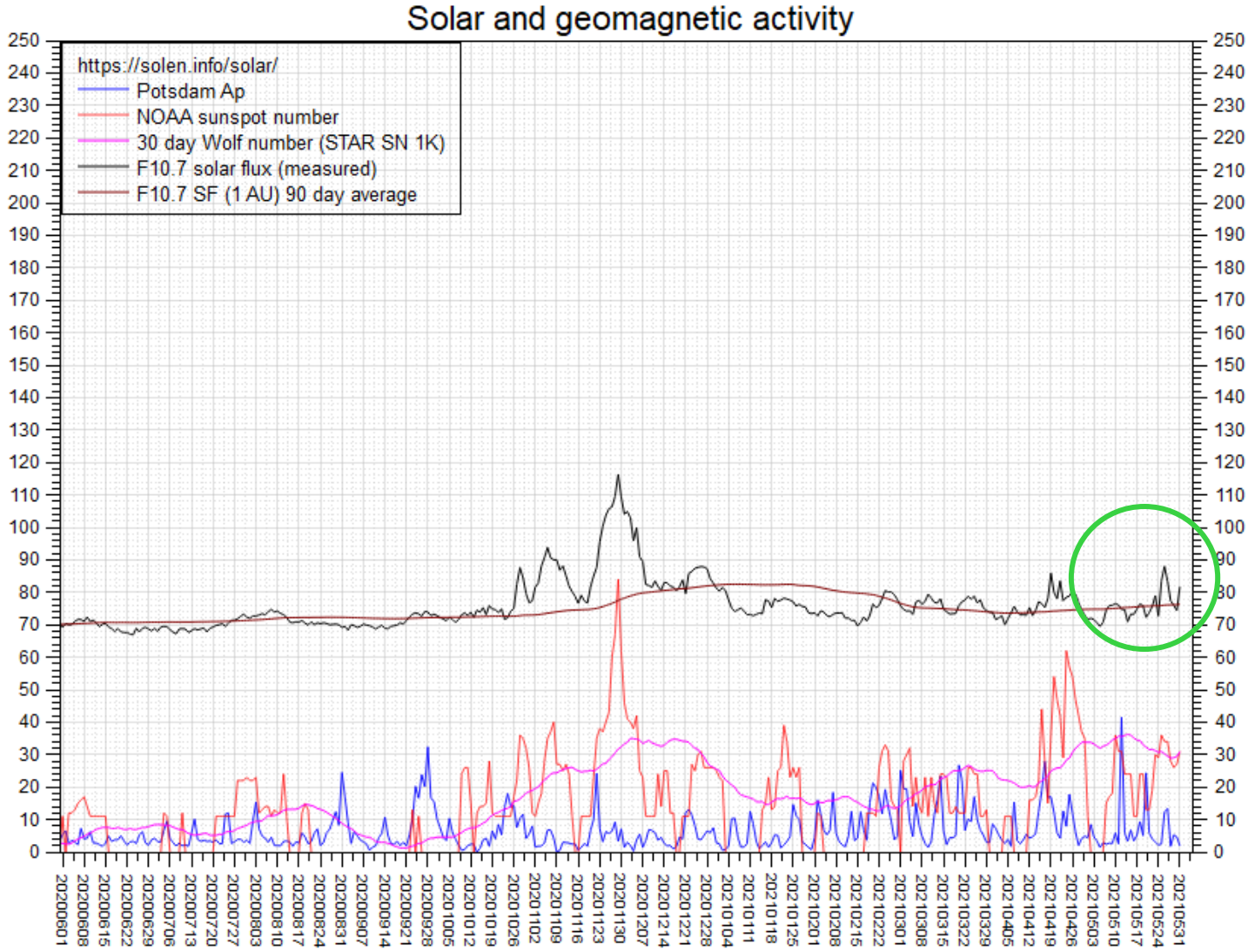
SOLAR WEATHER
1 JUNE 2021

Lewis Thompson
W5IFQ

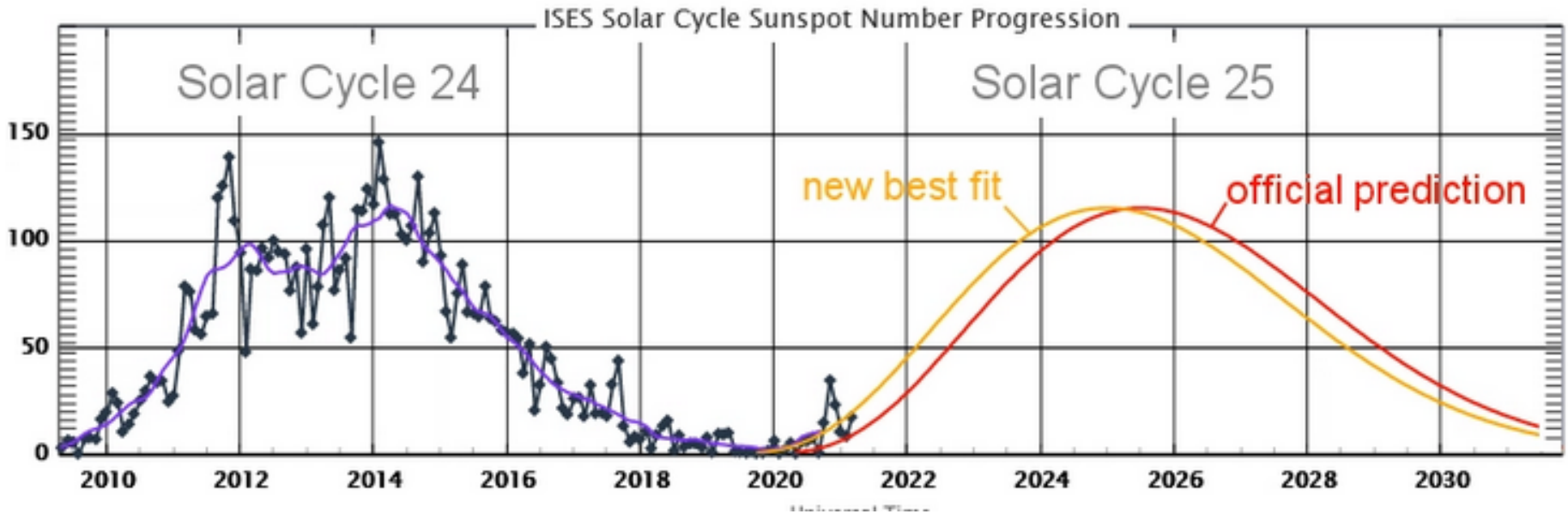
Taken by Harlan Thomas on May 27, 2021 @ Wheatland County, Alberta

