

SIDC Space Weather Briefing

10 December 2023-17 December 2023

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& the SIDC forecaster team



Royal Observatory
of Belgium

Solar Influences
Data analysis Centre
www.sidc.be

Summary Report

Solar activity from 2023-12-10 12:00 to 2023-12-17 23:59

Active regions	17 Active Regions NOAA AR 3507, 3508, 3510, 3511, 3513, 3514, 3515 – 3525
Flares	# C-class flare: 81 # M-class flare: 6 # X-class flare: 1
Coronal Holes	Two positive polarity coronal holes
CMEs	Four partially Earth directed CMEs on Dec 13, Dec 14

Proton flux	Exceeded 10 pfu threshold
Electron flux	Exceeded 1000pfu threshold

Solar wind and geomagnetic conditions

ICMEs	2023-12-12T11:30, 2023-12-13T21:45, 2023-12-15T10:40, 2023-12-17T05:20
Solar wind conditions	B : 0.12 - 23.49 nT //Bz: -14.31 nT to 17.83 nT //Speed: 275.4 - 565.3km/s
Geomagnetic conditions	max K _{Be} : 5, max K _p (NOAA): 5+, Minor Storm conditions

All Quiet Alert: Off

Solar Activity

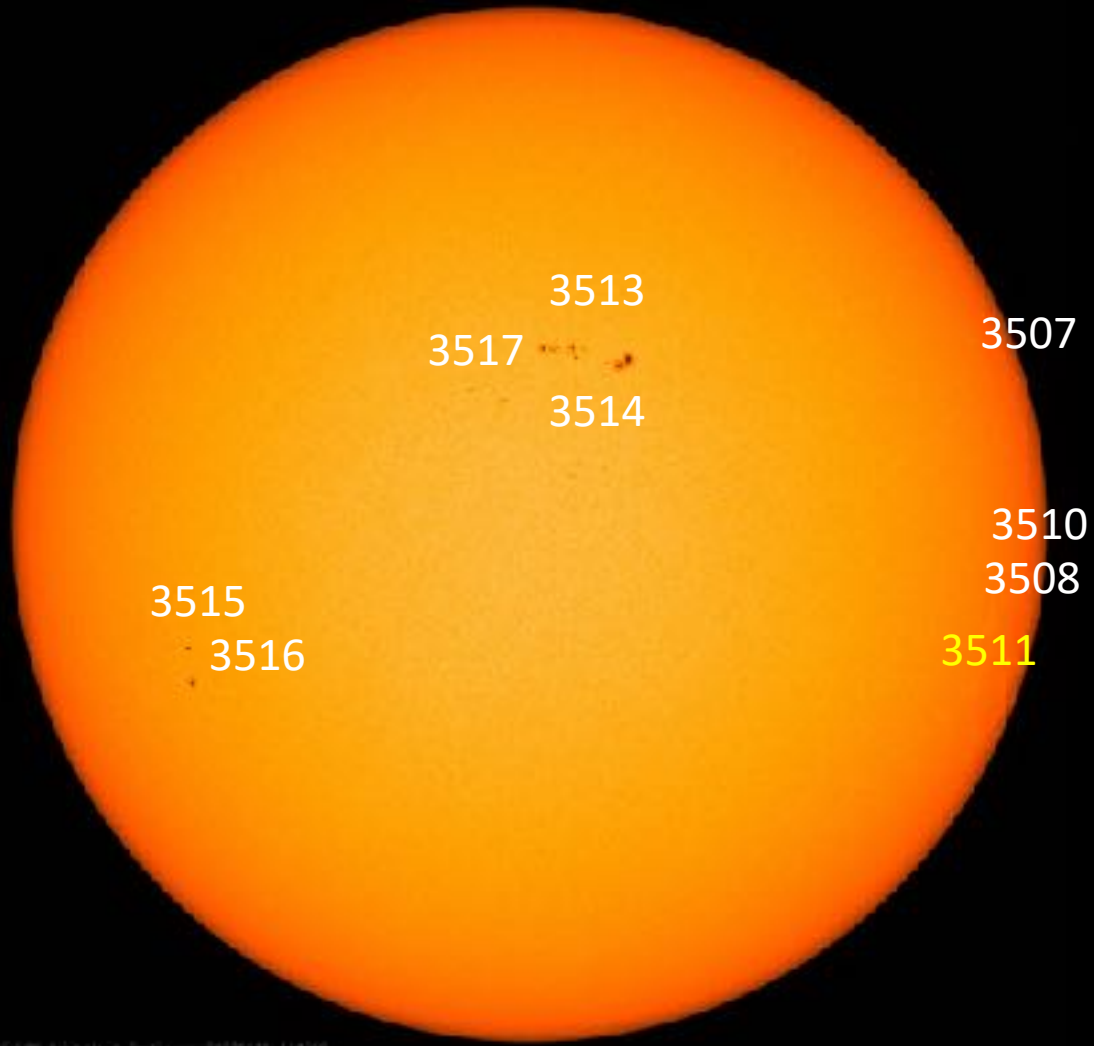


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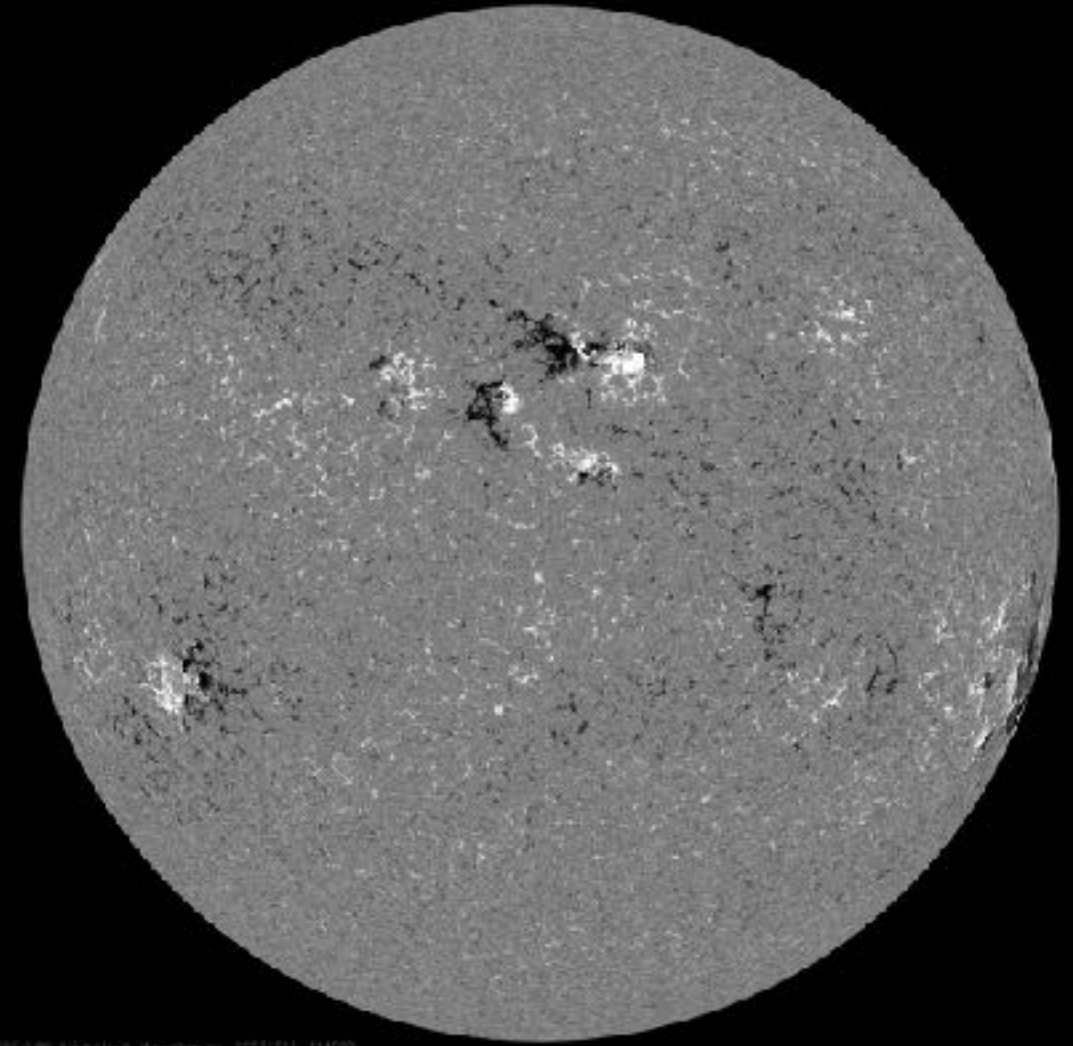
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Solar active regions

