBM**

CME start date: Jan 18 2026

CME start time (UTC): 18 h 12 min

R_0 - starting radial distance of CME (R_s): 20

v_0 - speed of CME at R_0 (km/s): 1400

Γ - drag parameter (10^{-7} km^{-1}): 0.2

w - asymptotic solar wind speed (km/s): 450

R_{target} - target heliocentric distance (AU): 0.98

Calculate Reset!

Drag-Based Model has performed **43** successful calculations (since 26.12.2012).



© Hvar Observatory, 2016

<https://oh.geof.unizg.hr/DBM/dbm.php>

Results | v-R-t plots | Documentation | **1400 km/s**

Output:

CME arrival at target (date & time): **20.01.2026 at 10h:56min**
Transit time: **40.75 h**
Impact speed at target (at 0.98 AU): **701 km/s**

Results | v-R-t plots | Documentation | **1700 km/s**

Output:

CME arrival at target (date & time): **20.01.2026 at 06h:57min**
Transit time: **36.76 h**
Impact speed at target (at 0.98 AU): **740 km/s**

Results | v-R-t plots | Documentation | **1900 km/s**

Output:

CME arrival at target (date & time): **20.01.2026 at 04h:50min**
Transit time: **34.64 h**
Impact speed at target (at 0.98 AU): **764 km/s**

CME – Aankomsttijd: (2) EUHFORIA

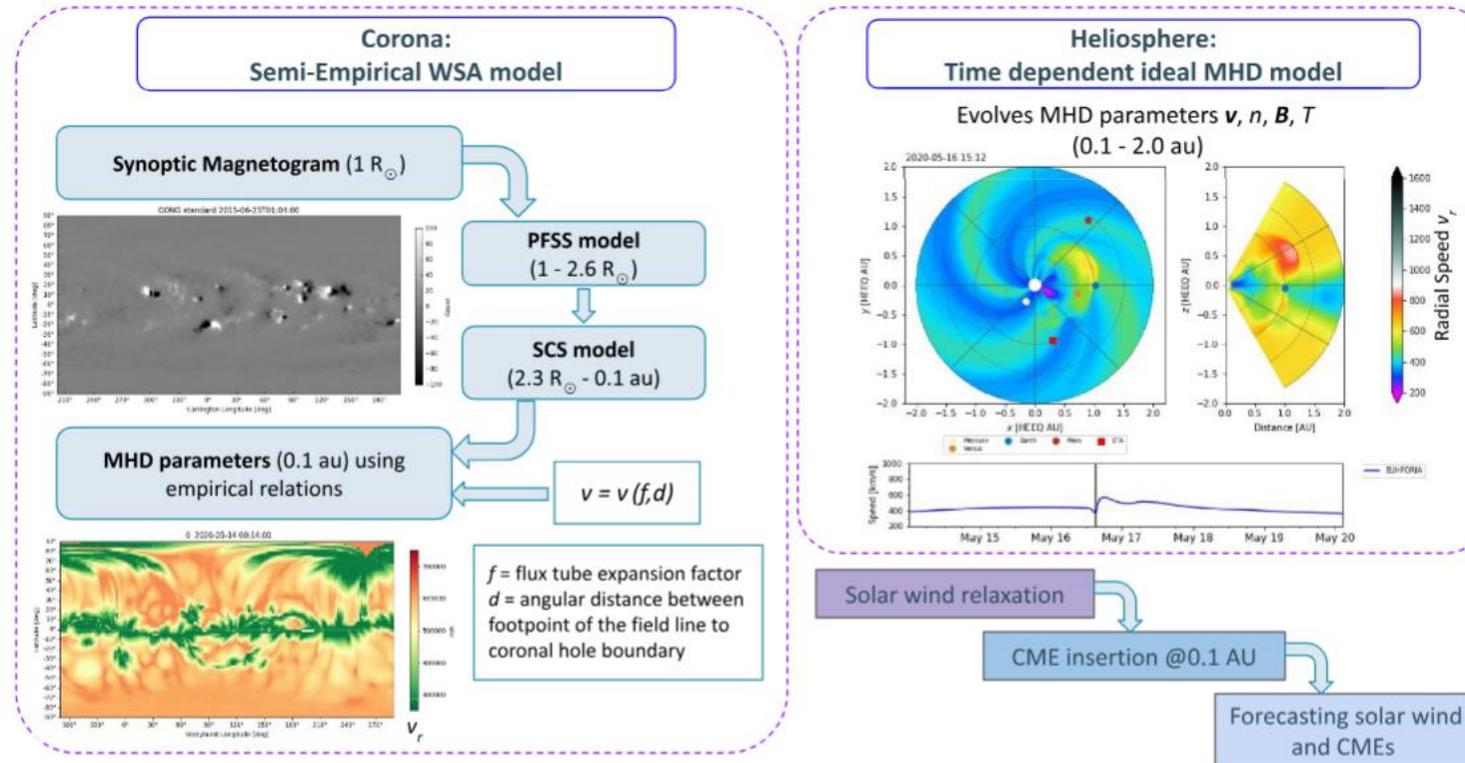
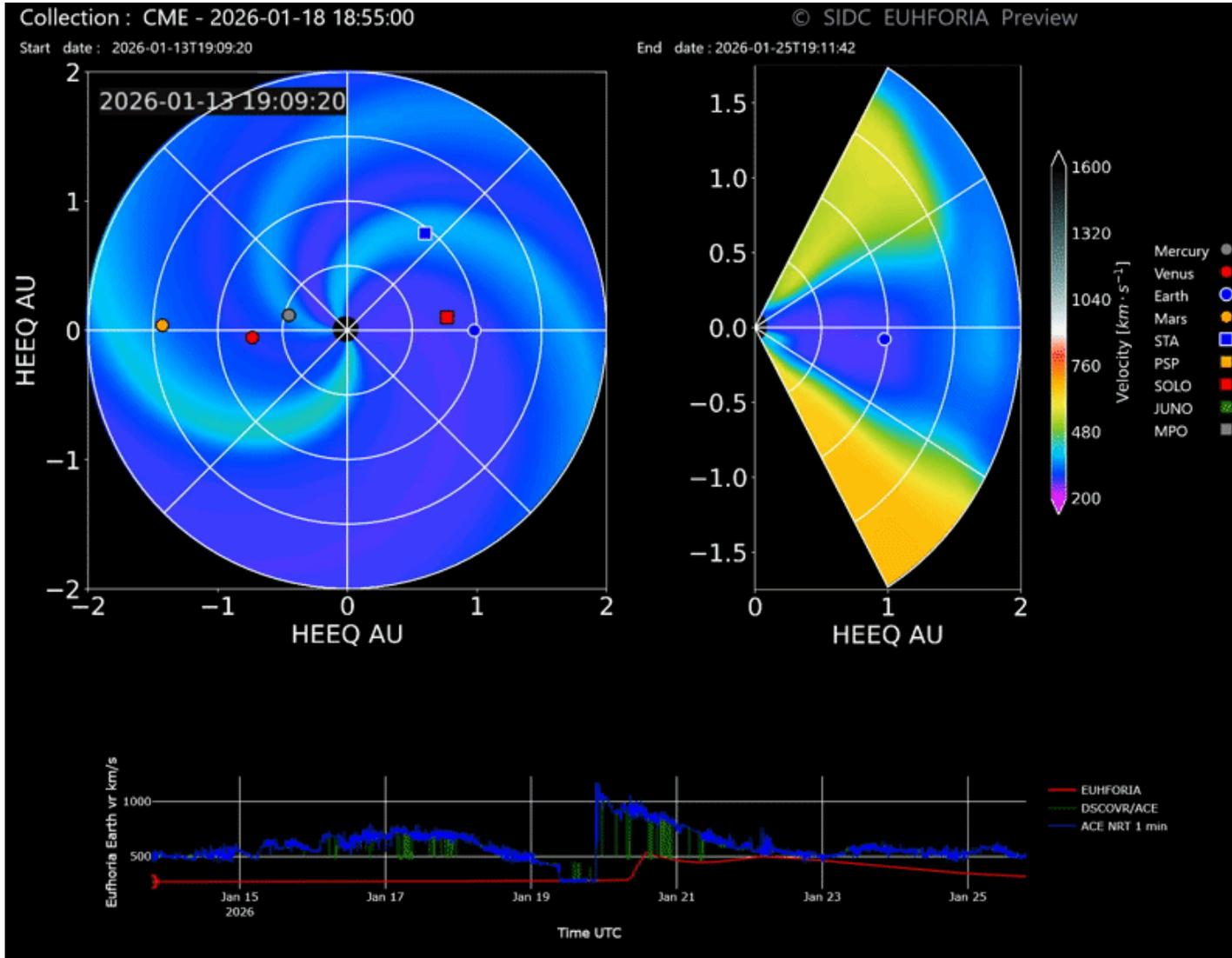


Figure 1. Schematic showing the different models within EUHFORIA and the outputs they produce. On the left, the corona is modeled using the semi-empirical Wang-Sheeley-Argé (WSA) model, driven by the synoptic magnetogram maps (e.g., top left figure). WSA model employs the potential field source surface (PFSS) model in the low corona and the Schatten current sheet (SCS) in the upper corona to extrapolate the magnetic field lines up to 0.1 au, and empirical relations to compute MHD parameters at 0.1 au (e.g., bottom left figure). The output of the coronal model is provided as a boundary condition to the 3D time-dependent ideal MHD model of the heliosphere, shown on the right. Figure on the right is an example showing the radial speed (v_r) profile in the EUHFORIA domain depicting a propagating CME on a relaxed solar wind background (equatorial and meridional planes containing Earth). The flowchart (bottom right) depicts the chronology of steps involved in a typical EUHFORIA simulation.

CME – Aankomsttijd: (2) EUHFORIA



- Aankomsttijd
 - 20 Jan – 07:10UTC
 - CME snelheid: 1403 km/s
 - Max. snelheid: 540 km/s
- SIDC SWx voorspeller

CME arrival alert (see json attachment).

