

# SIDC Space Weather Briefing

16 April 2023-23 April 2023

Yana Maneva  
& the SIDC forecaster team



Royal Observatory  
of Belgium

Solar Influences  
Data analysis Centre  
[www.sidc.be](http://www.sidc.be)

# Summary Report

Solar activity from 2023-04-16 12:00 to 2023-04-23 23:59

Active regions	11 ARs
Flares	# C-class flare: 34 # M-class flare: 1 # X-class flare: 0
Coronal Holes	Minor CH-
CME	Fast full halo on April 21st

Proton flux	Minor storm levels on April 23rd
Electron flux	Nominal levels

## Solar wind and geomagnetic conditions

ICMEs	strong arrival on April 23rd
Solar wind conditions	B : 1.27 - 31.11 nT //Bz: -25.1 nT to 25.8 nT //Speed: 289.5 - 650 km/s
K-indices	max K-index (KBel): 7 max Kp-index (NOAA): 8

All Quiet Alert: NOT QUIET

# Solar Activity

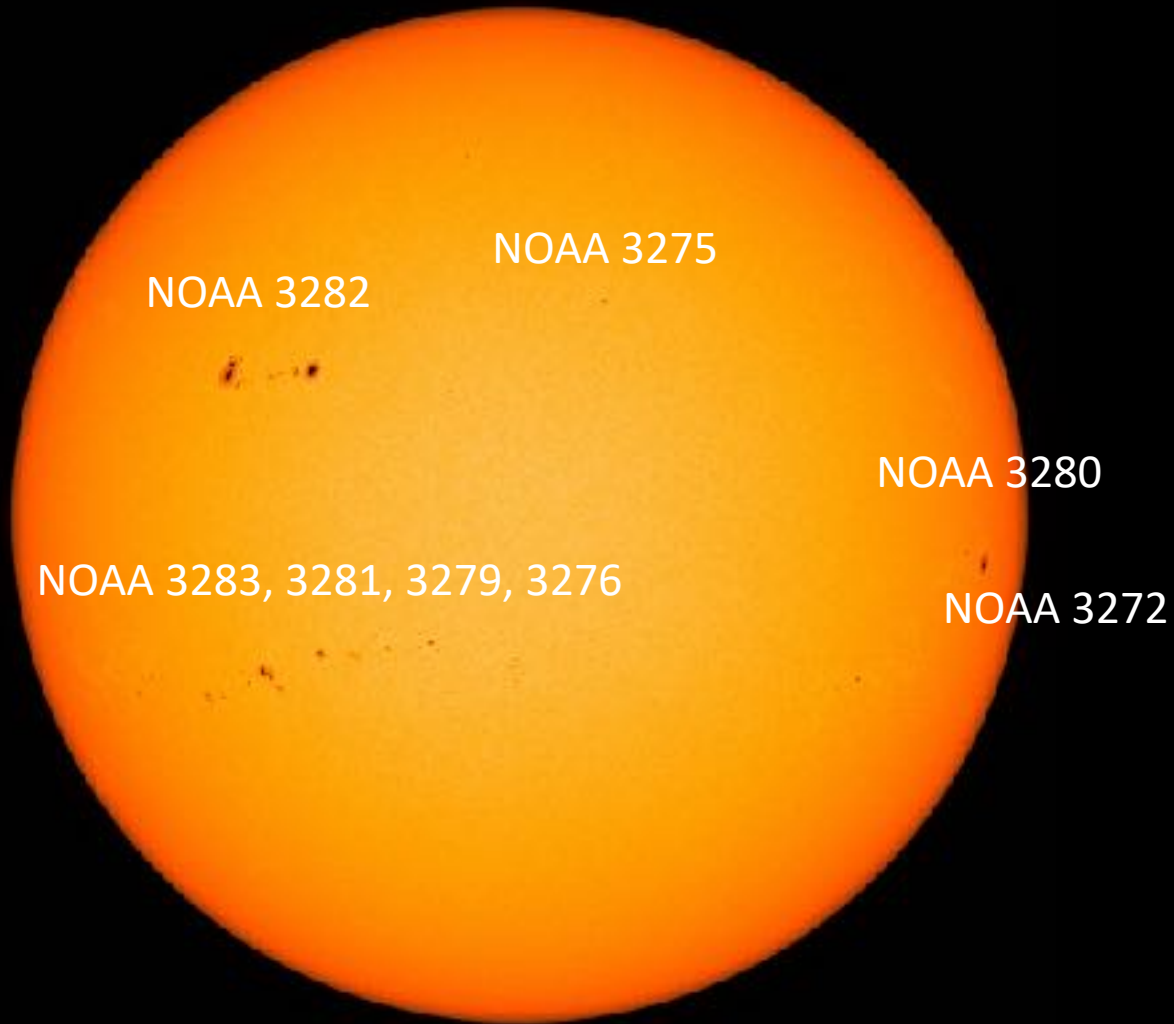


Royal Observatory  
of Belgium

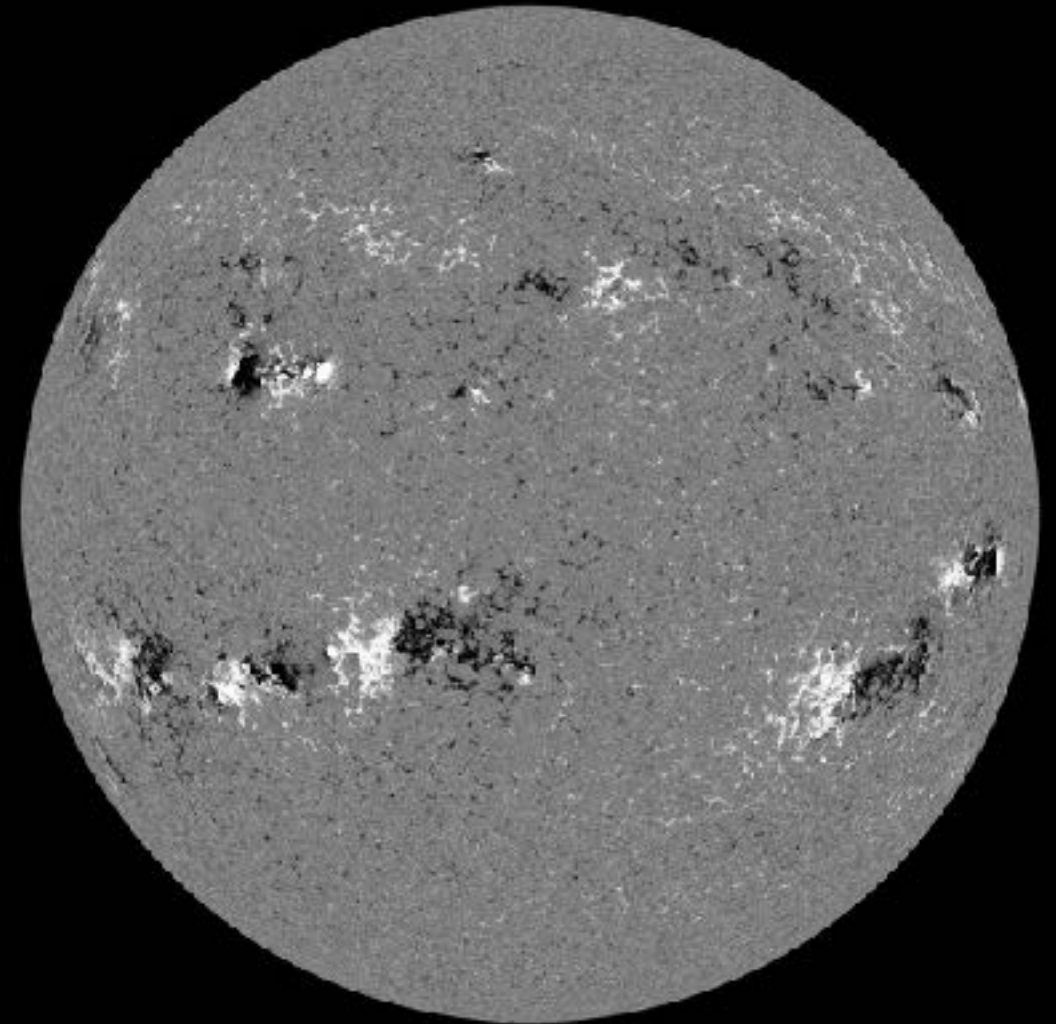
Solar Influences  
Data analysis Centre  
[www.sidc.be](http://www.sidc.be)