SOLAR FLUX INDEX – 2021

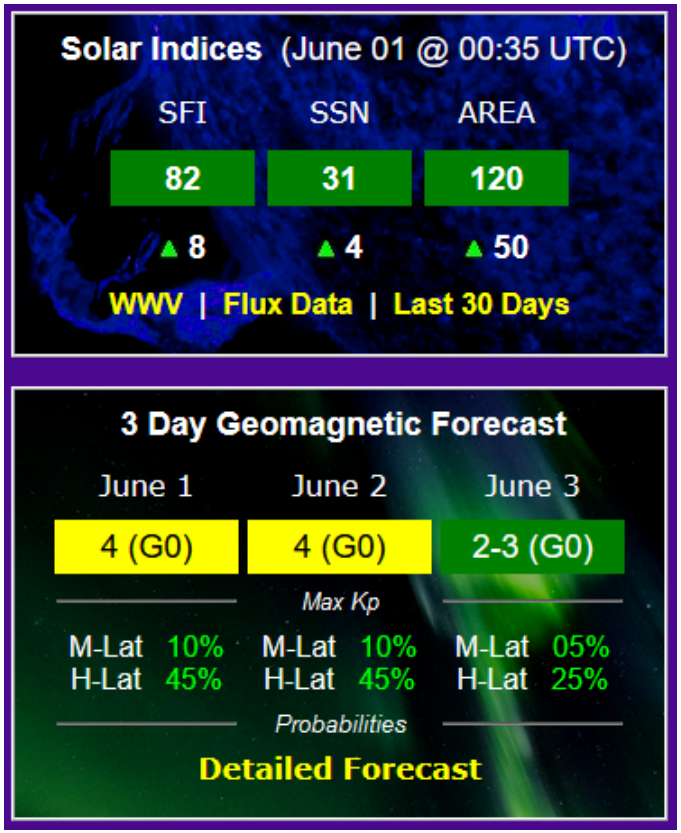


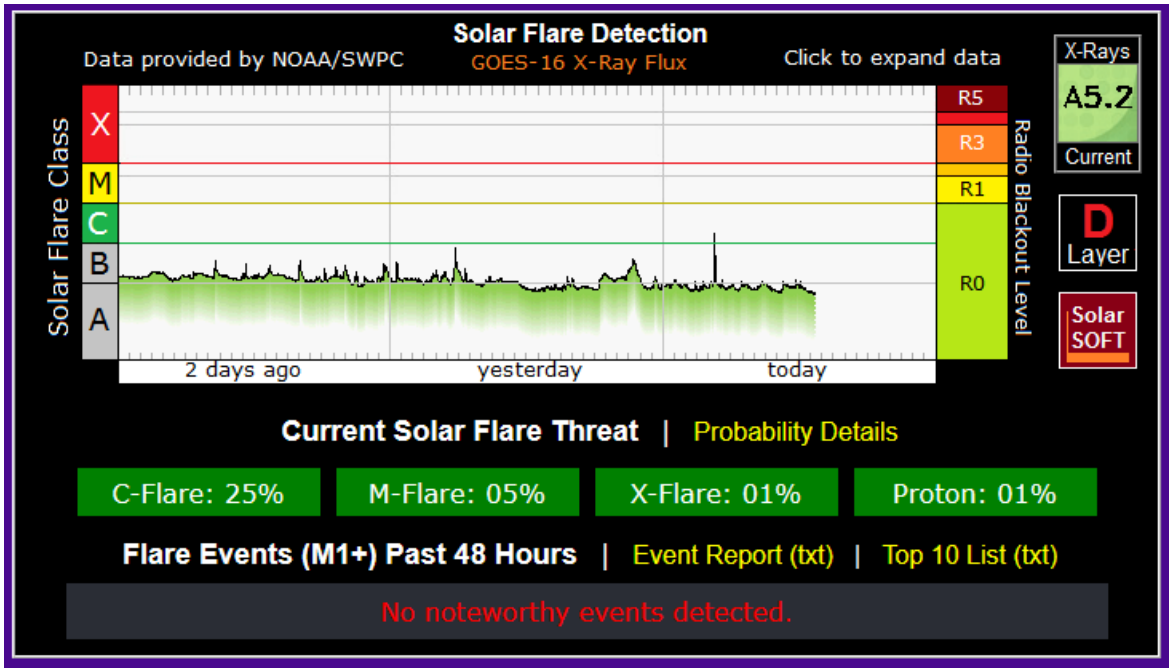
SF 81.7 (11.1 increase from one previous 27 day solar rotation)