From no-reply-sidc@oma.be
To SWforecasters@sidc.be
Date 2026-01-19 15:41

Expected arrival time: 2026-01-20T07:11:00Z

Arrival time uncertainty: 12

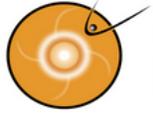
Estimated peak K: 7

Peak K uncertainty: 1

Probability of arrival: 85

CME start time: 2026-01-18T18:12:00Z

CME – Aankomsttijd: (3) Overzicht



Community Coordinated
Modeling Center

CCMC CME Scoreboard

<https://kauai.ccmc.gsfc.nasa.gov/CMEScoreboard/>

[Login](#)

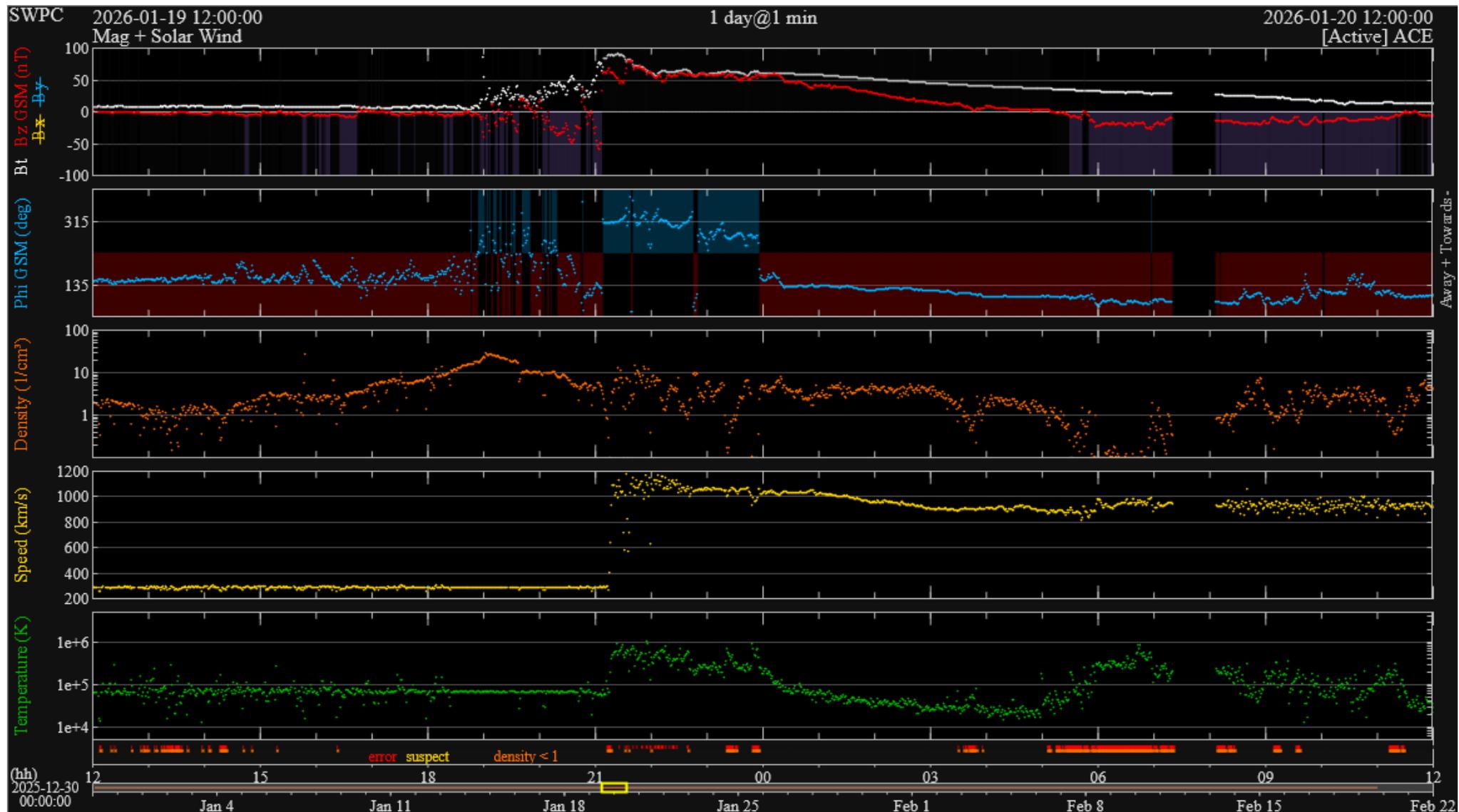
CCMC CME Scoreboard

The CME Scoreboard is part of the the [CME Arrival Time and Impact Working Team](#) within the COSPAR [International Space Weather Action Teams \(ISWAT\)](#).

Developed by the [Community Coordinated Modeling Center \(CCMC\)](#), the CME Scoreboard serves as a **research-based pre-event forecasting validation platform**.

Instituut	Model	In (18:09UTC)	Aankomst verwacht	Onzekerheid	Kp verwacht
NASA	WSA/ENLIL + Cone	+3.5h	20 Jan / 02:38	+/- 7h	8.0 - 9.0
JHU /APL	EAM	+5.7h	19 Jan / 19:53	-2.5h - +7.5h	
SEPC/NSSC/CAS	Cone + HAF	+8.2h	19 Jan / 22:00		7.0-9.0
KSWC	WSA/ENLIL + Cone	+8.7h	20 Jan / 05:00		
UK Met Office	WSA/ENLIL + Cone	+12.4h	20 Jan / 04:00	+/- 6h	7.0-8.0
ASWO	ELEvo	+15.3h	20 Jan / 02:46	+/- 5.3h	
NOAA/SWPC	WSA/ENLIL + Cone	+16.7h	20 Jan / 01:00		5.0-8.0
SIDC	EUHFORIA + Hvar DBM	+20.5h	20 Jan / 07:11	+/- 12h	6.0-8.0

CME – Aankomst: 19 Jan / 18:56UTC (ACE/L1)



<https://www.swpc.noaa.gov/products/real-time-solar-wind>

CME – Aankomst: 19 Jan / 18:56UTC (ACE/L1)



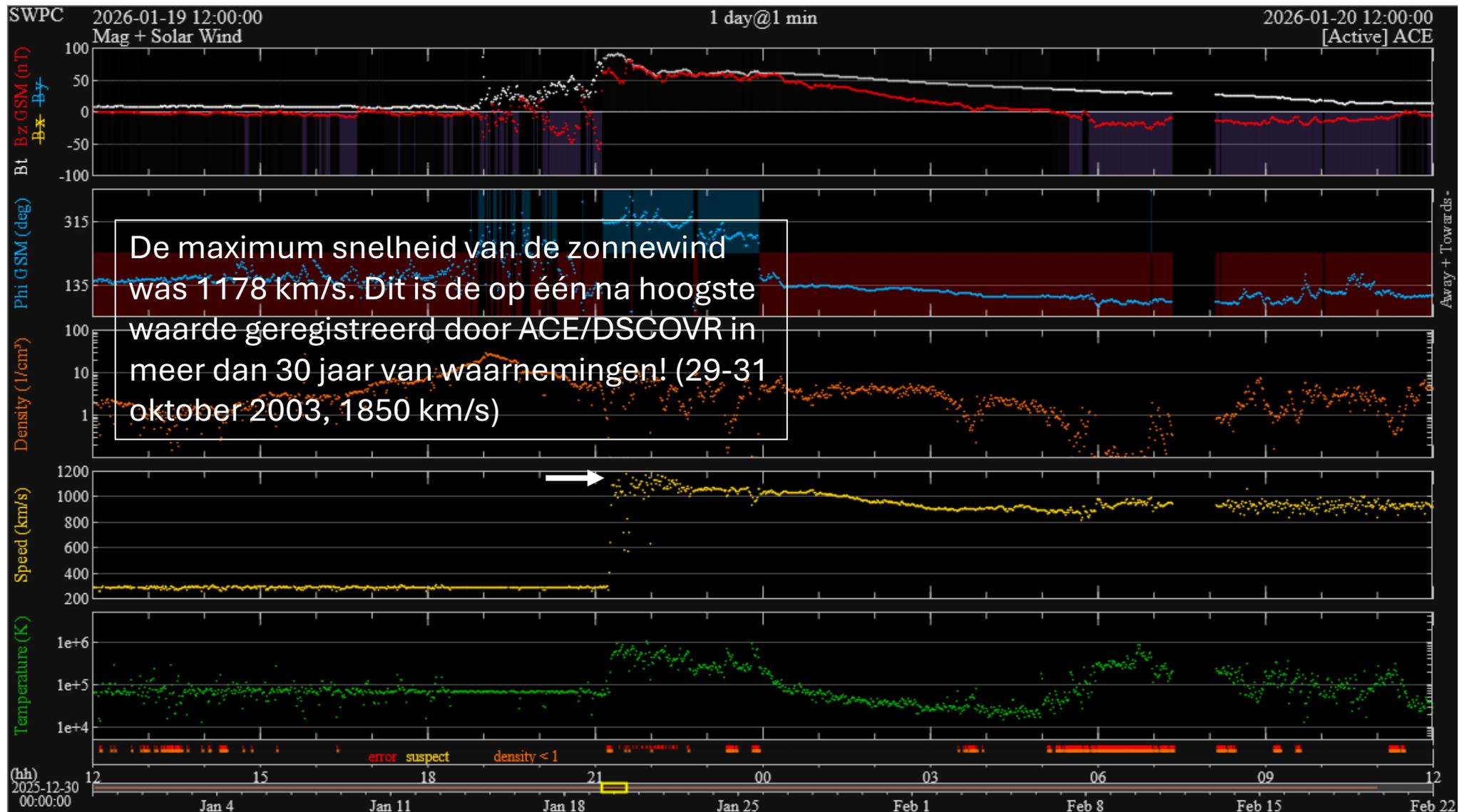
CME – Aankomst: 19 Jan / 18:56UTC (ACE/L1)



CME – Aankomst: 19 Jan / 18:56UTC (ACE/L1)



CME – Aankomst: 19 Jan / 18:56UTC (ACE/L1)



CME – Aankomst: Waarom zoveel vroeger?