SDO/HMI White Light 2023-12-11

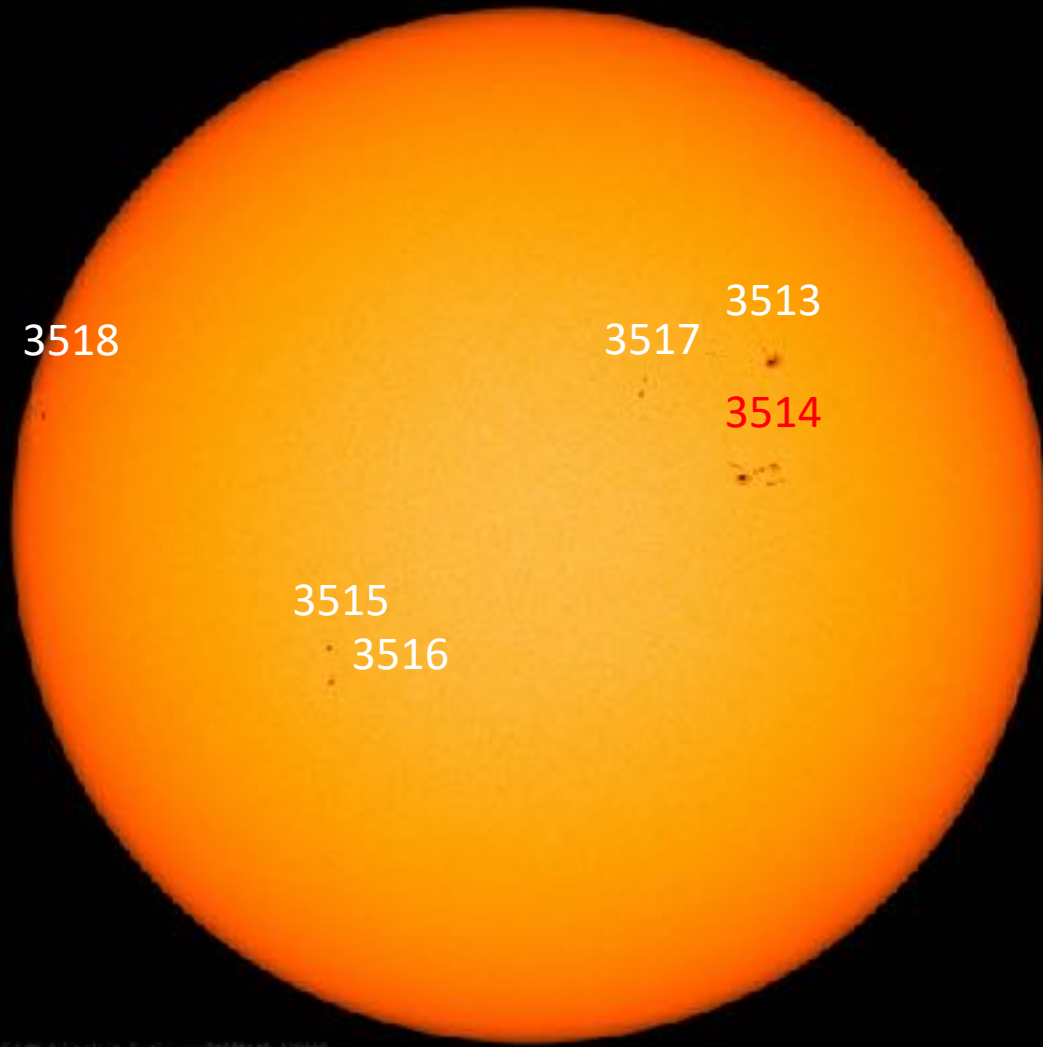


SDO/HMI Magnetogram 2023-12-11

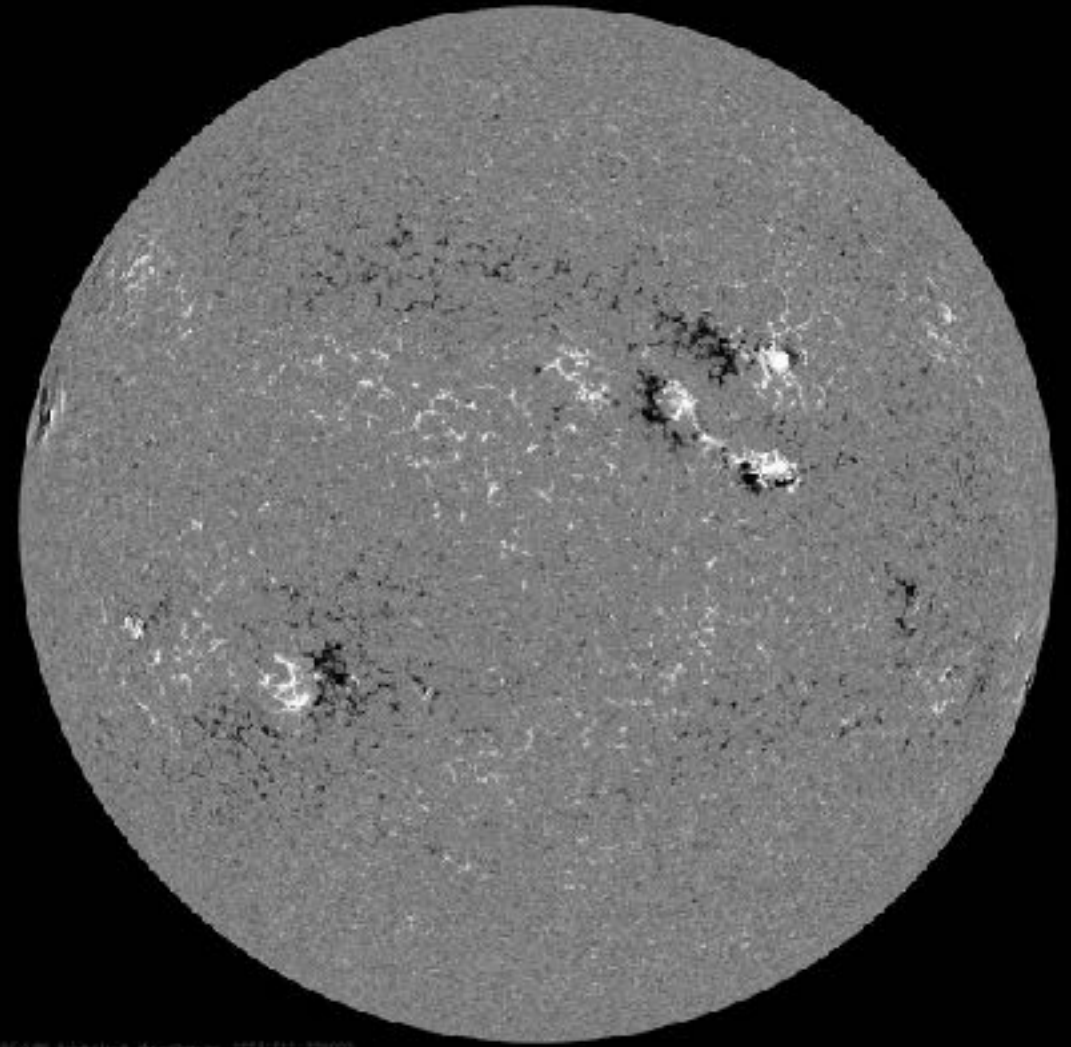


Solar active regions

SDO/HMI White Light 2023-12-13

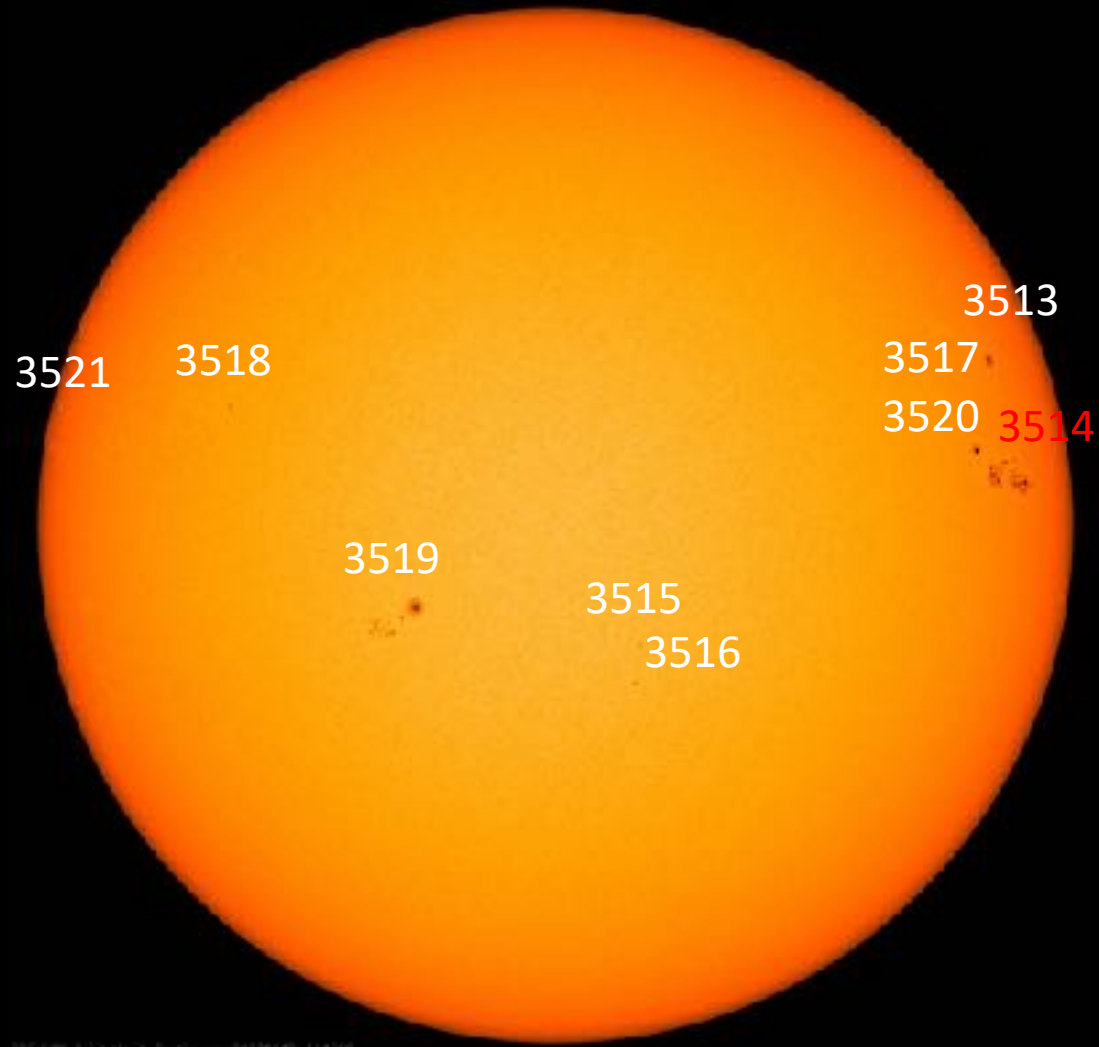


SDO/HMI Magnetogram 2023-12-13

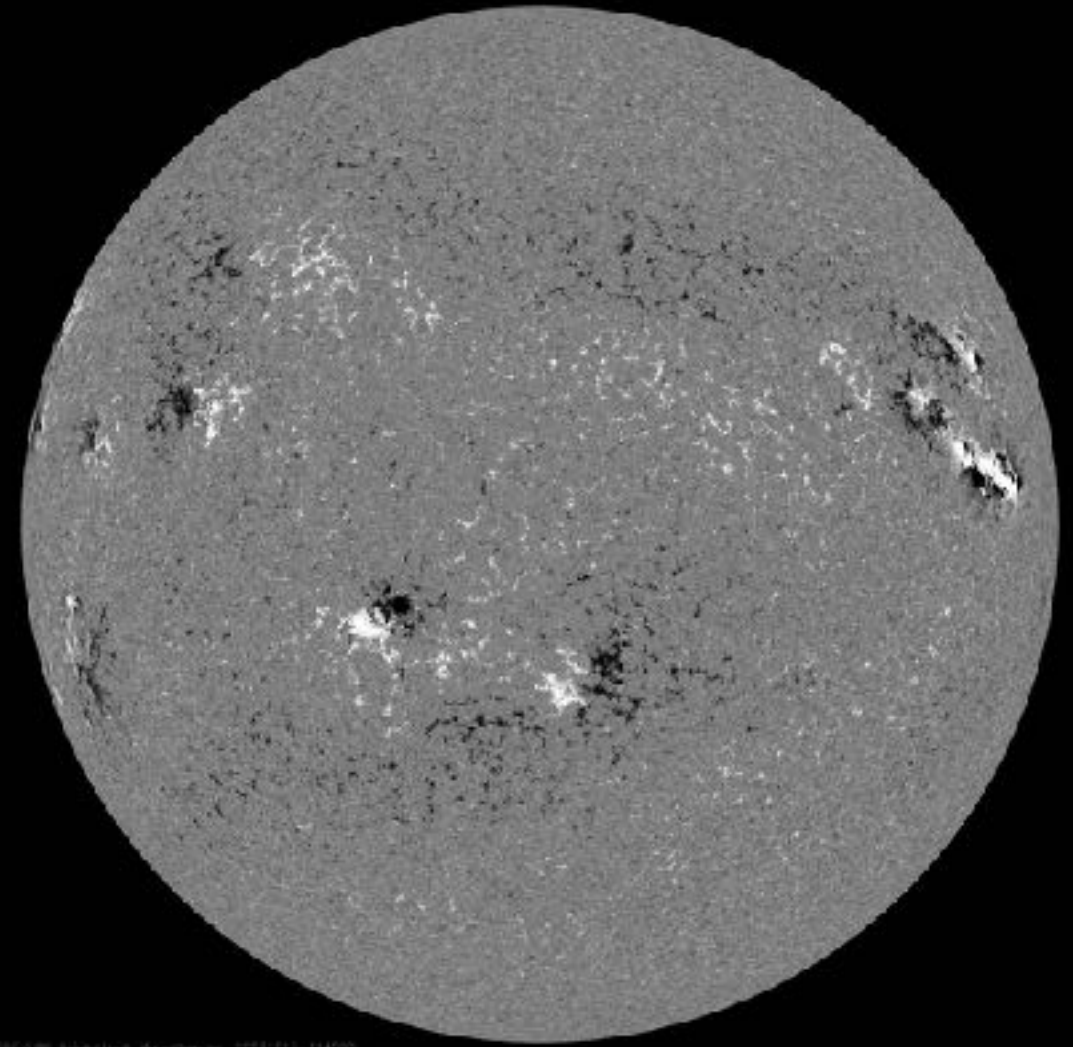


Solar active regions

SDO/HMI White Light 2023-12-15

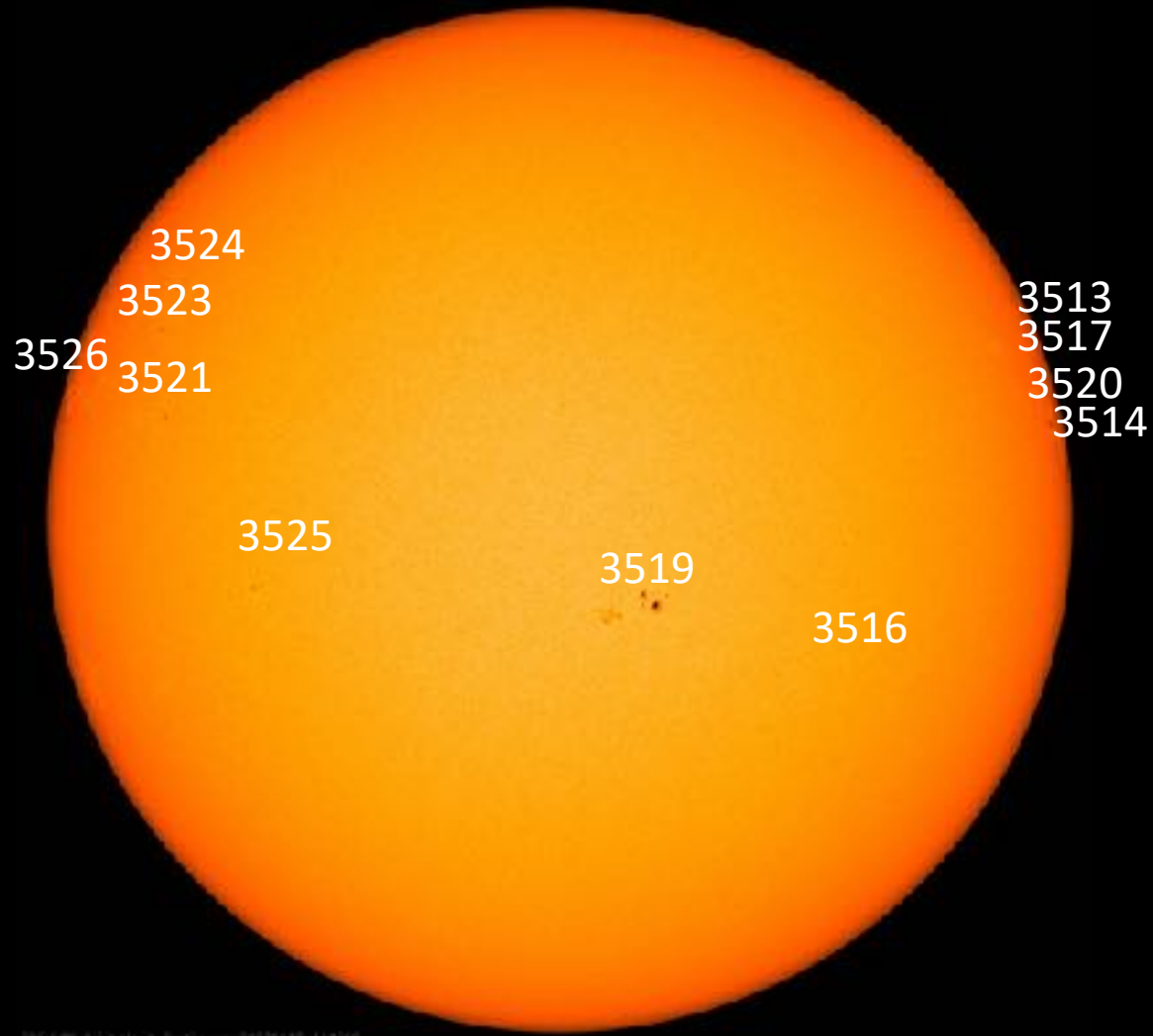