Solar Cycle 25 Prediction



SolarHam.org Forecast

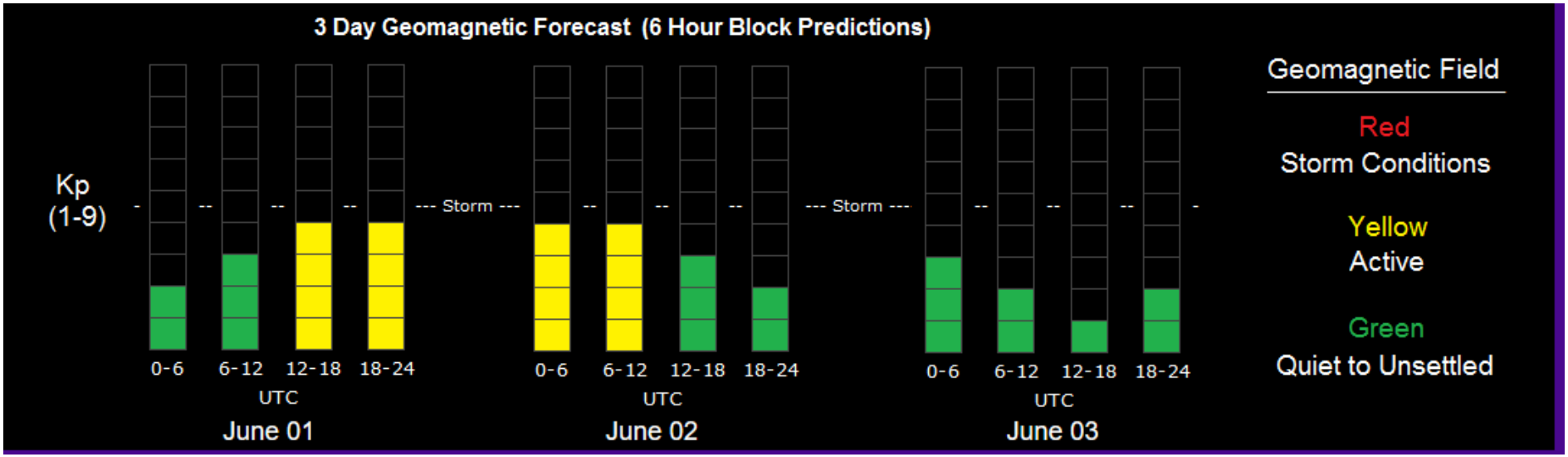




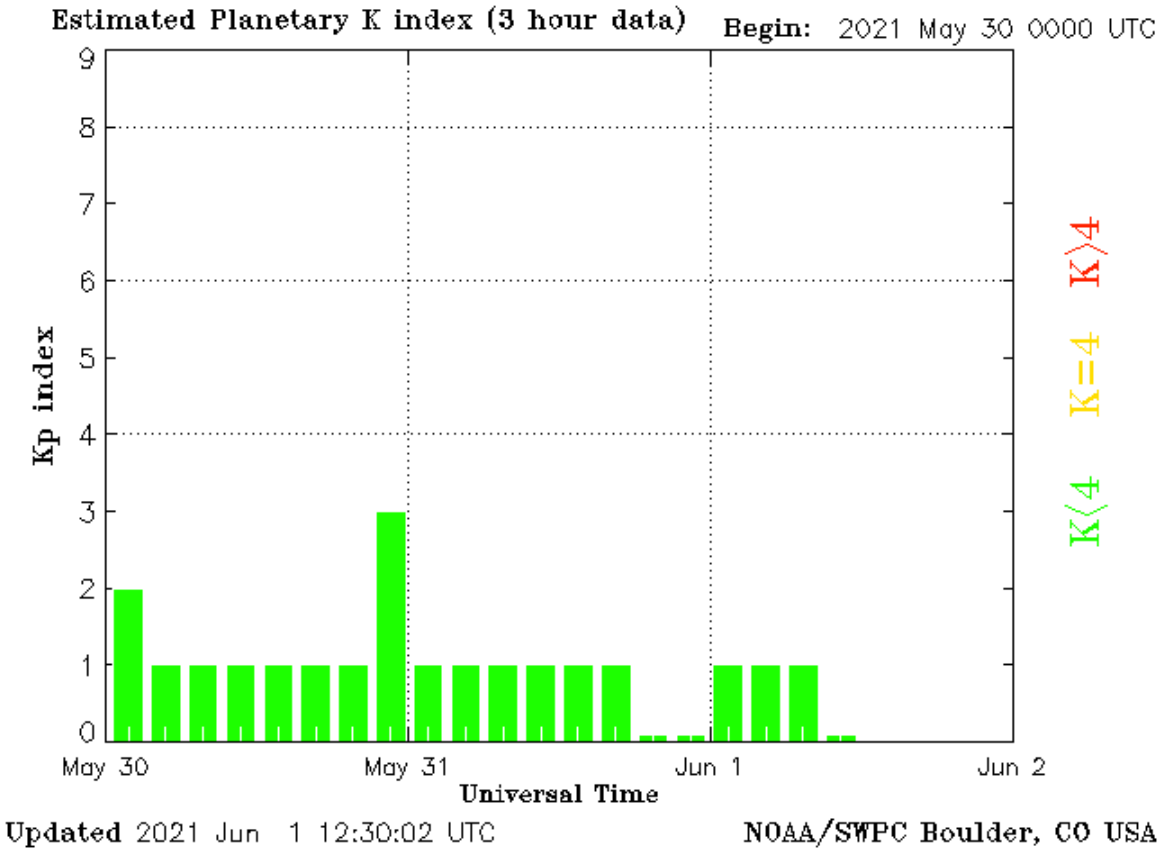
.24 hr Summary...
The geomagnetic field was quiet.