# Solar active regions

SDO/HMI White Light 2023-04-16

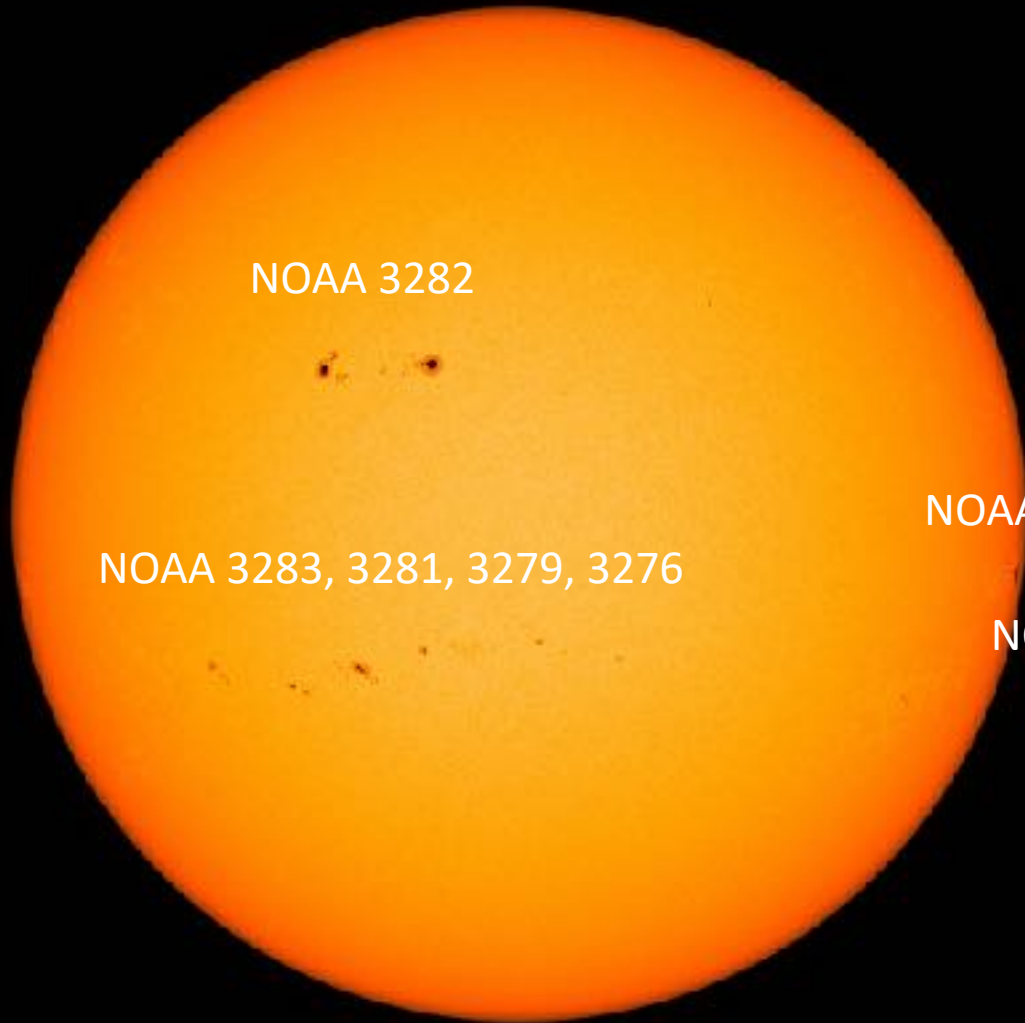


SDO/HMI Magnetogram 2023-04-16

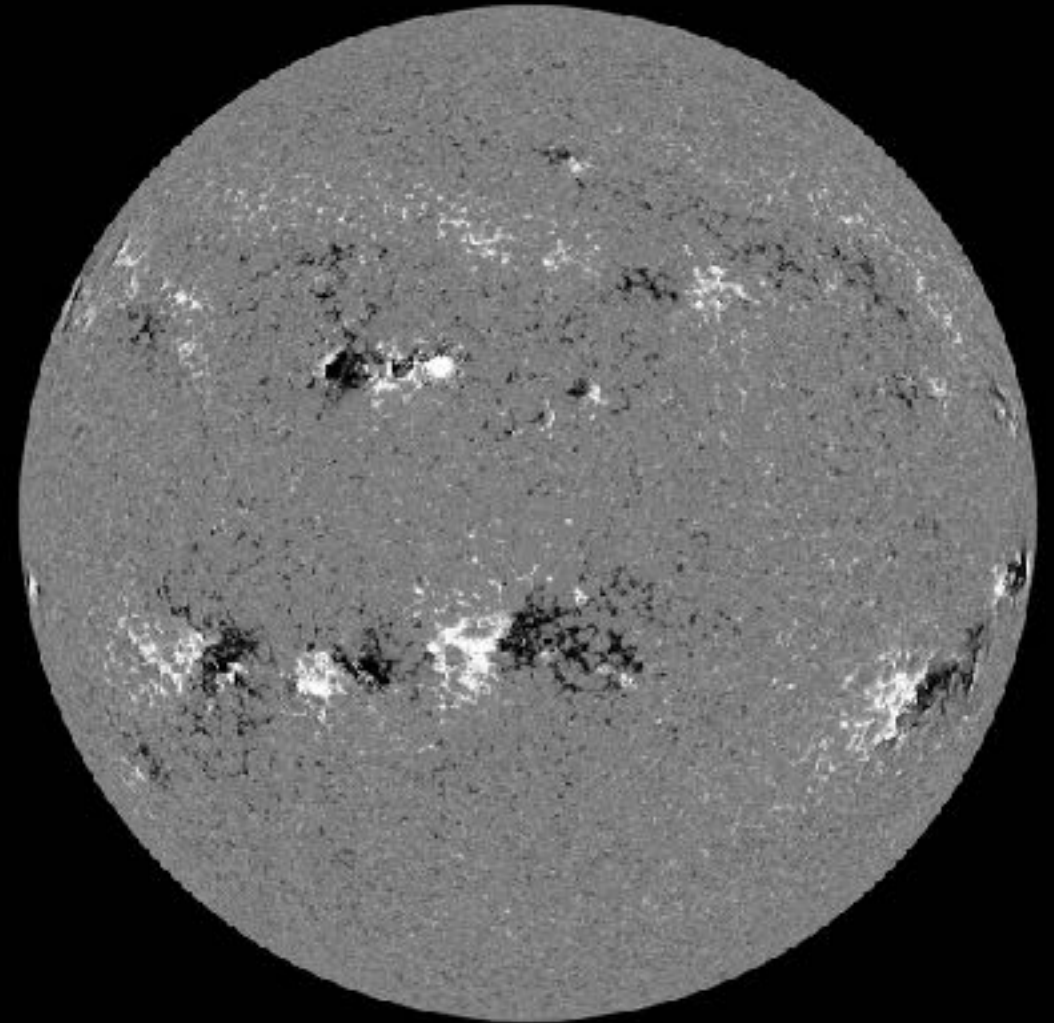


# Solar active regions

SDO/HMI White Light 2023-04-17

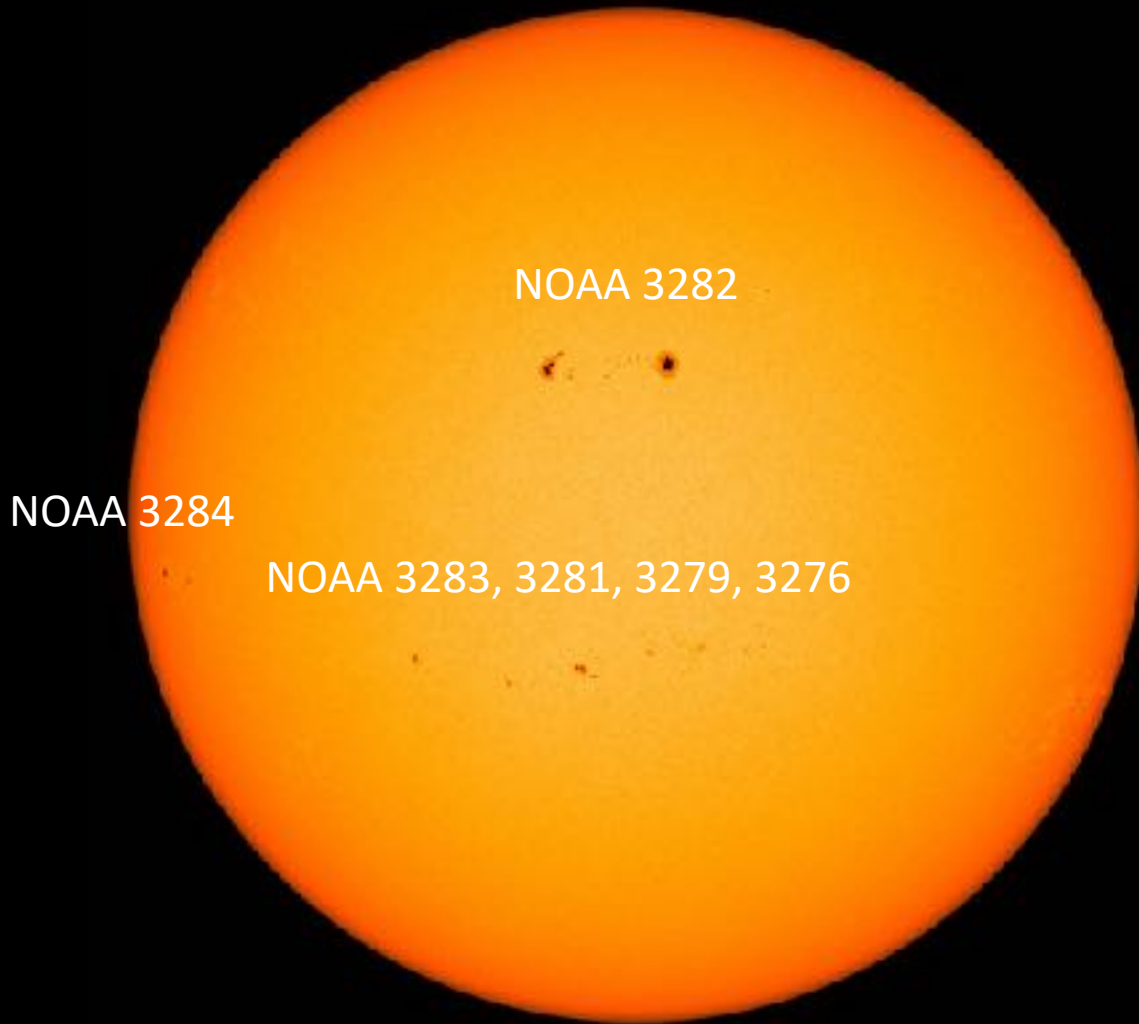


SDO/HMI Magnetogram 2023-04-17

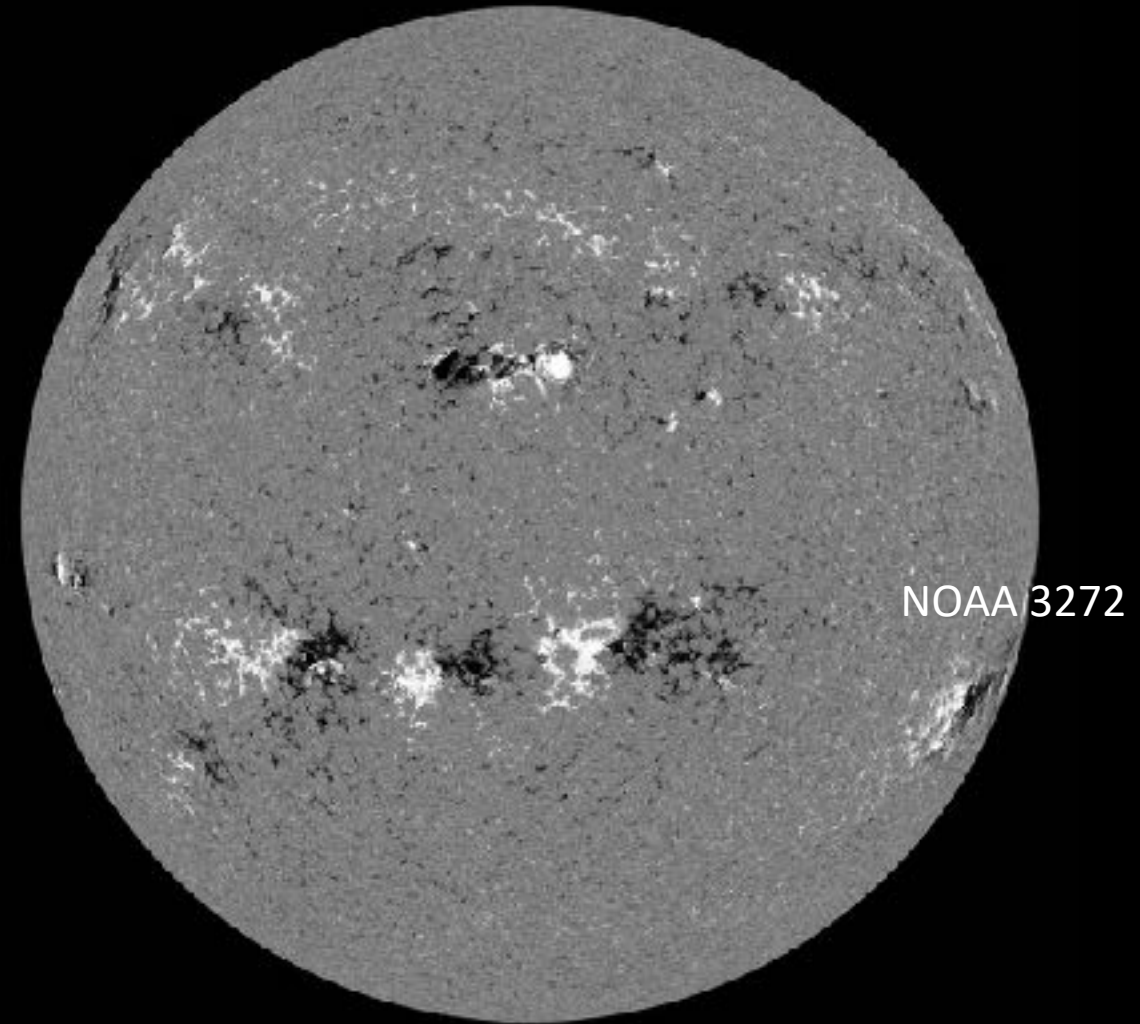


# Solar active regions

SDO/HMI White Light 2023-04-18

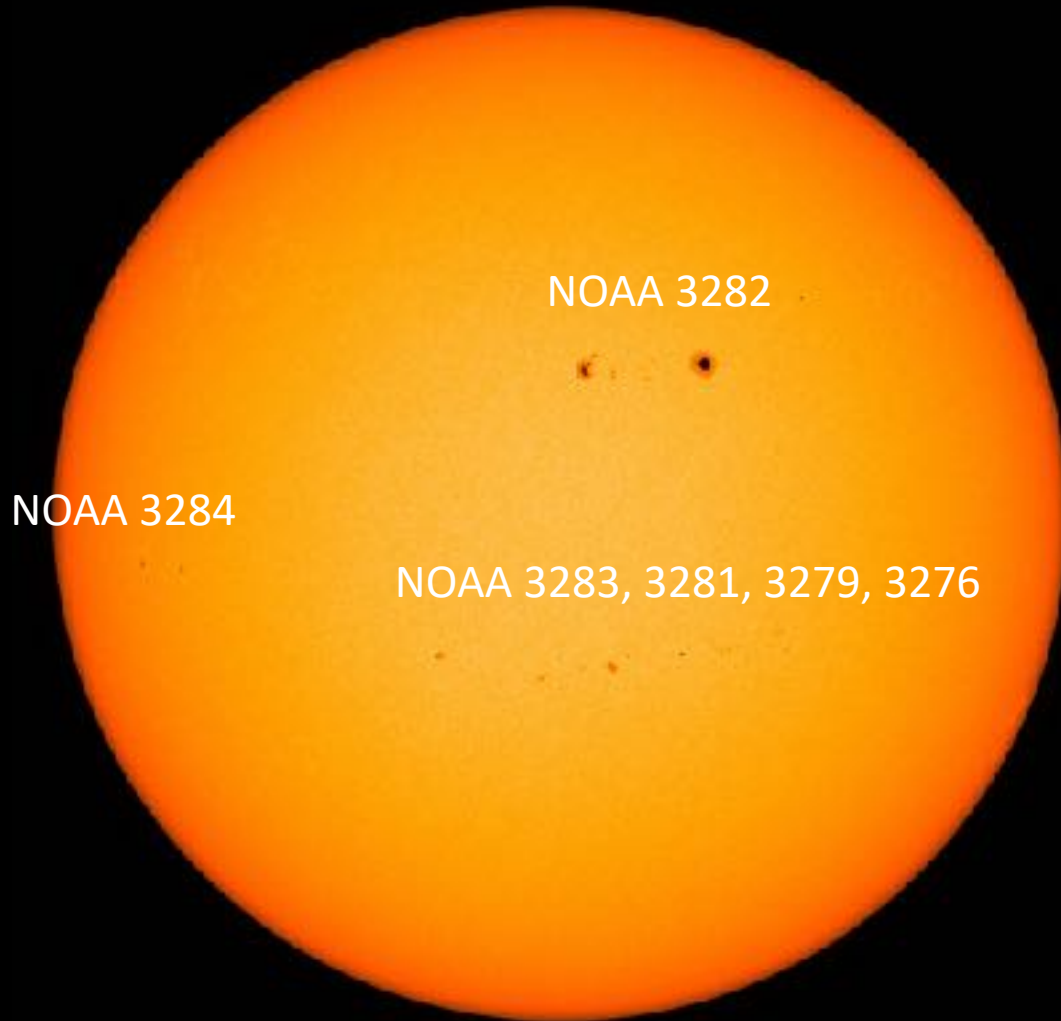


SDO/HMI Magnetogram 2023-04-18

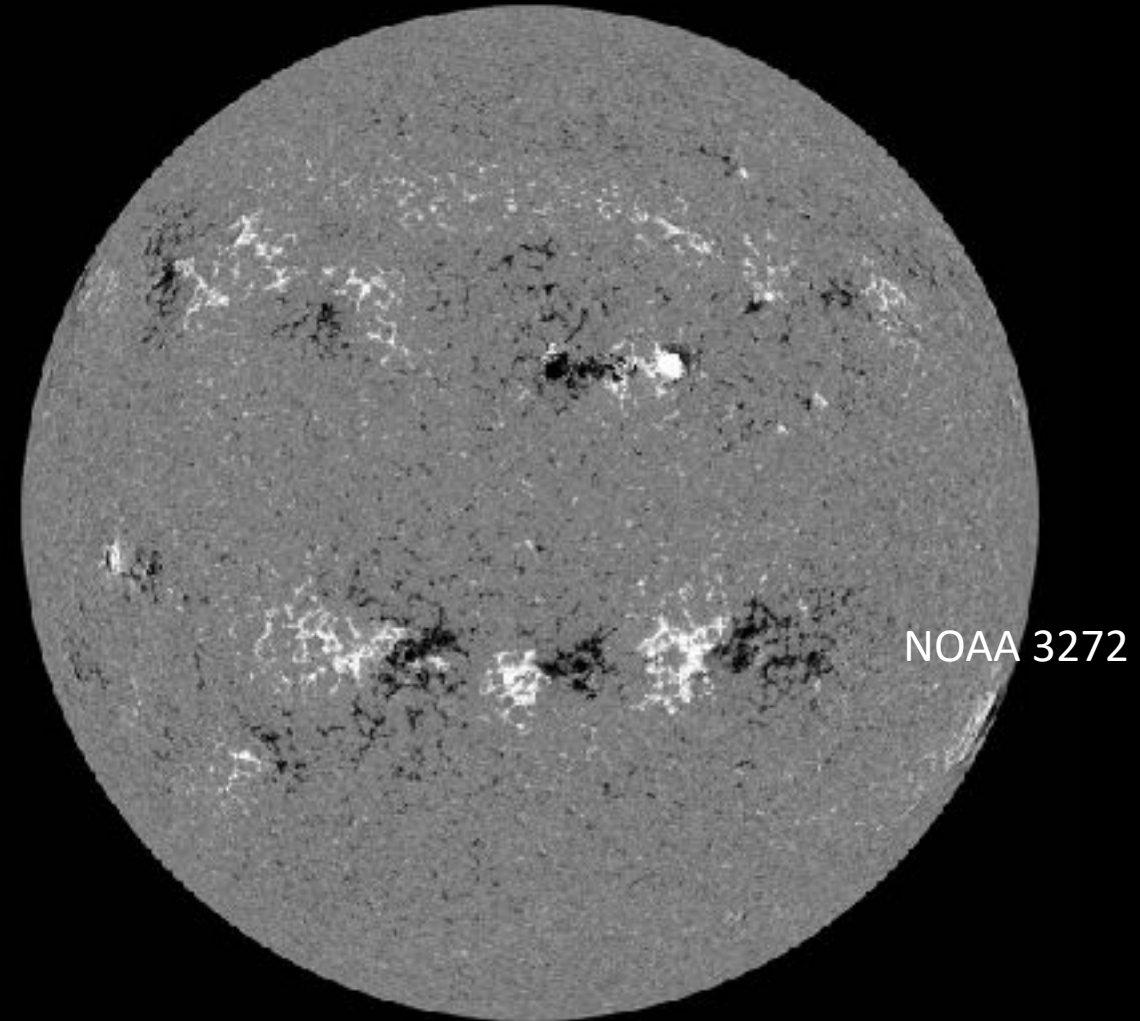


# Solar active regions

SDO/HMI White Light 2023-04-19

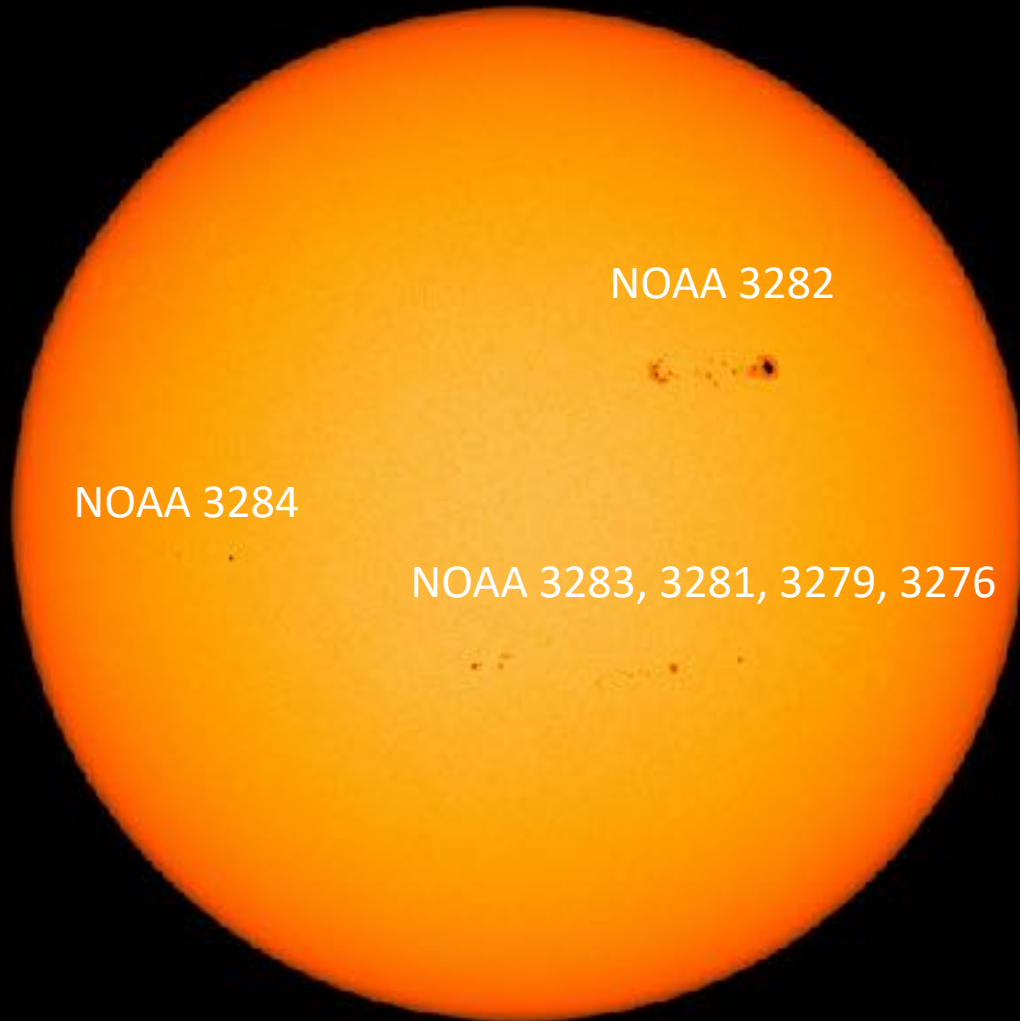


SDO/HMI Magnetogram 2023-04-19

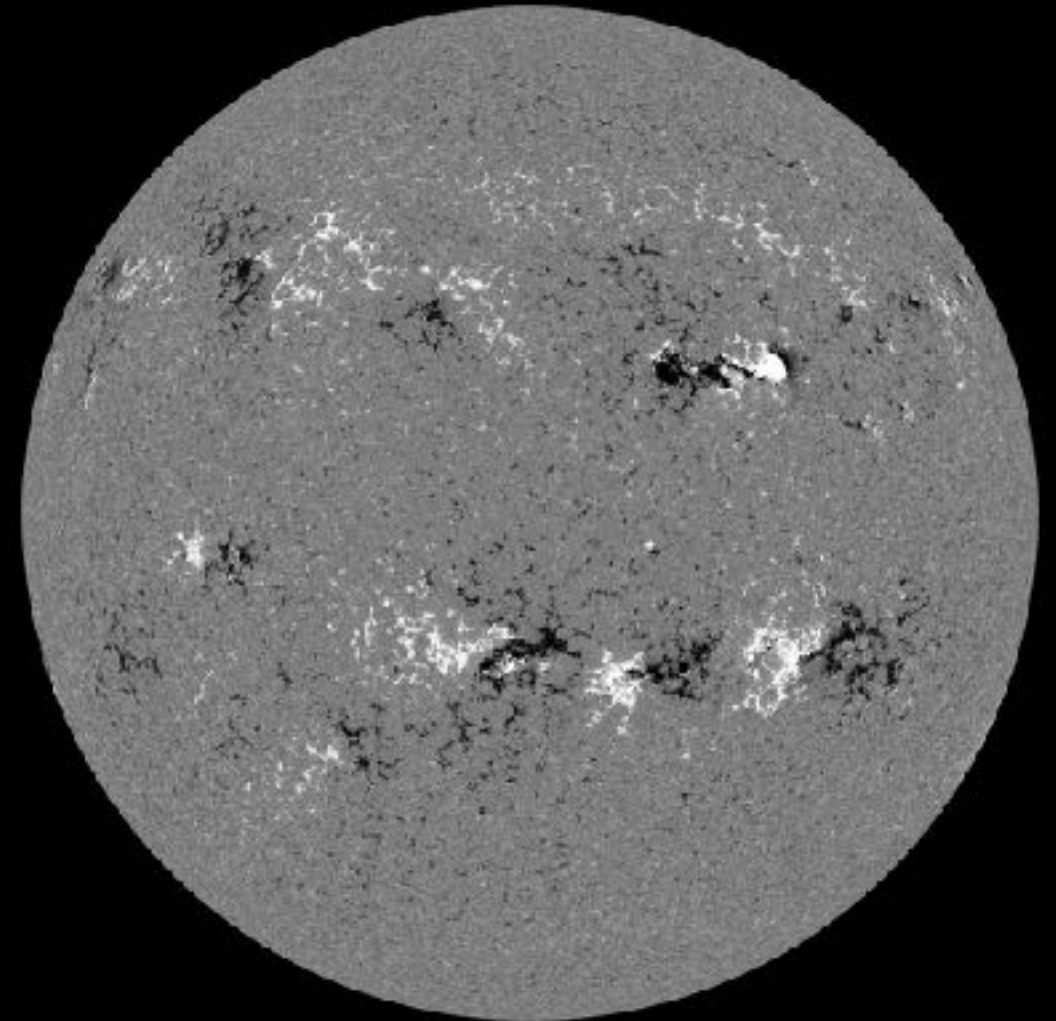


# Solar active regions

SDO/HMI White Light 2023-04-20



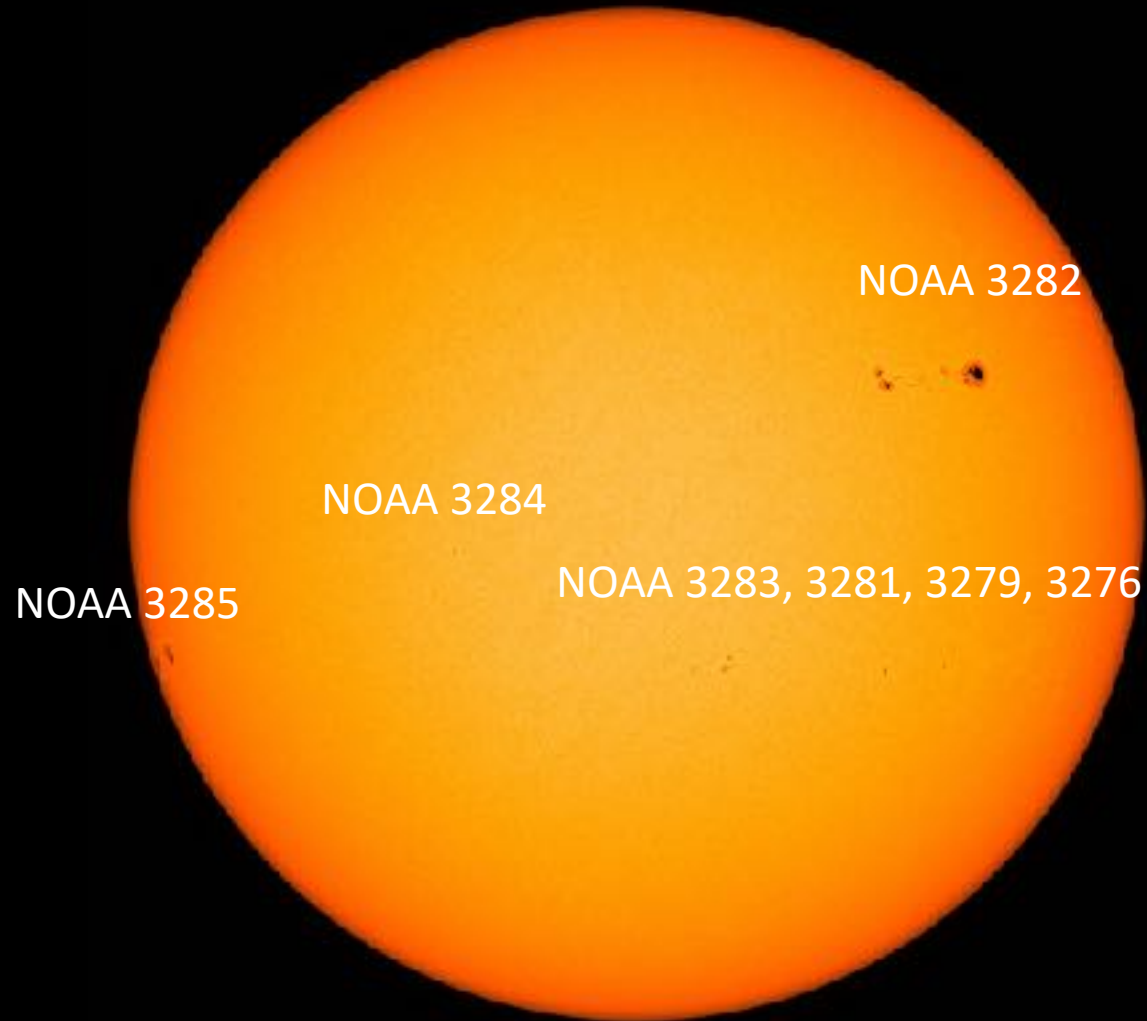
SDO/HMI Magnetogram 2023-04-20



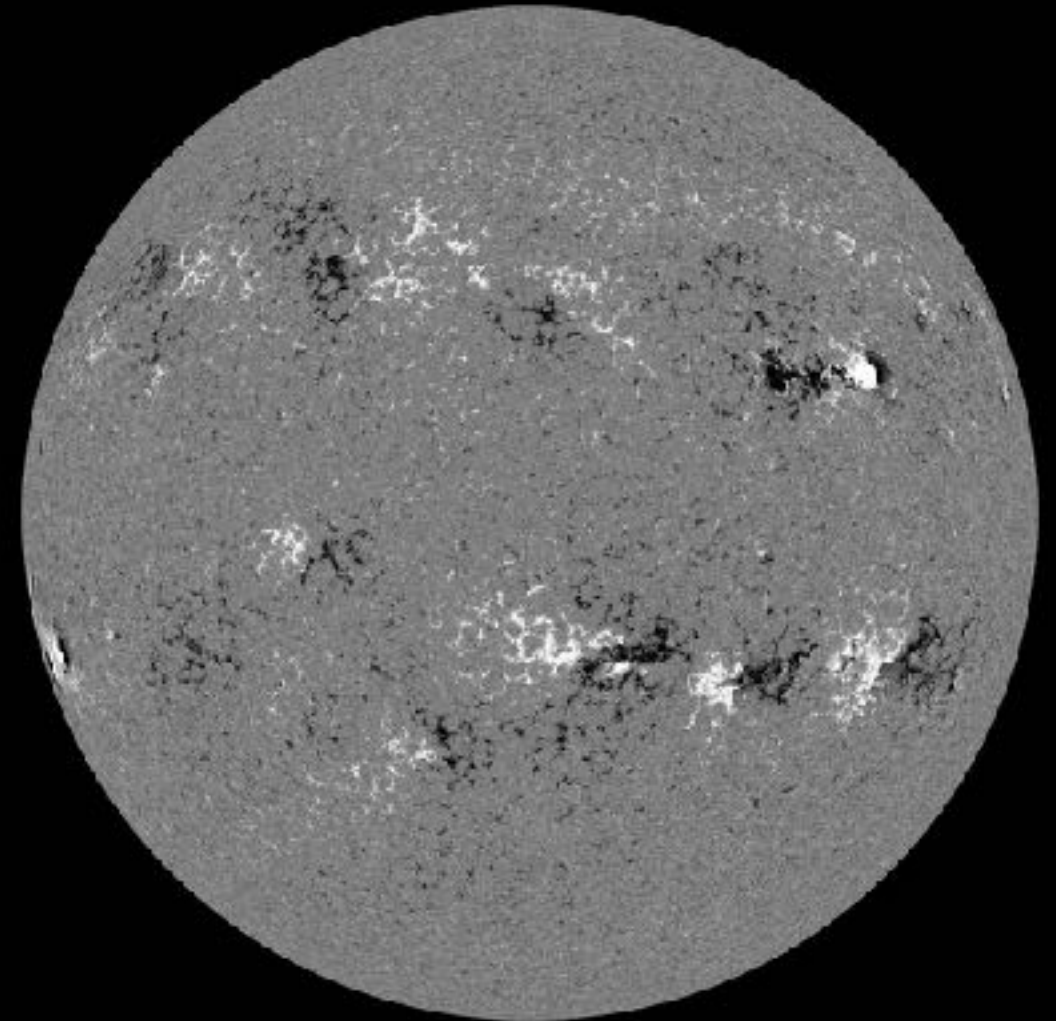


# Solar active regions

SDO/HMI White Light 2023-04-21