Basic DBM **Advanced DBM**

CME start date: Jan 18 2026

CME start time (UTC): 18 h 12 min

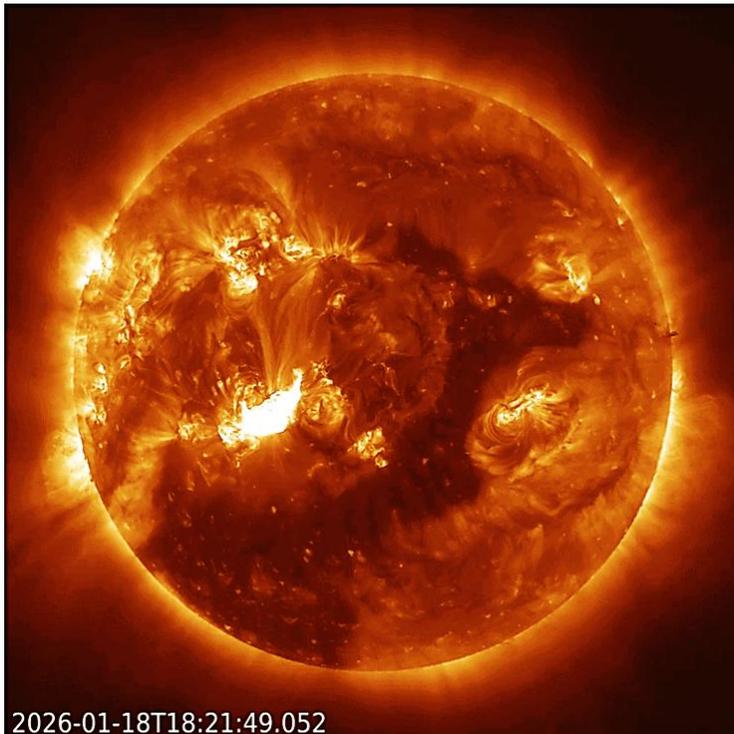
R_0 - starting radial distance of CME (R_s): 20

v_0 - speed of CME at R_0 (km/s): 1900

Γ - drag parameter (10^{-7} km^{-1}): 0.1

w - asymptotic solar wind speed (km/s): 450

R_{target} - target heliocentric distance (AU): 0.98



- CME snelheid te laag ingeschat
 - Eerder rond 1900 km/s
- Invloed coronaal gat onderschat
 - Pad effenen voor CME

Results **v-R-t plots** Documentation **1900 km/s**

Output:

Drag: 0.2

CME arrival at target (date & time): **20.01.2026 at 04h:50min**
Transit time: **34.64 h**
Impact speed at target (at 0.98 AU): **764 km/s**

Results **v-R-t plots** Documentation **1900 km/s**

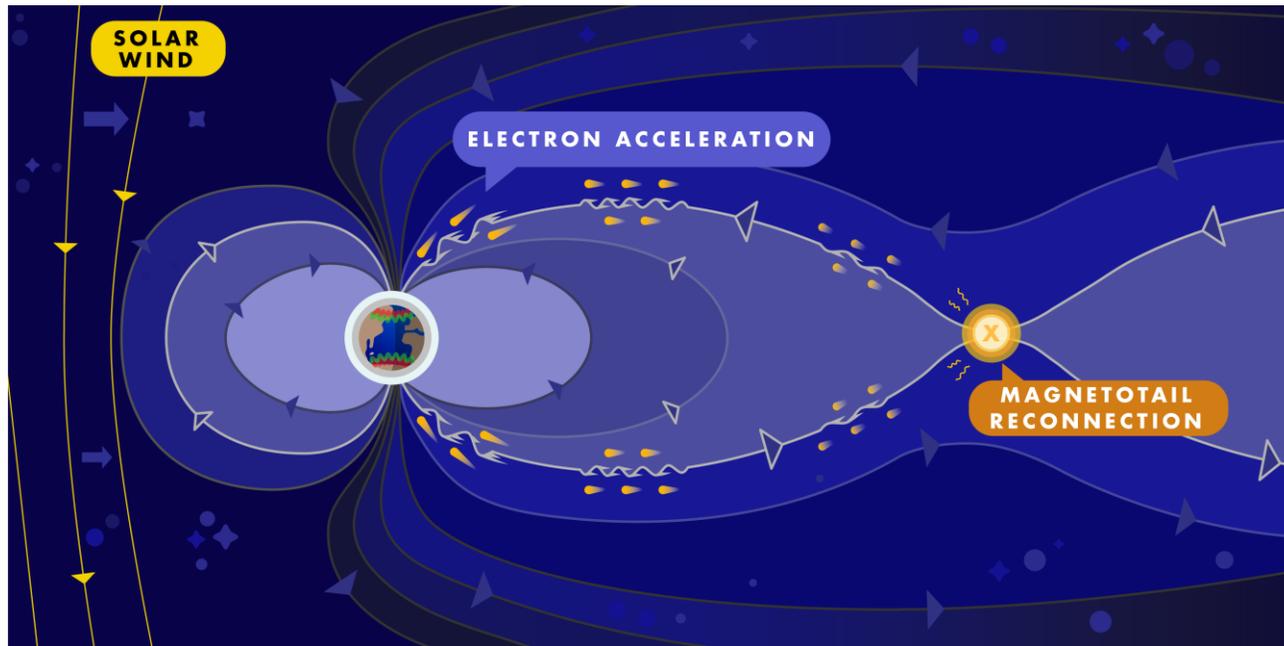
Output:

Drag: 0.1

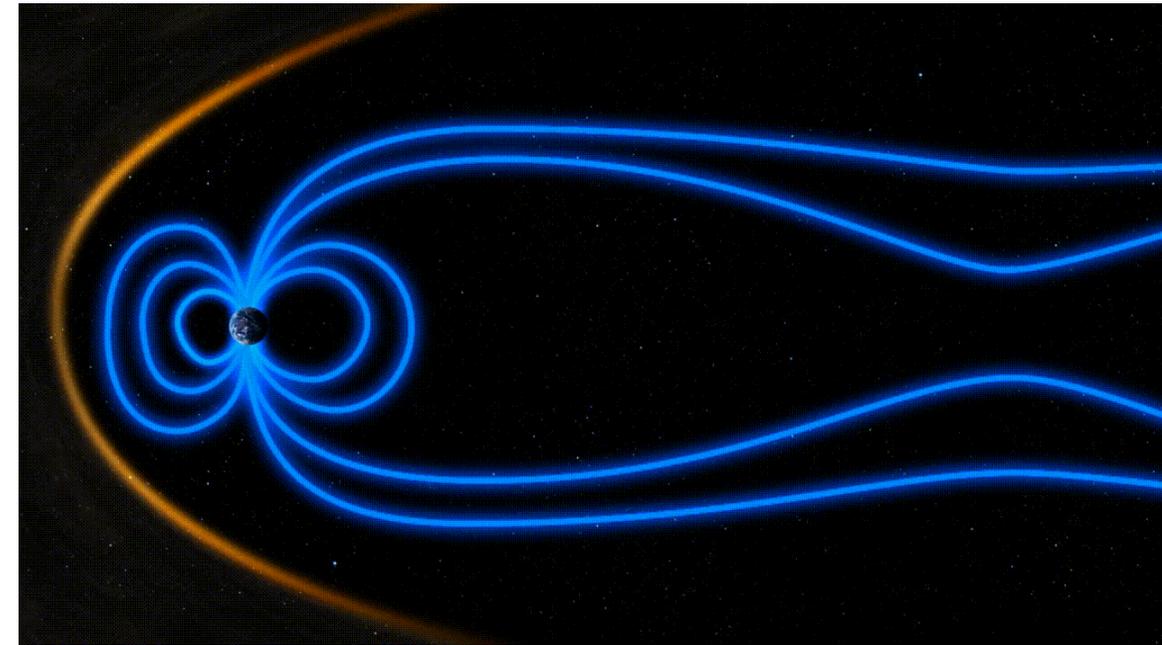
CME arrival at target (date & time): **19.01.2026 at 21h:26min**
Transit time: **27.24 h**
Impact speed at target (at 0.98 AU): **1 049 km/s**

Recept voor een zware geomagnetische storm

Bz < 0



© G. G. Howes, University of Iowa, 2021



© ESA / CLUSTER

Recept voor een zware geomagnetische storm

Bz dient zo negatief mogelijk te zijn

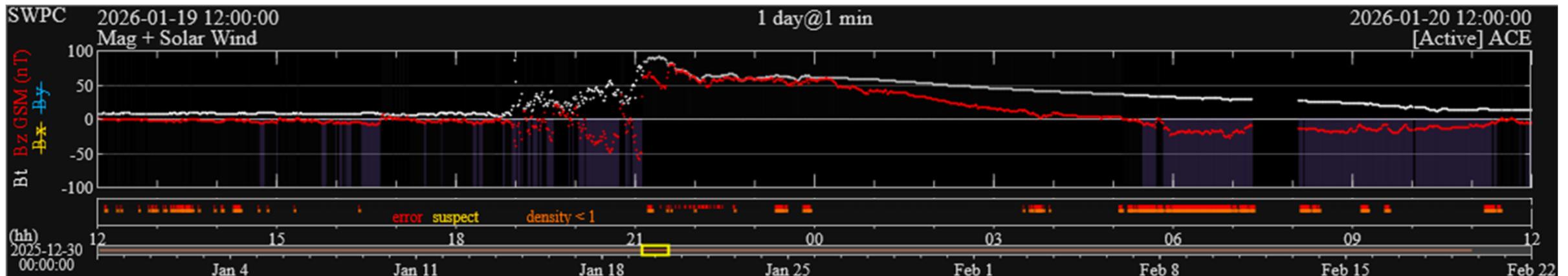
Bz dient zo lang mogelijk negatief te zijn