.Forecast...
The geomagnetic field is expected to be at elevated with unsettled and active conditions likely on 01-02 Jun due to the influence of a negative polarity CH HSS and the anticipated glancing-blow arrival of the 28 May CME. Levels may remain elevated but starting to return toward ambient on 03 Jun, as CH and CME influences wane.

Detailed Geomagnetic Forecast (Soarham.org)



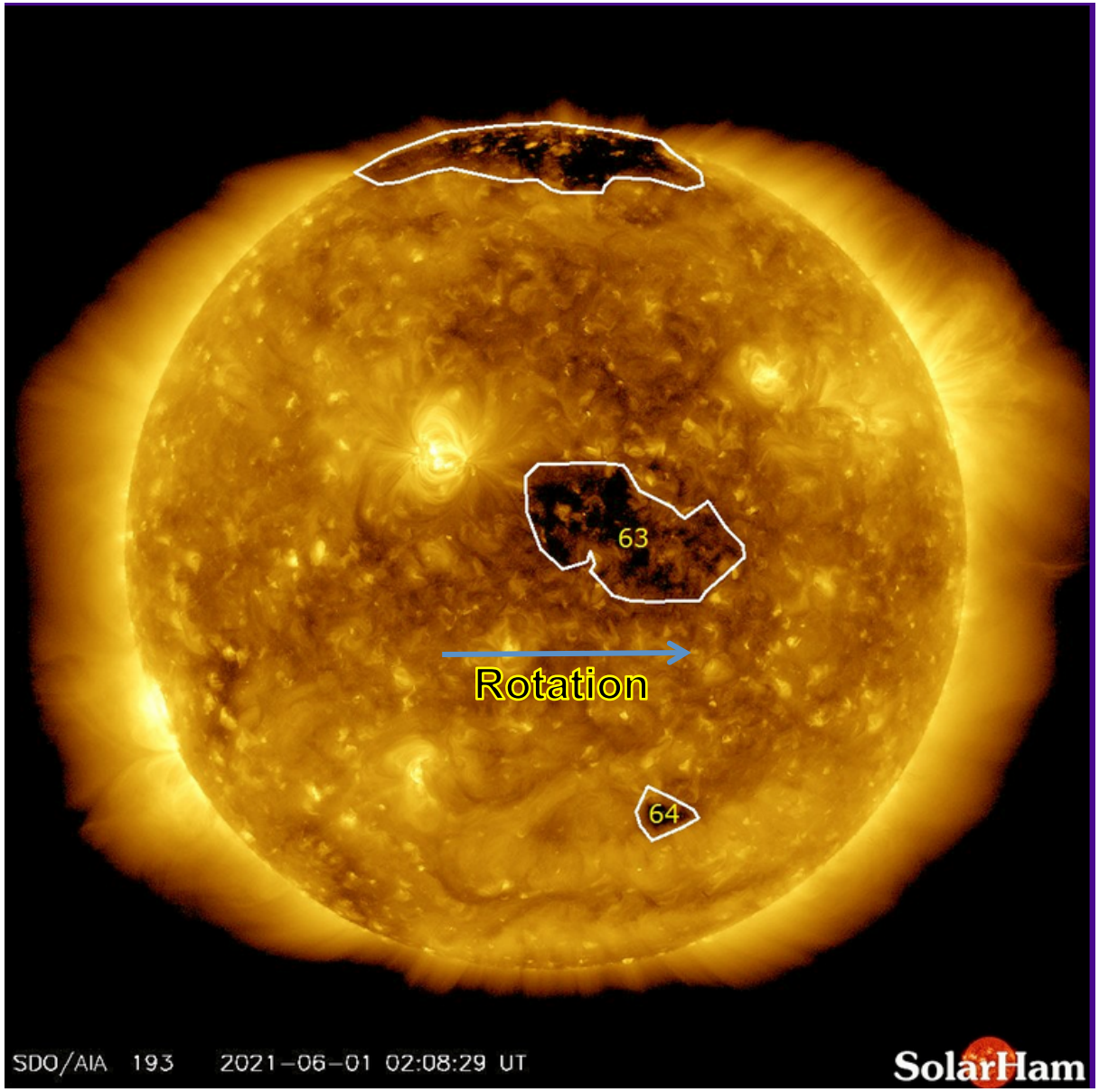
Planetary K index May 30 – 1 June



Generally, as planetary K-Index rises, critical frequency is suppressed.

K-Index	Effect
0-2	Inactive/Quiet, no impact on HF
3-4	Unsettled/Active, minor HF fade in higher latitudes
5-6	HF fade at higher latitudes
7-8	HF sporadic
9	HF impossible above 40M

Coronal Holes – 1 June 2021



Analysis

Coronal hole #63 is now facing Earth. A solar wind influence past Earth should be expected by later this week.