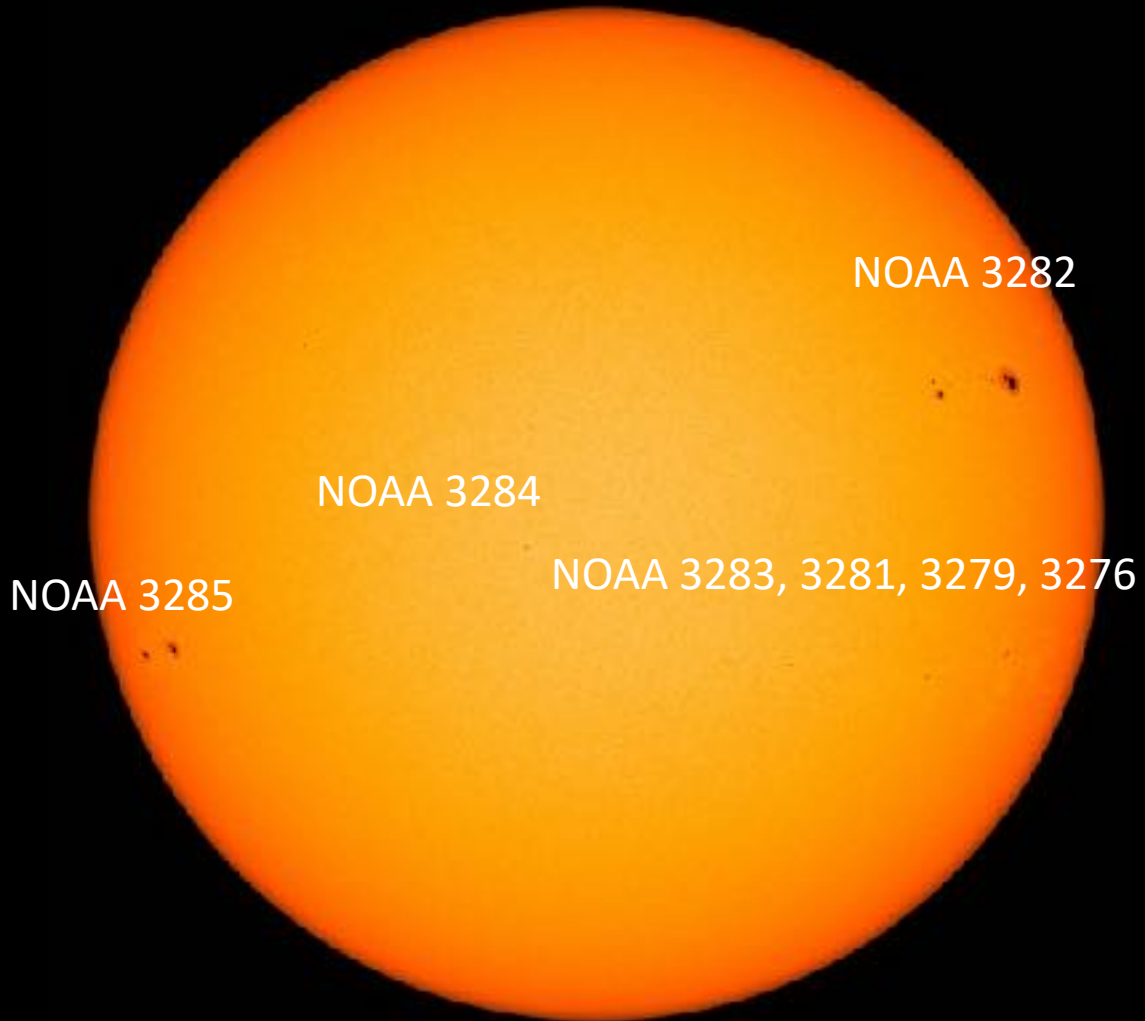


SDO/HMI Magnetogram 2023-04-21

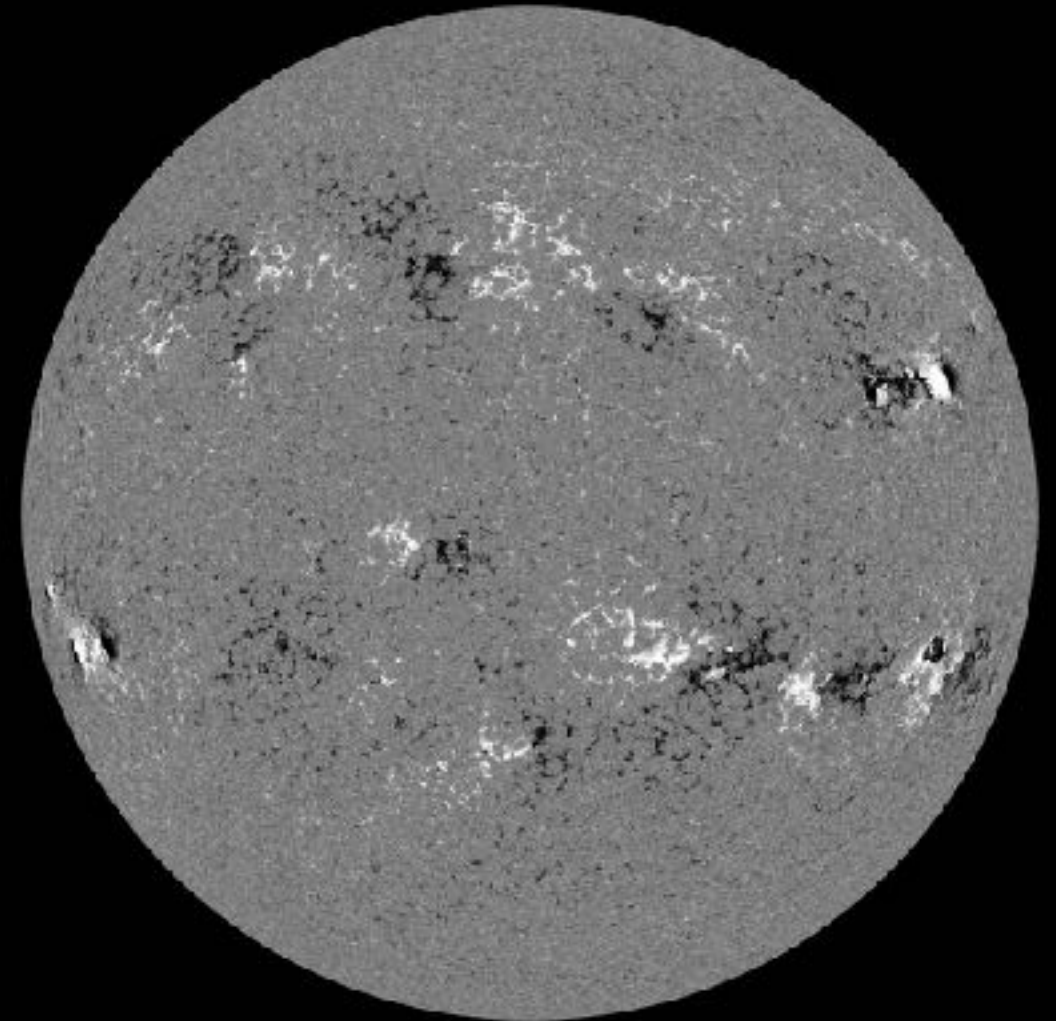


# Solar active regions

SDO/HMI White Light 2023-04-22

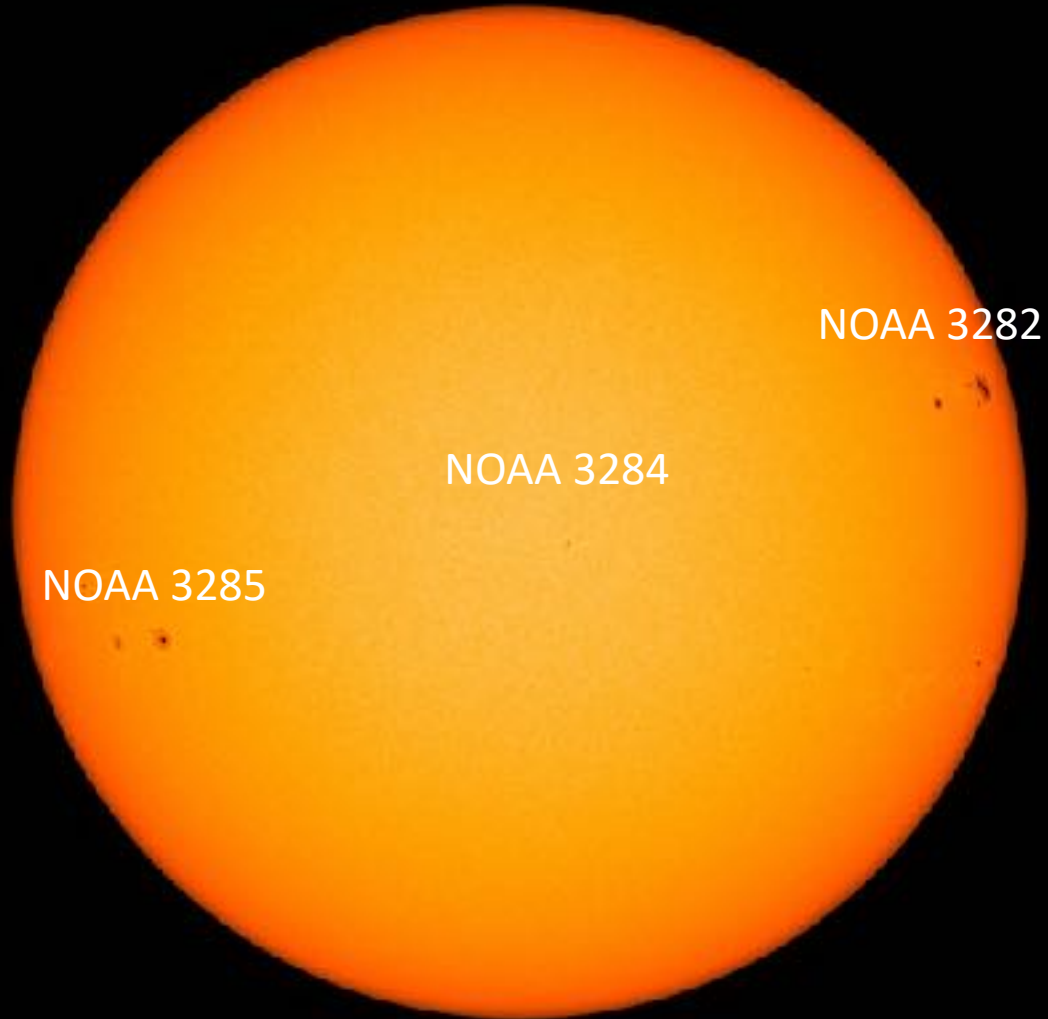


SDO/HMI Magnetogram 2023-04-22

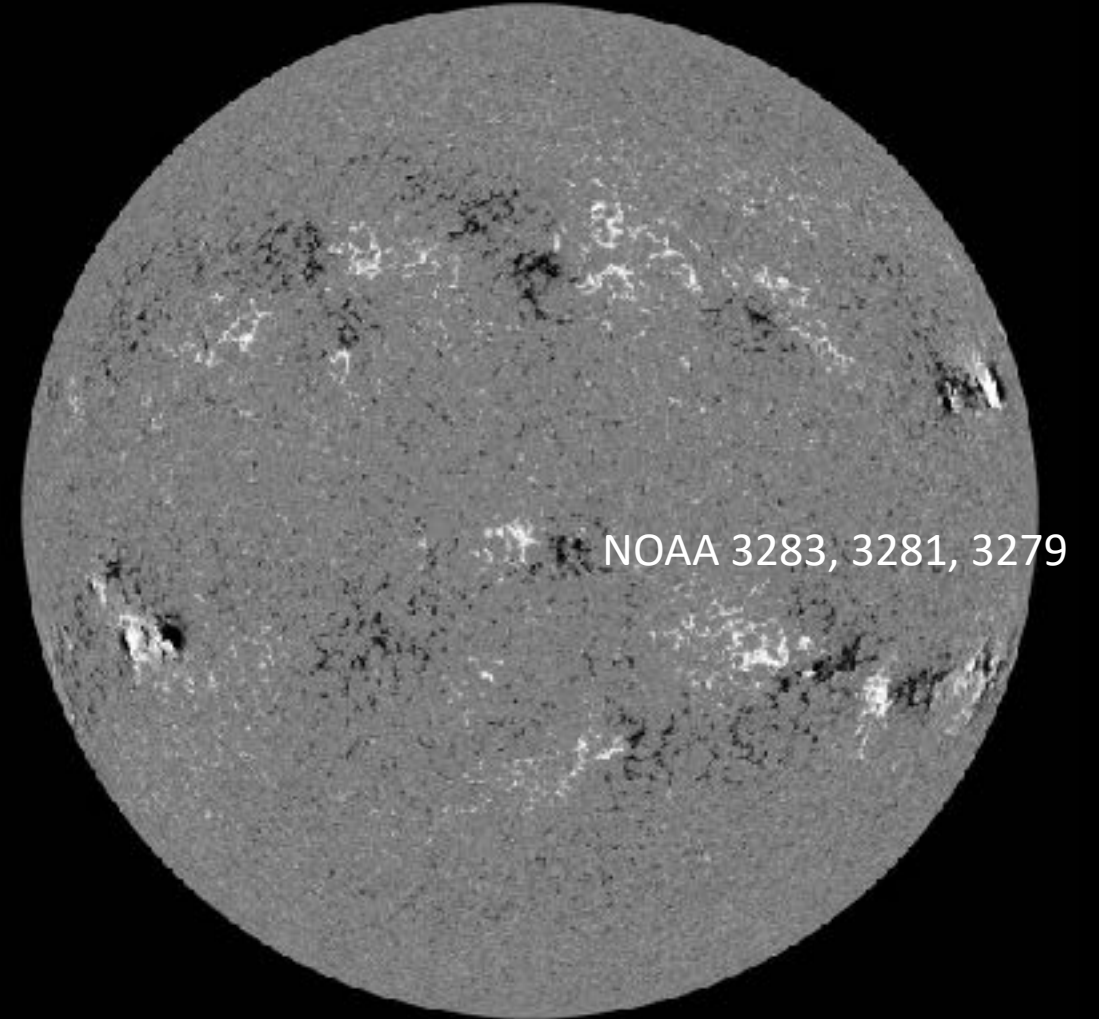


# Solar active regions

SDO/HMI White Light 2023-04-23



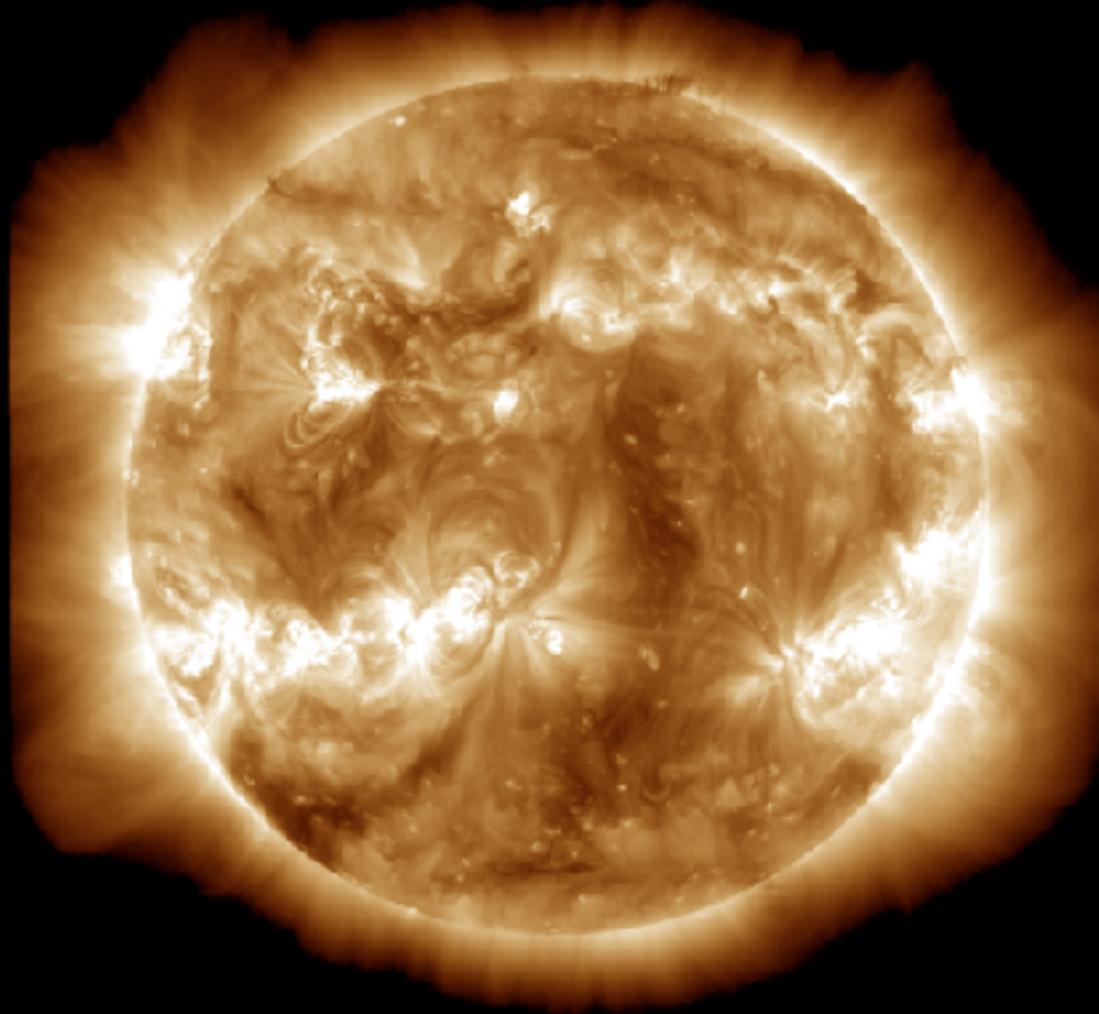
SDO/HMI Magnetogram 2023-04-23



# Coronal holes

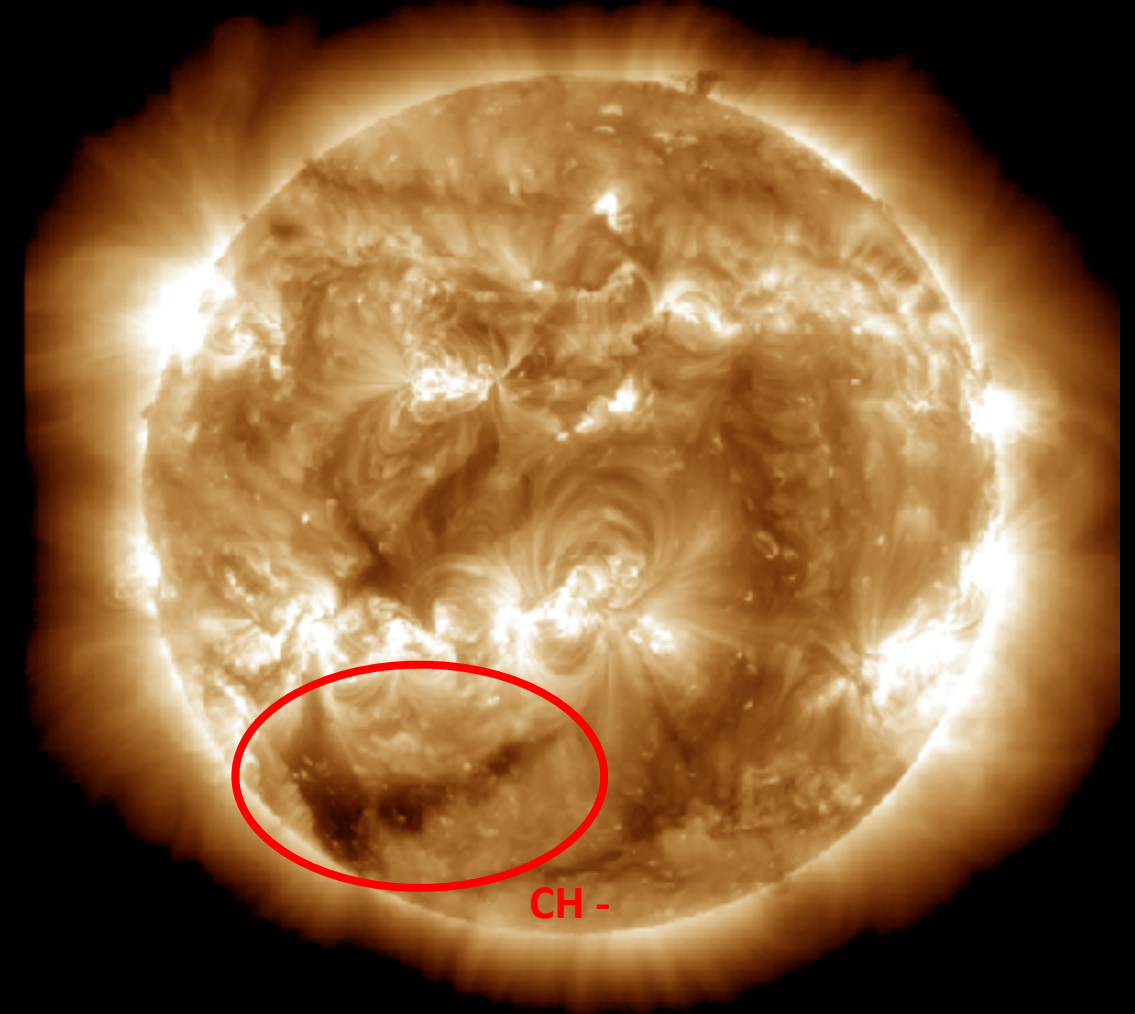
SDO/AIA 19.3 nm 2023-04-16

SDO/AIA AIA 193Å 2023-04-16T12:00:05.848



SDO/AIA 19.3 nm 2023-04-17

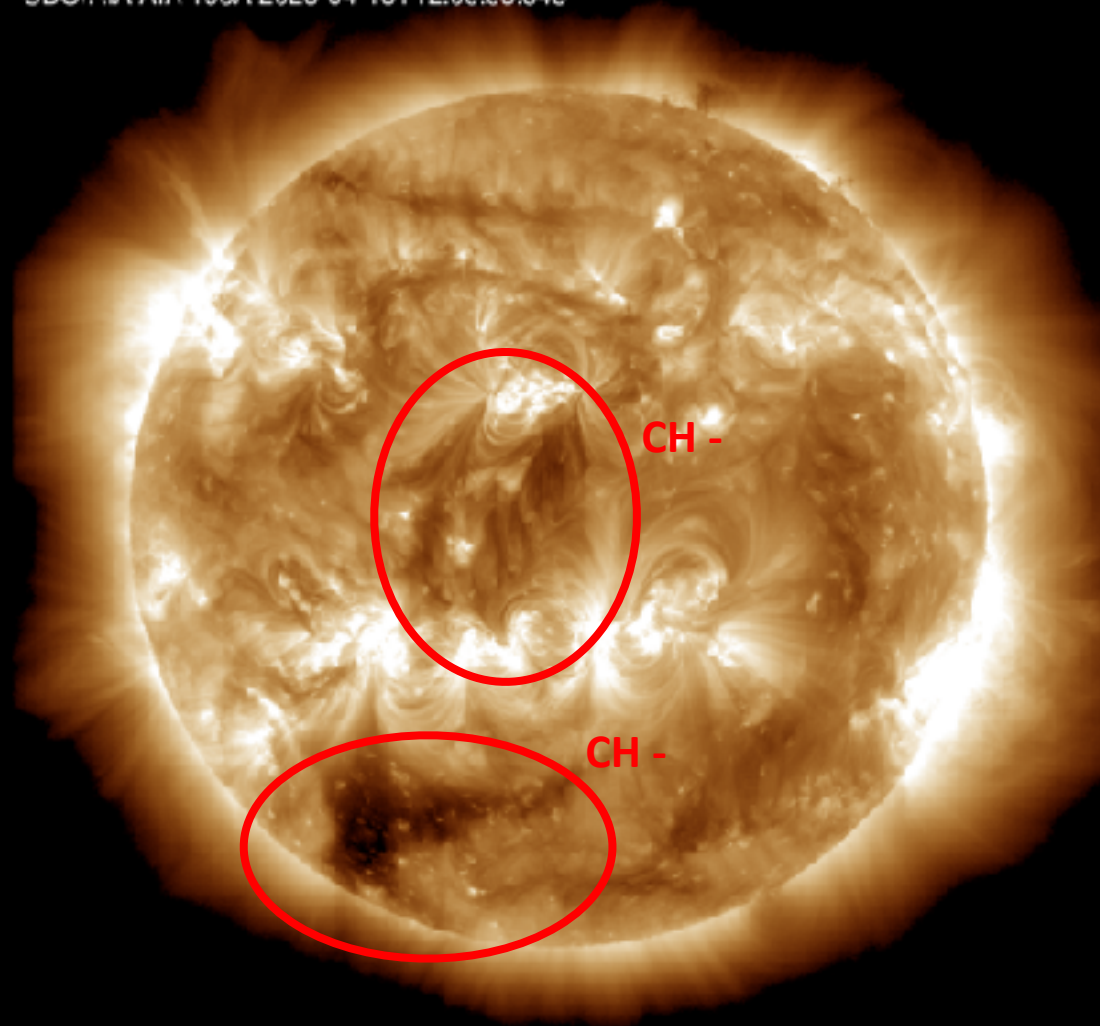
SDO/AIA AIA 193Å 2023-04-17T12:00:05.835



# Coronal holes

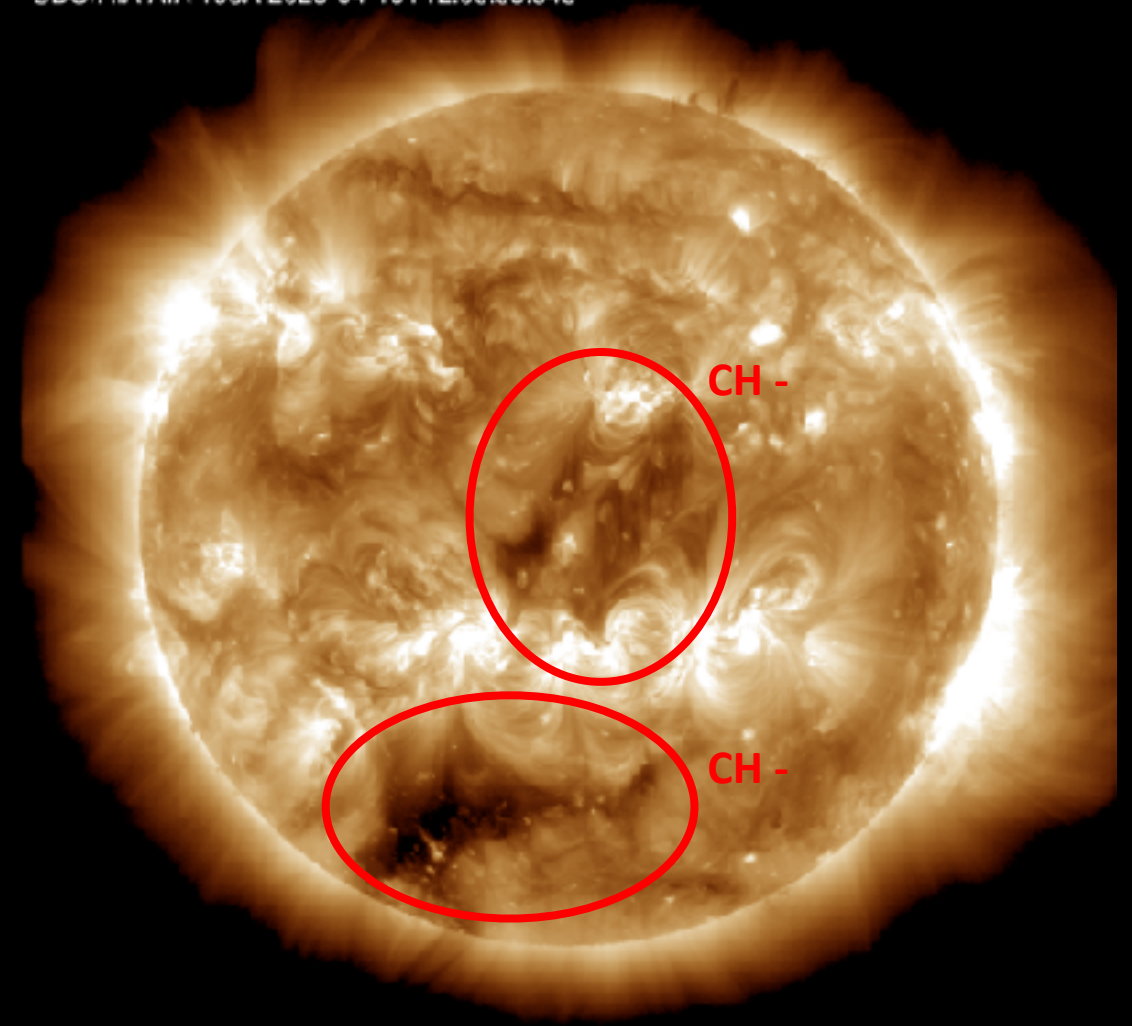
SDO/AIA 19.3 nm 2023-04-18

SDO/AIA AIA 193Å 2023-04-18T12:00:05.843



SDO/AIA 19.3 nm 2023-04-19

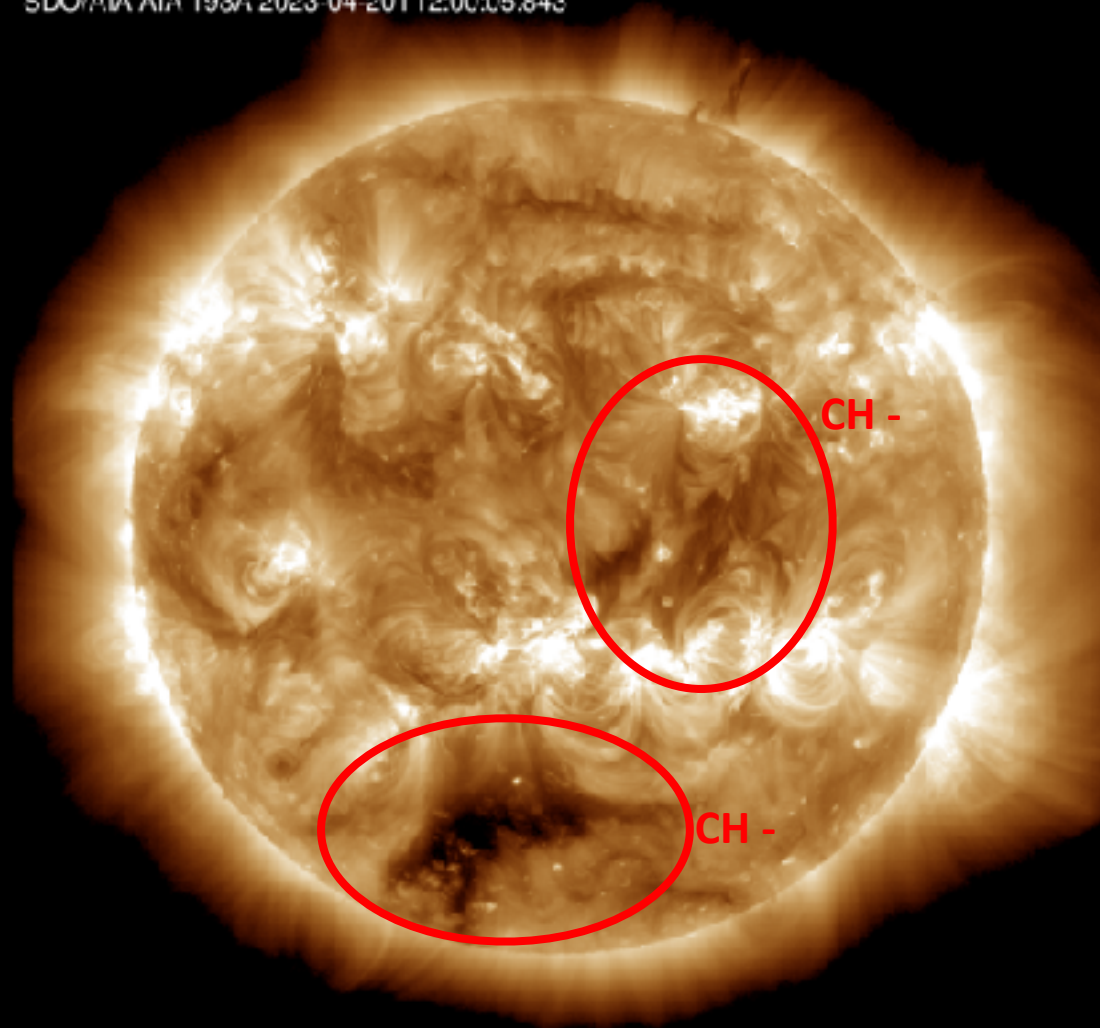
SDO/AIA AIA 193Å 2023-04-19T12:00:05.843