Recept voor een zware geomagnetische storm

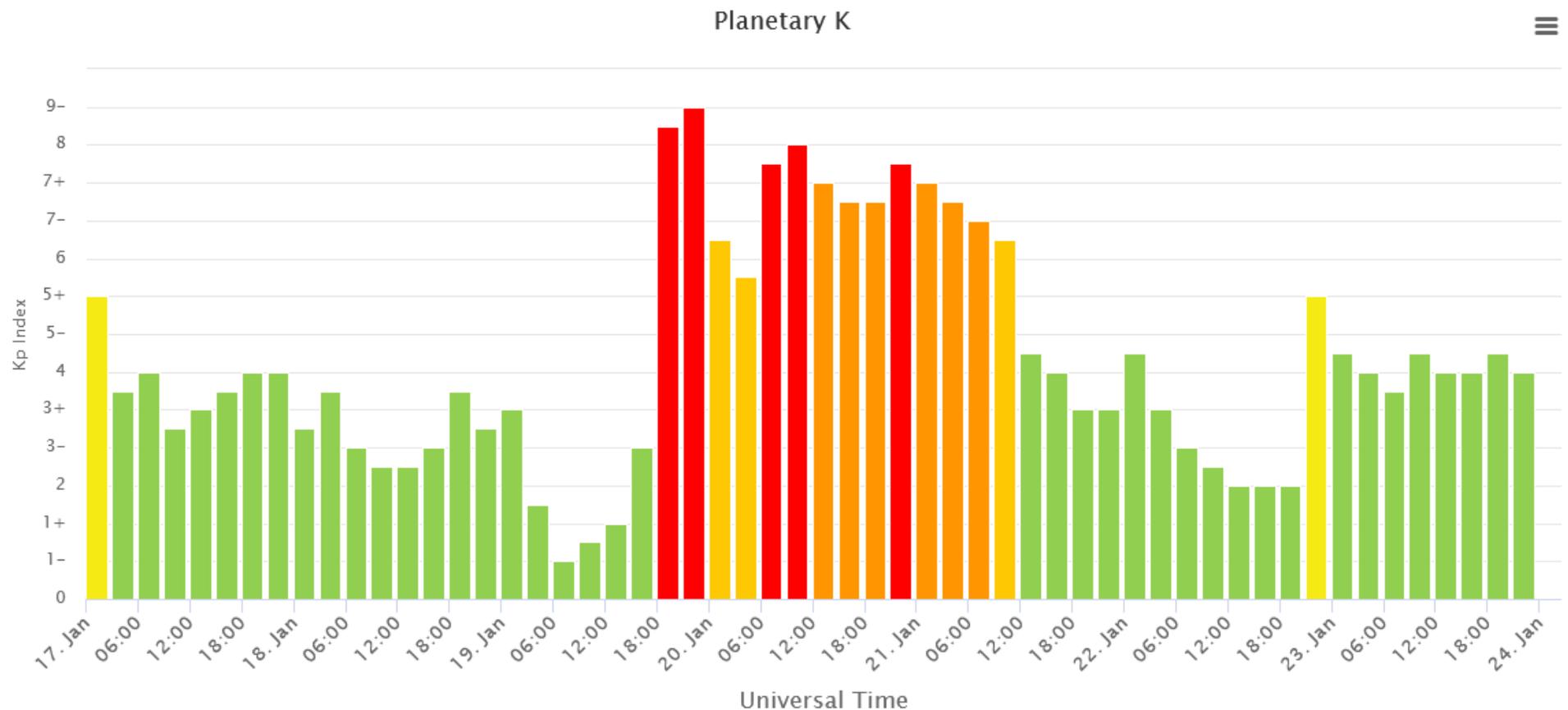
Bz dient zo negatief mogelijk te zijn



Bz dient zo lang mogelijk negatief te zijn



19-20 januari - Zware geomagnetische storm

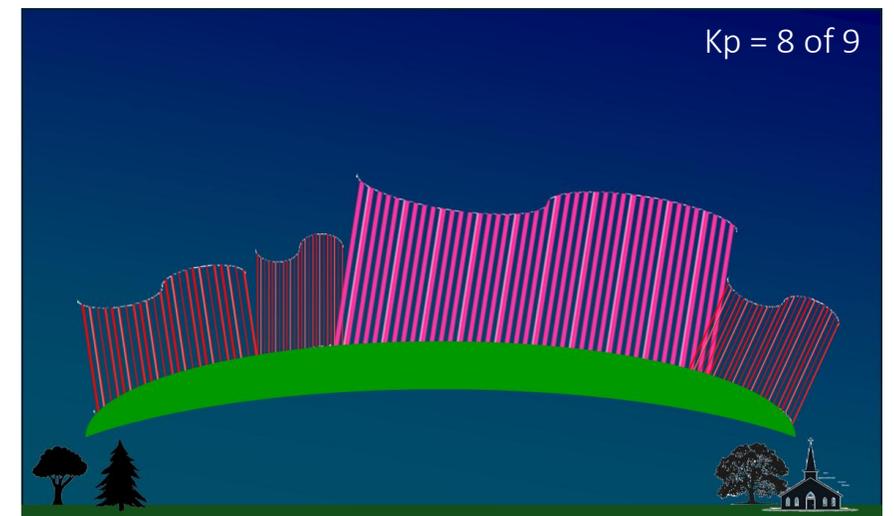
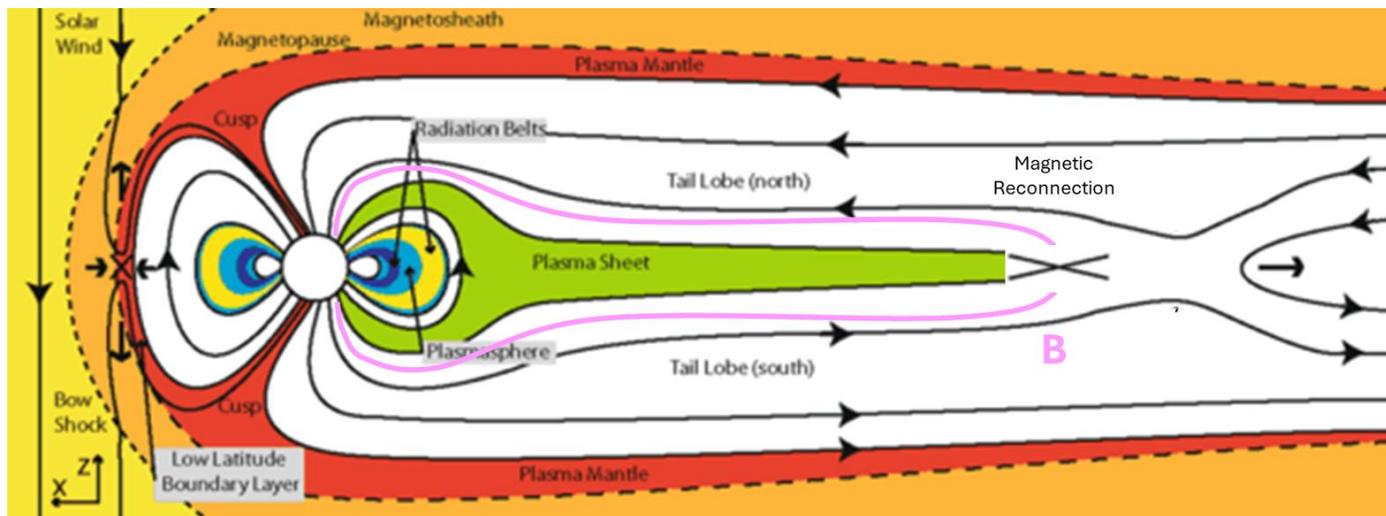
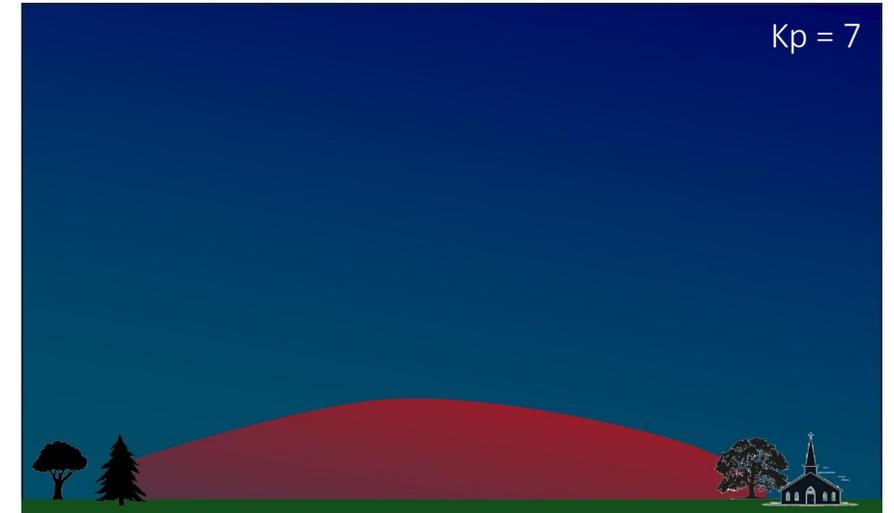
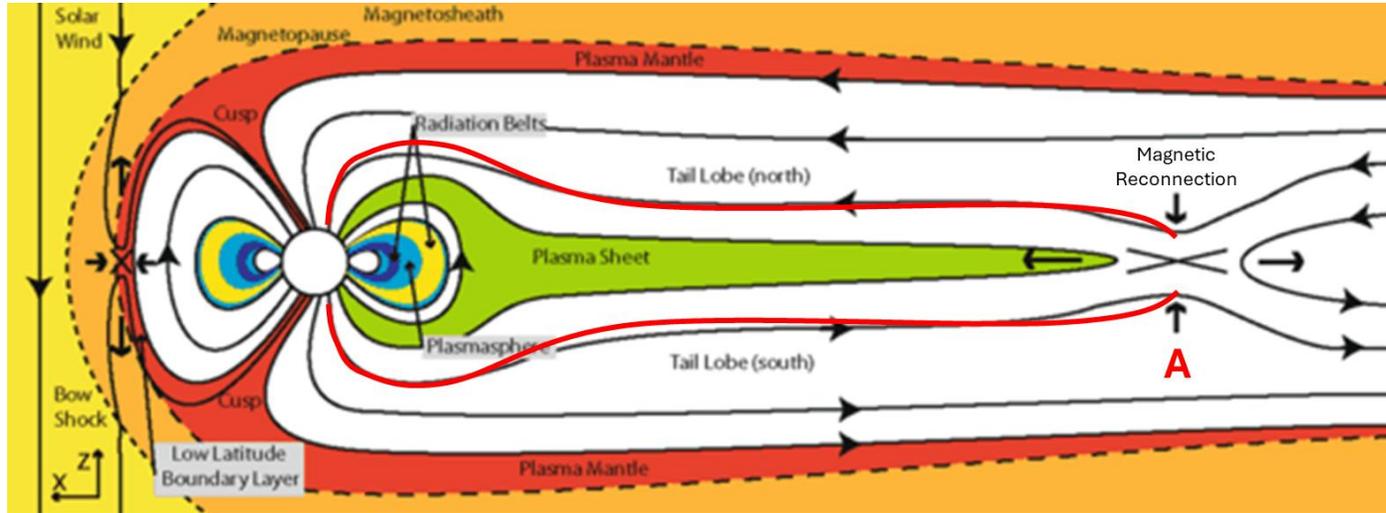