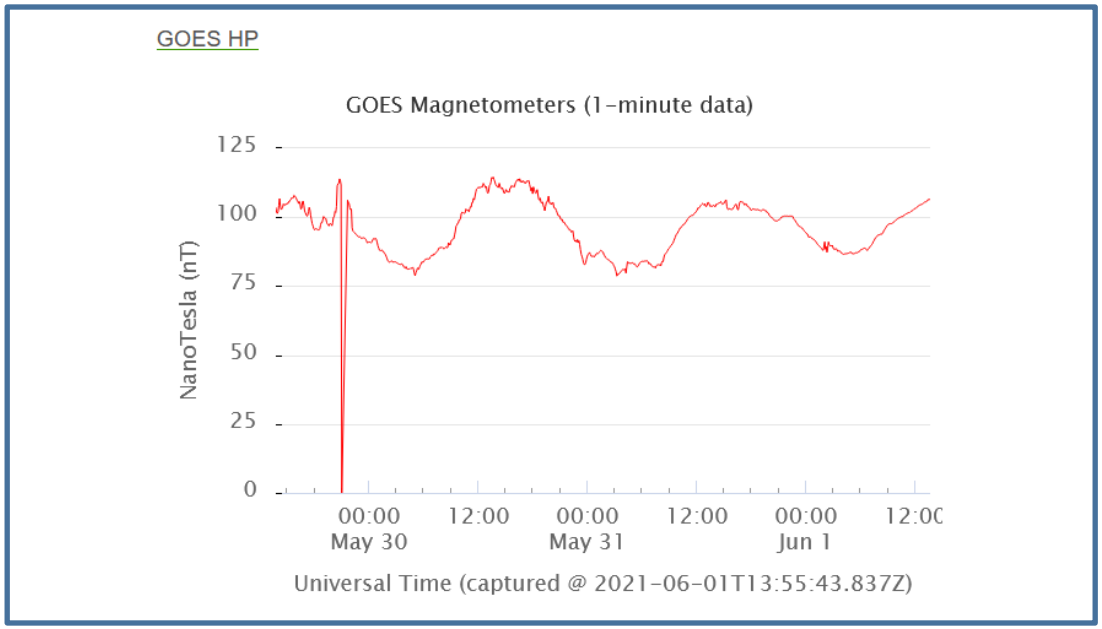
Coronal Hole History – May 2021

STAR Coronal hole tag	Location	Earth facing position - date interval	Geomagnetic disturbance - date interval	Kp dominant / Kp max / ap max	Max solar wind speed (km/s)	Comment
CH1013	trans equatorial	2021.05.15-2021.05.17	2021.05.19-2021.05.21	4/5/48	569	
CH1012	southern	2021.05.10	2021.05.14-2021.05.15	2/3/18	424	

Geomagnetic Conditions: 1 June 2021

Solar wind:
Bz = 1 nT North
speed = 295 km/sec
density = 6.48 protons/cm^3

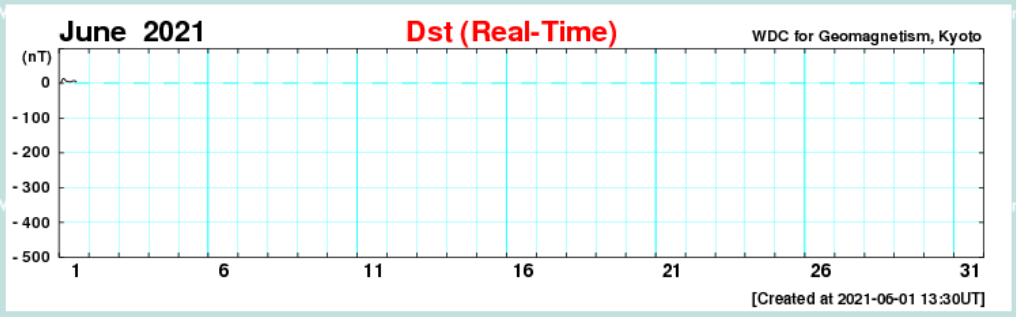
(From – NOAA DSCOVR
In L1, Lagrange Point)