SDO/HMI Magnetogram 2023-12-15

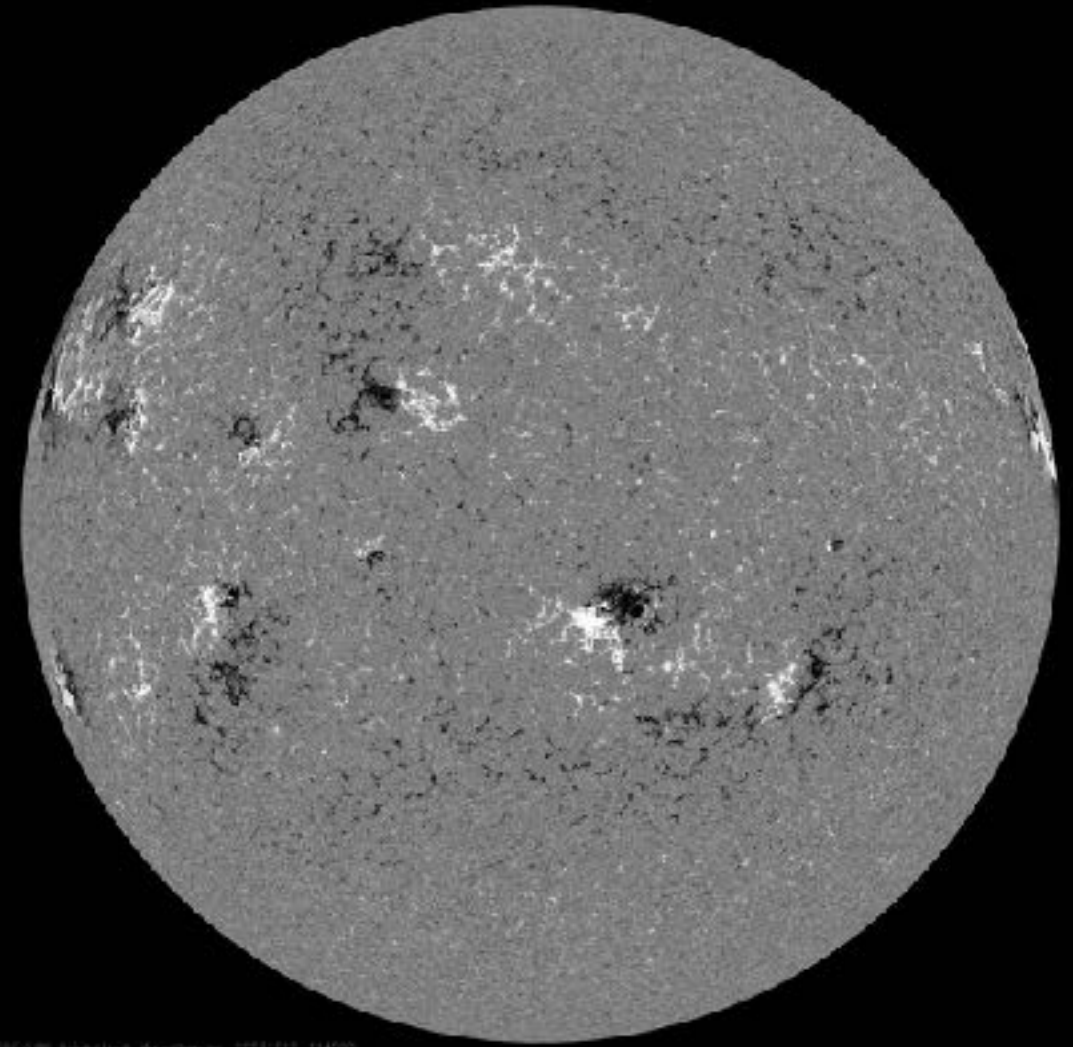


Solar active regions

SDO/HMI White Light 2023-12-17



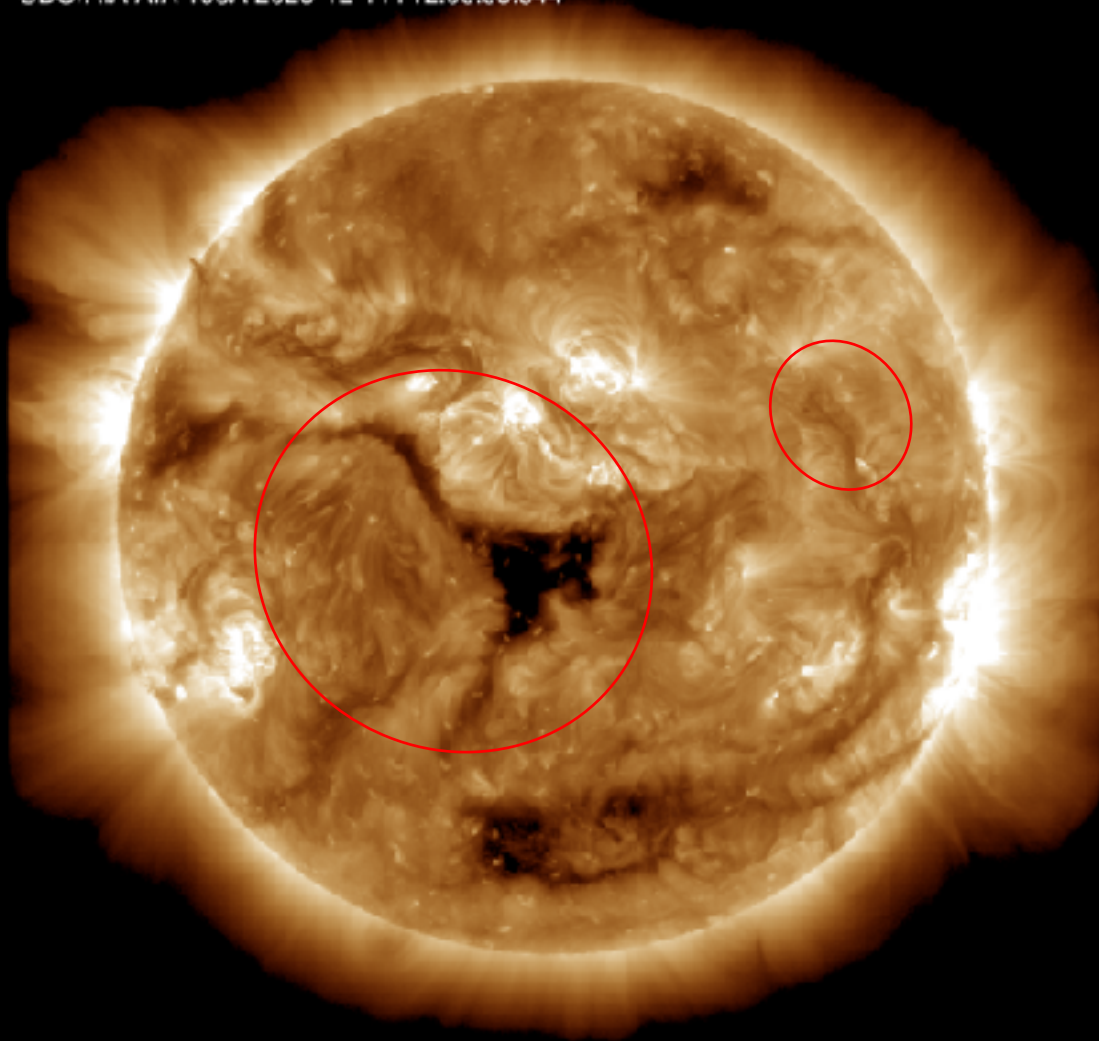
SDO/HMI Magnetogram 2023-12-17



Coronal holes

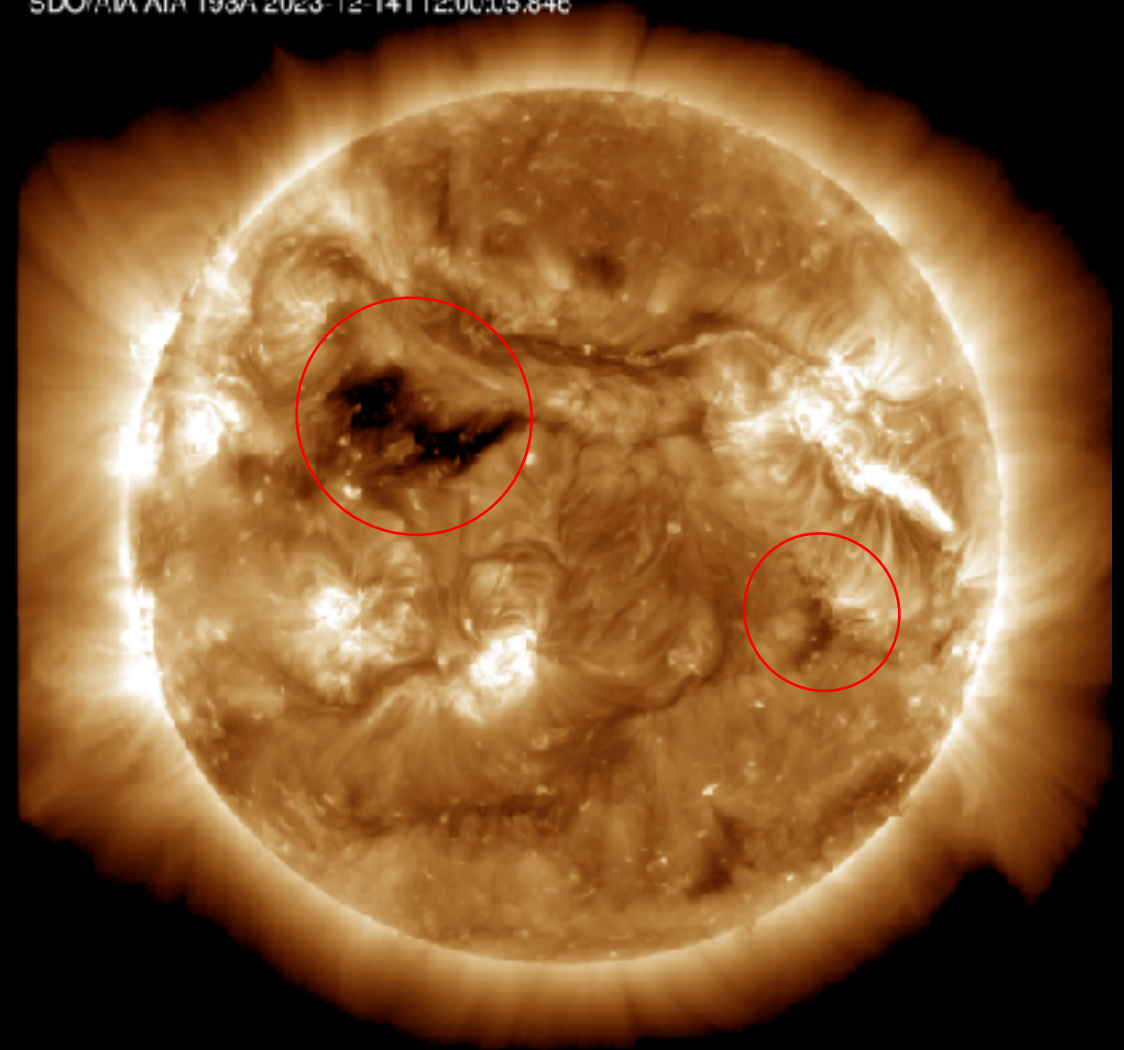
SDO/AIA 19.3 nm 2023-12-11

SDO/AIA AIA 193Å 2023-12-11T12:00:05.844



SDO/AIA 19.3 nm 2023-12-14

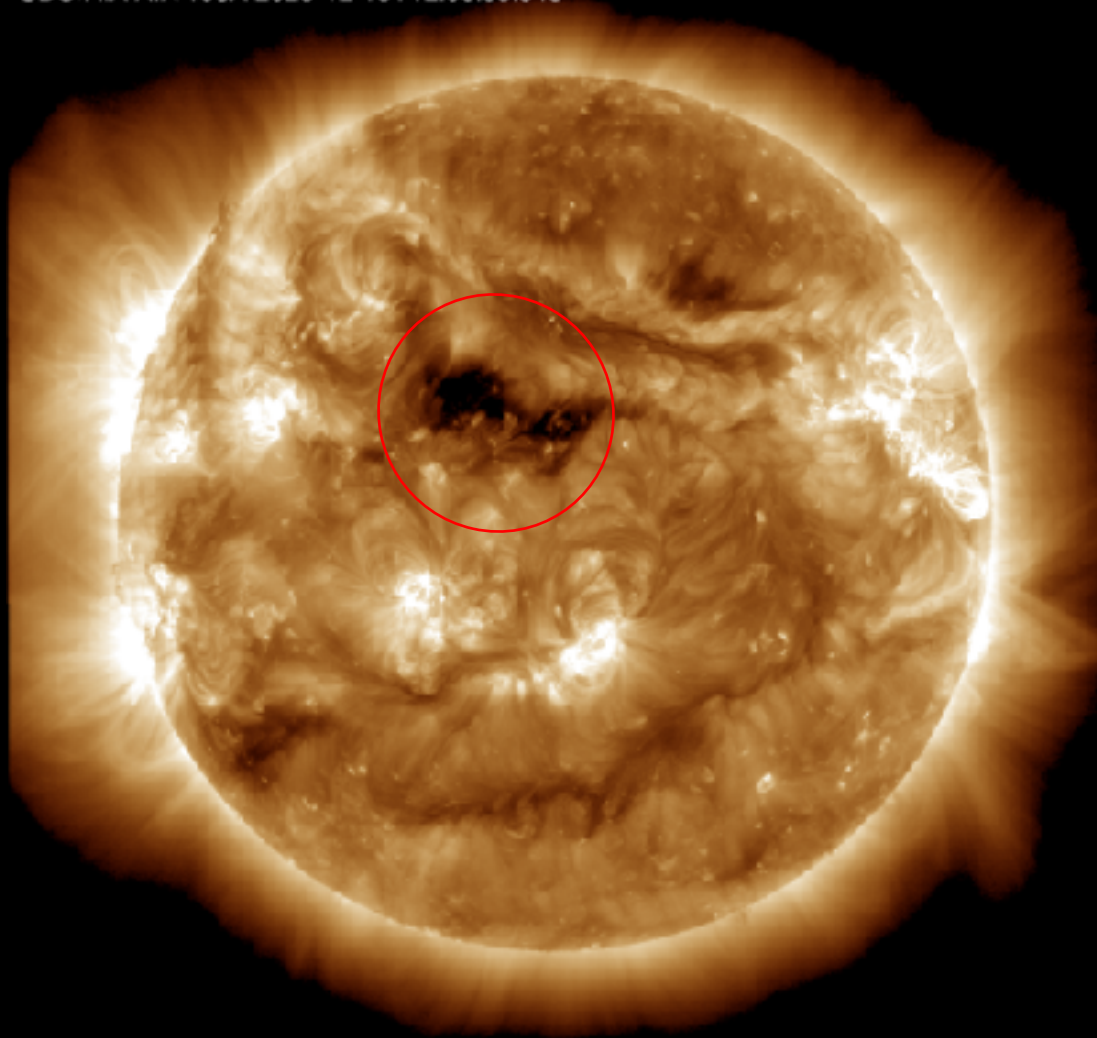
SDO/AIA AIA 193Å 2023-12-14T12:00:05.846