NOAA Scales Geomagnetic Storms



SWx TREC
Highcharts.com

Recept voor aurora boven België

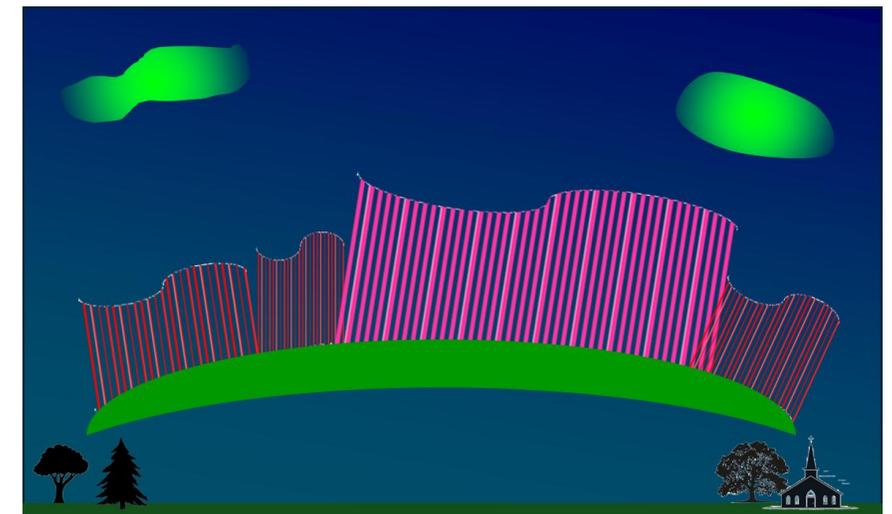
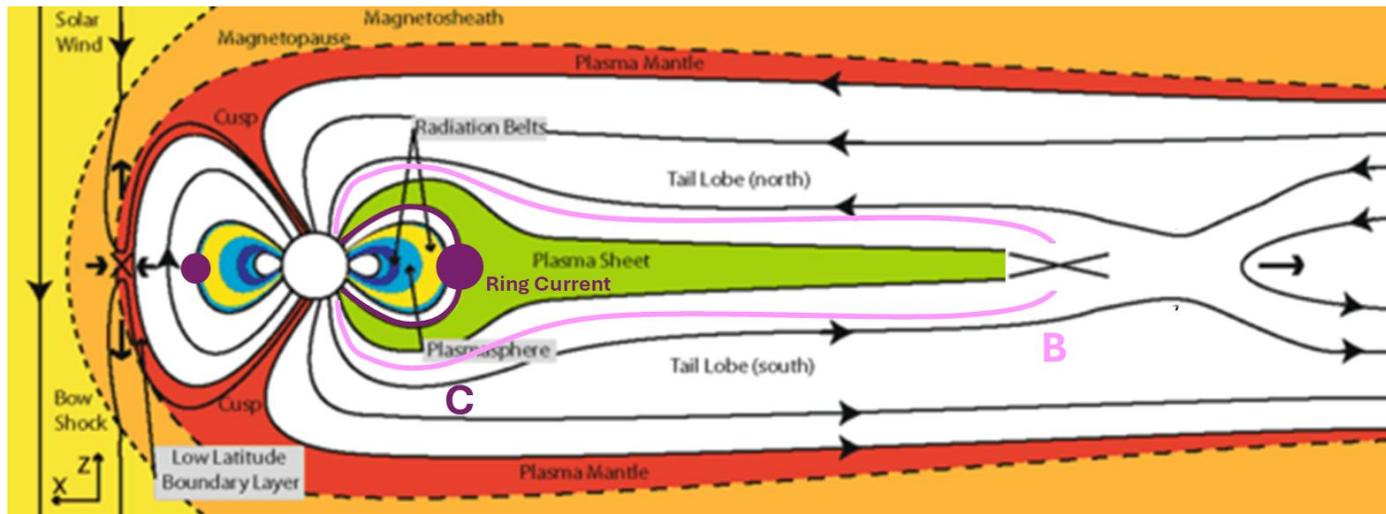
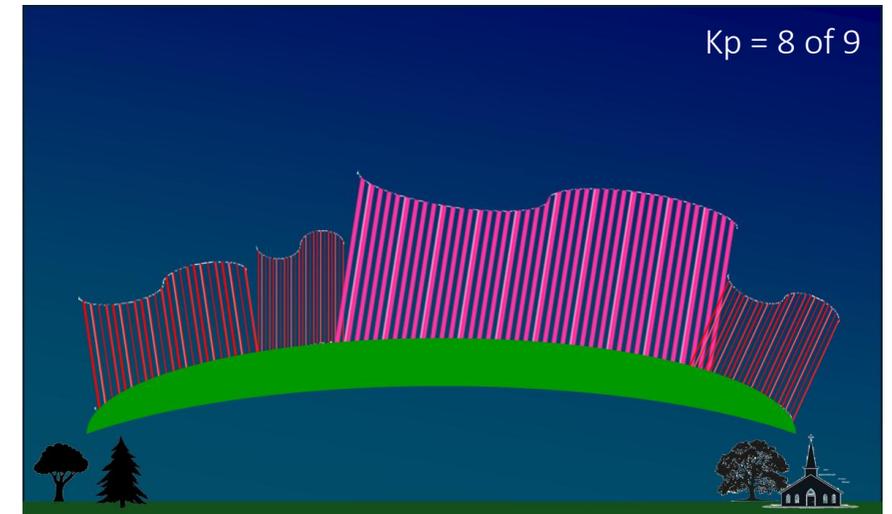
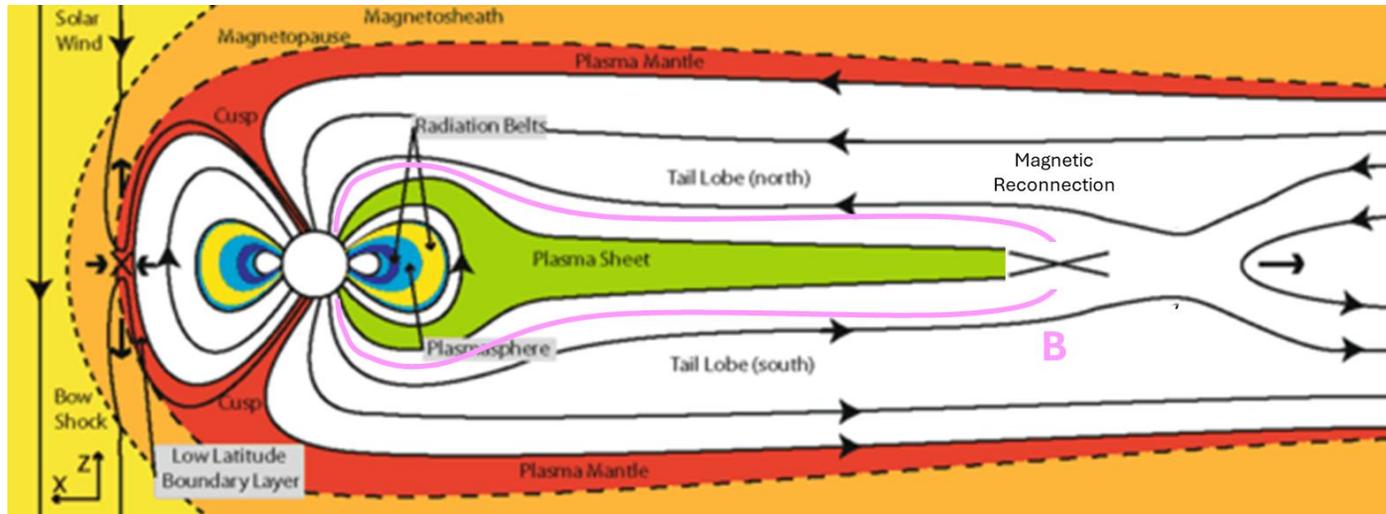


Poollicht boven België – 19 januari 2026



Credits: Jonas Piontek - <https://www.youtube.com/watch?v=MxM-h5pU9mE> ; STCE newsitem: <https://www.stce.be/news/802/welcome.html>