# Coronal holes

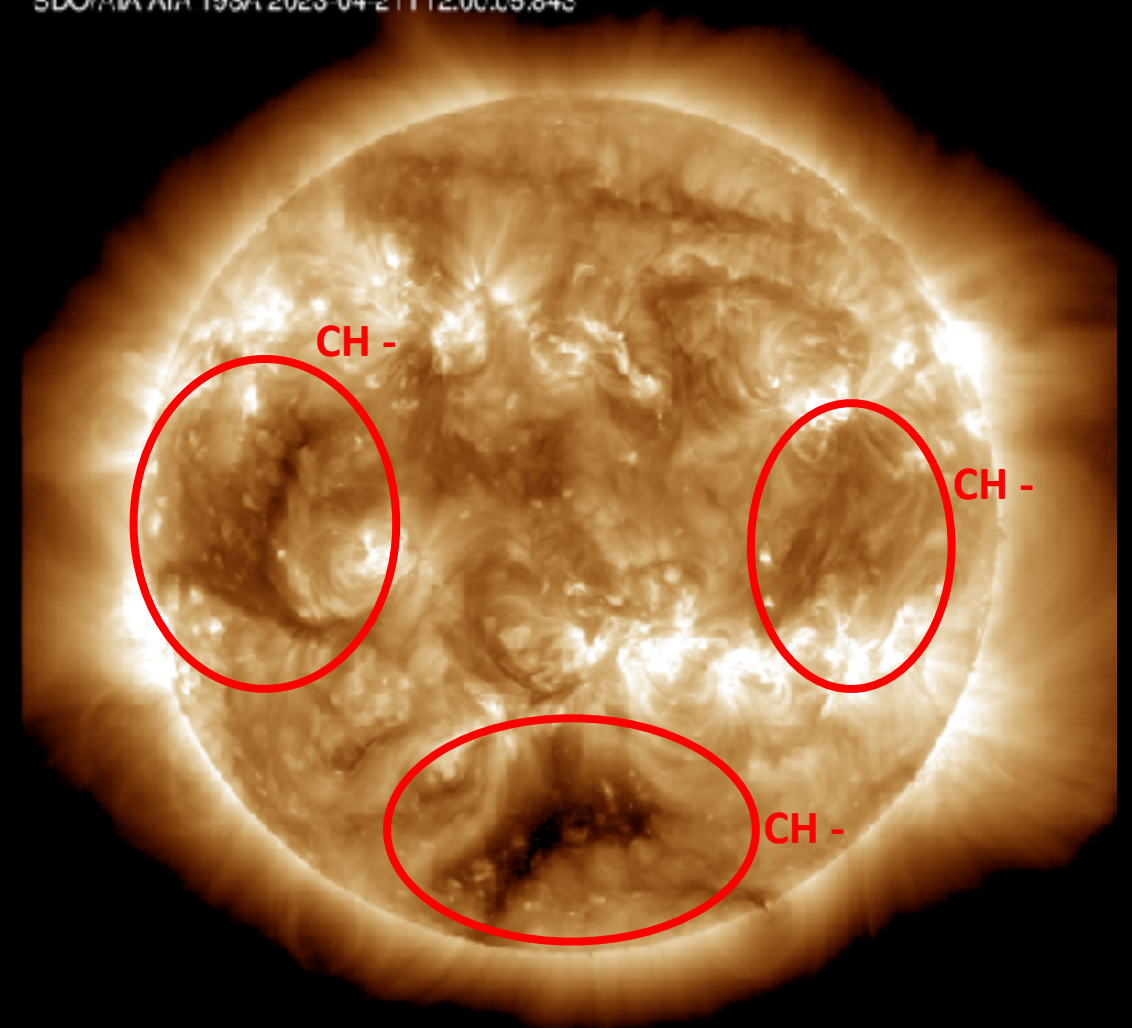
SDO/AIA 19.3 nm 2023-04-20

SDO/AIA AIA 193Å 2023-04-20T12:00:05.843



SDO/AIA 19.3 nm 2023-04-21

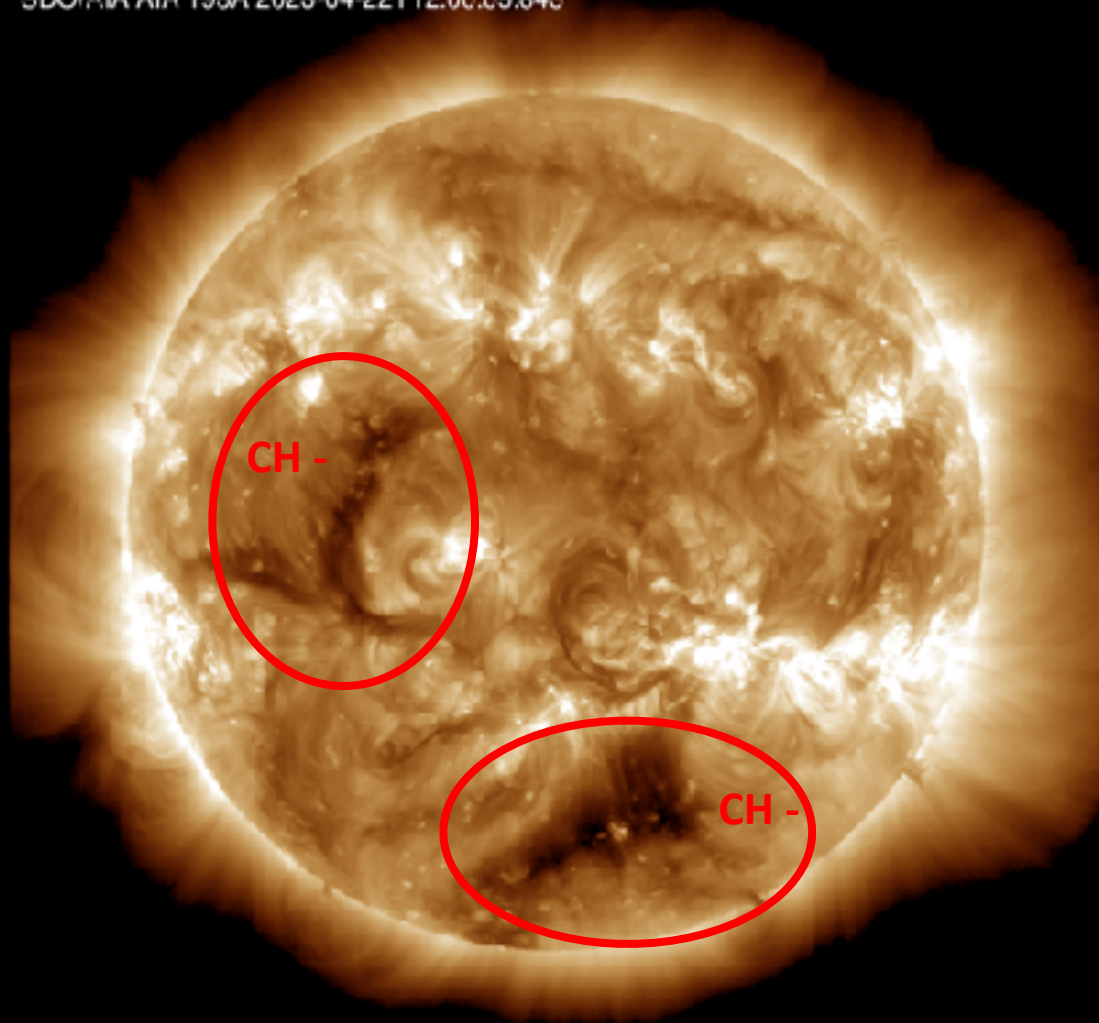
SDO/AIA AIA 193Å 2023-04-21T12:00:05.843



# Coronal holes

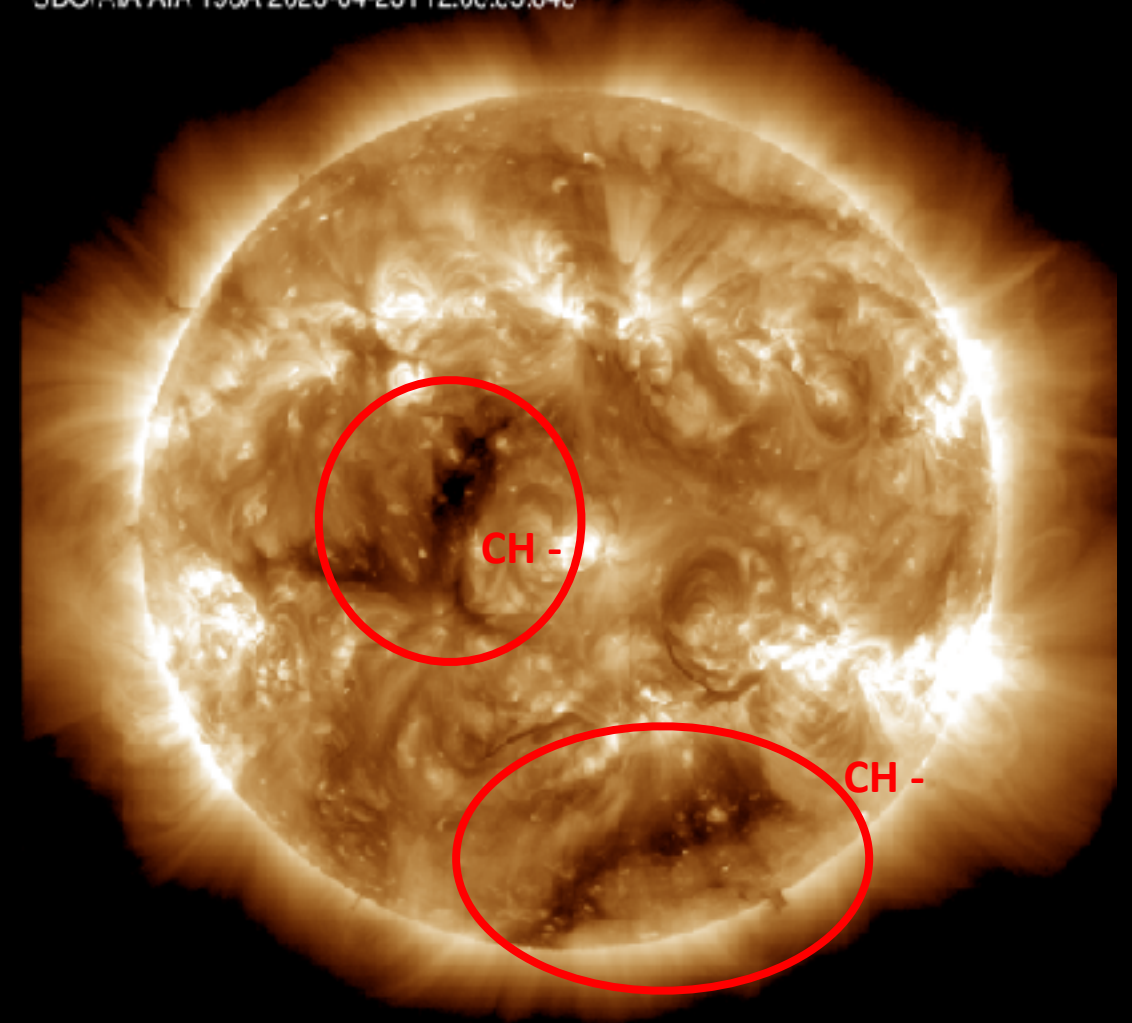
SDO/AIA 19.3 nm 2023-04-22

SDO/AIA AIA 193Å 2023-04-22T12:00:05.843



SDO/AIA 19.3 nm 2023-04-23

SDO/AIA AIA 193Å 2023-04-23T12:00:05.843



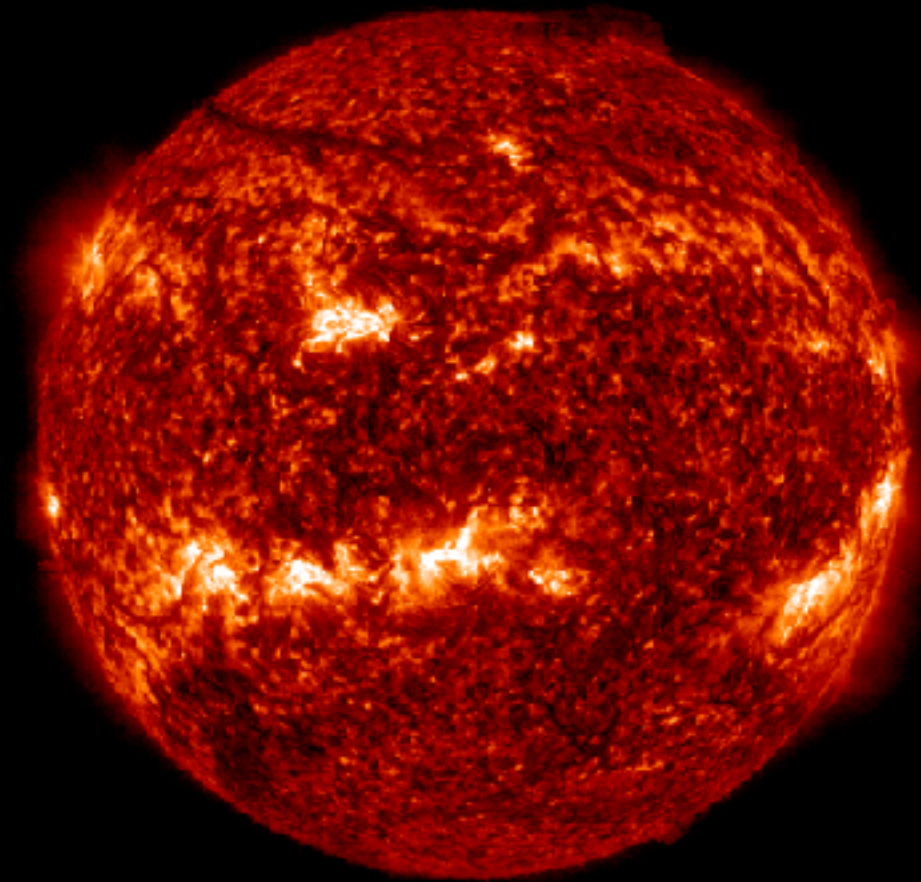
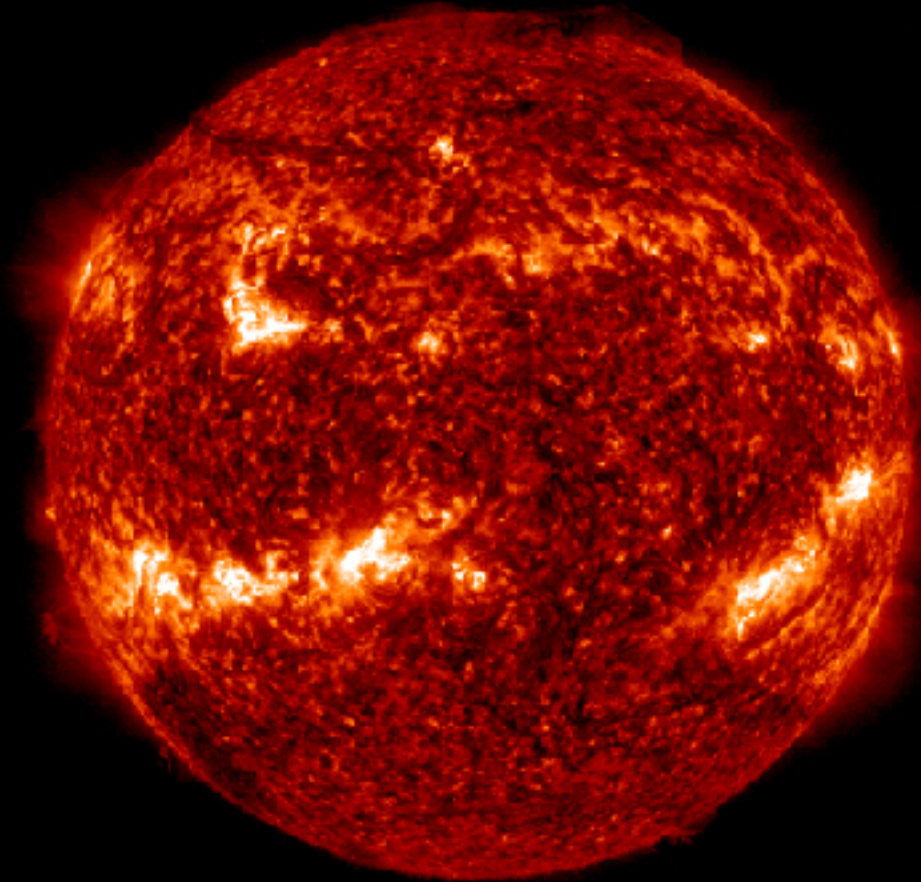
# Filaments