Coronal holes

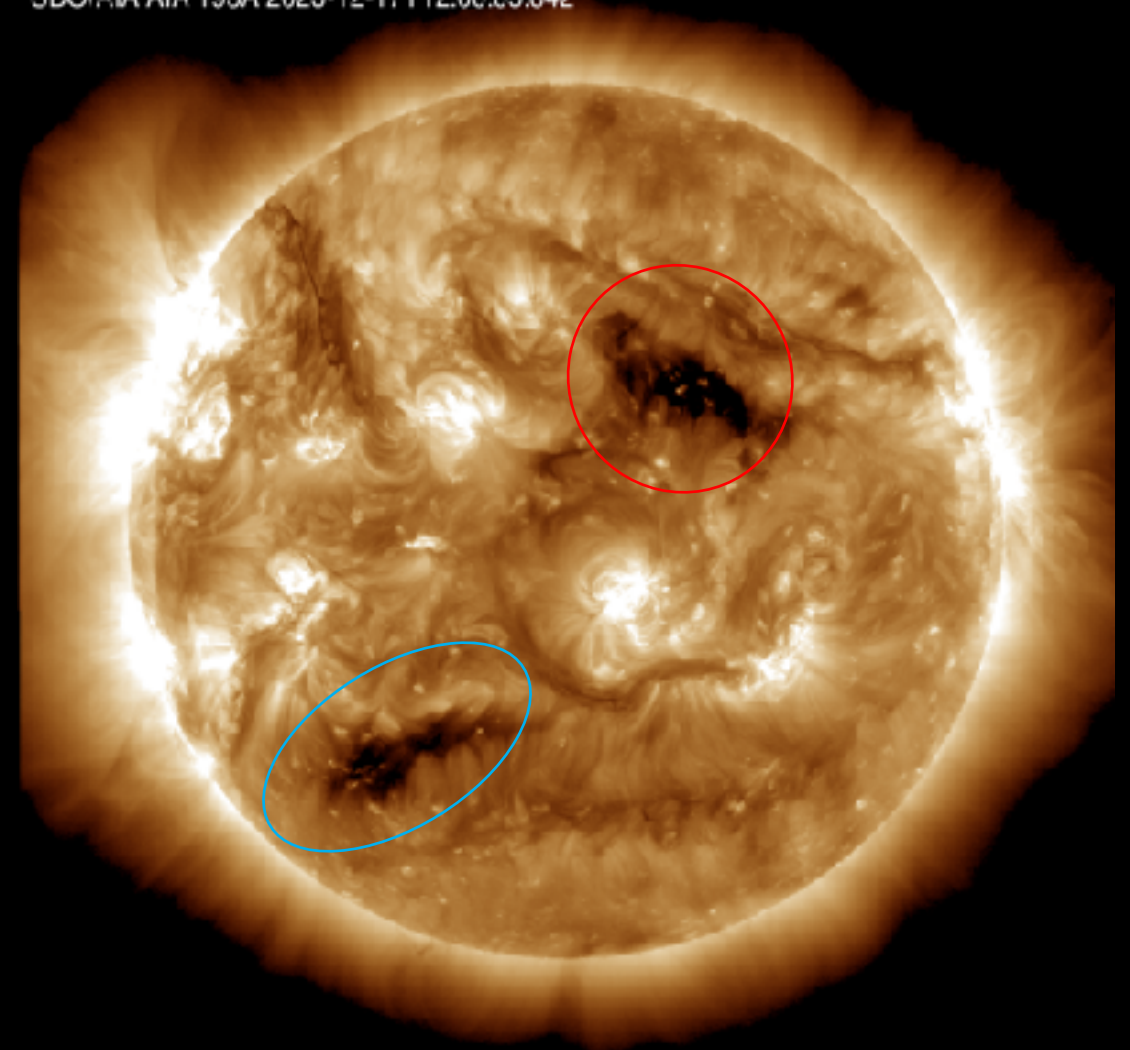
SDO/AIA 19.3 nm 2023-12-15

SDO/AIA AIA 193Å 2023-12-15T12:00:05.843



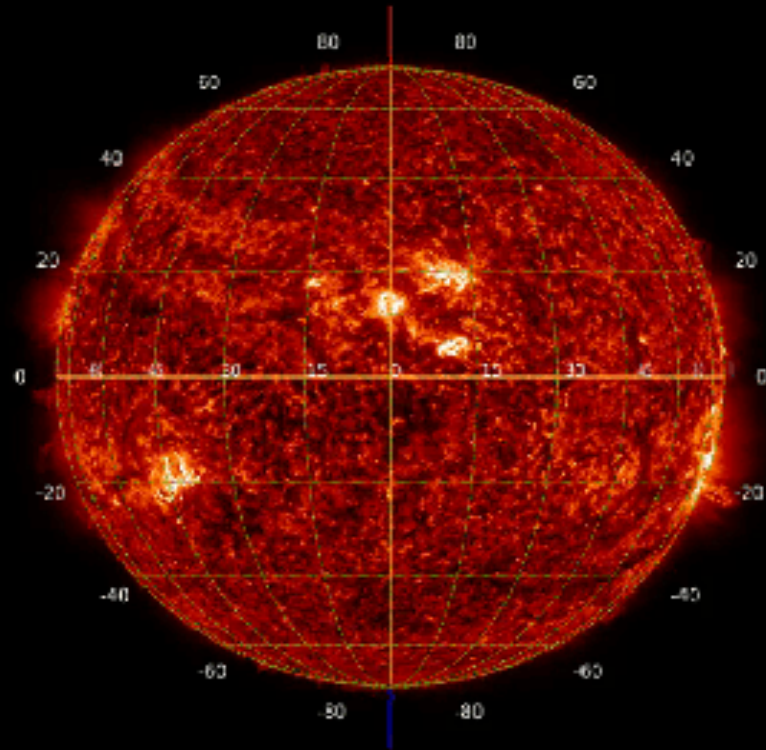
SDO/AIA 19.3 nm 2023-12-17

SDO/AIA AIA 193Å 2023-12-17T12:00:05.842



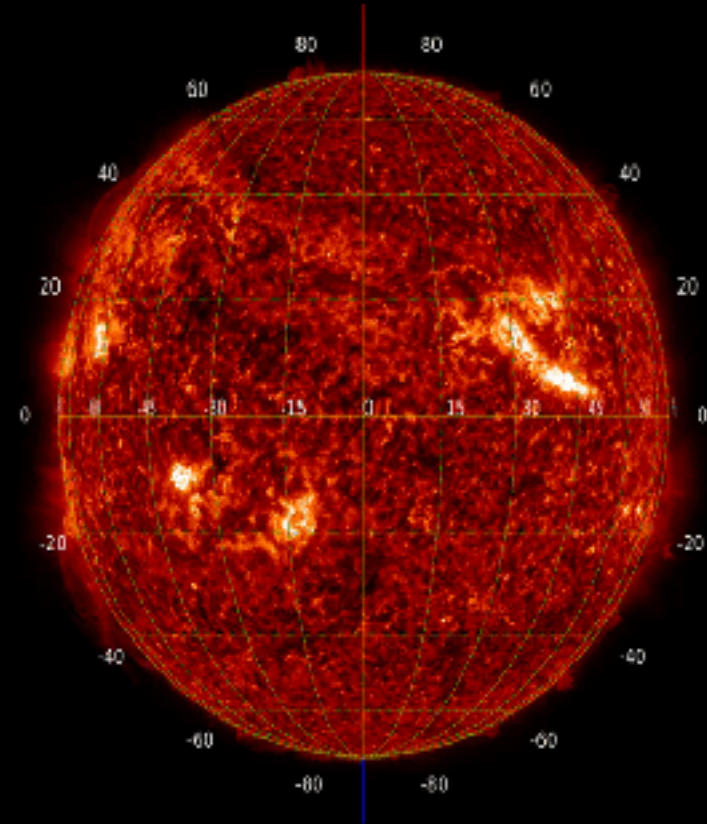
Filaments

SDO/AIA 30.4 nm 2023-12-11



2023-12-11T20:00:41.131

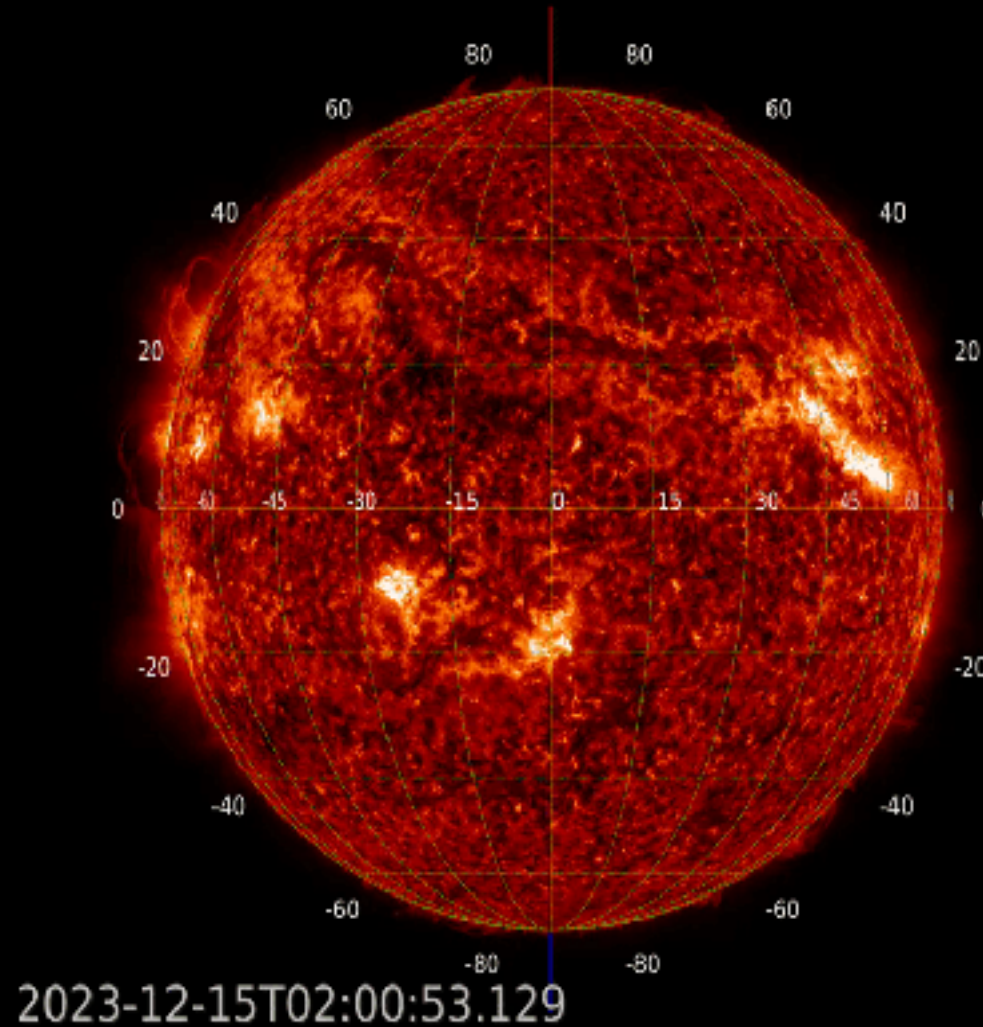
SDO/AIA 30.4 nm 2023-12-14



2023-12-14T02:00:41.129

Filaments

SDO/AIA 30.4 nm 2023-12-15



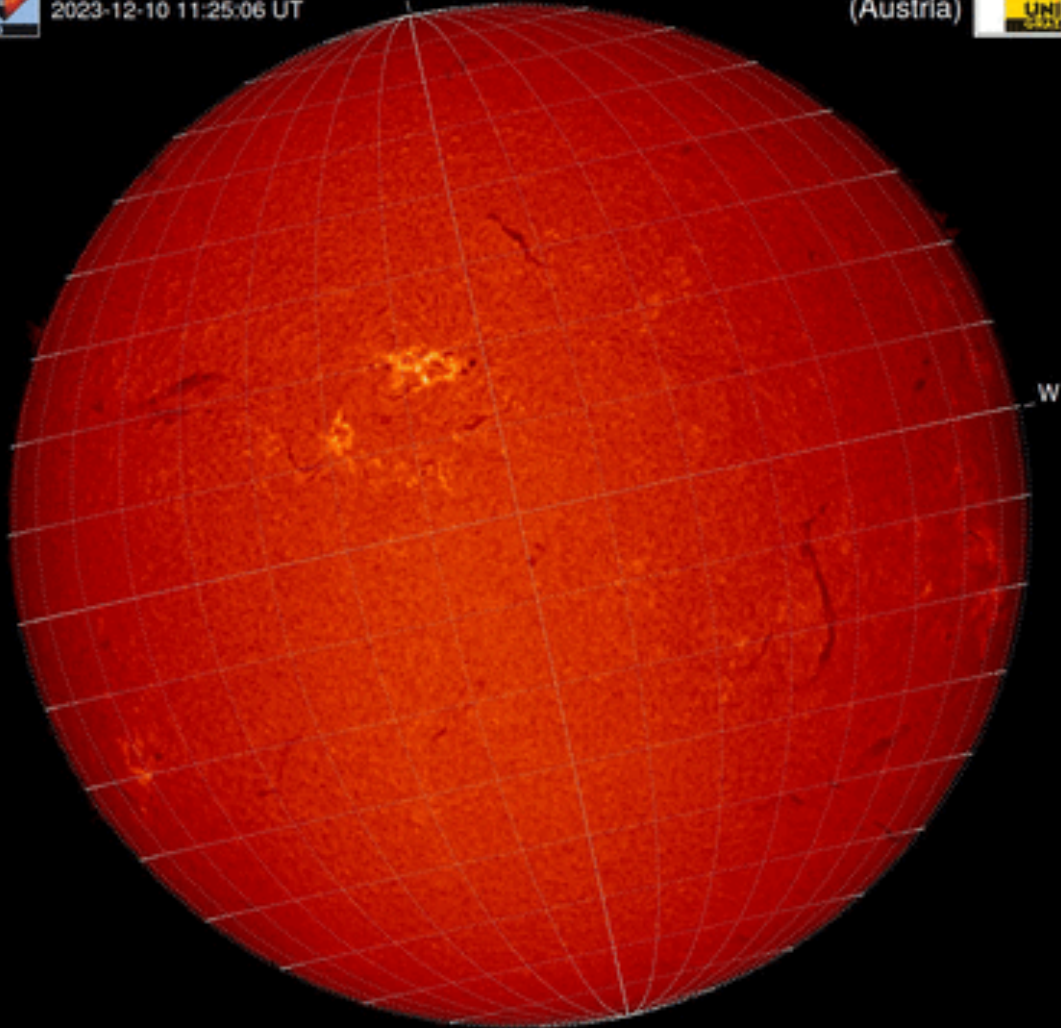
Filaments & Filament eruptions

H-alpha 2023-12-10



Kanzelhöhe Observatory
2023-12-10 11:25:06 UT

University of Graz
(Austria)