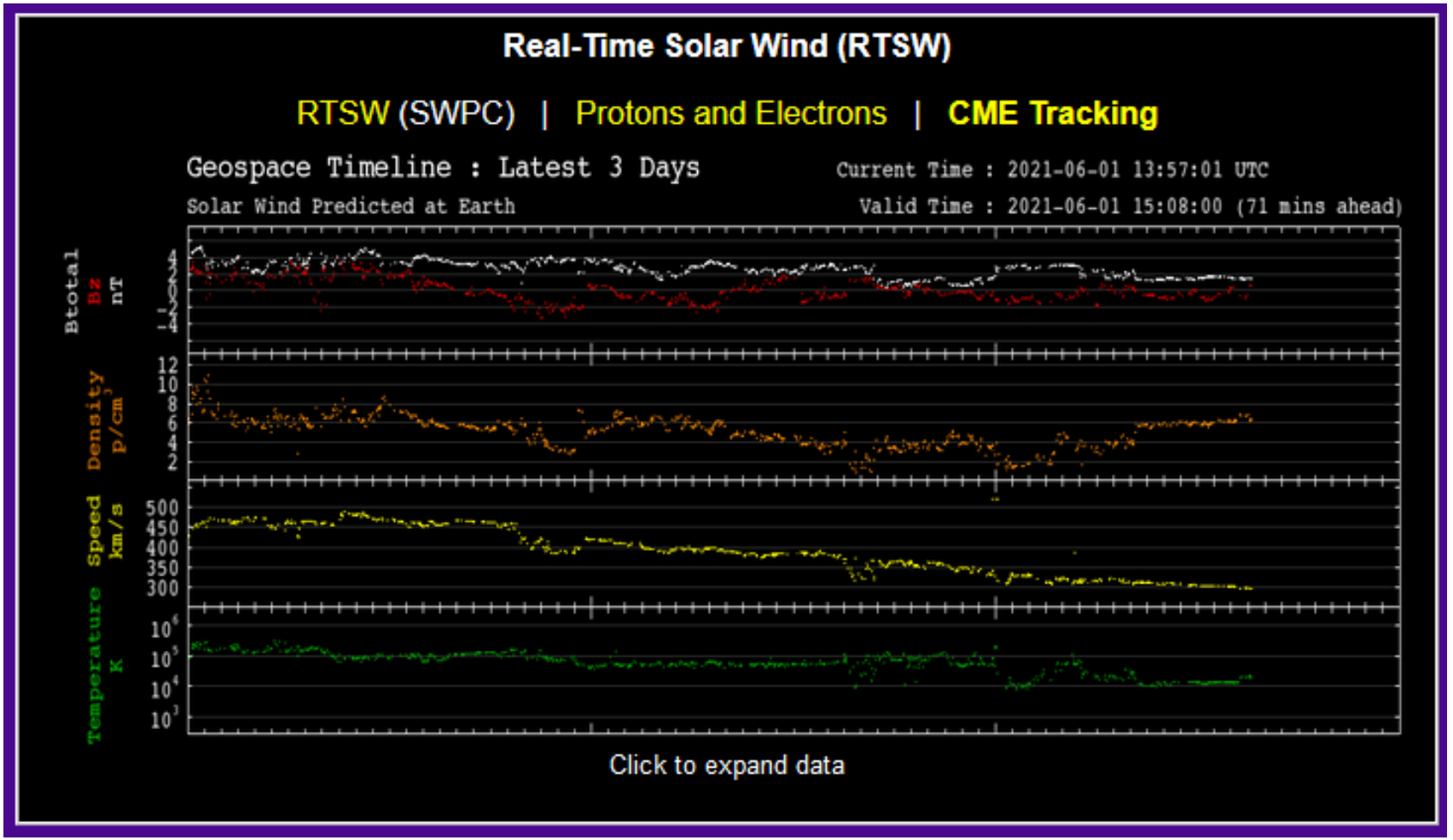
From – GOES 16
In geostationary orbit

Dst = 5 nT (Ring Field)

(From – Data Analysis Center
For Geomagnetics and Space
Magnetism – Kyoto University)