Poollicht in België – Proton aurora



Poollicht boven België – 19 januari 2026



Thomas Lecocq



Jan Janssens

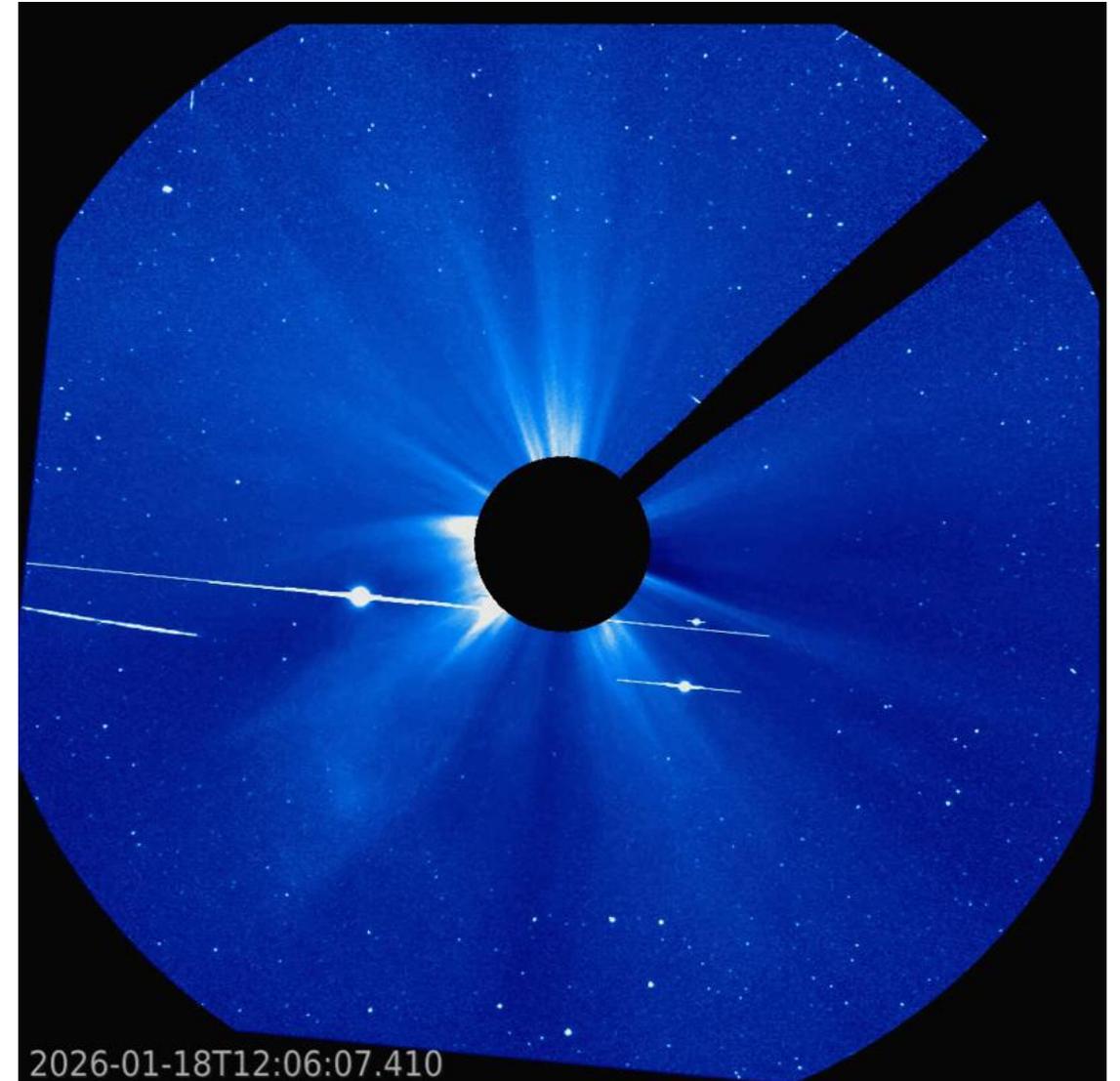
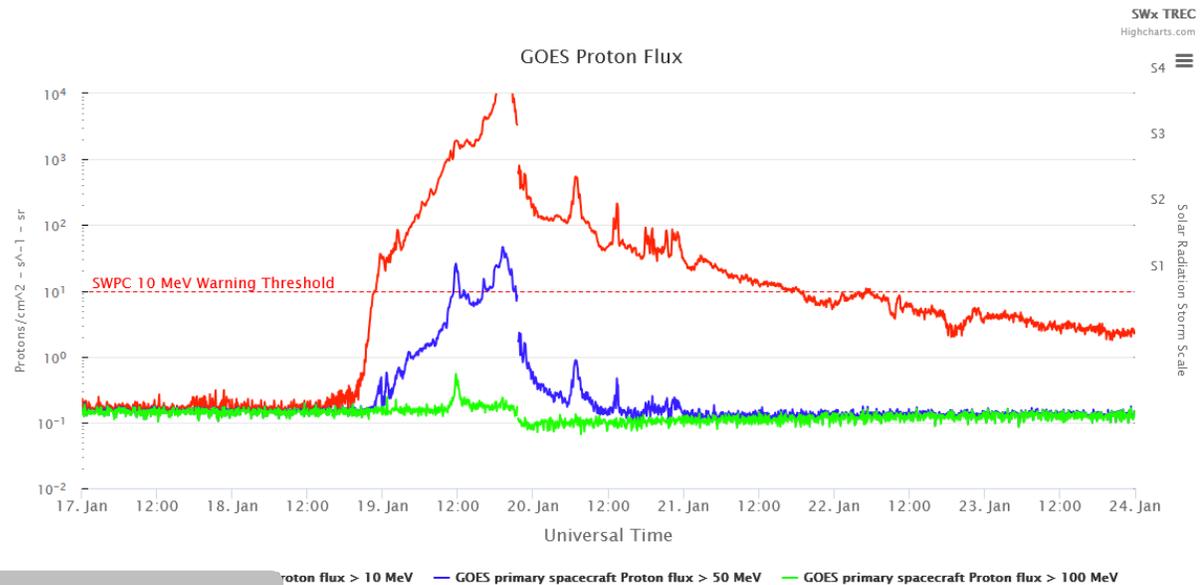
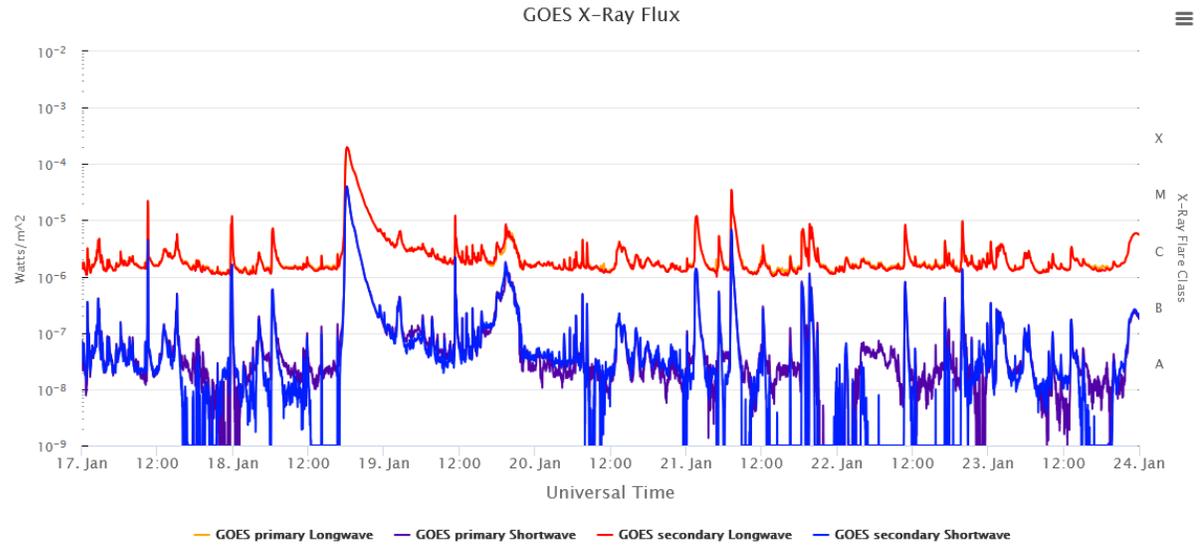


Jennifer O'Hara



Thomas Lecocq

Laatste verrassing: Zware proton storm



<https://www.stce.be/news/804/welcome.html>

proton flux > 10 MeV GOES primary spacecraft Proton flux > 50 MeV GOES primary spacecraft Proton flux > 100 MeV



Zwaarste proton storm in 20-35 jaar

NOAA Space Weather Prediction Center

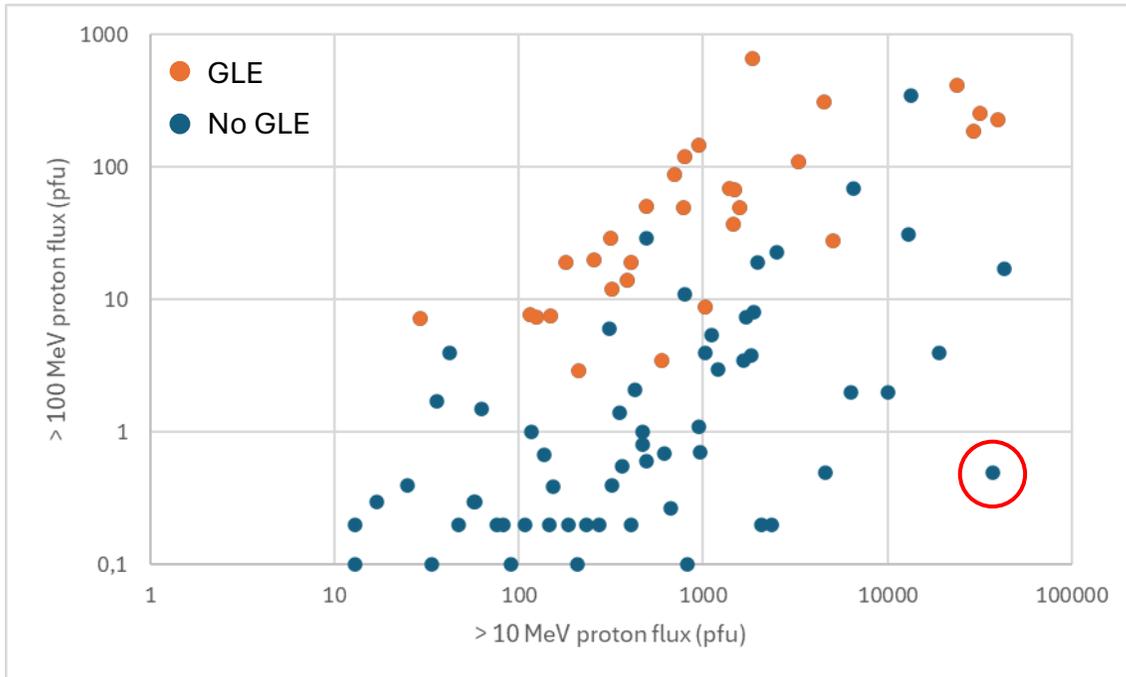
Solar Proton Events Affecting the Earth Environment