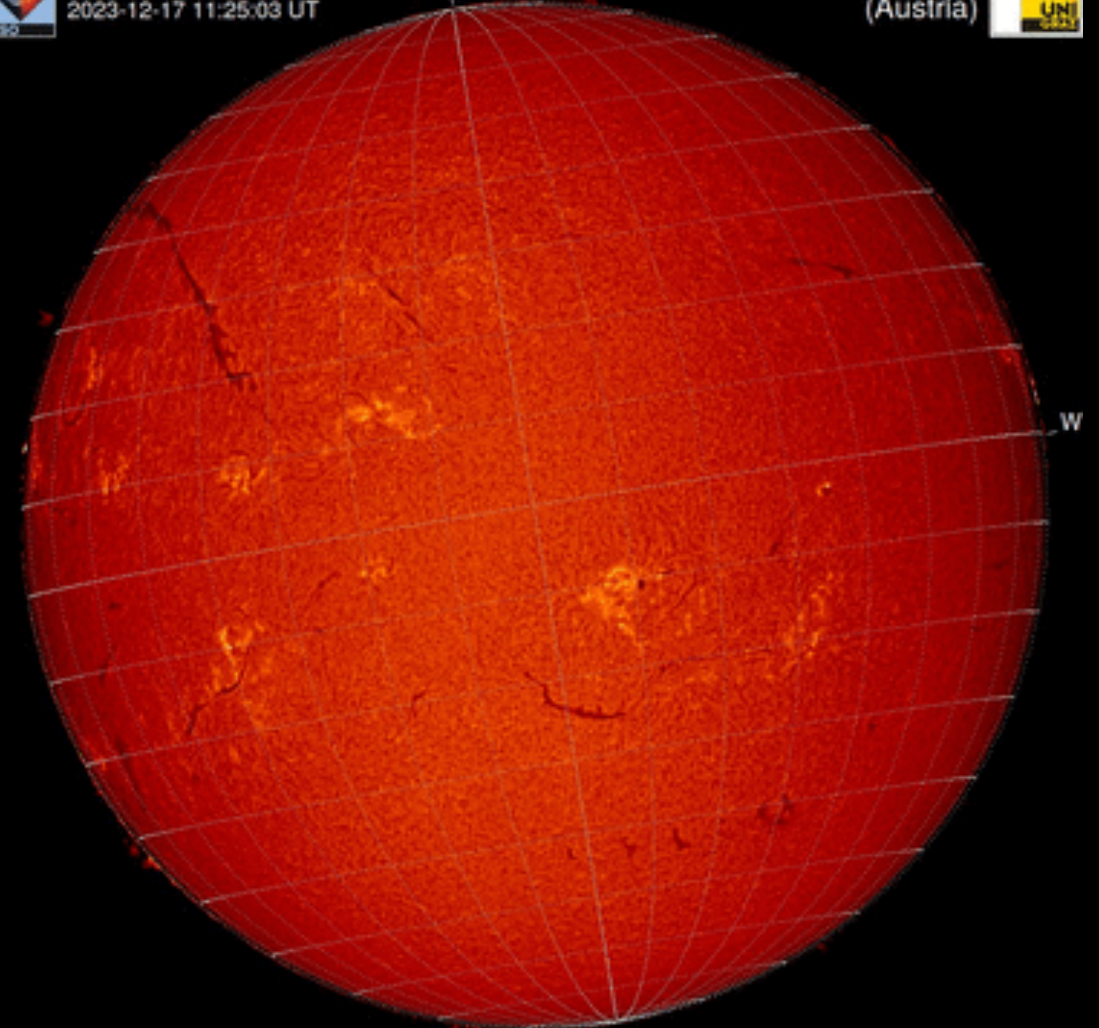


H-alpha 2023-12-17

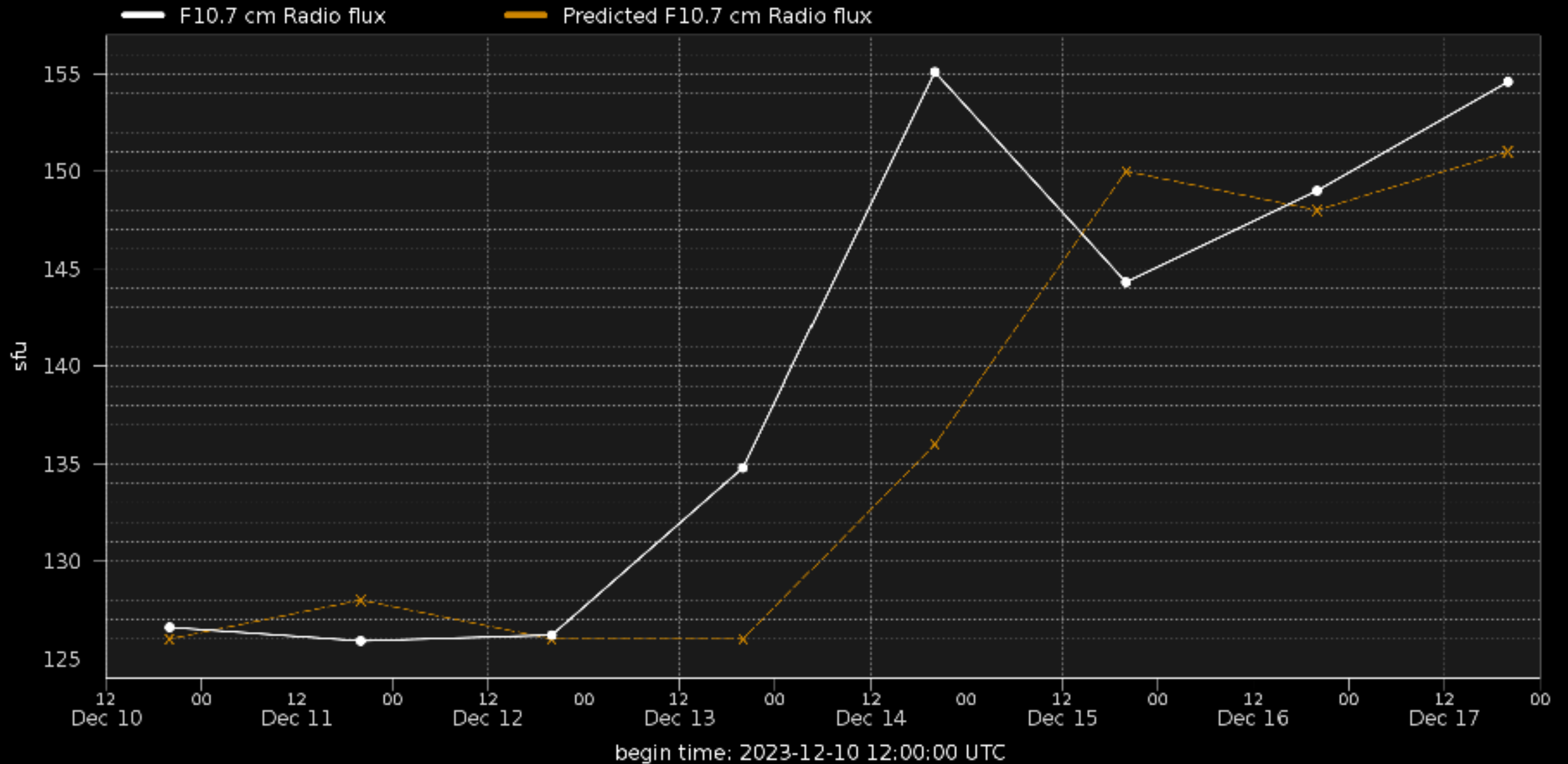


Kanzelhöhe Observatory
2023-12-17 11:25:03 UT

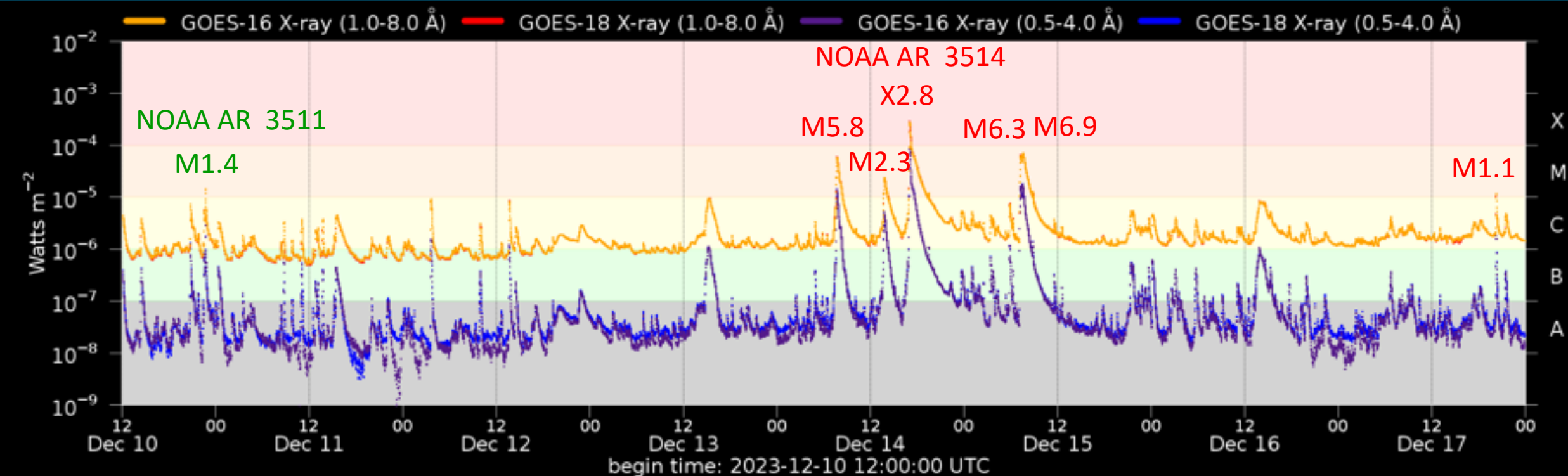
University of Graz
(Austria)