SDO/AIA 30.4 nm 2023-04-16

SDO/AIA AIA 304Å 2023-04-16T12:00:06.580

SDO/AIA 30.4 nm 2023-04-17

SDO/AIA AIA 304Å 2023-04-17T12:00:06.580

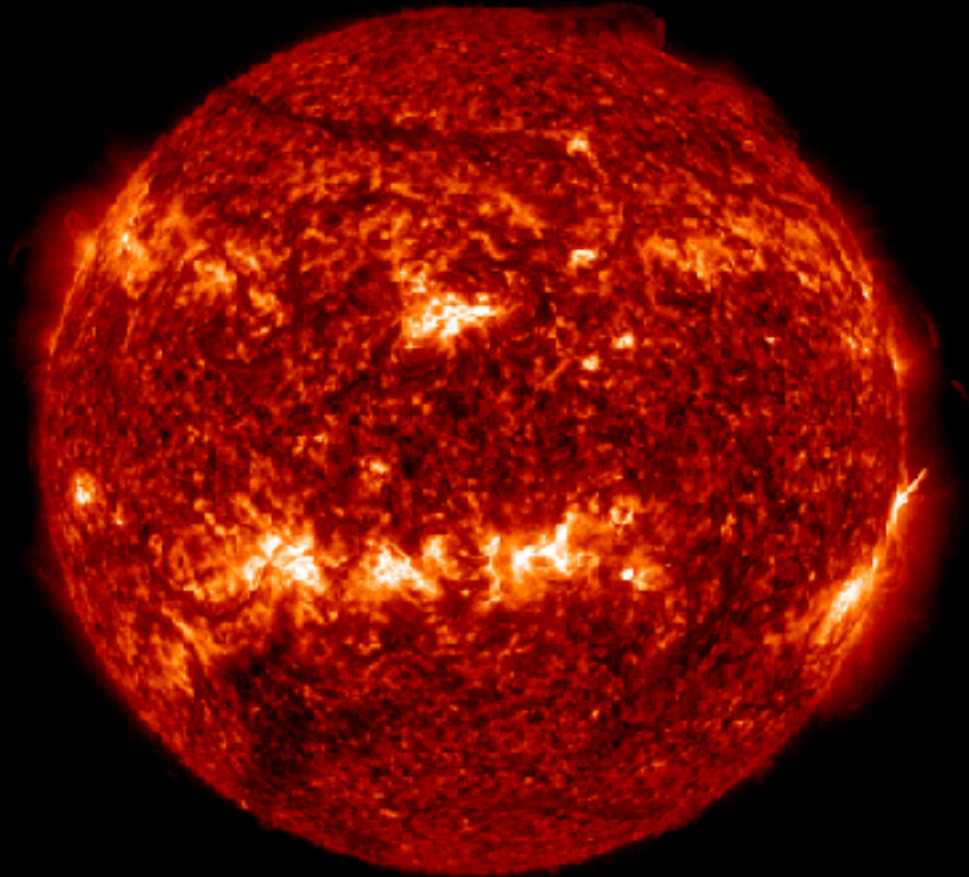




# Filaments

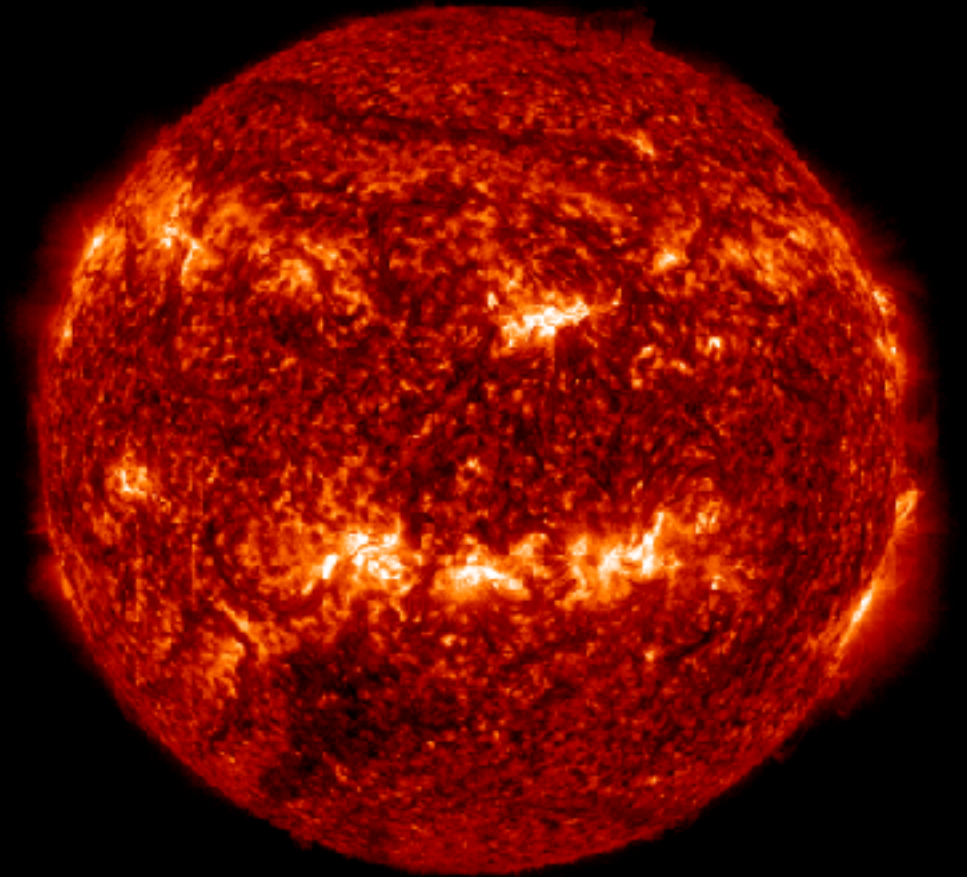
SDO/AIA 30.4 nm 2023-04-18

SDO/AIA AIA 304Å 2023-04-18T12:00:06.581



SDO/AIA 30.4 nm 2023-04-19

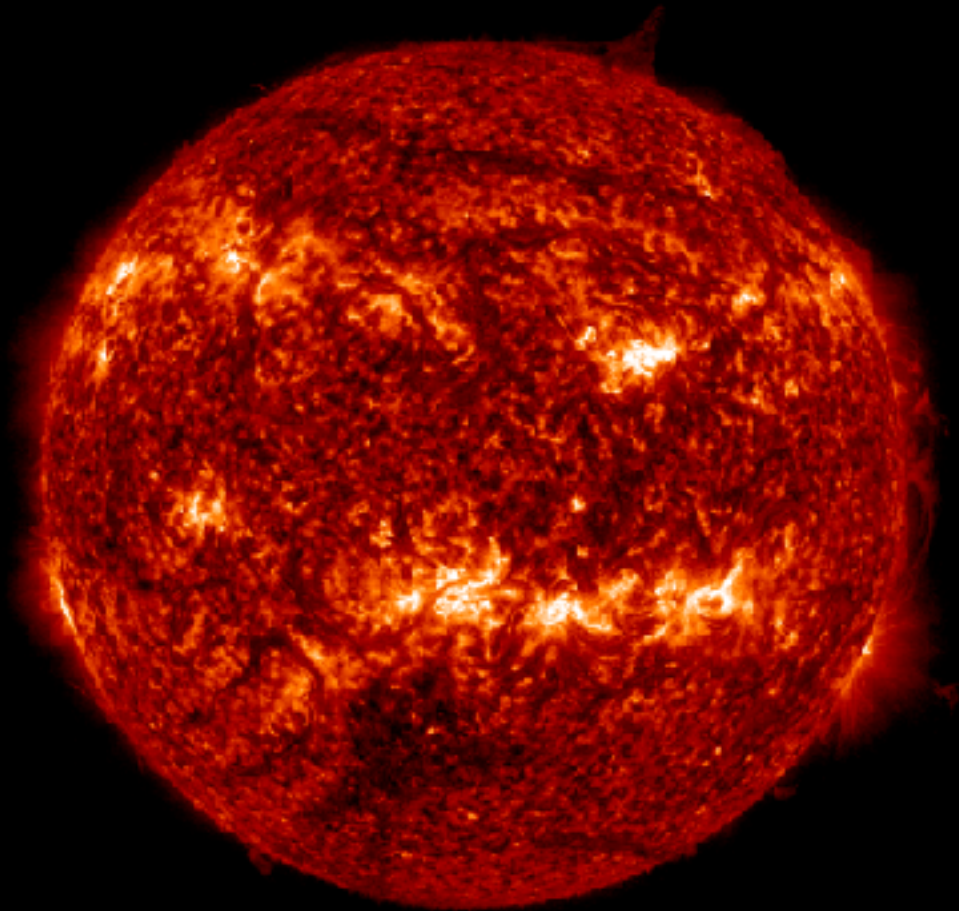
SDO/AIA AIA 304Å 2023-04-19T12:00:06.580



# Filaments

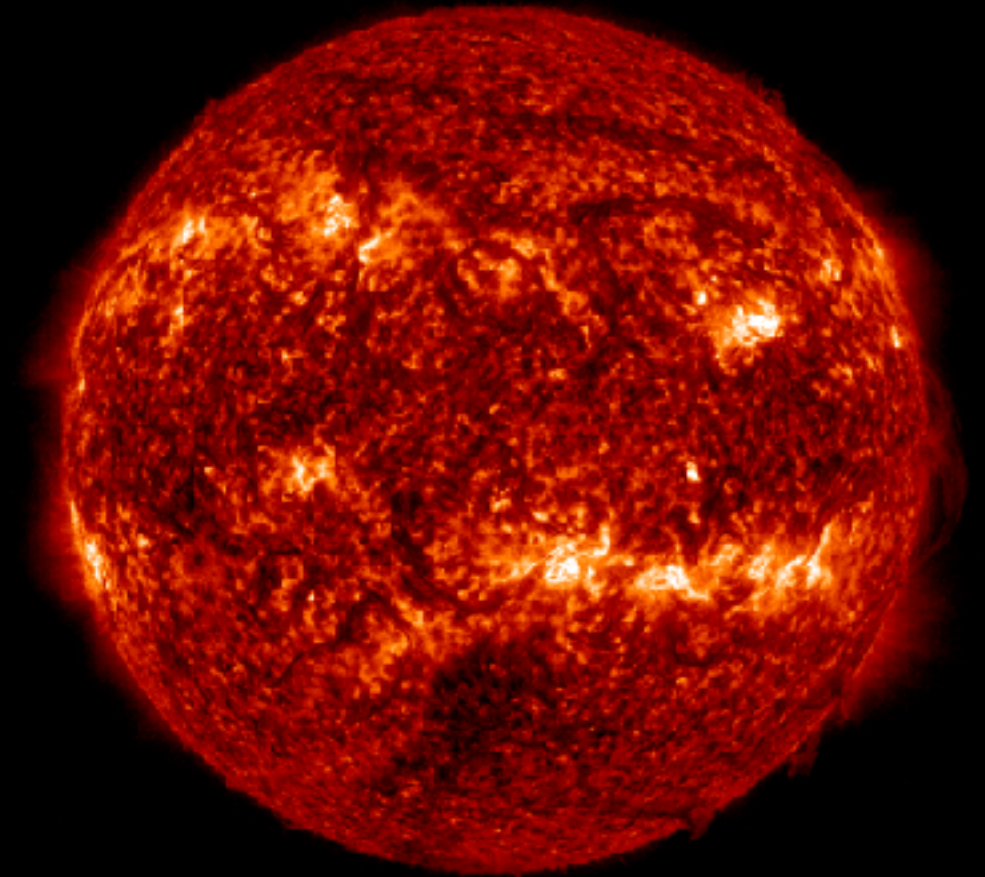
SDO/AIA 30.4 nm 2023-04-20

SDO/AIA AIA 304Å 2023-04-20T12:00:06.575



SDO/AIA 30.4 nm 2023-04-21

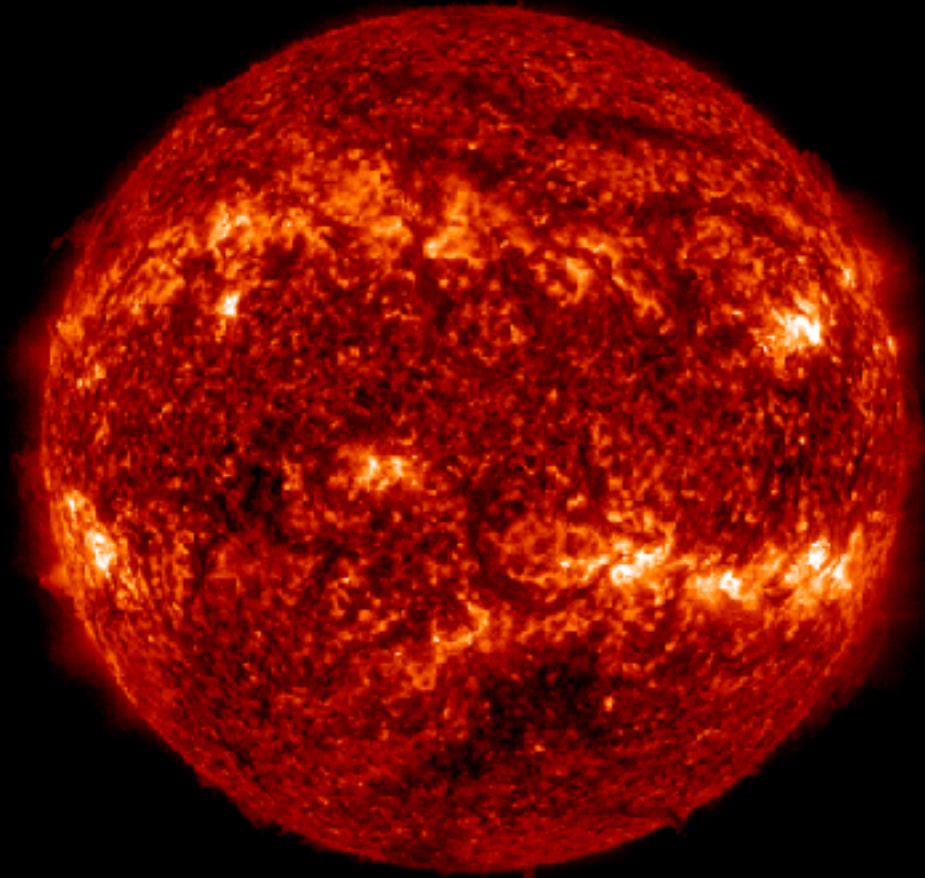
SDO/AIA AIA 304Å 2023-04-21T12:00:06.580



# Filaments

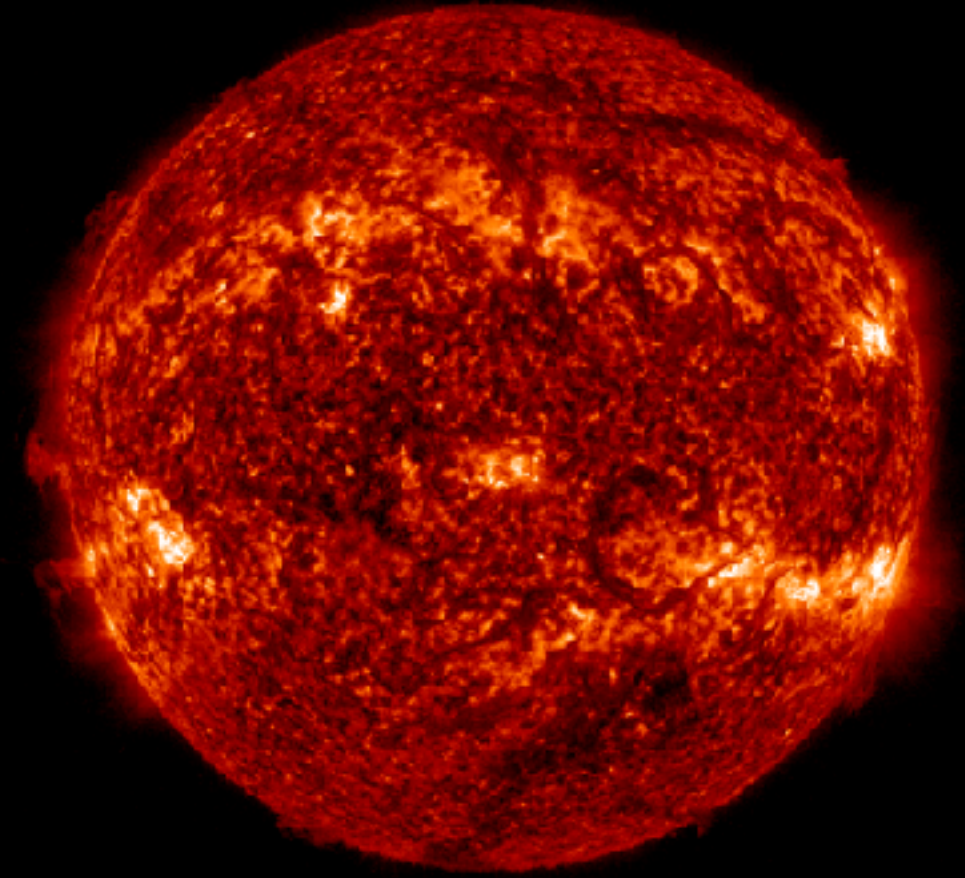
SDO/AIA 30.4 nm 2023-04-22

SDO/AIA AIA 304Å 2023-04-22T12:00:06.580



SDO/AIA 30.4 nm 2023-04-23

SDO/AIA AIA 304Å 2023-04-23T12:00:06.580



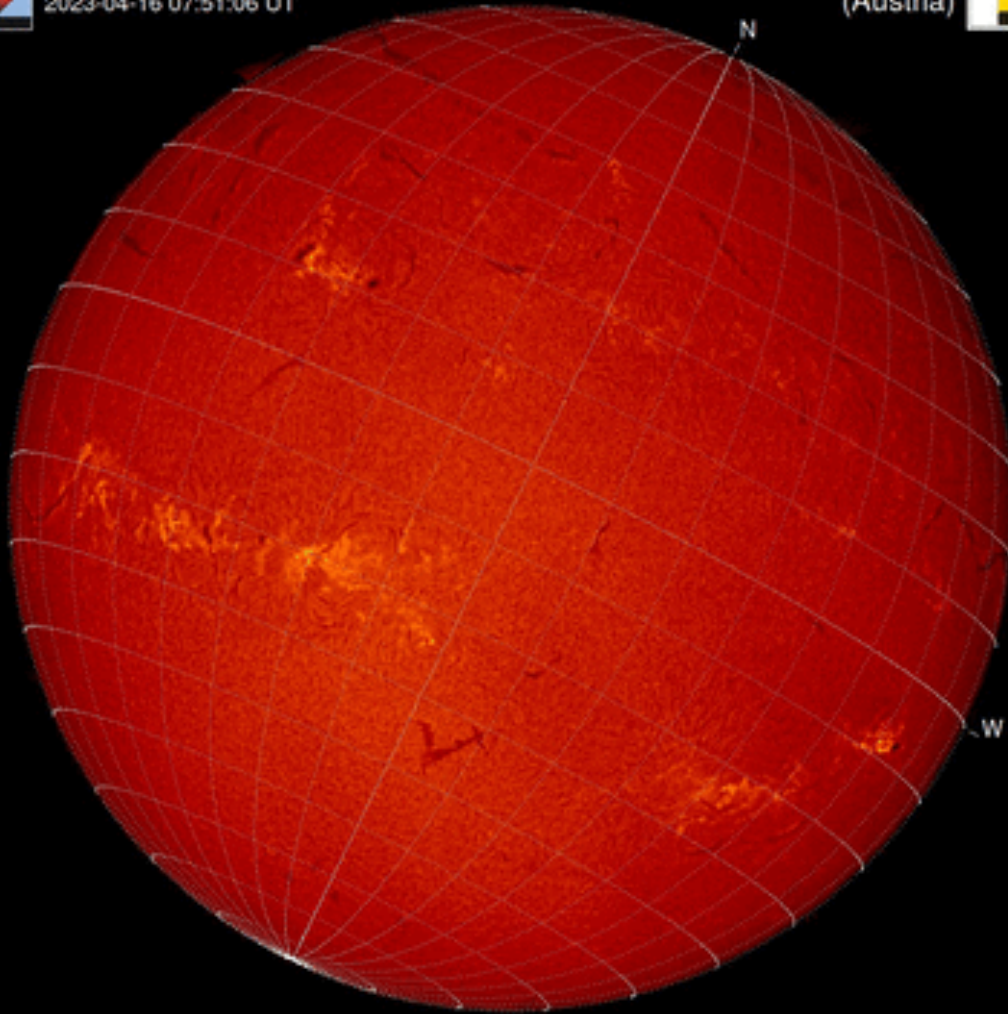
# Filaments & Filament eruptions

H-alpha 2023-04-16



Kanzelhöhe Observatory  
2023-04-16 07:51:06 UT

University of Graz  
(Austria)

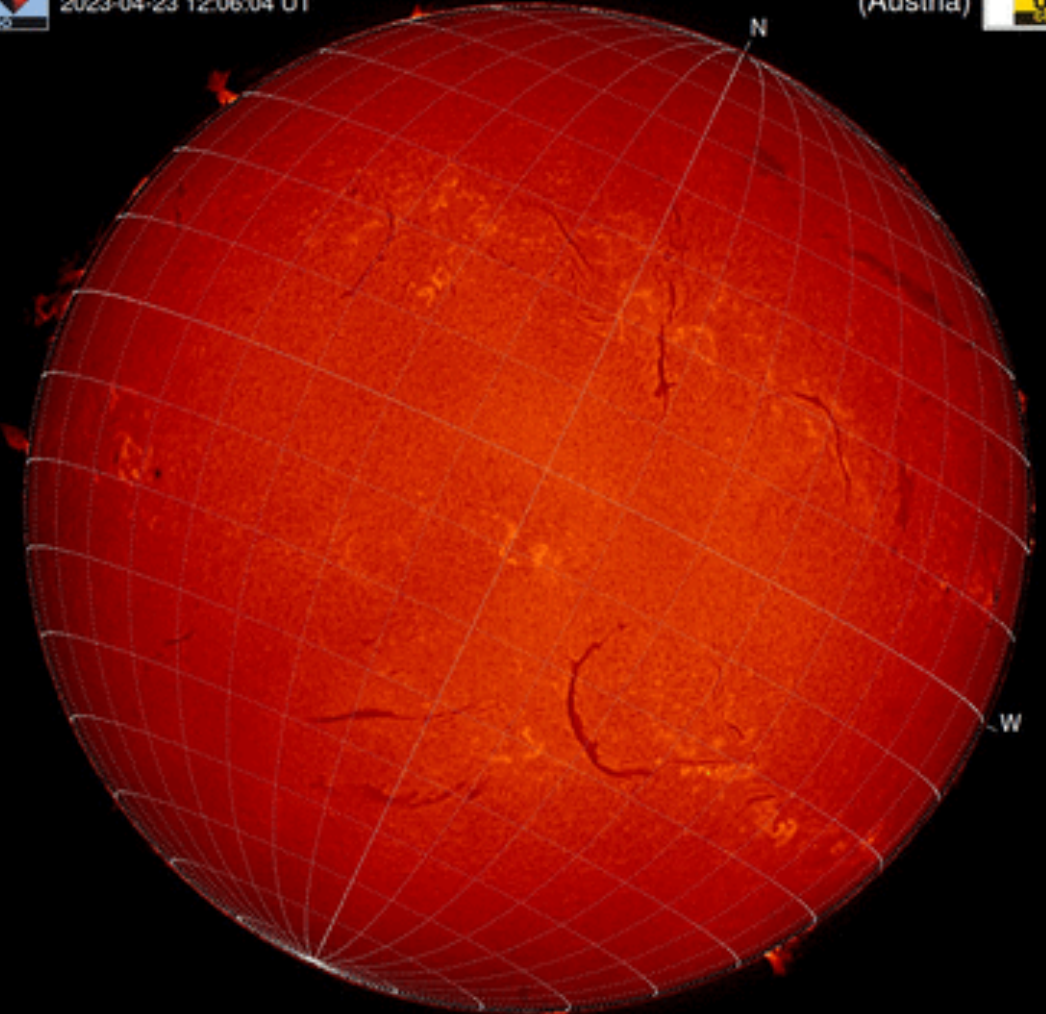


H-alpha 2023-04-23

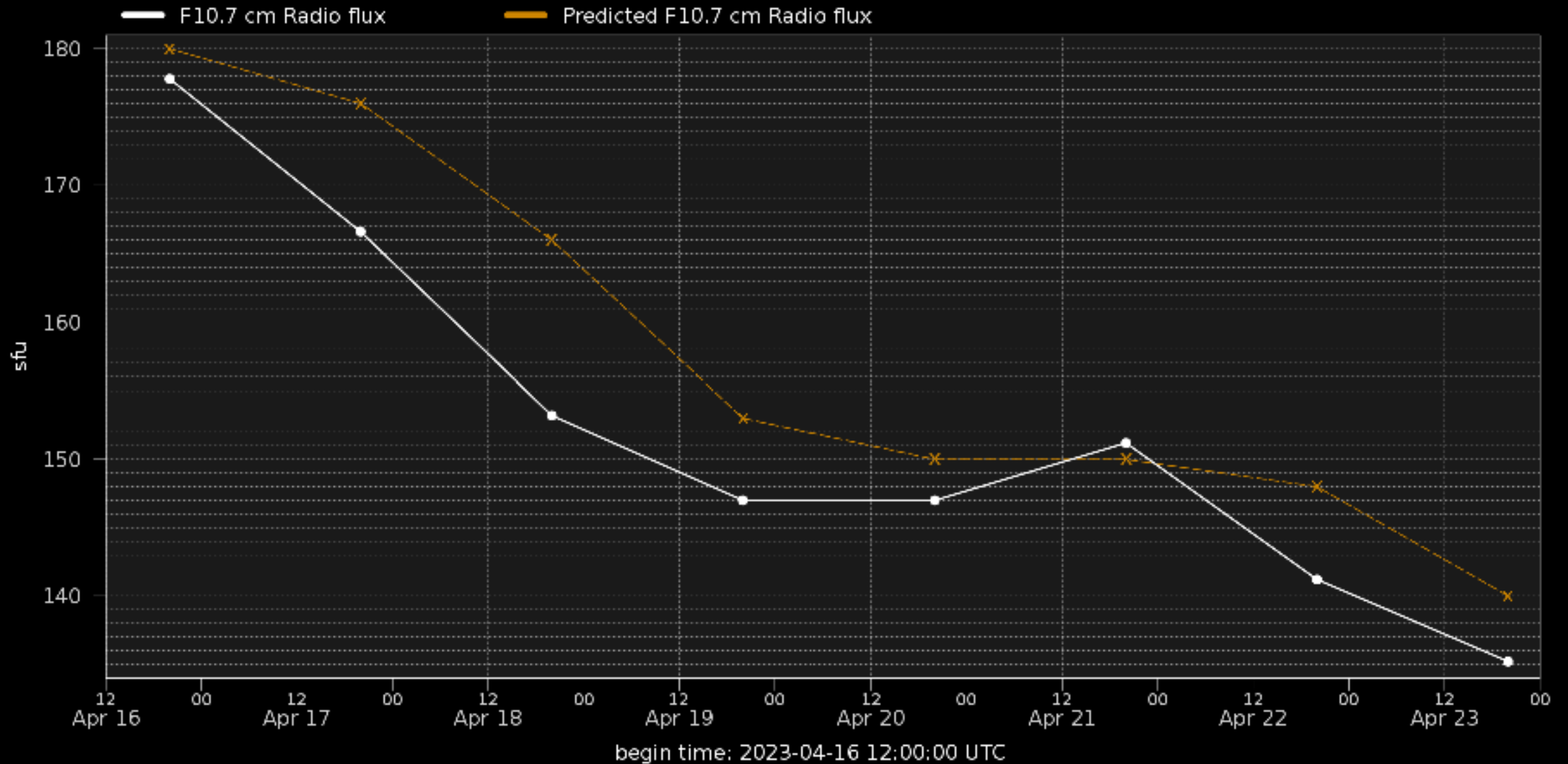


Kanzelhöhe Observatory  
2023-04-23 12:06:04 UT

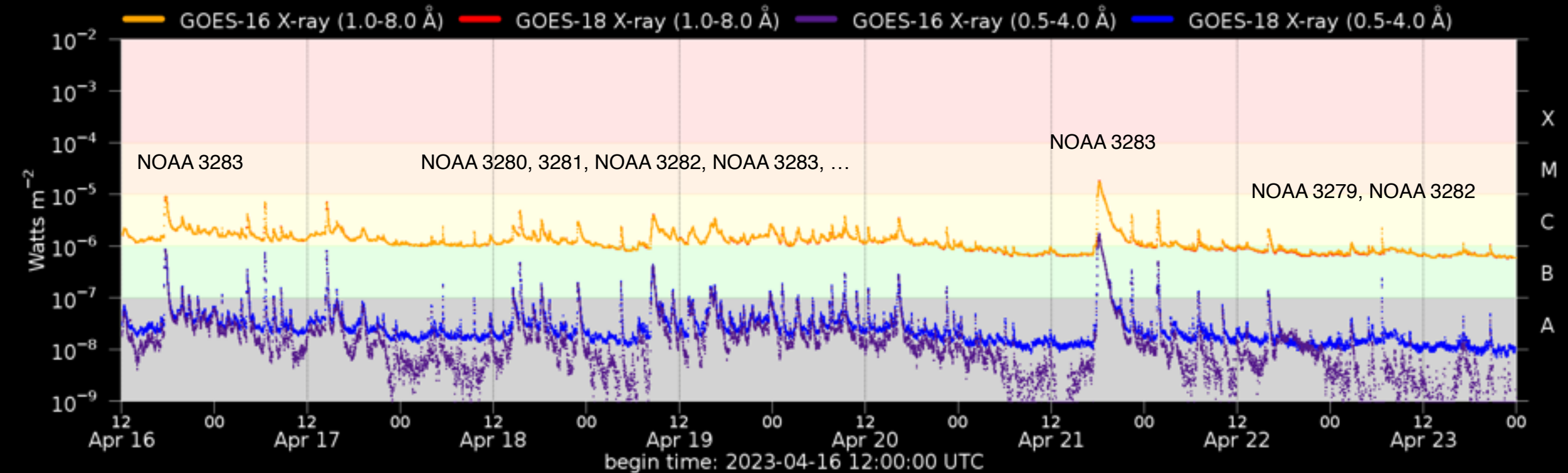
University of Graz  
(Austria)