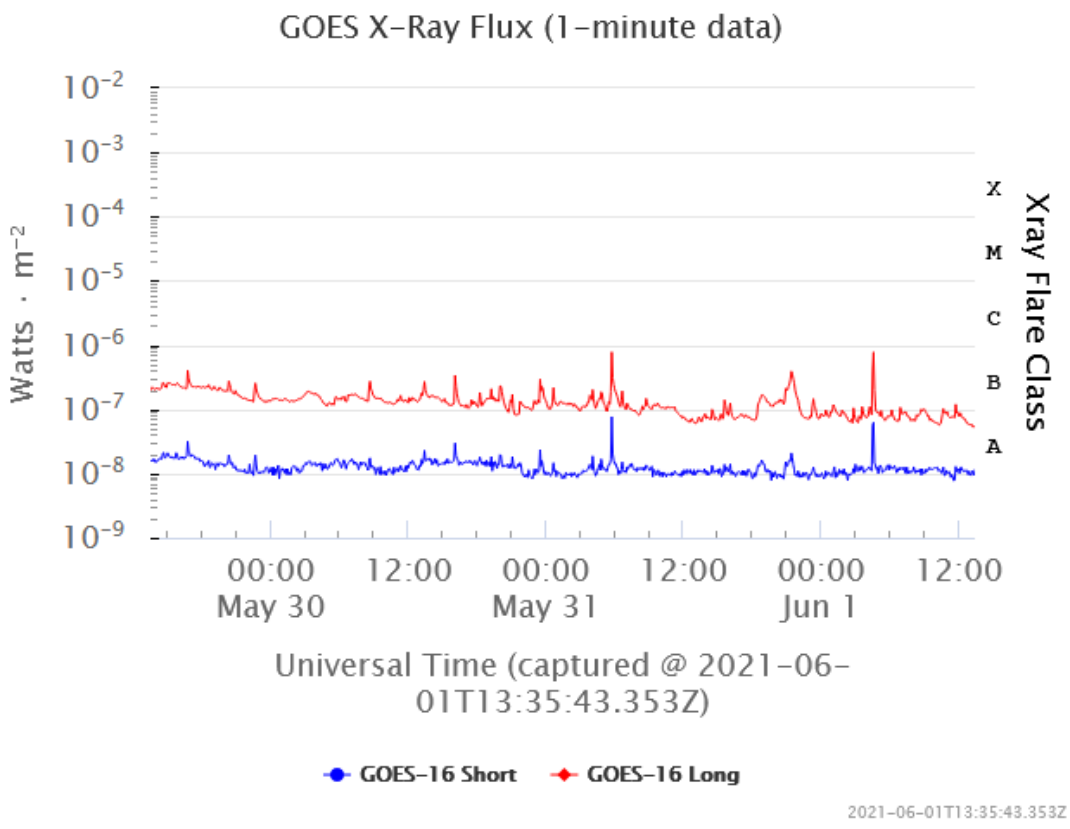


Real Time Solar Wind



SolarHam

Solar X-Ray Flux: 30 May – 1 June 2021

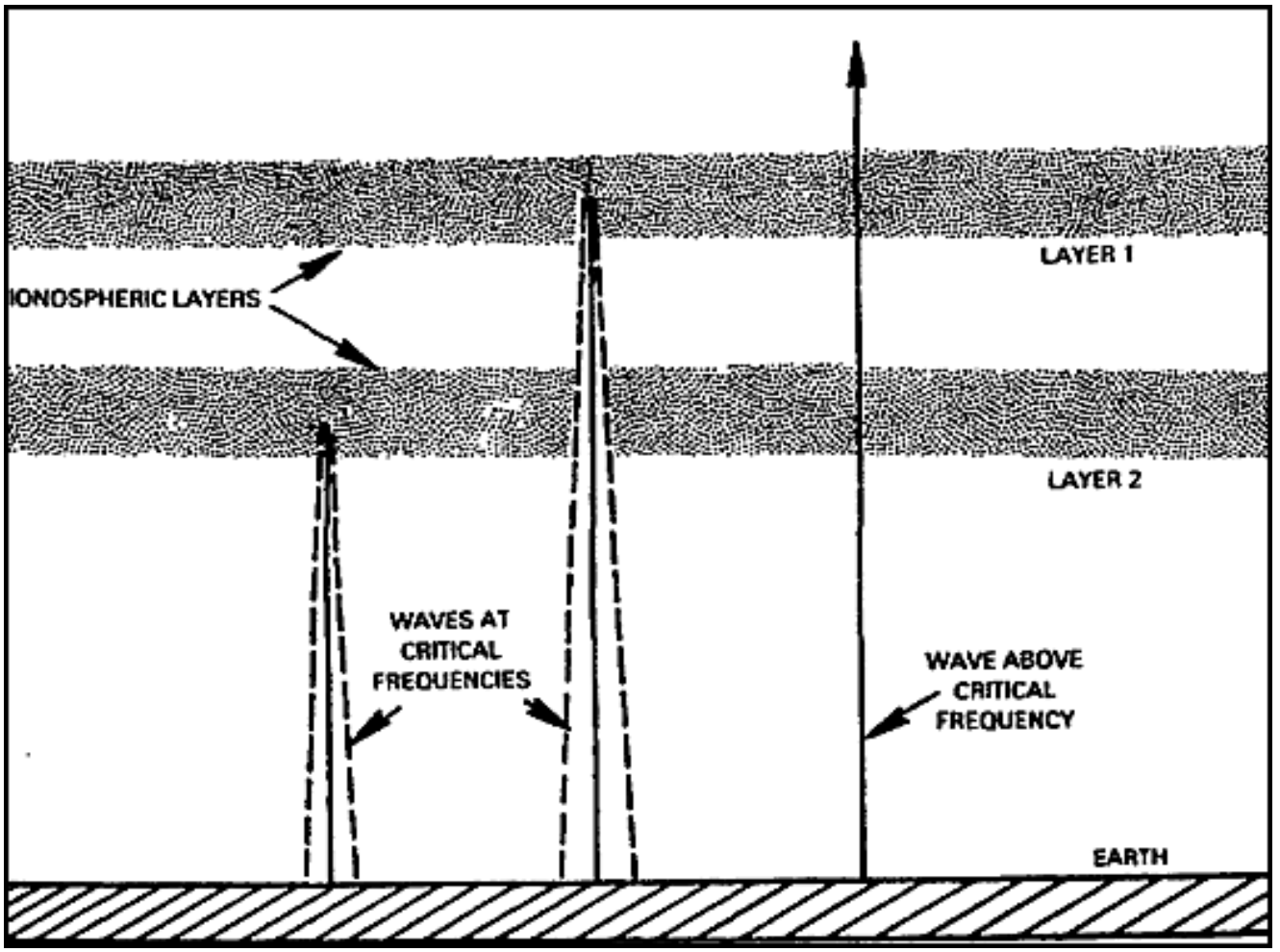


The X-ray radiation that ionizes the D-layer is the 1.0 - 8.0 A (red) plot. These measurements currently taken from the GOES 16 satelite.

Flare Category	Effect
A1-B9	No or minor impact on HF
C1	Low absorption of HF signals
M1	Occaisional loss of radio contact on sun-lit side
M5	Limited HF blackout for several minutes
X1	Wide area HF blackout for approx. 1 hr
X10	HF blackout over most of sun-lit side for 1-2 hrs
X20	Complete HF blackout of all sun-lit areas lasting hours

Critical or foF2 Frequency Definition

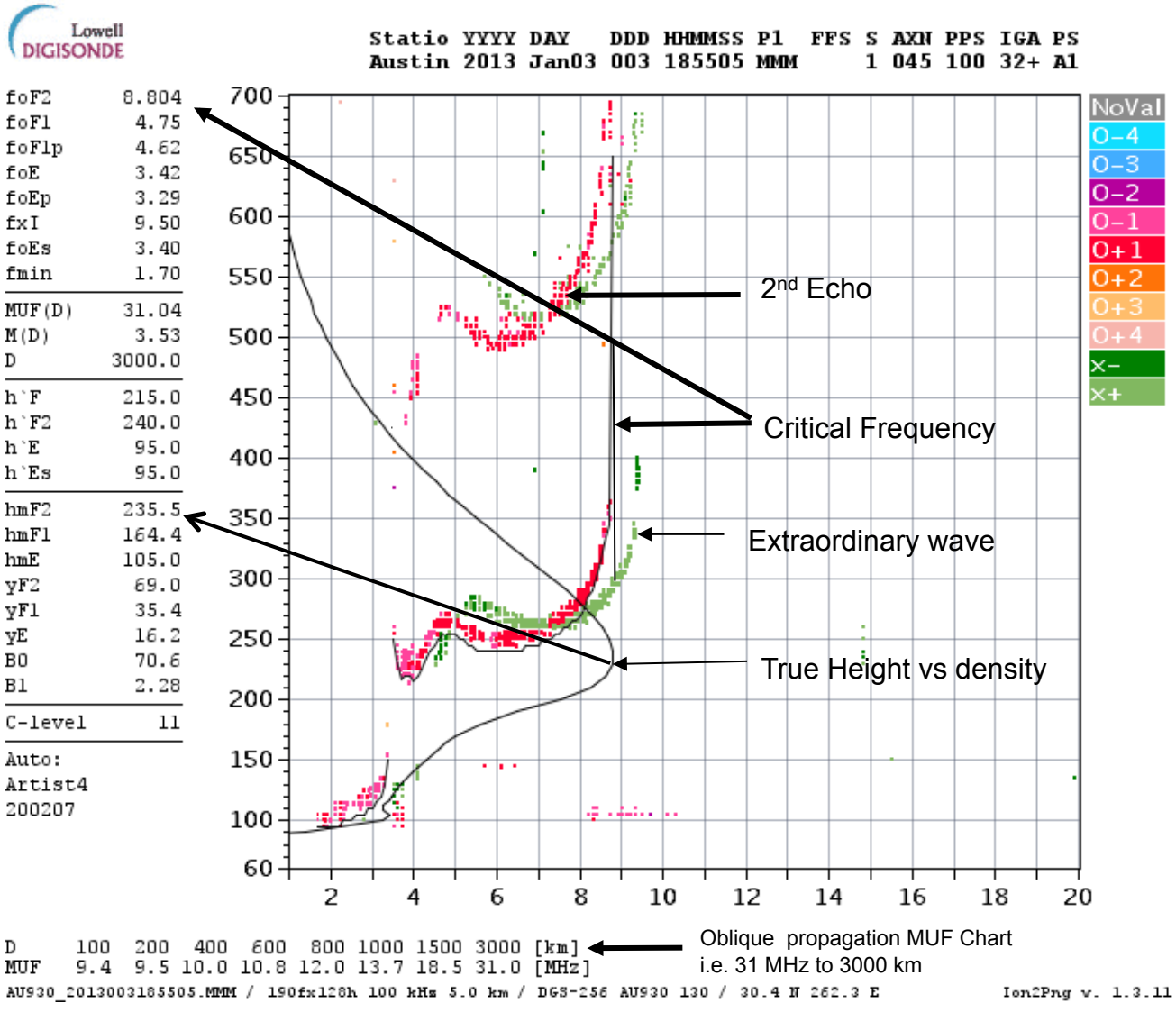
- For State-Wide HF communications (NVIS), but operate at or below CF