Solar F10.7cm radio flux



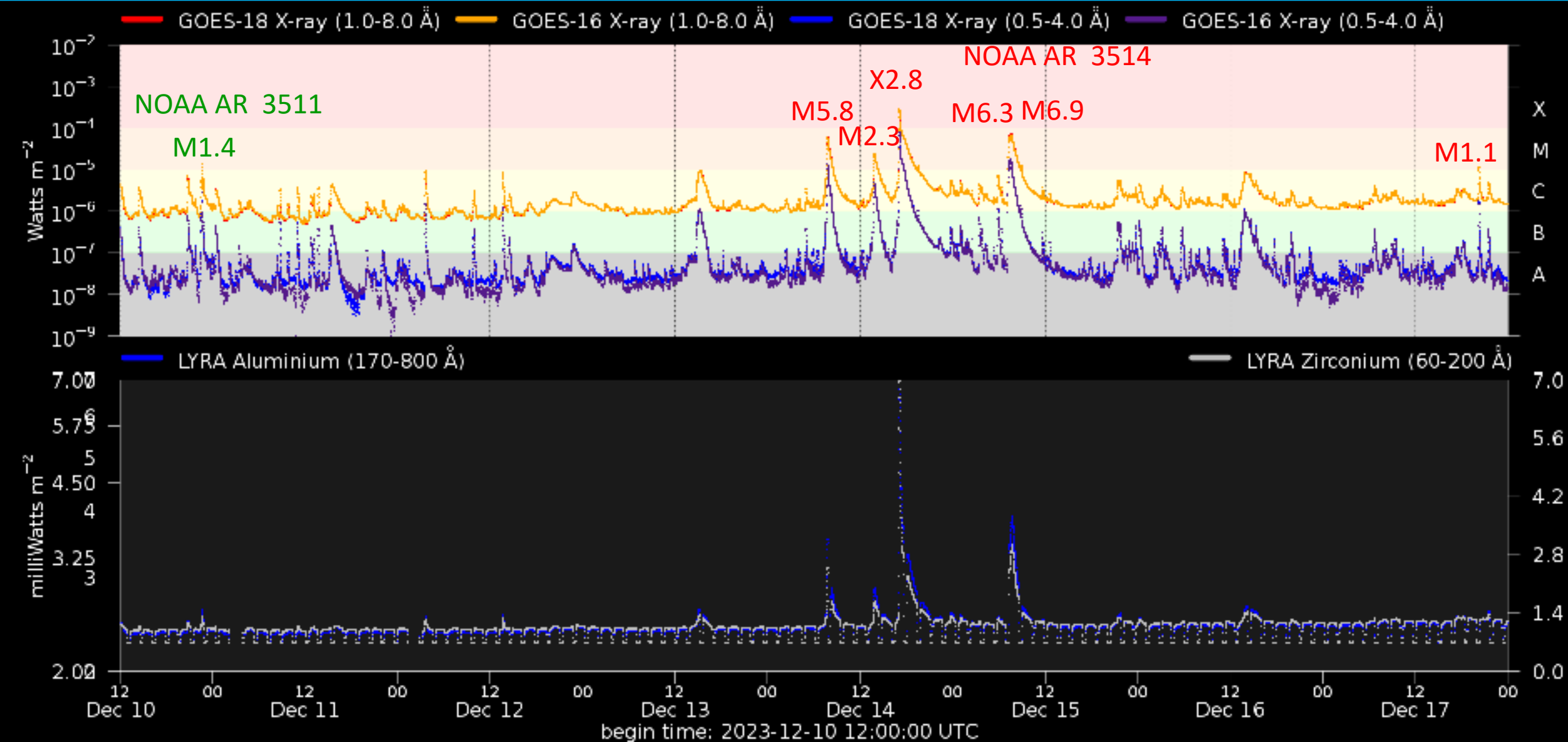
Flaring activity



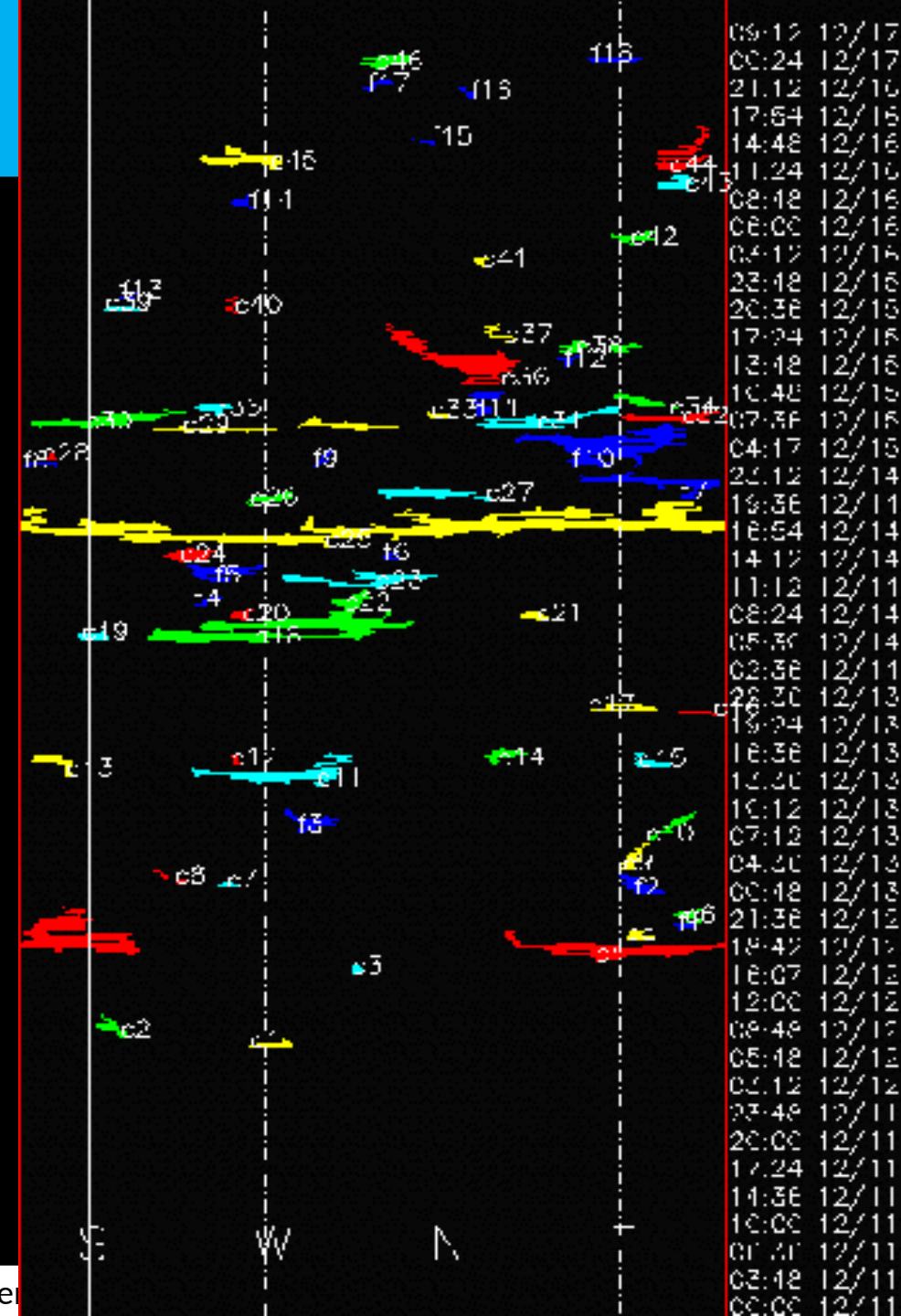
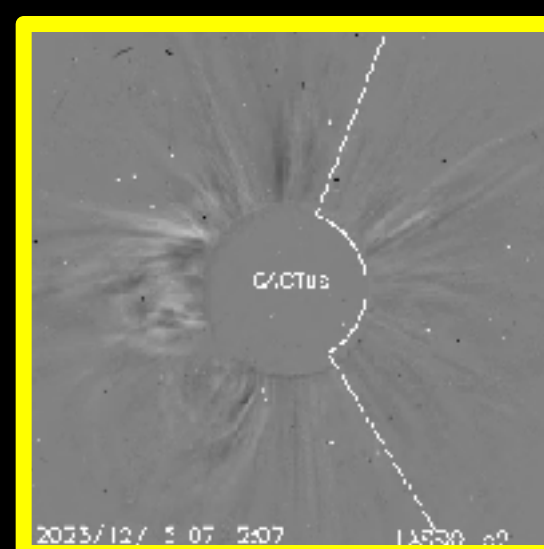
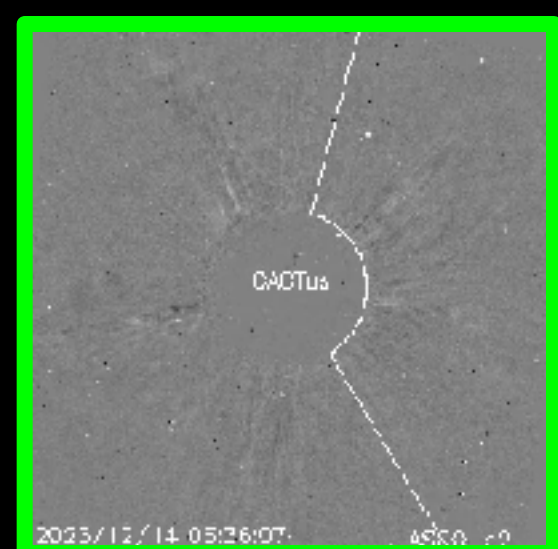
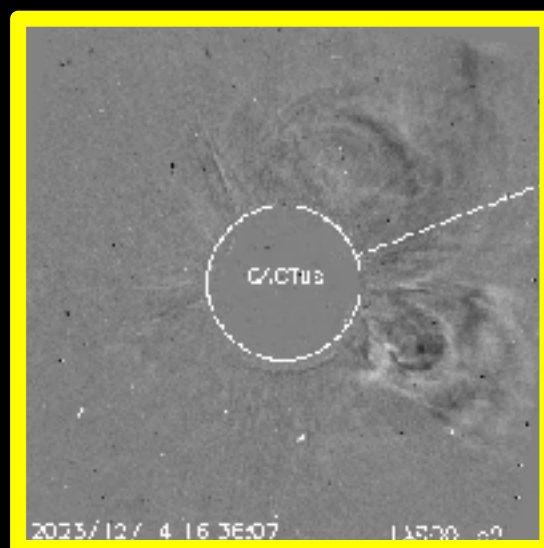
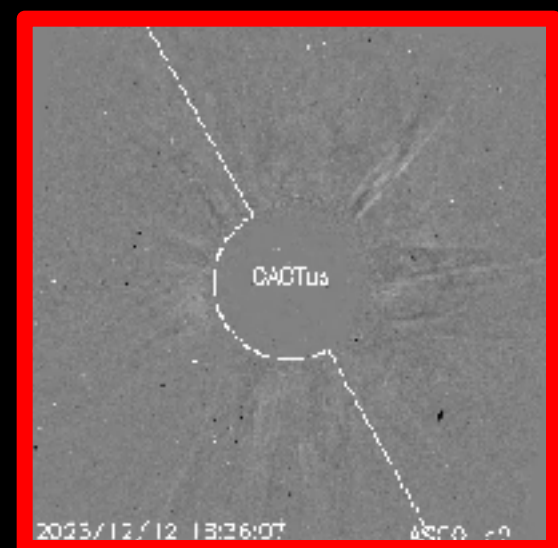
Probabilities (%) and occurrences (#) of C/M/X-flares daily, from noon to noon:

Issue date	2023-12-10	2023-12-11	2023-12-12	2023-12-13	2023-12-14	2023-12-15	2023-12-16	2023-12-17
Probability (%)	99 55 15	99 55 15	95 30 10	95 20 05	95 40 05	95 60 25	99 55 20	99 50 20
Observed (#)	17 01 00	11 00 00	07 00 00	07 01 00	10 03 01	15 00 00	10 00 00	04 01 00

Solar X-Ray and UV flux



Coronal Mass Ejections



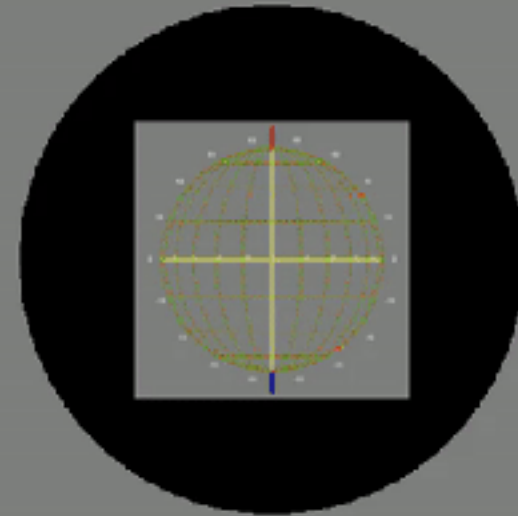
Coronal Mass Ejections

When: 23:36 UTC on Dec 12

Associated to GOES C2.8 flare from NOAA AR 3514,
which peaked at 2023-12-12T22:55 and
dimming region

Prediction: Predicted arrival at Earth at
2023-12-15T22:33:00

Shock Arrival time: 2023-12-15T10:57



2023-12-12T22:01:04.835

Coronal Mass Ejections

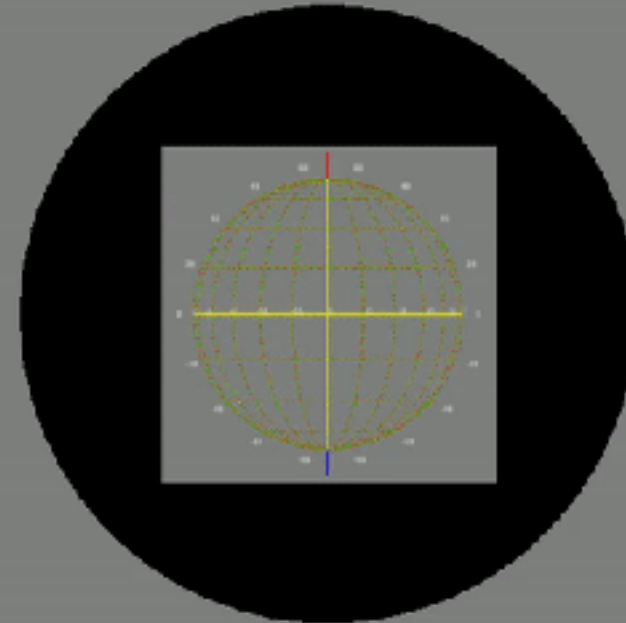
When: 07:39 UTC on December 14
Associated to a GOES M5.8 flare from NOAA AR 3514, peak time 07:44 UTC on Dec 14 and small coronal dimming

When: 14:20 UTC on December 14
Associated to a filament eruption

When: 17:24 UTC on December 14
Associated to a GOES X2.8 flare from NOAA AR 3514, peak time 17:02 UTC on Dec 14, Type II and Type IV radio emission

Prediction: Predicted arrival at Earth
2023-12-17T02:03:00

Shock Arrival time: 2023-12-17T05:50



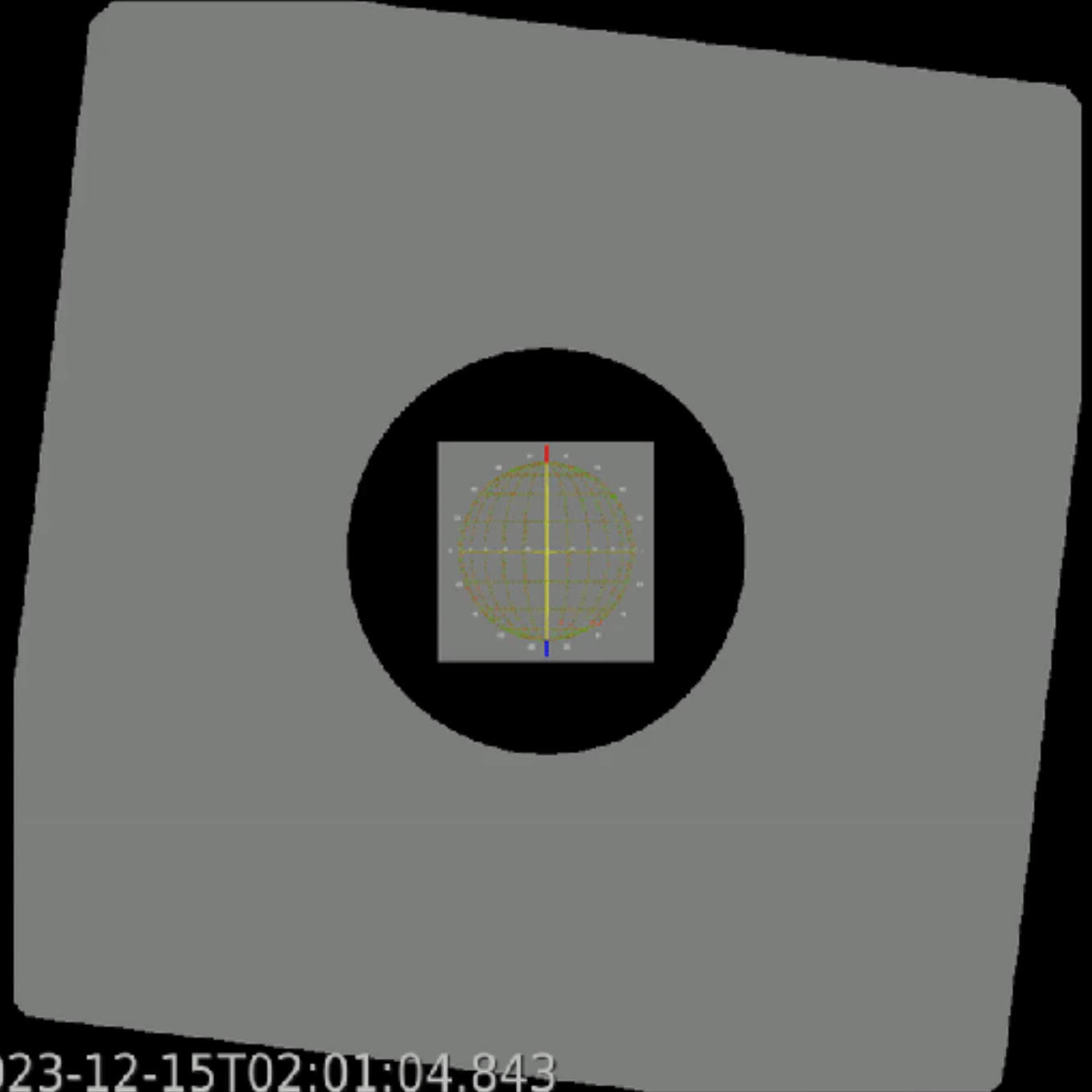
2023-12-14T02:00:41.129

Coronal Mass Ejections

When: 07:48 UTC on December 15
Associated to a GOES M6.3 and M6.9 flares from
NOAA AR 3514, peak time 07:15 UTC
and 07:34 UTC on Dec 15, and type IV radio burst