# Solar F10.7cm radio flux



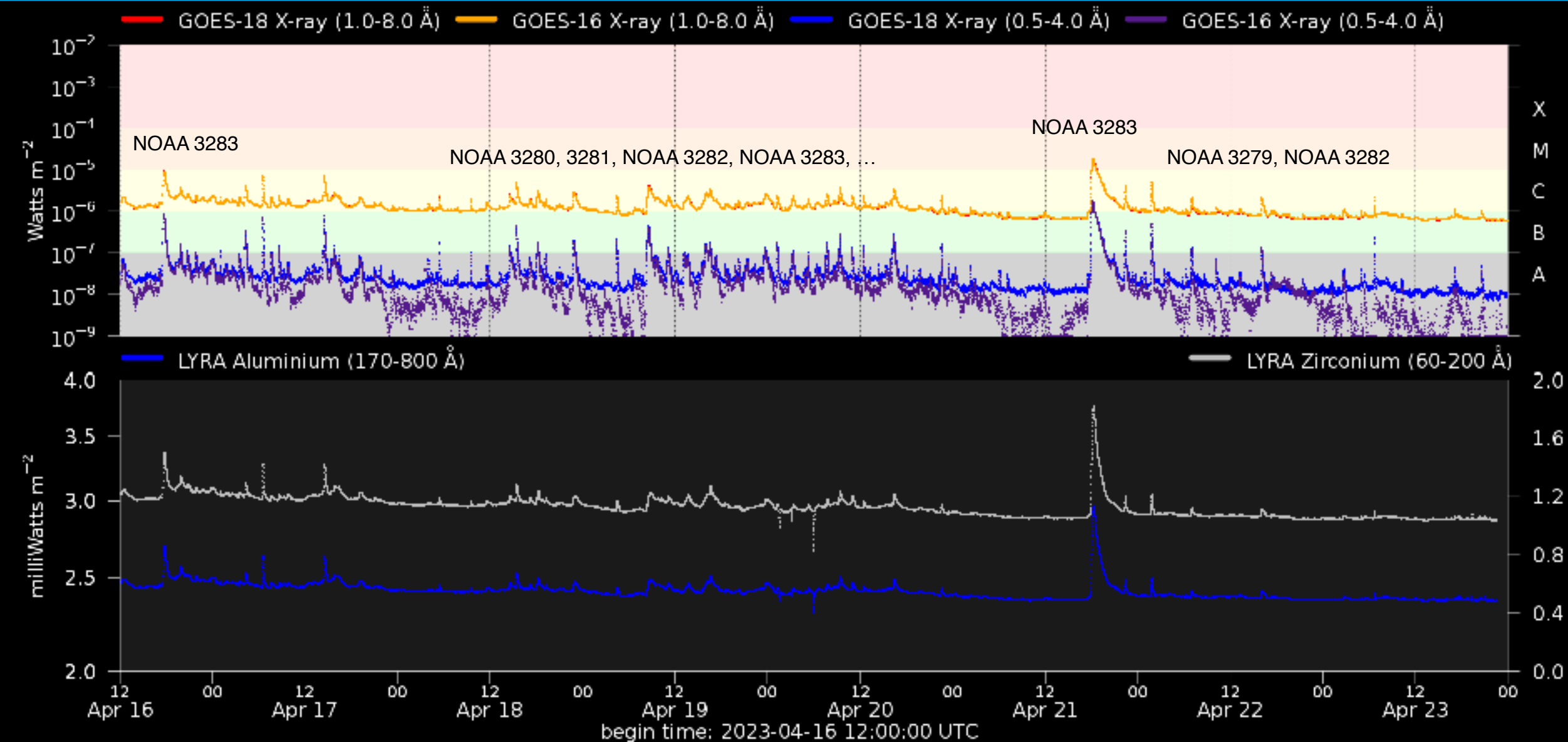
# Flaring activity



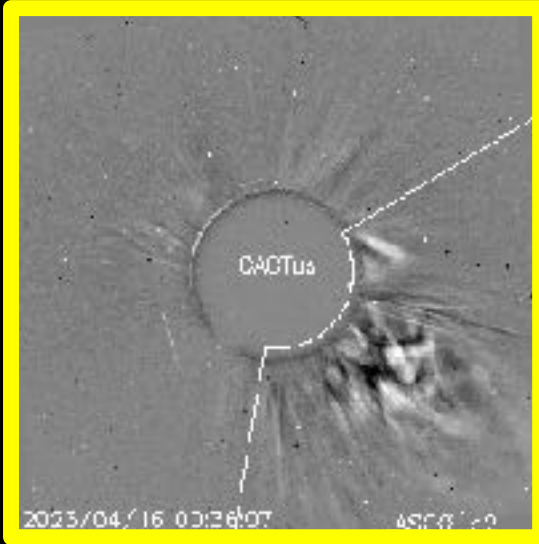
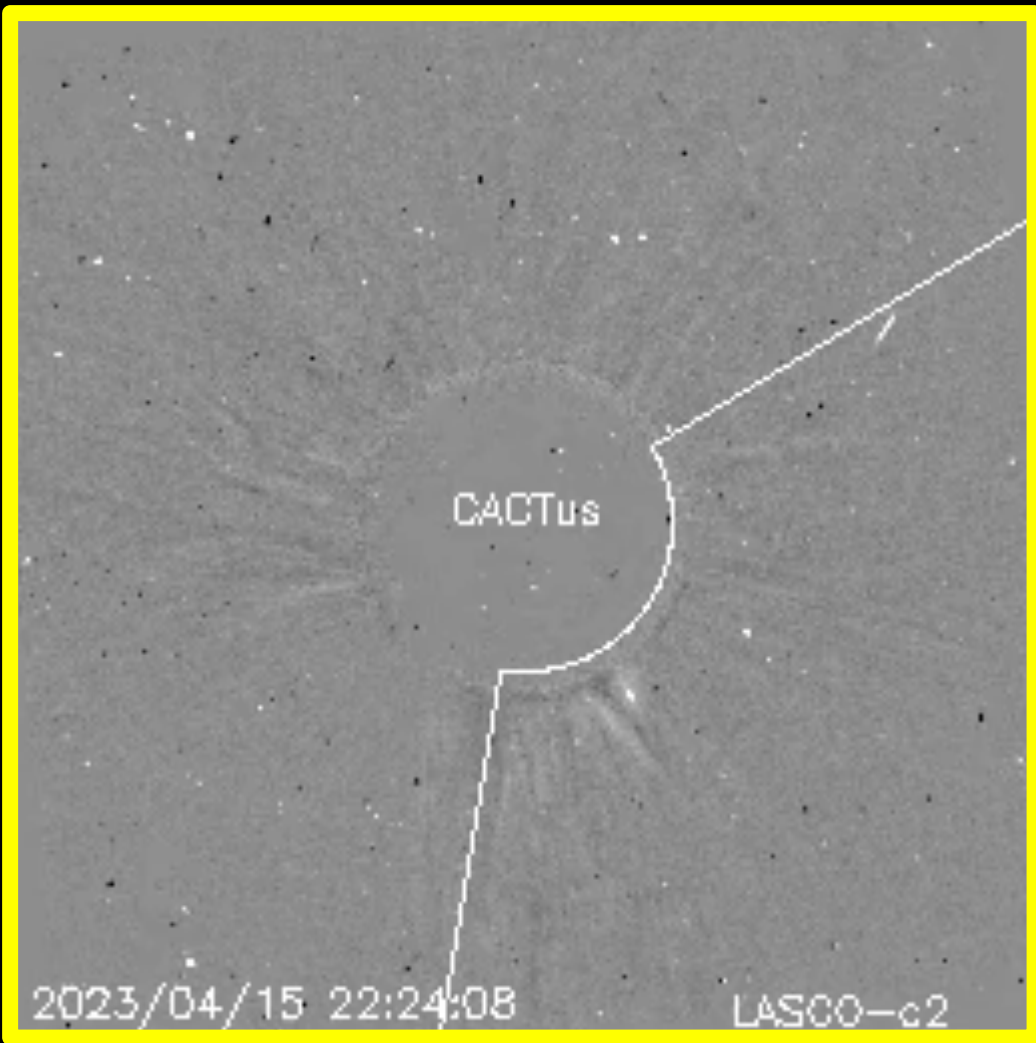
Probabilities (%) and occurrences (#) of C/M/X-flares daily, from noon to noon:

Issue date	2023-04-16	2023-04-17	2023-04-18	2023-04-19	2023-04-20	2023-04-21	2023-04-22	2023-04-23
Probability (%)	95 40 01	98 35 10	70 15 05	85 30 10	95 30 10	85 15 05	90 30 10	85 30 10
Observed (#)	07 00 00	05 00 00	06 00 00	04 00 00	03 00 00	05 01 00	02 00 00	02 00 00

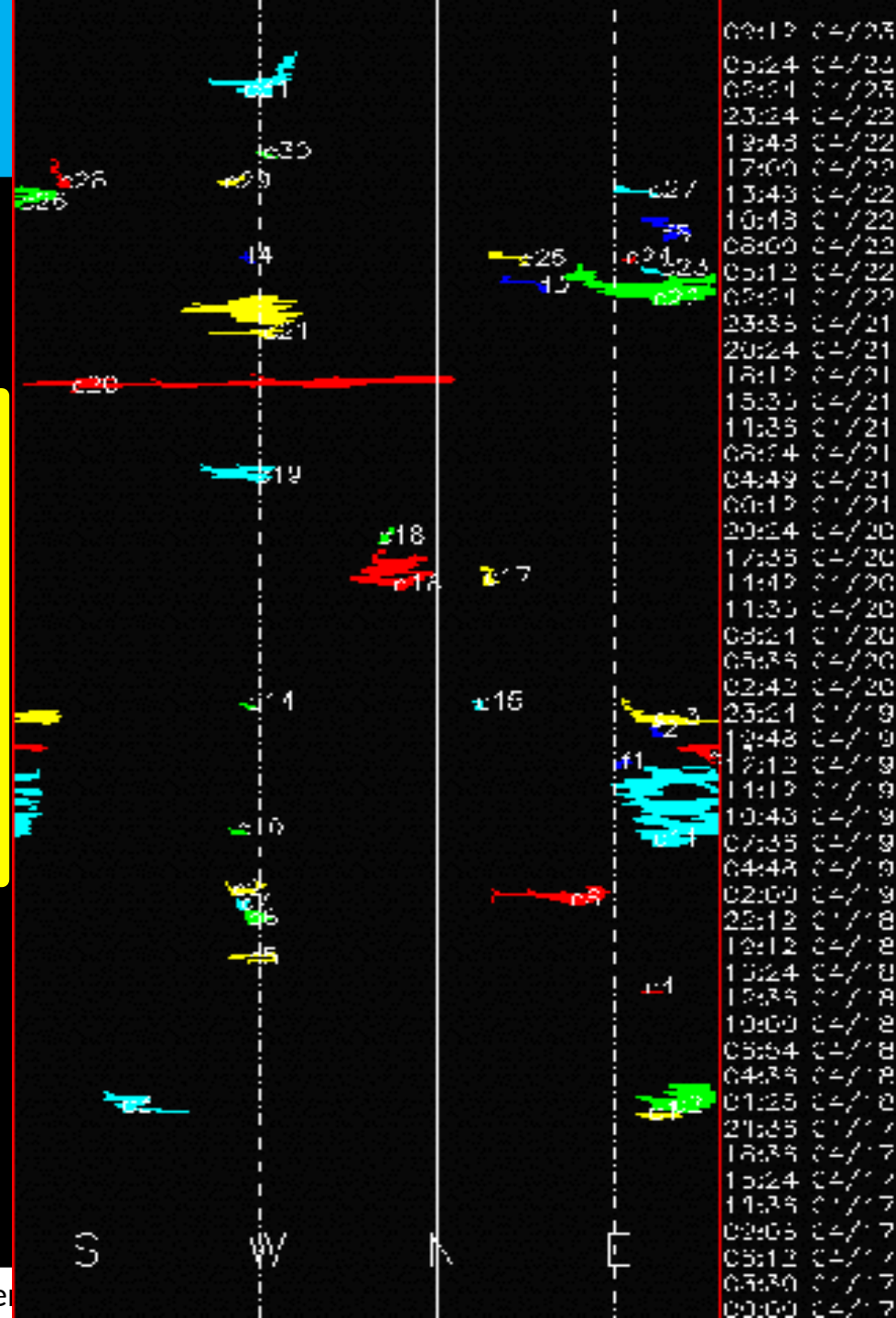
# Solar X-Ray and UV flux



# CMEs: partial halo on April 15th

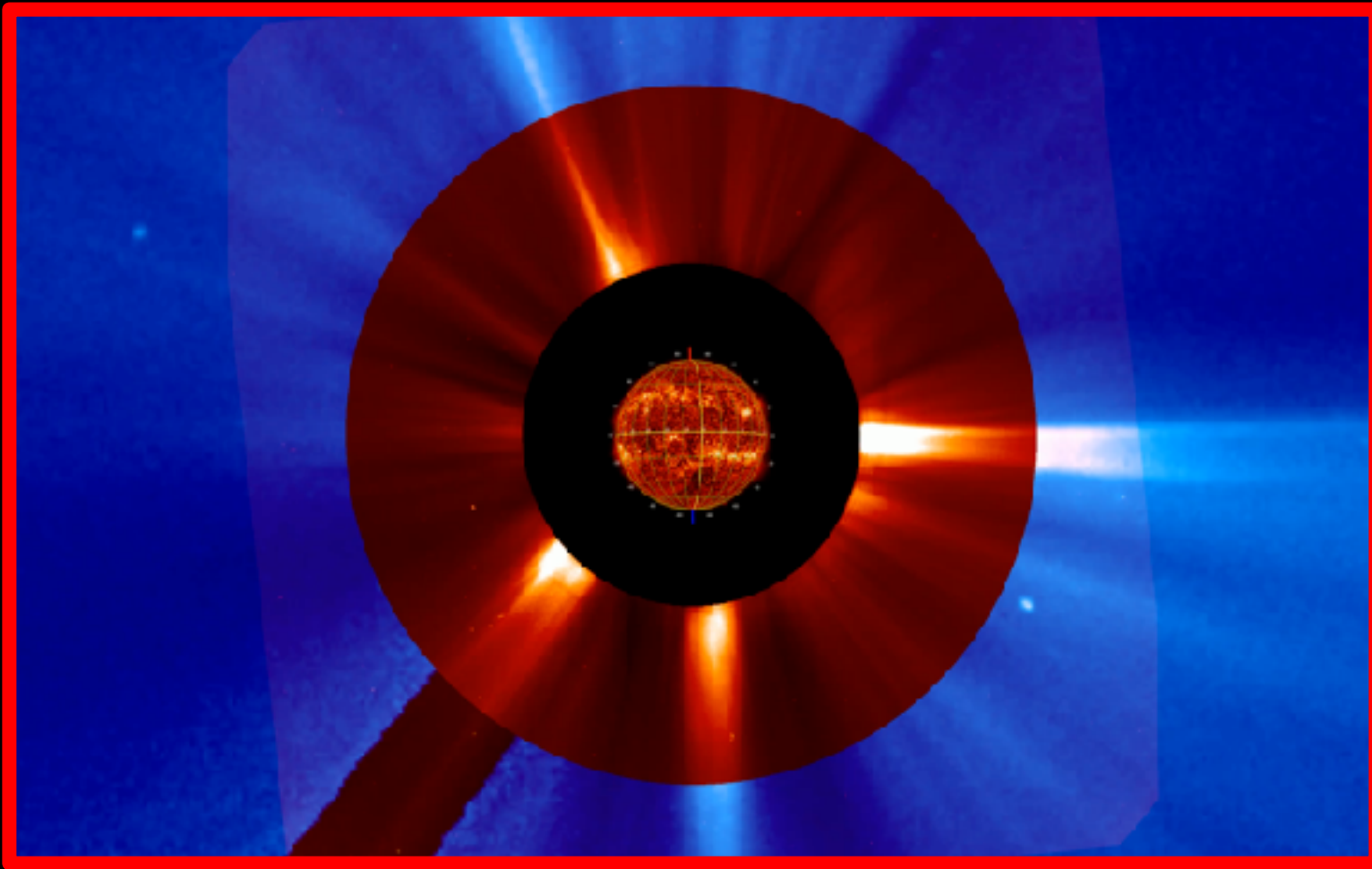


Slow partial halo,  
estimated speed  
of ~ 350 km/s.  
Possible arrival  
on April 18th

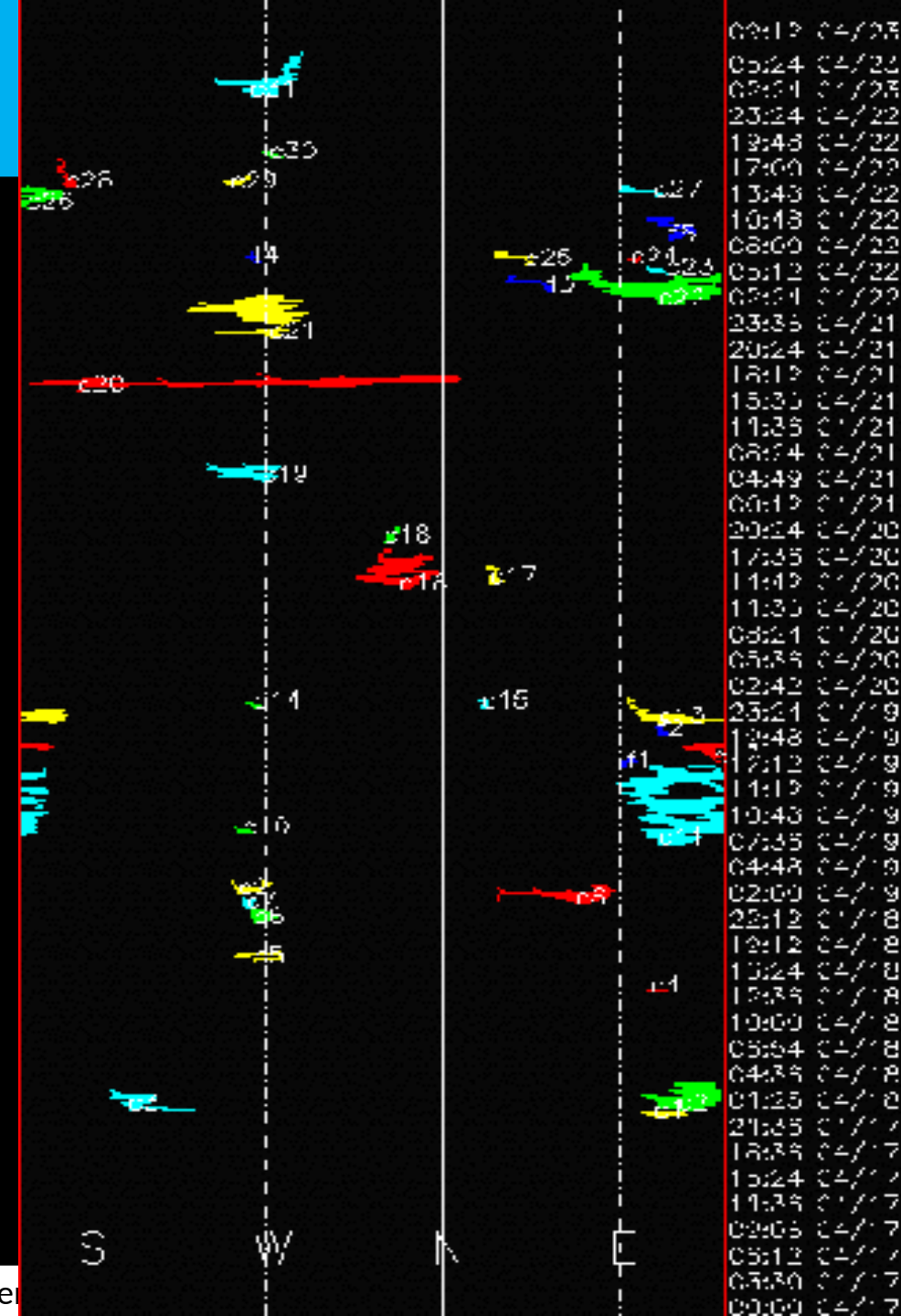




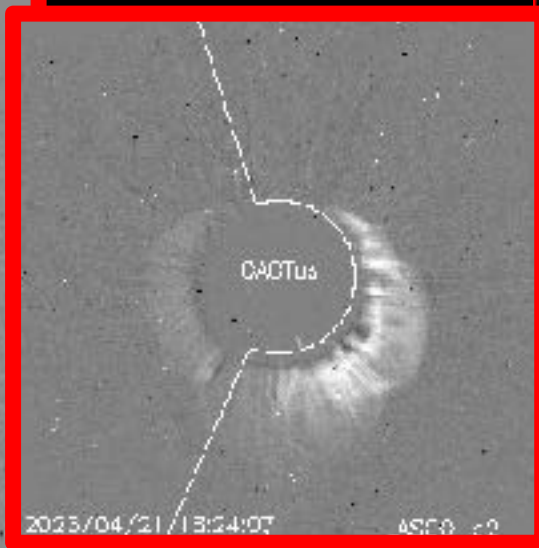
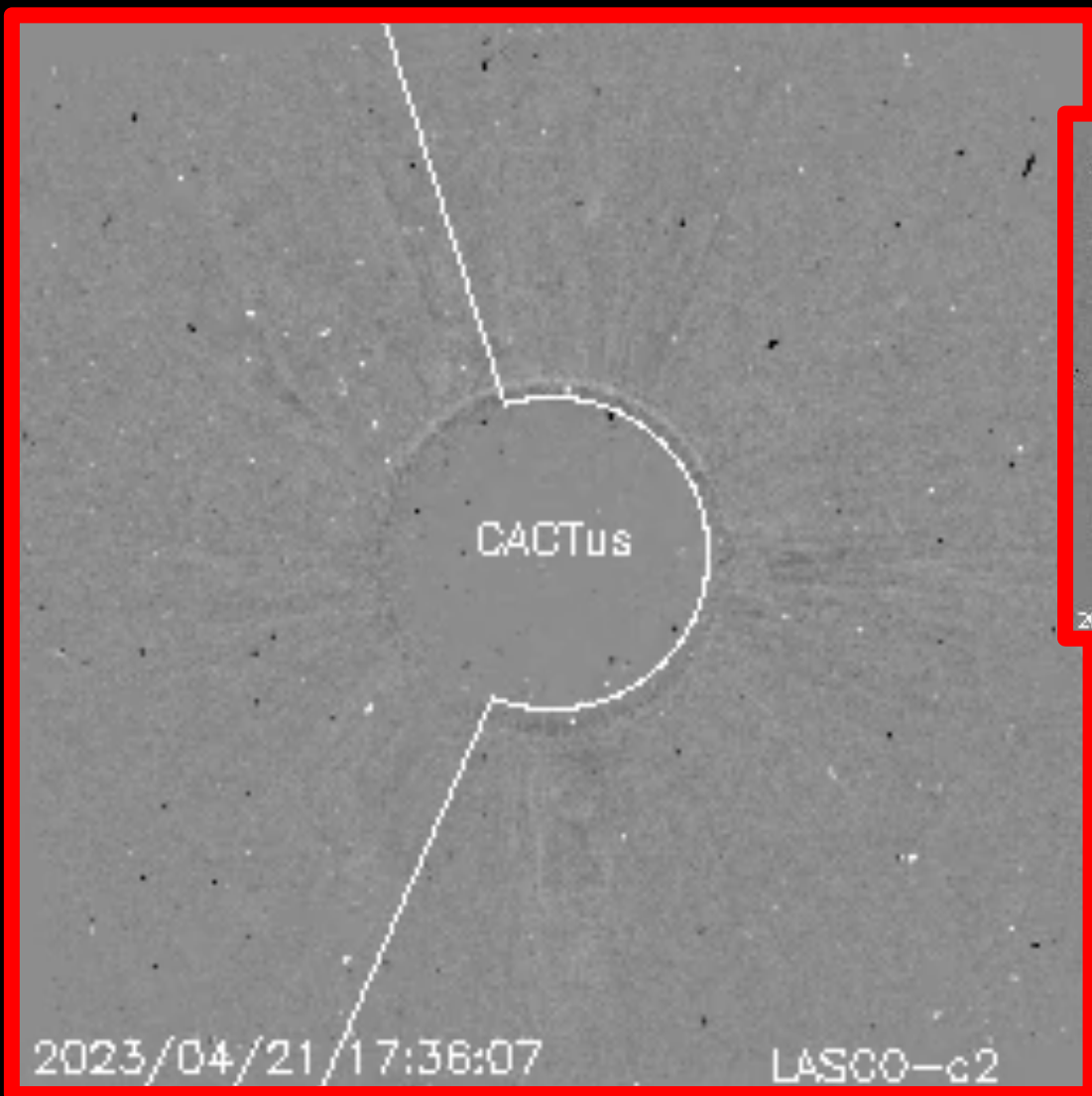
# CMEs: full halo April 21st