1976 - Present

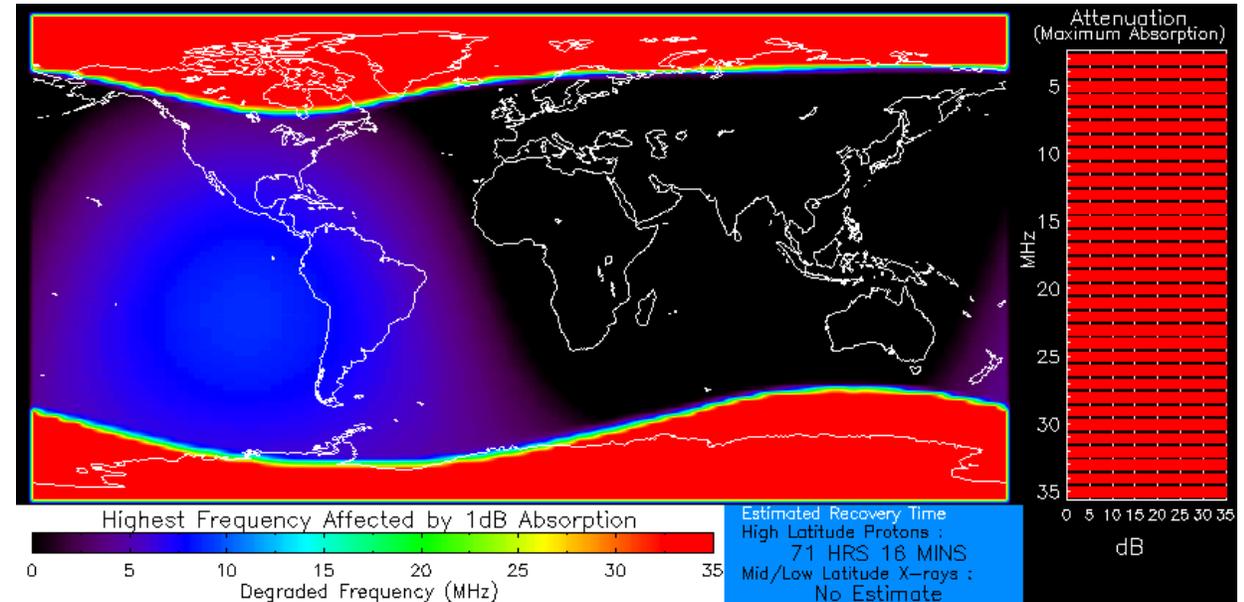
Search for year... Clear search 1809

Begin Time Yr M/D (UTC)	Maximum Time Yr M/D (UTC)	>10 MeV Maximum (pfu) ▲▼	Region	Location	Flare Maximum (UTC)	Type II Radio Emission	Type IV	Linear Speed ▲▼	Imagery/Misc
1991 03/23 0820	1991 03/24 0350	43,500	6555	S26E28	X9/3B 03/22 2246	Yes	No	N/A	N/A
1989 10/19 1310	1989 10/20 1600	42,200	5747	S27E10	X13/4B 10/19 1306	Yes	Yes	N/A	N/A
2026 01/18 2255	2026 01/19 1915	37,000	14341	S11E24	X1.9/3B 01/18 1809	Yes	Yes	ESP enhanced at CME arrival	Flux Plot
2001 11/04 1705	2001 11/06 0215	31,700	9684	N06W18	X1/3B 11/04 1620	Yes	Yes	1329 km/s	C2
2003 10/28 1215	2003 10/29 0615	29,500	10486	S16E08	X17/4B 10/28 1110	Yes	Yes	2459 km/s	C2 EIT
2000 07/14 1045	2000 07/15 1230	24,000	9077	N22W07	X5/3B 07/14 1024	Yes	Yes	1674 km/s	C2 EIT

Zware proton storm: vooral HF Com boven polen



GLE: Ground Level Enhancement

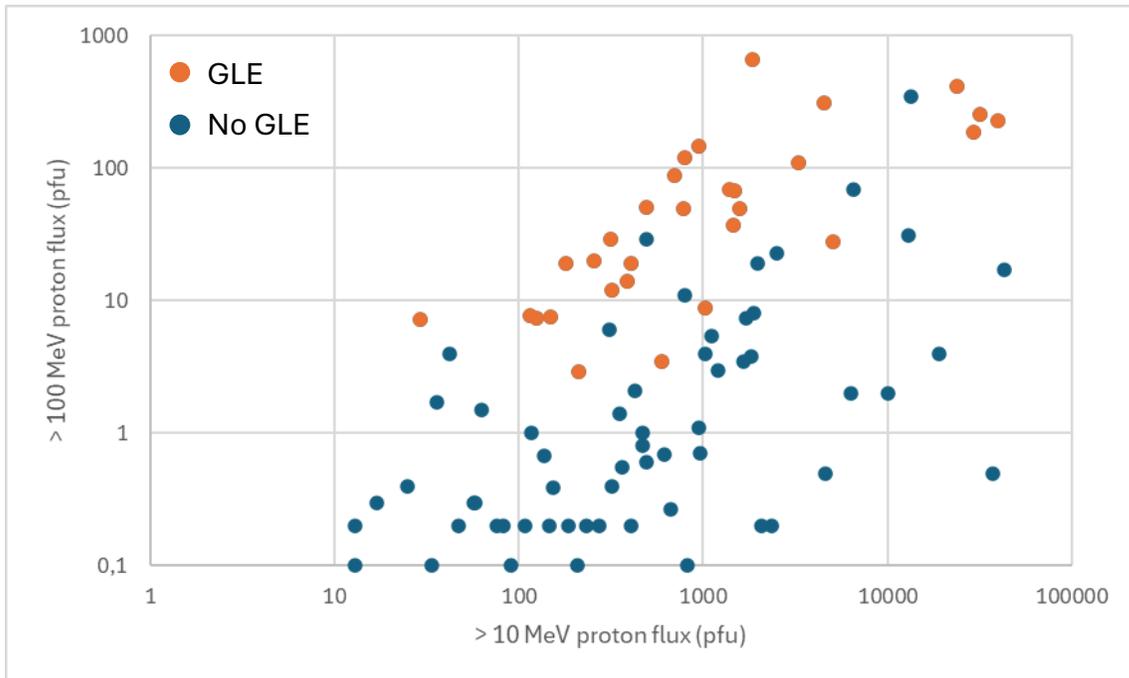


Elevated X-ray flux
Product Valid At : 2026-01-19 18:43 UTC

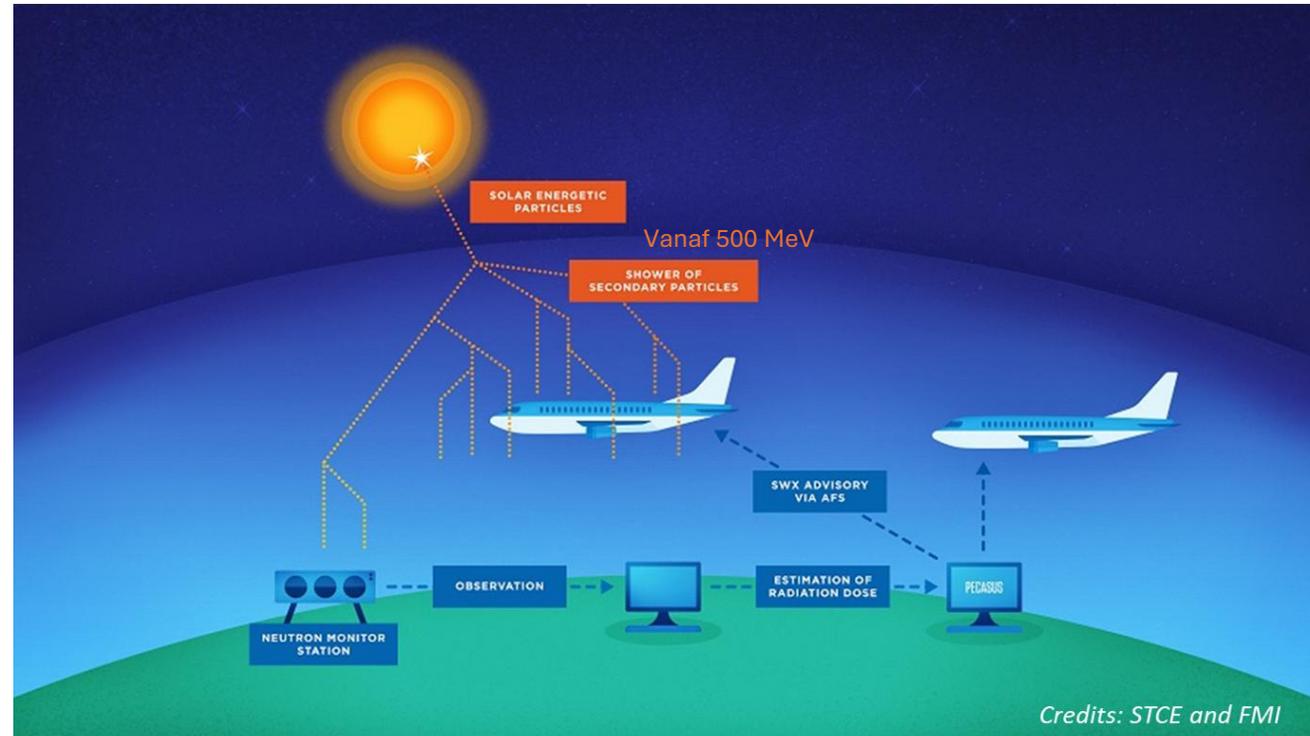
Severe Proton Flux
NOAA/SWPC Boulder, CO USA

<https://www.swpc.noaa.gov/products/d-region-absorption-predictions-d-rap>

Zware proton storm: lage extra stralingsdosis

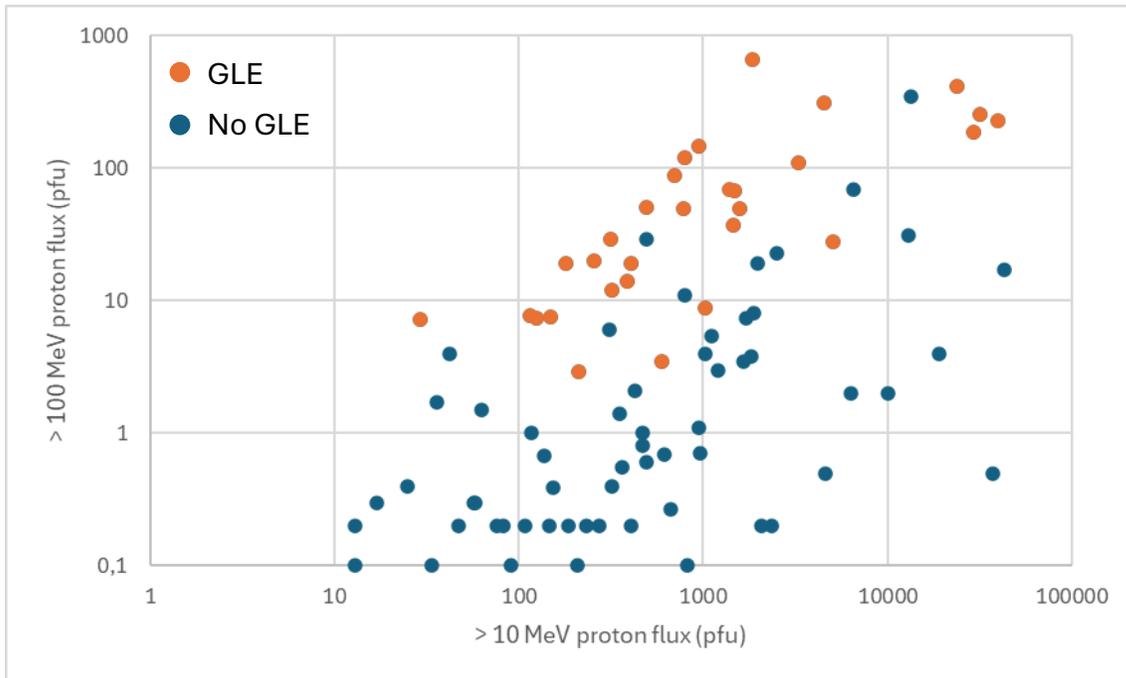


GLE: Ground Level Enhancement



<https://www.stce.be/news/797/welcome.html>

Zware proton storm: lage extra stralingsdosis



GLE: Ground Level Enhancement

Federated products from the **Seibersdorf Laboratories (SL)**

AVIDOS
AVIATION DOSIMETRY

SEIBERSDORF
LABORATORIES

FLIGHT PLANNER

17.01.2026 17:19 (UTC)