Prediction: No or little impact

2023-12-15T02:01:04.843



Solar Wind and

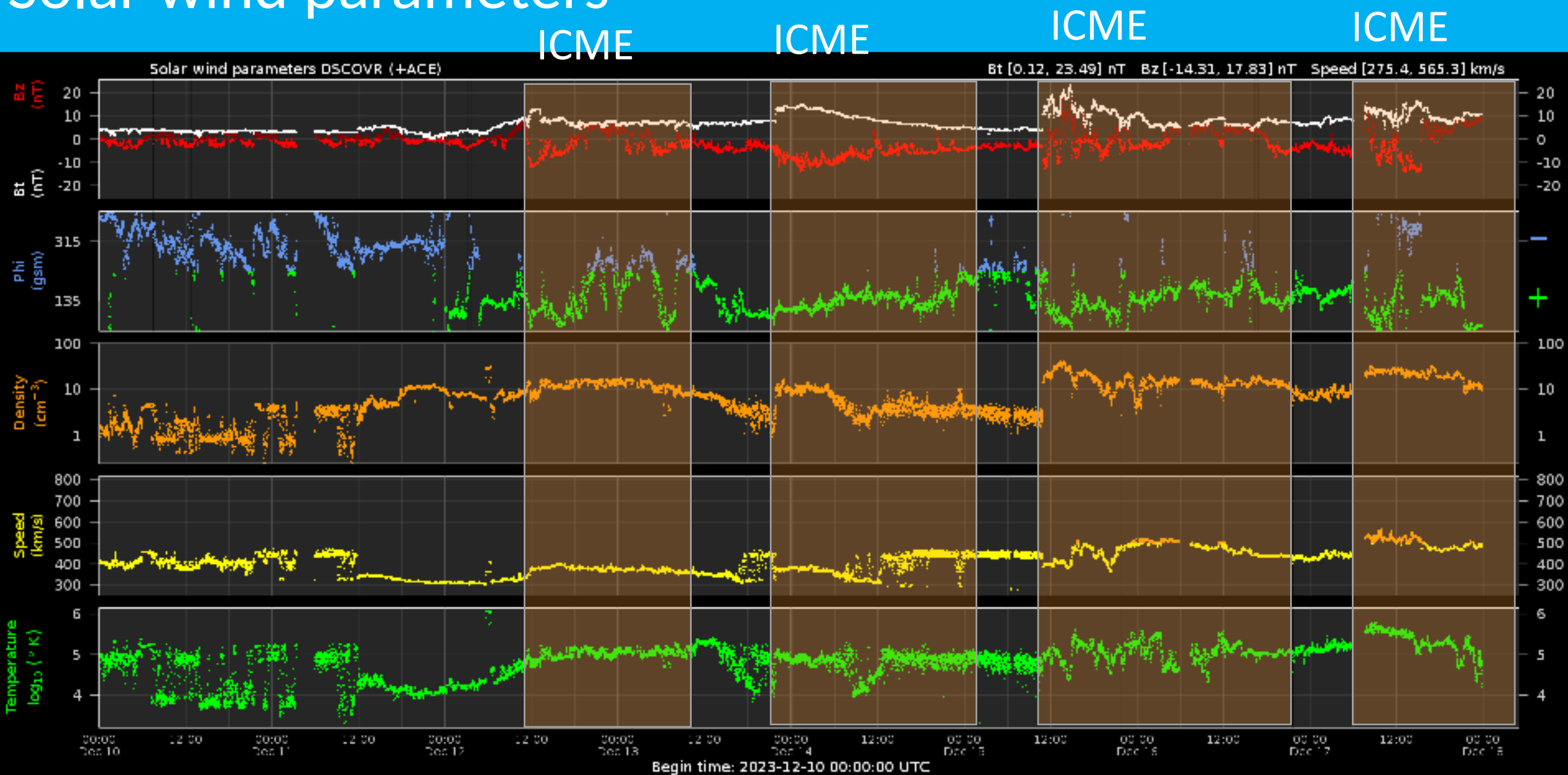
Geomagnetic Activity



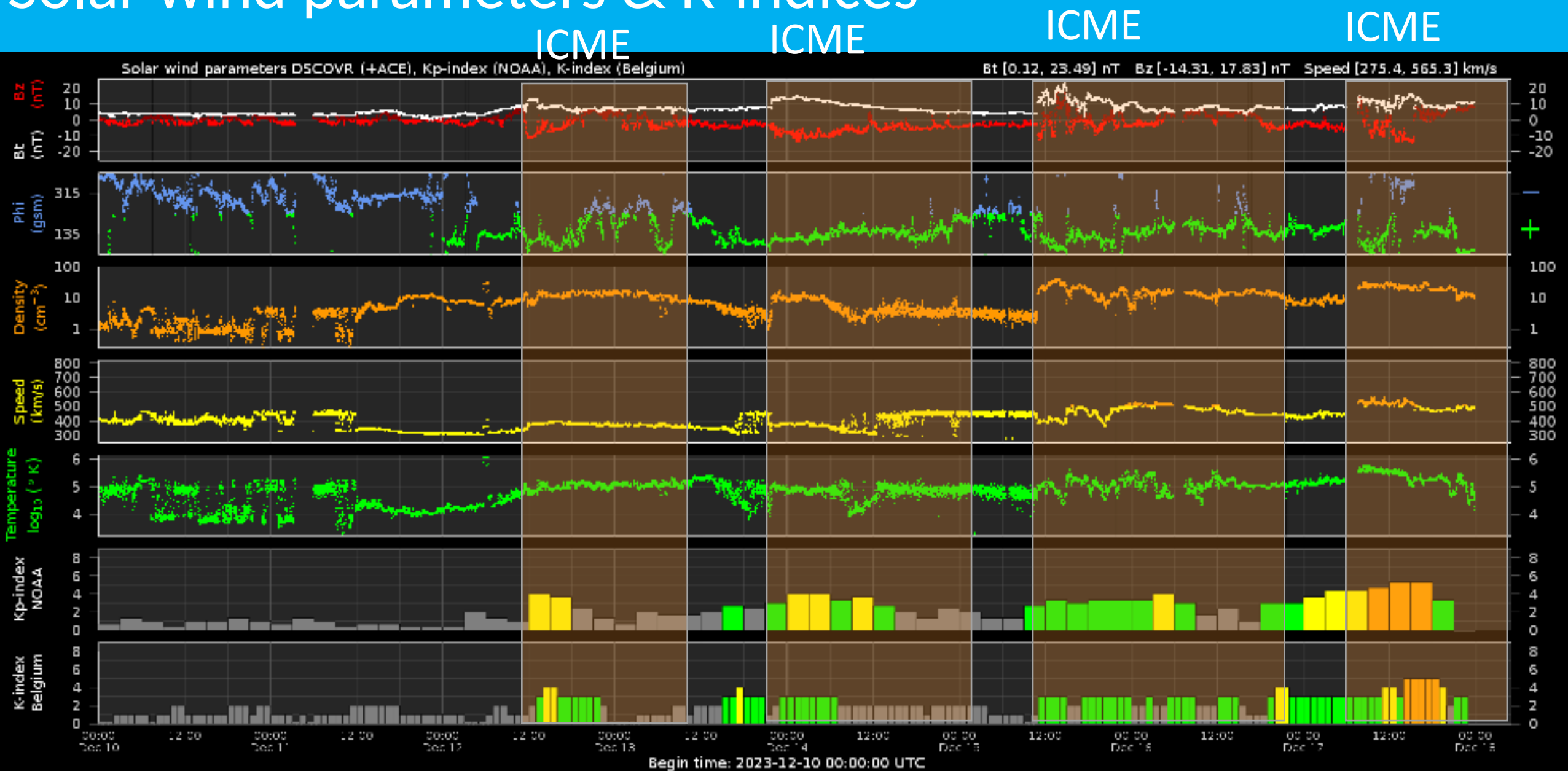
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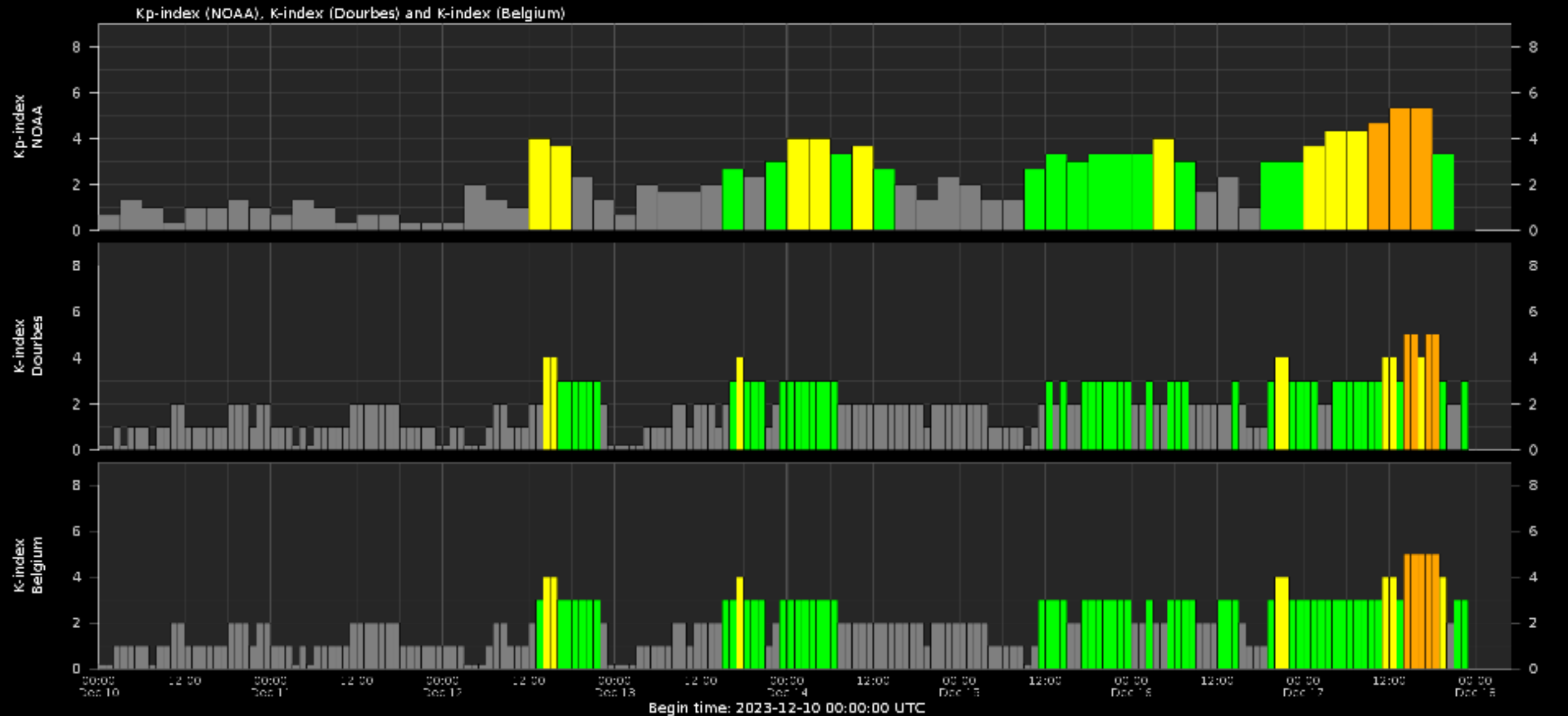
Solar wind parameters



Solar wind parameters & K-indices



Geomagnetic activity (K-indexes)



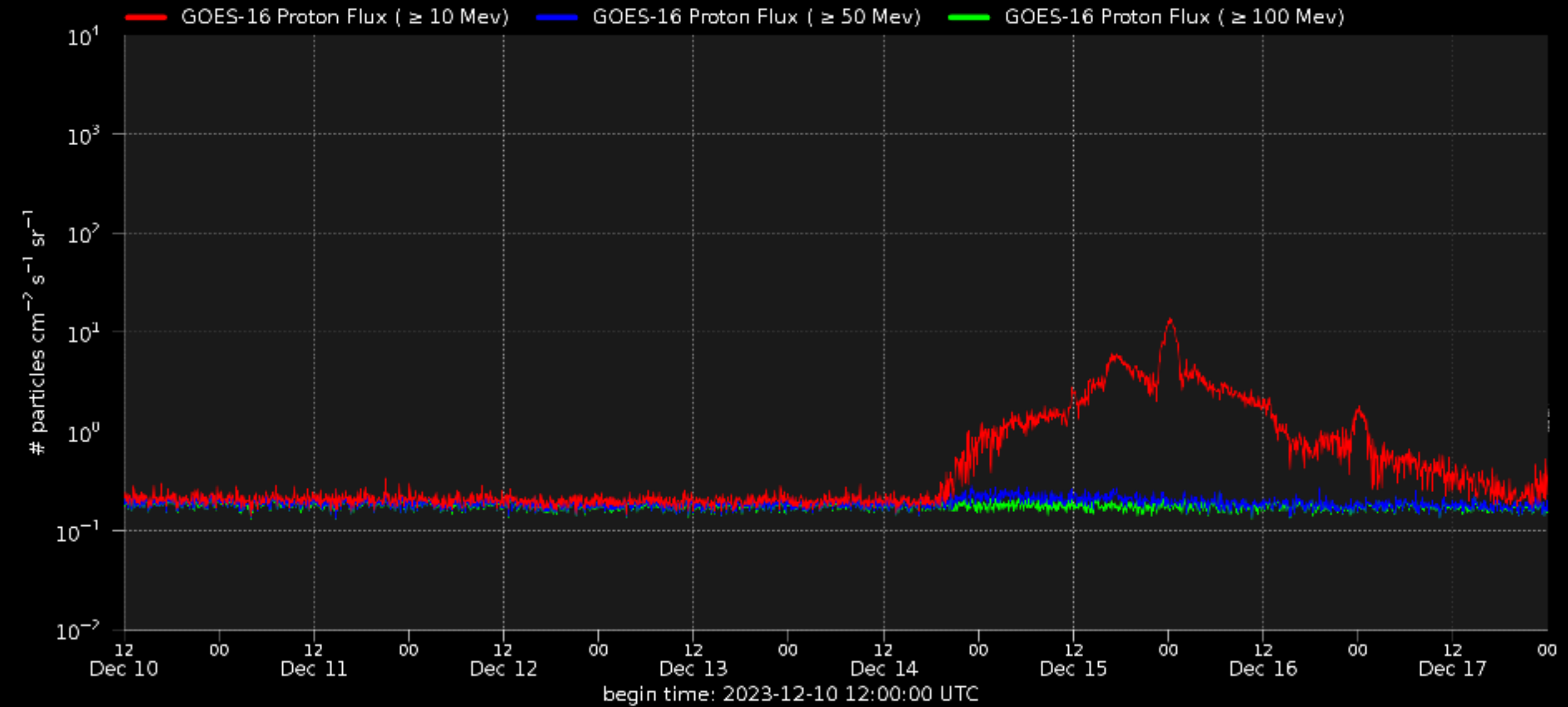
Energetic Particles



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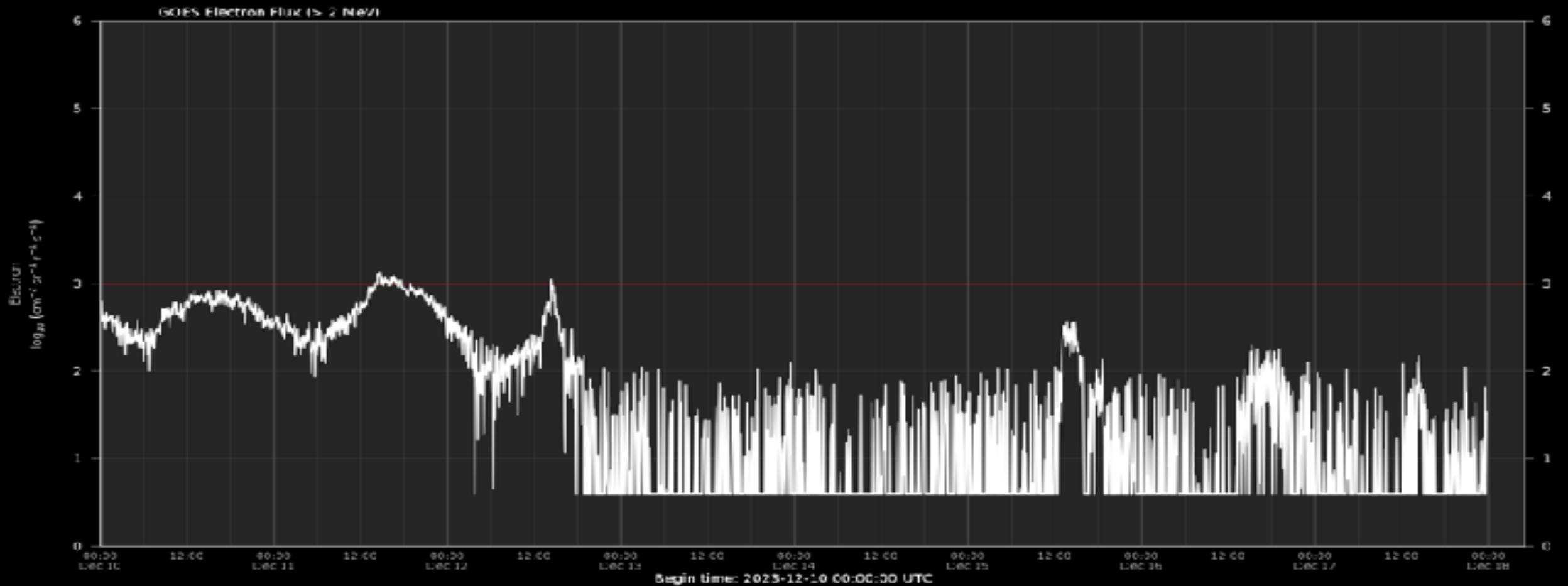
Solar proton flux