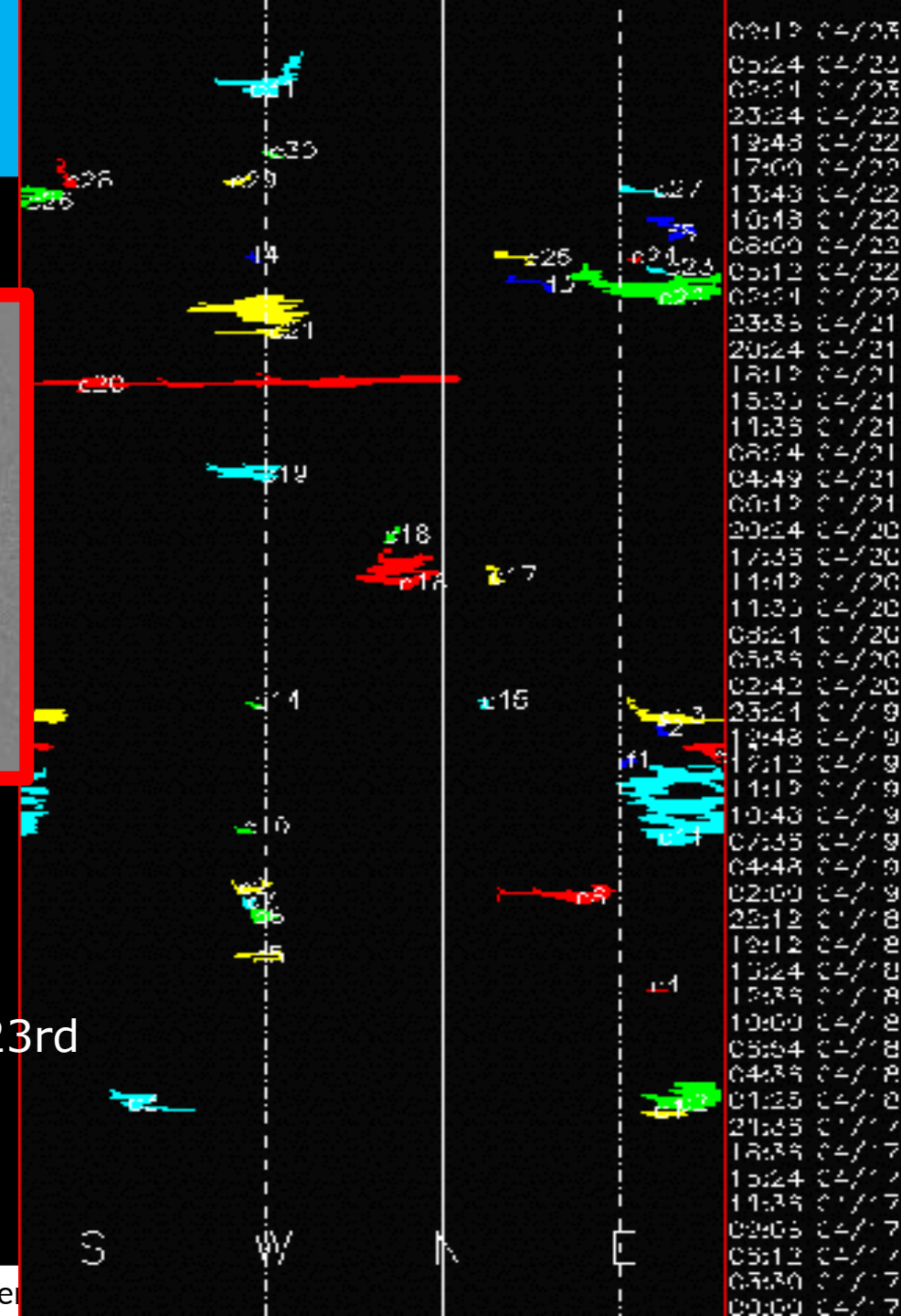
Driven by M1.7-flaring from NOAA 3283 (beta) and previous filament eruption. Projected velocity  $\sim 1100$  km/s



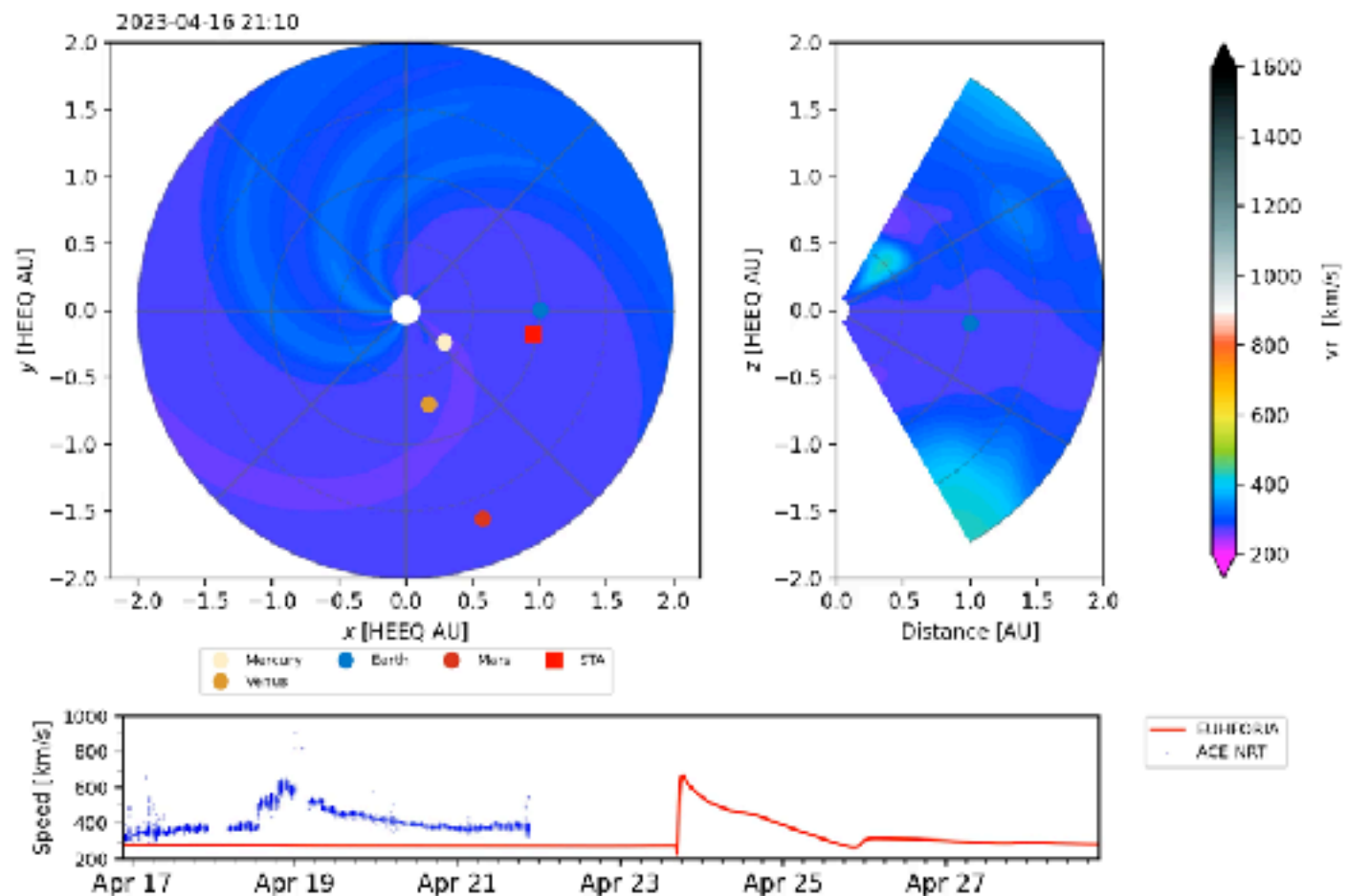
# Coronal Mass Ejections: full halo



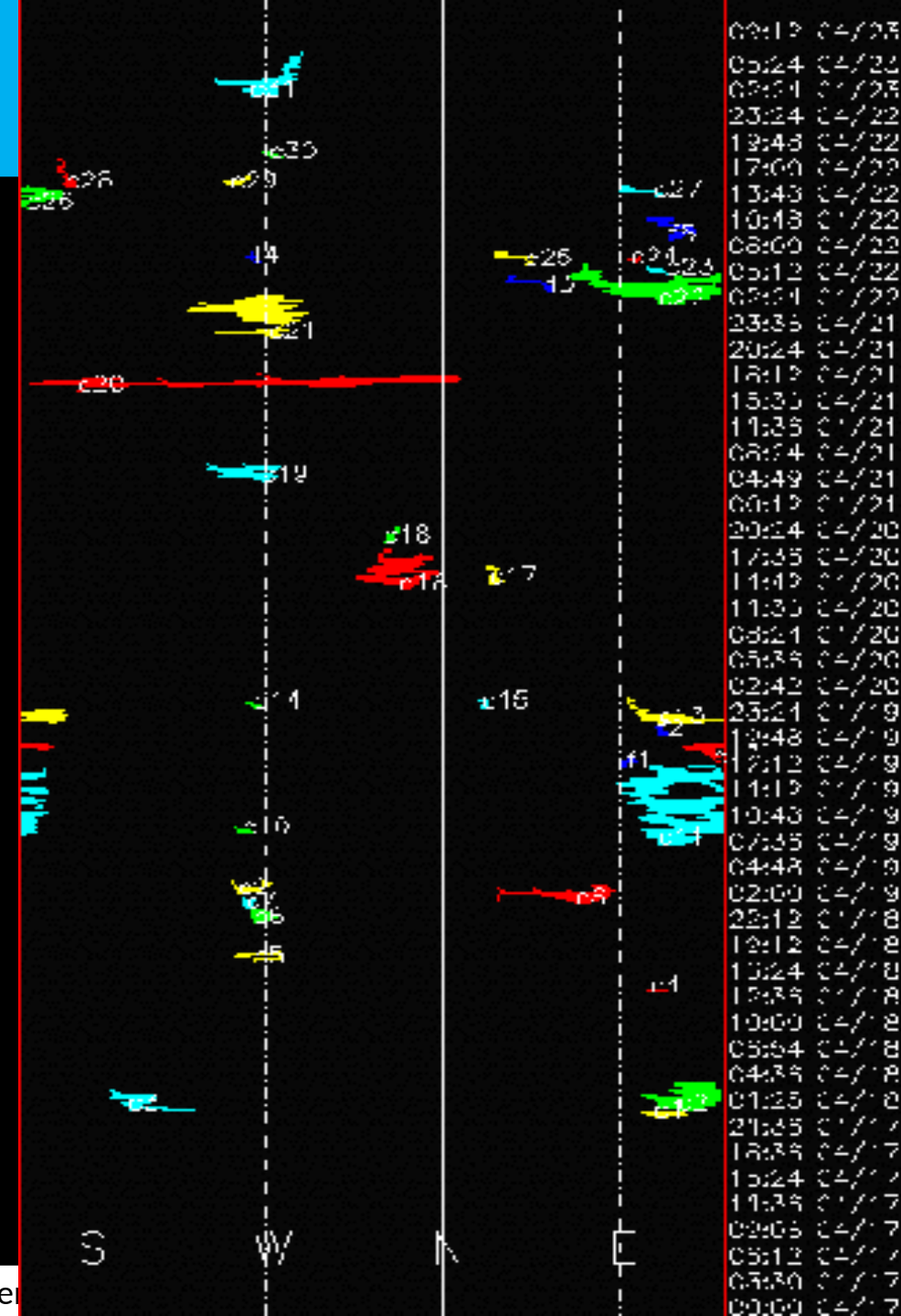
Fast full halo,  
estimated speed  
> 1100 km/s.  
Awaited on April 23rd  
— April 24th  
Arrived April 23rd



# Coronal Mass Ejections: full halo



EUFHORIA predicted arrival early evening on April 23rd



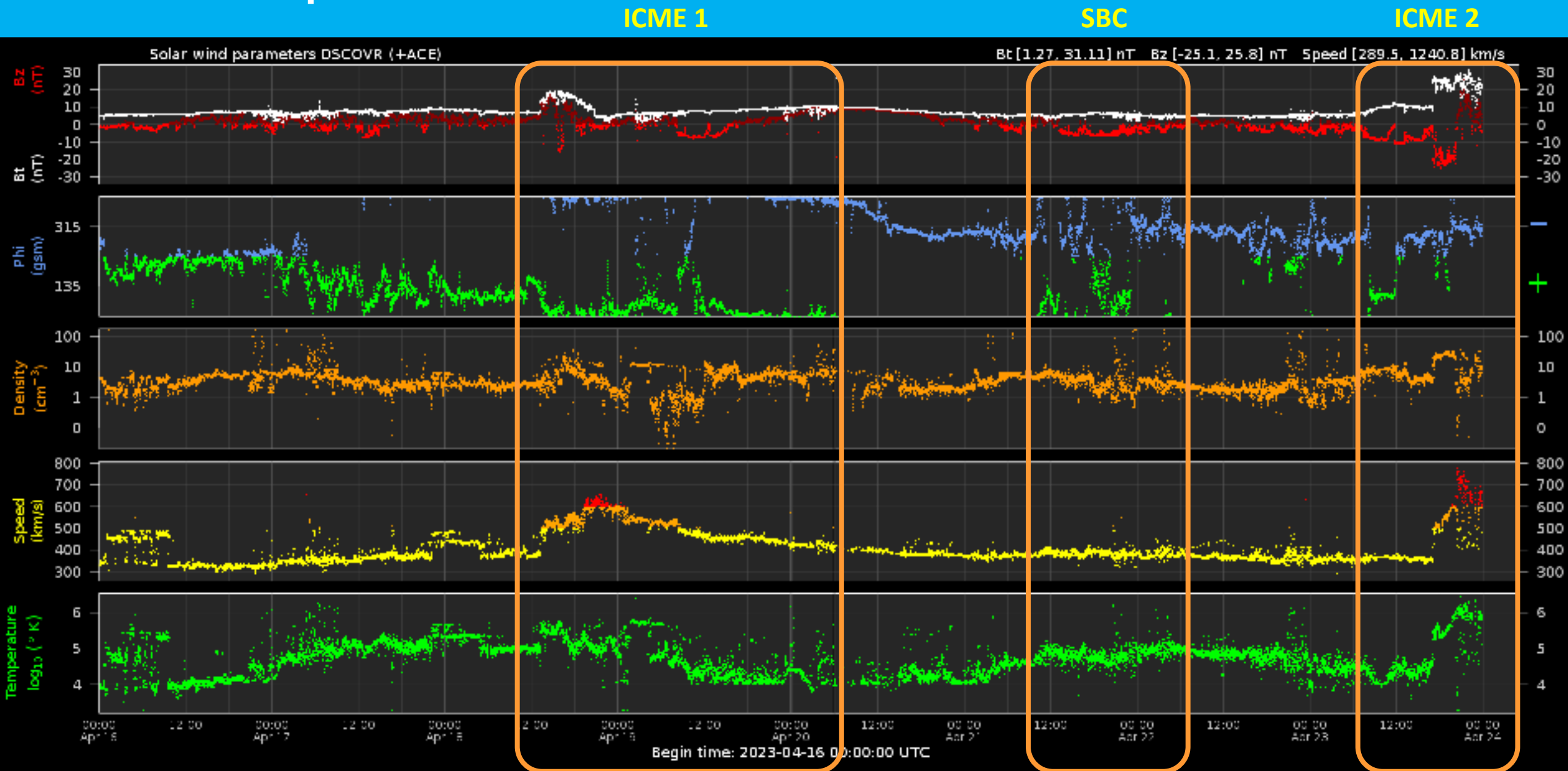
# Solar Wind and Geomagnetic Activity



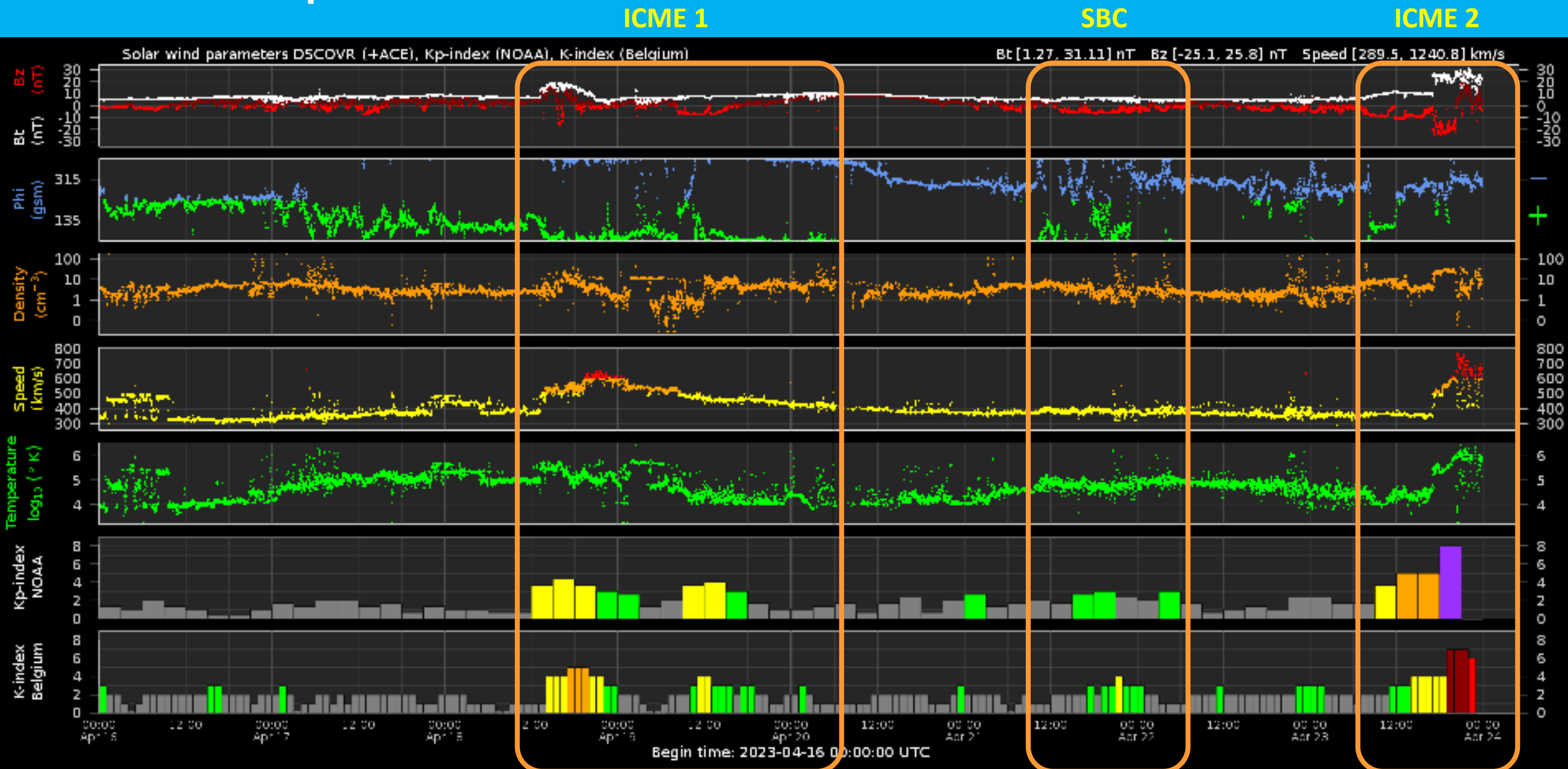
Royal Observatory  
of Belgium

Solar Influences  
Data analysis Centre  
[www.sidc.be](http://www.sidc.be)