KLGA, LGA | La Guardia Airport VHHH, HKG | Hong Kong International Airport

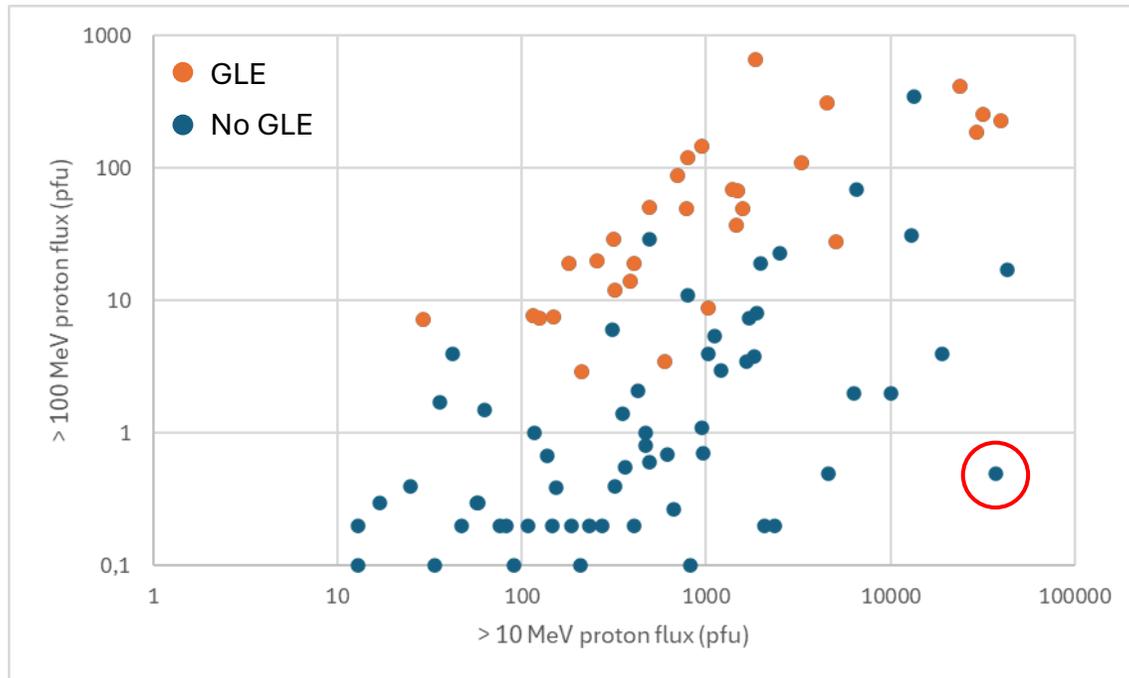
Calculate

49 μSv
7
Days On Ground 2400
Effective Dose

[AVIDOS v3.1] Calculation successful. No >500MeV SEP event is expected. GLE Status: QUIET

<https://swe.ssa.esa.int/web/guest/avidos-federated>

Zware proton storm: lage extra stralingsdosis



GLE: Ground Level Enhancement

Federated products from the Seibersdorf Laboratories (SL)

AVIDOS
AVIATION DOSIMETRY

SEIBERSDORF
LABORATORIES

FLIGHT PLANNER

19.01.2026 13:00 (UTC)

KLGA, LGA | La Guardia Airport VHHH, HKG | Hong Kong International Airport

Calculate

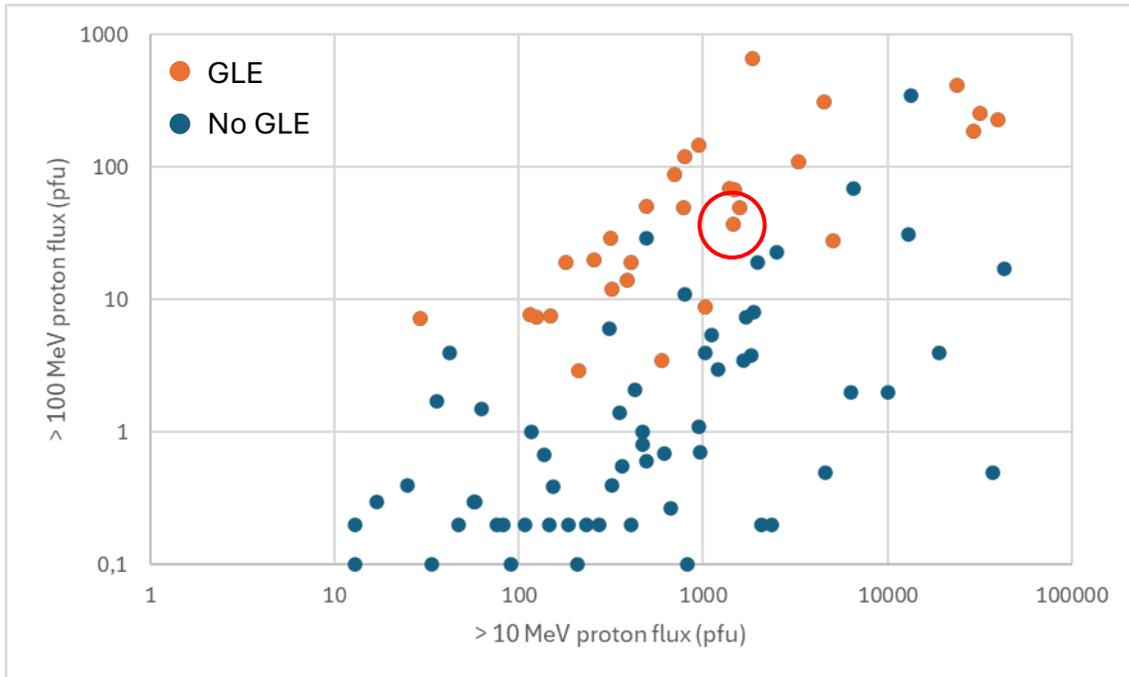
49 μ Sv
7
Days On Ground 2400
Effective Dose

[AVIDOS v3.1] Calculation successful. No >500MeV SEP event is expected. GLE Status 19:19 (UTC) QUIET

<https://swe.ssa.esa.int/web/guest/avidos-federated>

Zware proton storm: GLE 11 november 2025

Federated products from the Seibersdorf Laboratories (SL)

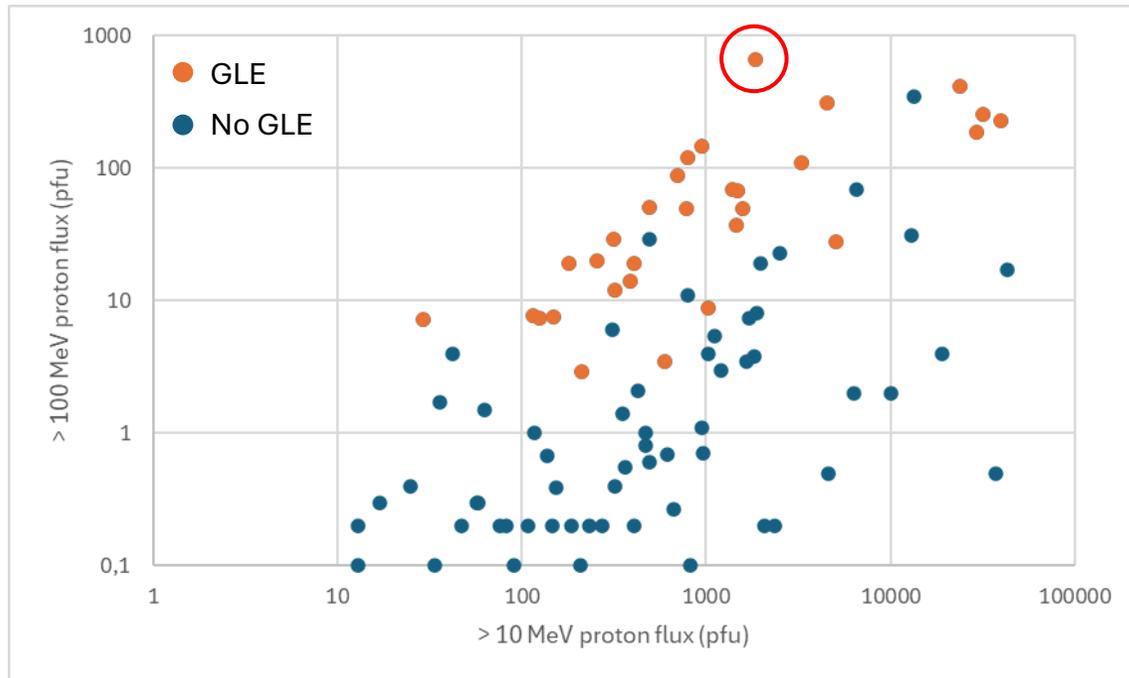


GLE: Ground Level Enhancement

The screenshot displays the AVIDOS Flight Planner interface. At the top, it shows the date and time: 11.11.2025 08:00 (UTC). The flight route is set from KLGA, LGA | La Guardia Airport to VHHH, HKG | Hong Kong International Airport. A 'Calculate' button is visible. On the right, a circular gauge displays the Effective Dose as 187 μSv and 29 Days On Ground. The gauge also shows a minimum of 74 and a maximum of 301. Below the gauge is a world map with a yellow flight path connecting the two airports. At the bottom, a status bar indicates: [AVIDOS v3.1] Calculation successful., No >500MeV SEP event is expected., GLE Status 16.03 (UTC), and QUIET.

<https://swe.ssa.esa.int/web/guest/avidos-federated>

Zware proton storm: GLE 20 januari 2005



GLE: Ground Level Enhancement



<https://swe.ssa.esa.int/web/guest/avidos-federated>

Vragen?