Electron flux at GEO

www.stce.be/educational/classification#electrons

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



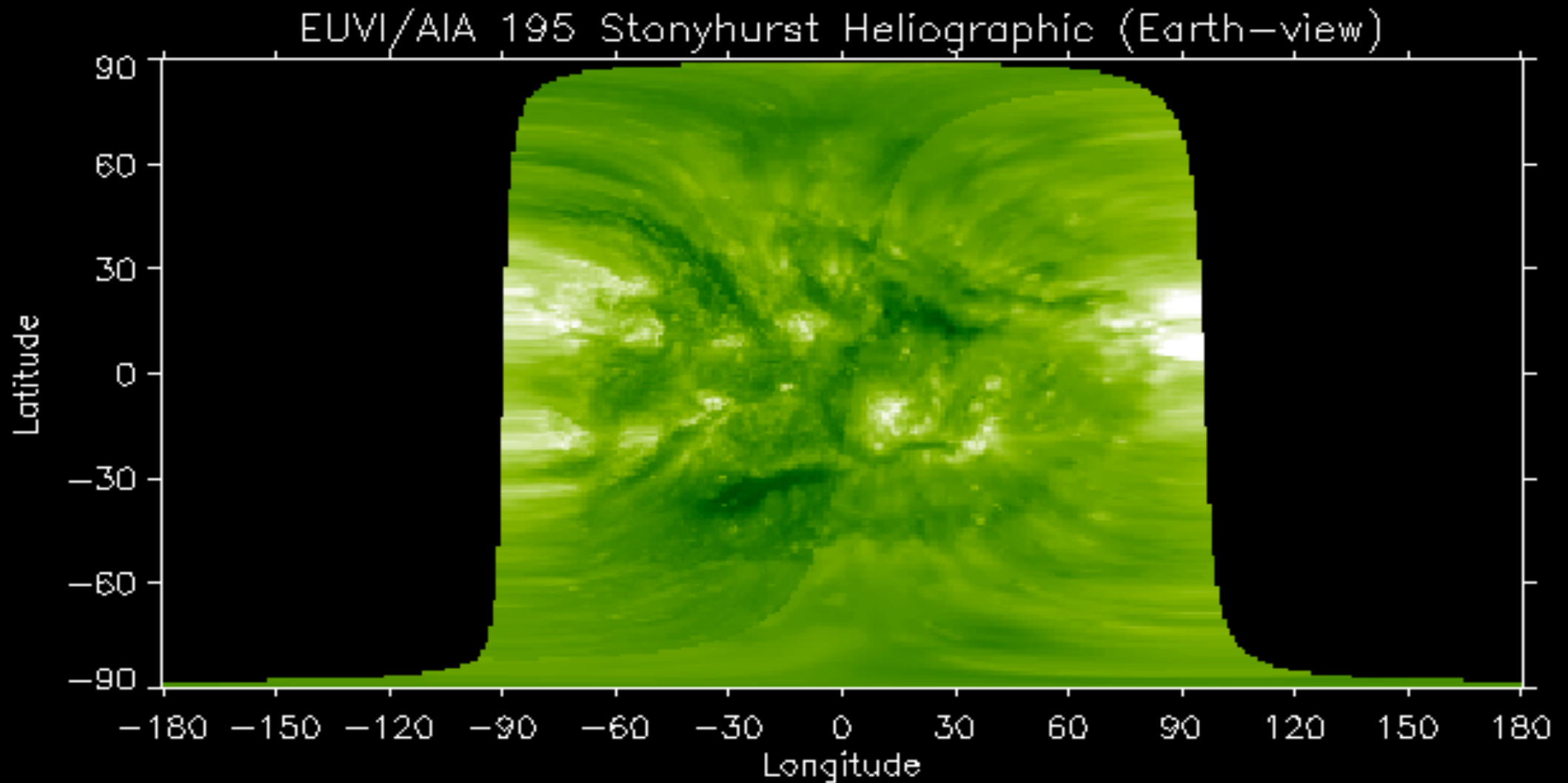
Outlook



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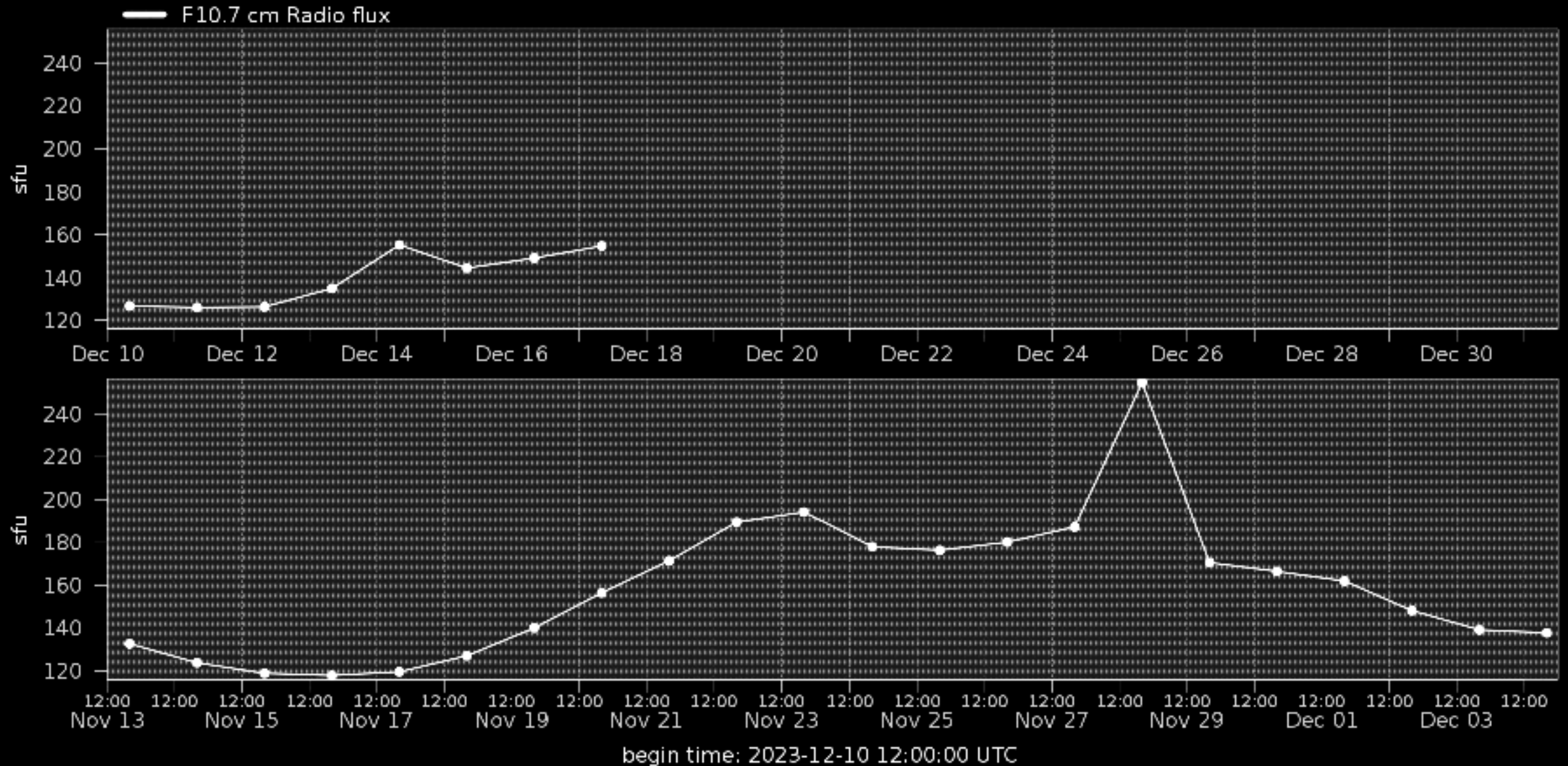
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Outlook: Solar activity

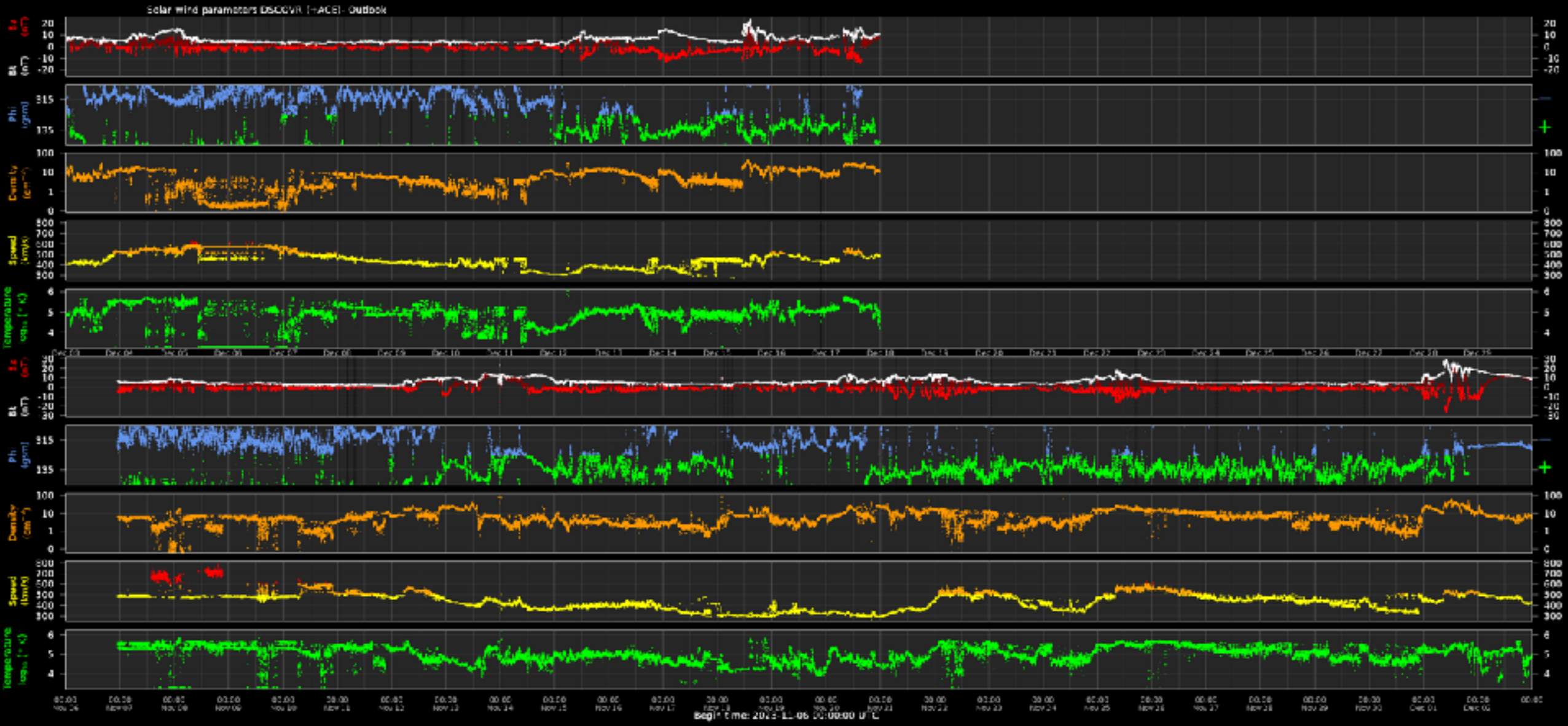


Observation date: 2023/12/17 20:35:00

Outlook: Solar F10.7cm radio flux



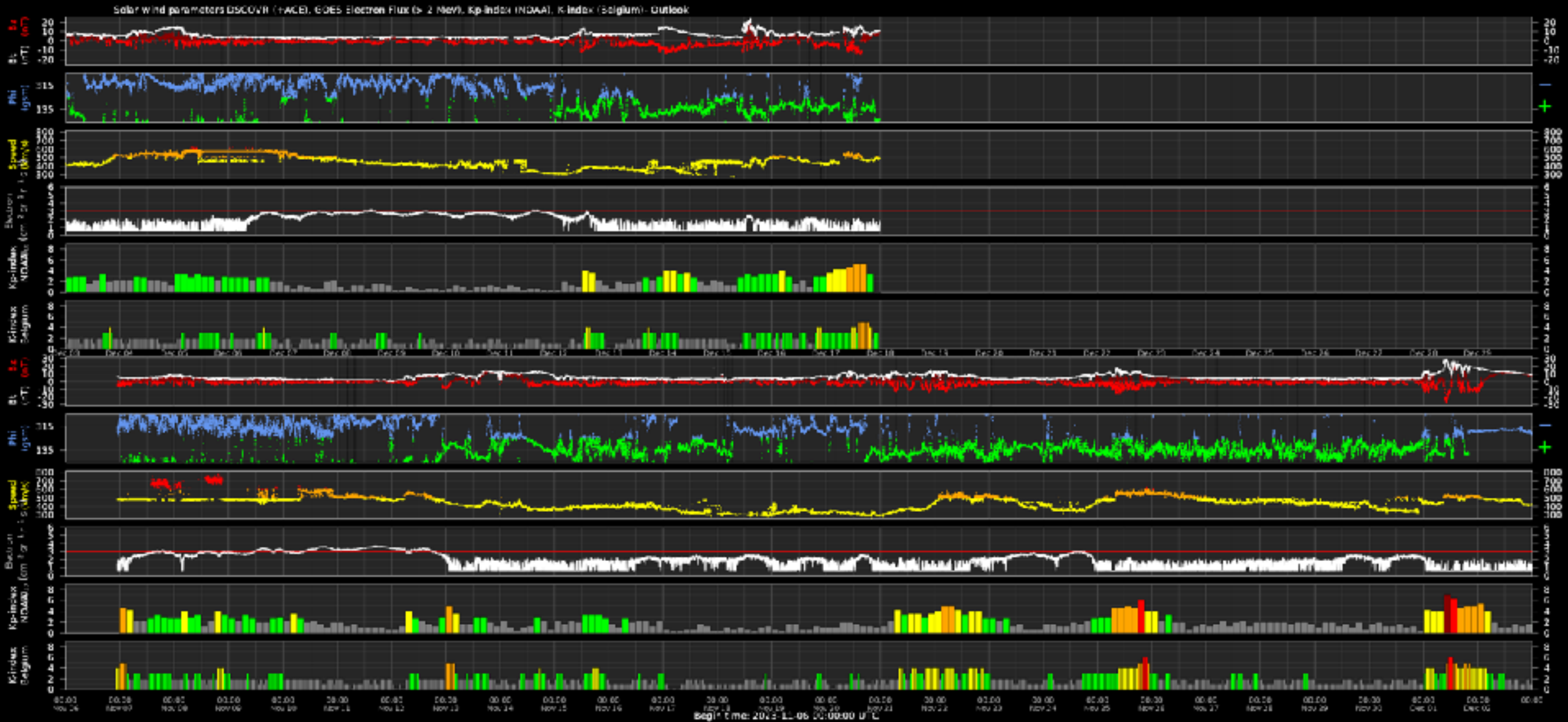
Outlook: Solar wind parameters



Outlook: Geomagnetic activity



Outlook: Electron Flux at GEO Outlook



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