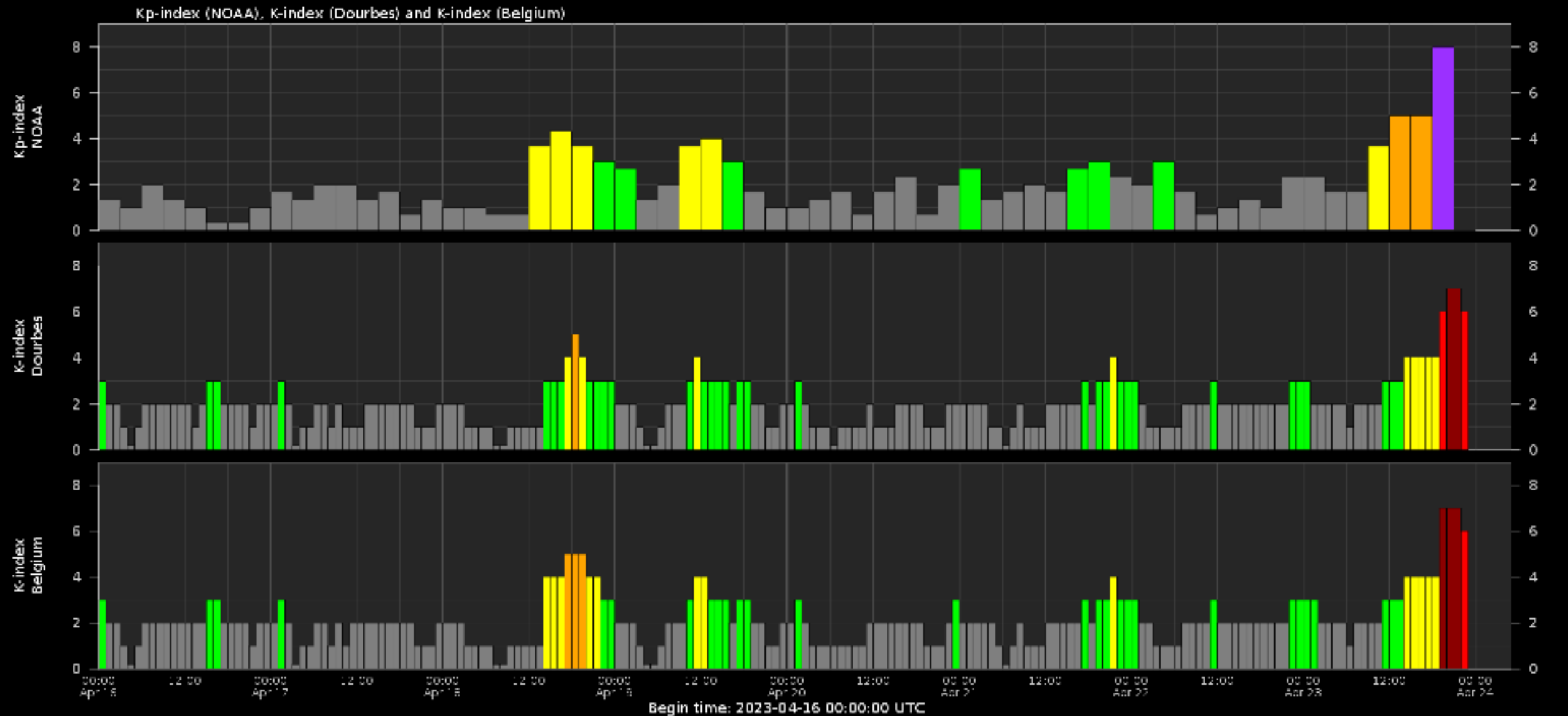
# Solar wind parameters



# Solar wind parameters & K-indices



# Geomagnetic activity (K-indexes)



# Energetic Particles

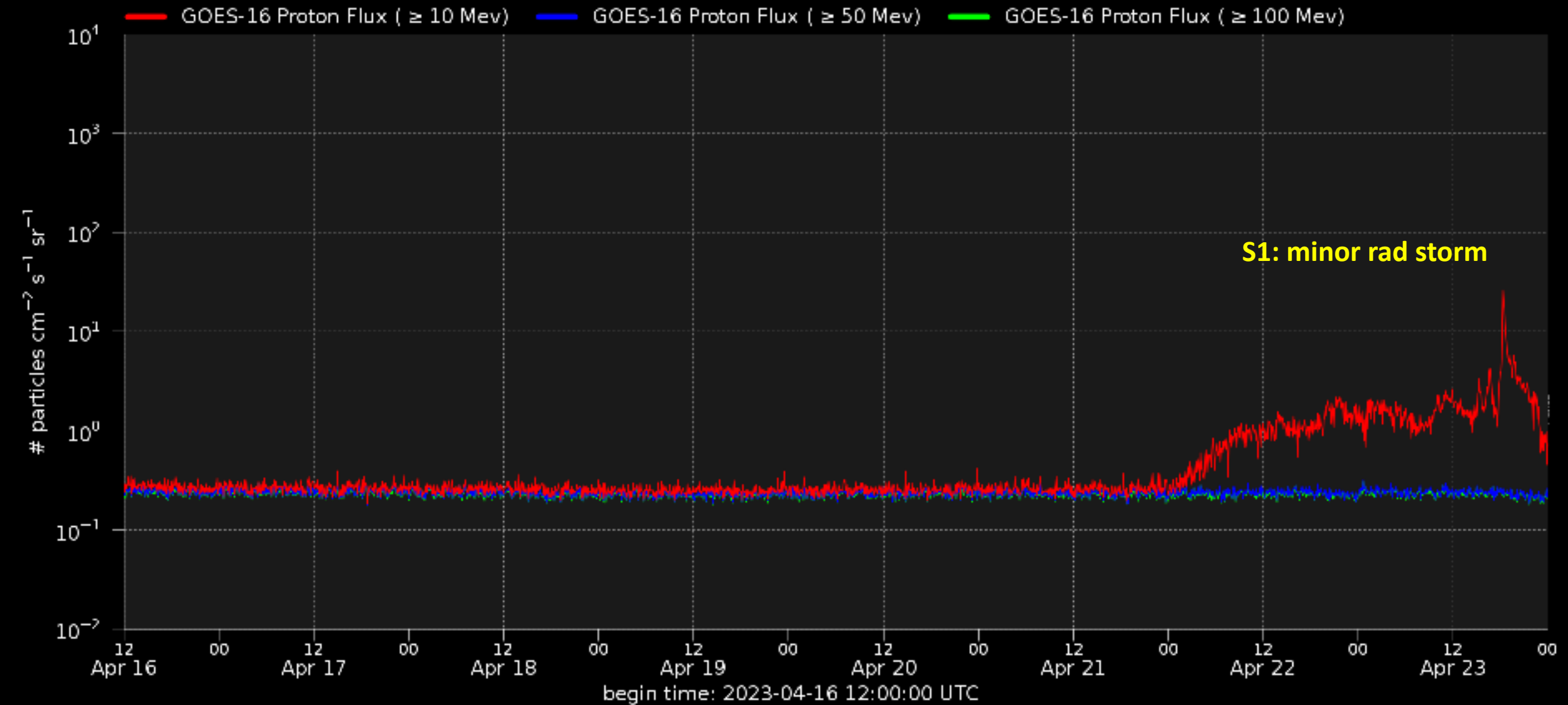


Royal Observatory  
of Belgium

Solar Influences  
Data analysis Centre  
[www.sidc.be](http://www.sidc.be)



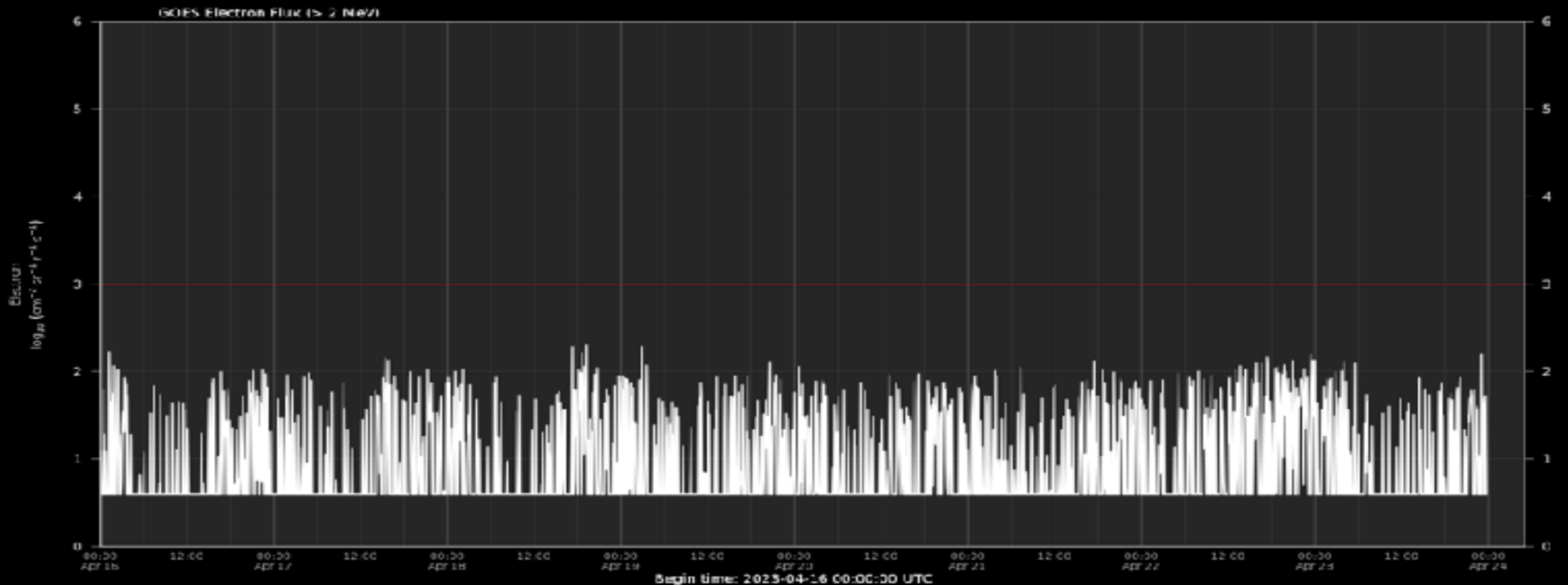
# Solar proton flux



# Electron flux at GEO

[www.stce.be/educational/classification#electrons](http://www.stce.be/educational/classification#electrons)

[www.spaceweather.gc.ca/forecast-prevision/space-spatiale/sffl-en.php](http://www.spaceweather.gc.ca/forecast-prevision/space-spatiale/sffl-en.php)



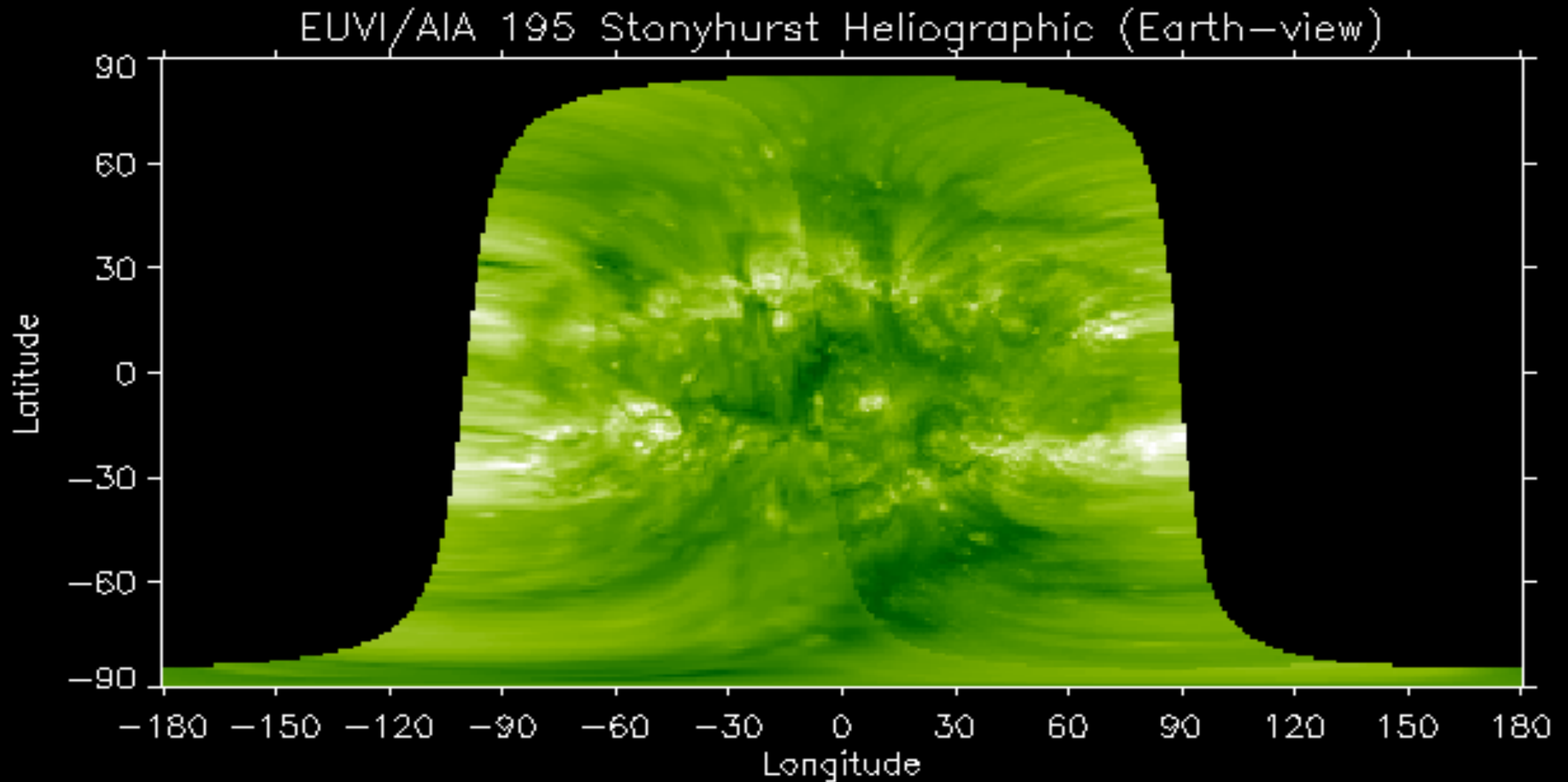
# Outlook



Royal Observatory  
of Belgium

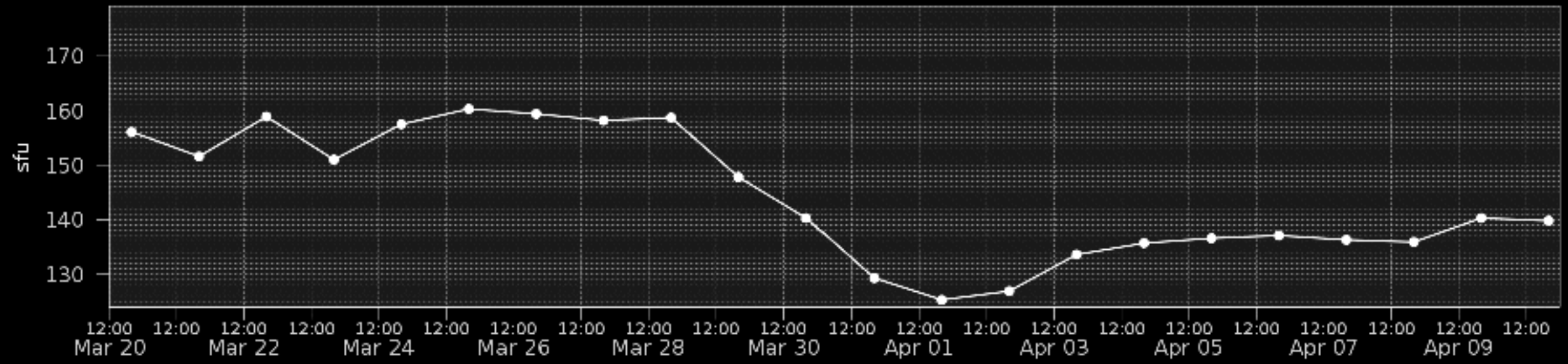
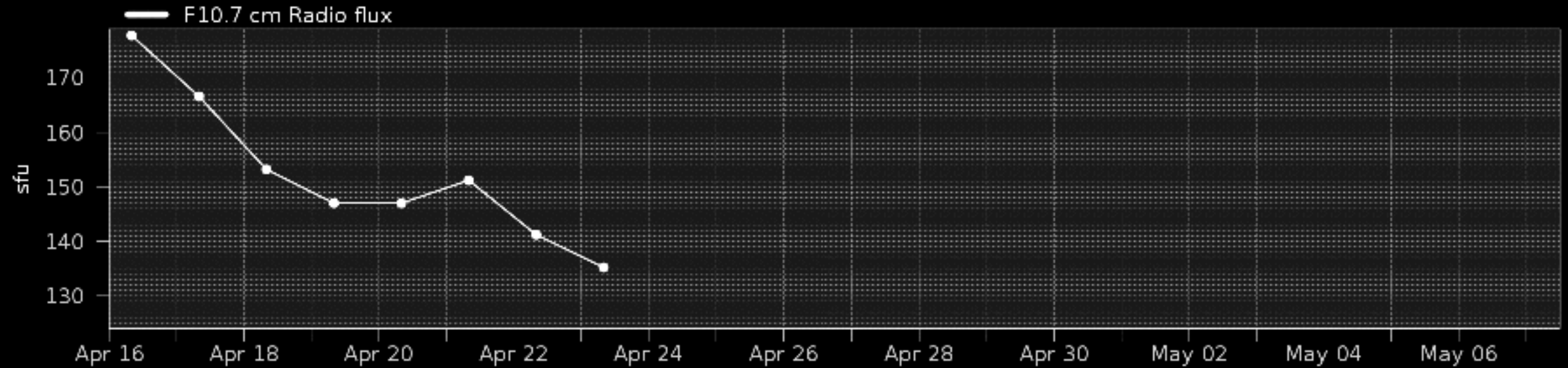
Solar Influences  
Data analysis Centre  
[www.sidc.be](http://www.sidc.be)

# Outlook: Solar activity



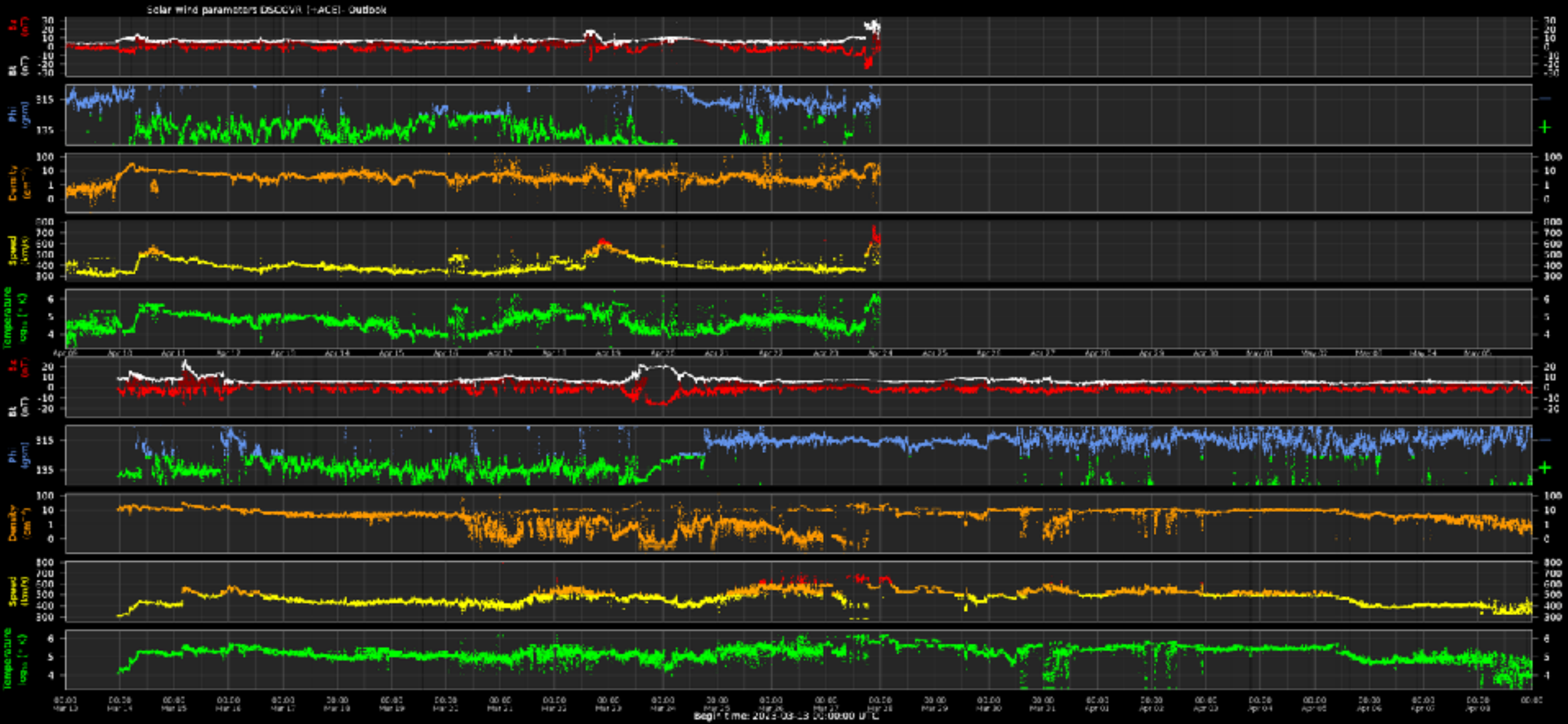
Observation date: 2023/04/23 23:05:00

# Outlook: Solar F10.7cm radio flux



begin time: 2023-04-16 12:00:00 UTC

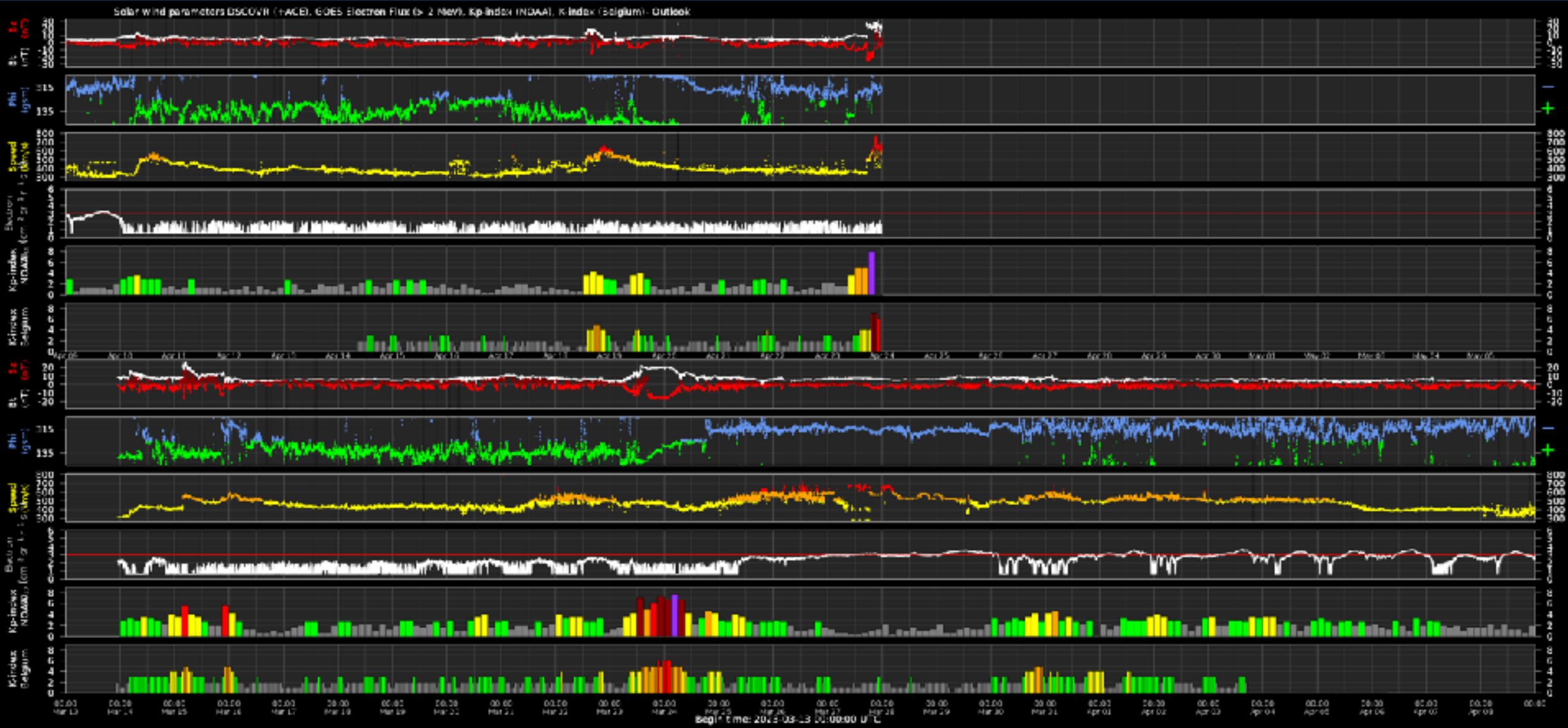
# Outlook: Solar wind parameters



# Outlook: Geomagnetic activity



# Outlook: Electron Flux at GEO Outlook





# Pegasus






Royal Observatory  
of Belgium



Solar Influences  
Data analysis Centre  
[www.sidc.be](http://www.sidc.be)





# Pecasus related events

## PECASUS DASHBOARD

### PECASUS DUTY STATUS: On Duty Centre

GNSS	Moderate	Severe	Time UTC	Values	Status	Alert	Max-3h values	Max-3h status
<u>Amplitude Scintillation</u>	0.5	0.8	2023-04-23 20:35	1.06	SEVERE		1.06	SEVERE
<u>Phase Scintillation</u>	0.4	0.7	2023-04-23 20:35	0.23	QUIET		1.06	SEVERE
<u>Vertical TEC</u>	125	175	2023-04-23 20:35	131.84	QUIET		134.83	MODERATE

RADIATION	Moderate	Severe	Time UTC	Flags	Status	Alert	Max-3h flags	Max-3h status
<u>Effective Dose FL ≤ 460</u>	30	80	2023-04-23 20:35	0	QUIET		0	QUIET
<u>Effective Dose FL &gt; 460</u>	/	80	2023-04-23 20:35	0	QUIET		0	QUIET

HF COM	Moderate	Severe	Time UTC	Values/Flags	Status	Alert	Max-3h values	Max-3h status
<u>Auroral Absorption (AA)</u>	8	9	2023-04-23 20:36	8.0	MODERATE		8.0	MODERATE
<u>Polar Cap Absorption (PCA)</u>	2	5	2023-04-23 20:37	2.33	MODERATE		4.64	MODERATE
<u>Shortwave Fadeout (SWF)</u>	x1.0	x10.0	2023-04-23 20:37	< M5 flare	QUIET		< M5 flare	QUIET
<u>Post-Storm Depression (PSD)</u>	30%	50%	2023-04-23 20:00	2	SEVERE		2	SEVERE

# SIDC Space Weather Briefing

See you at our next briefing!

Or visit us at [www.sidc.be](http://www.sidc.be)



Royal Observatory  
of Belgium

Solar Influences  
Data analysis Centre  
[www.sidc.be](http://www.sidc.be)