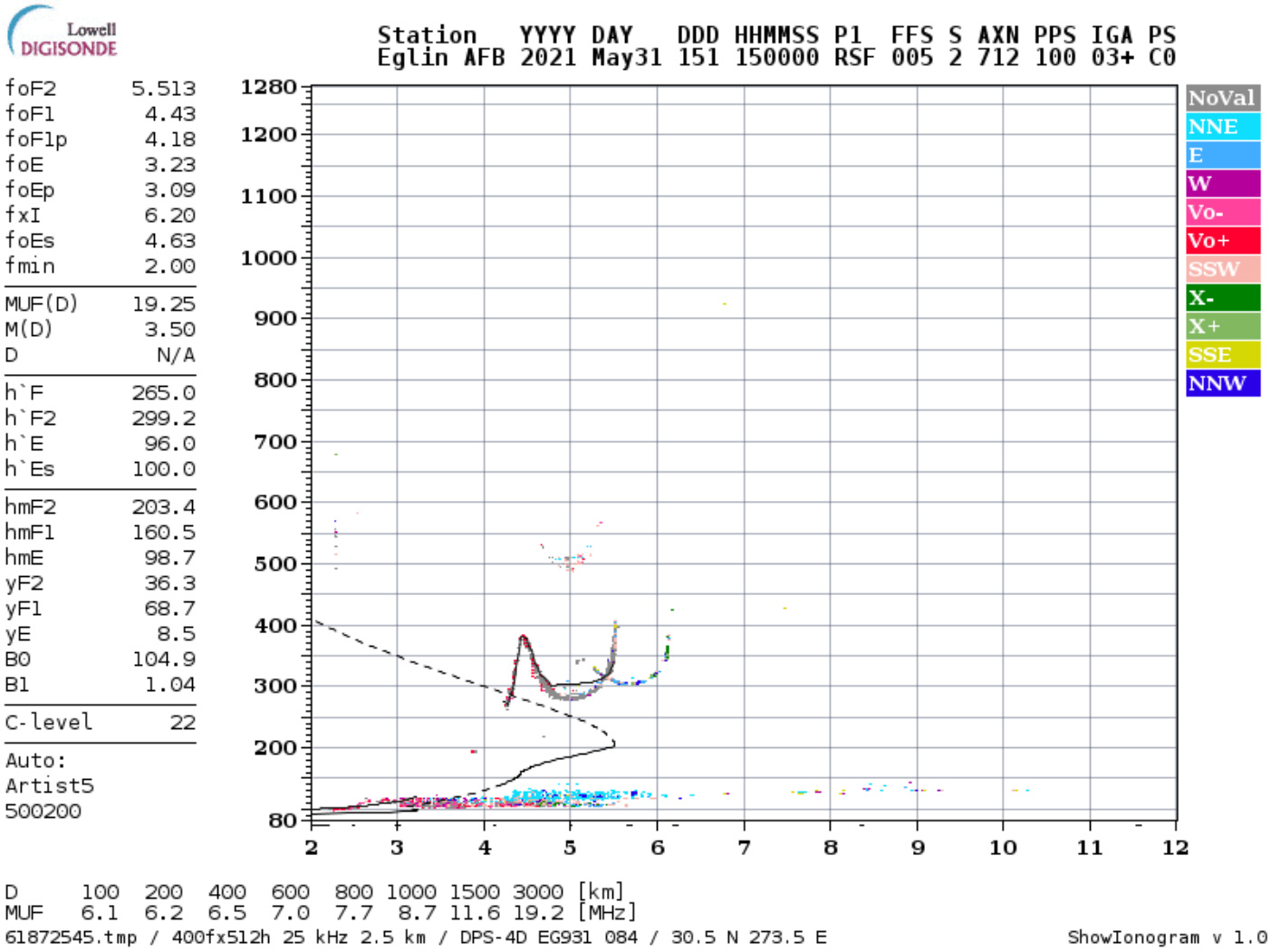
F2 layer

E layer

Ionogram Interpretation

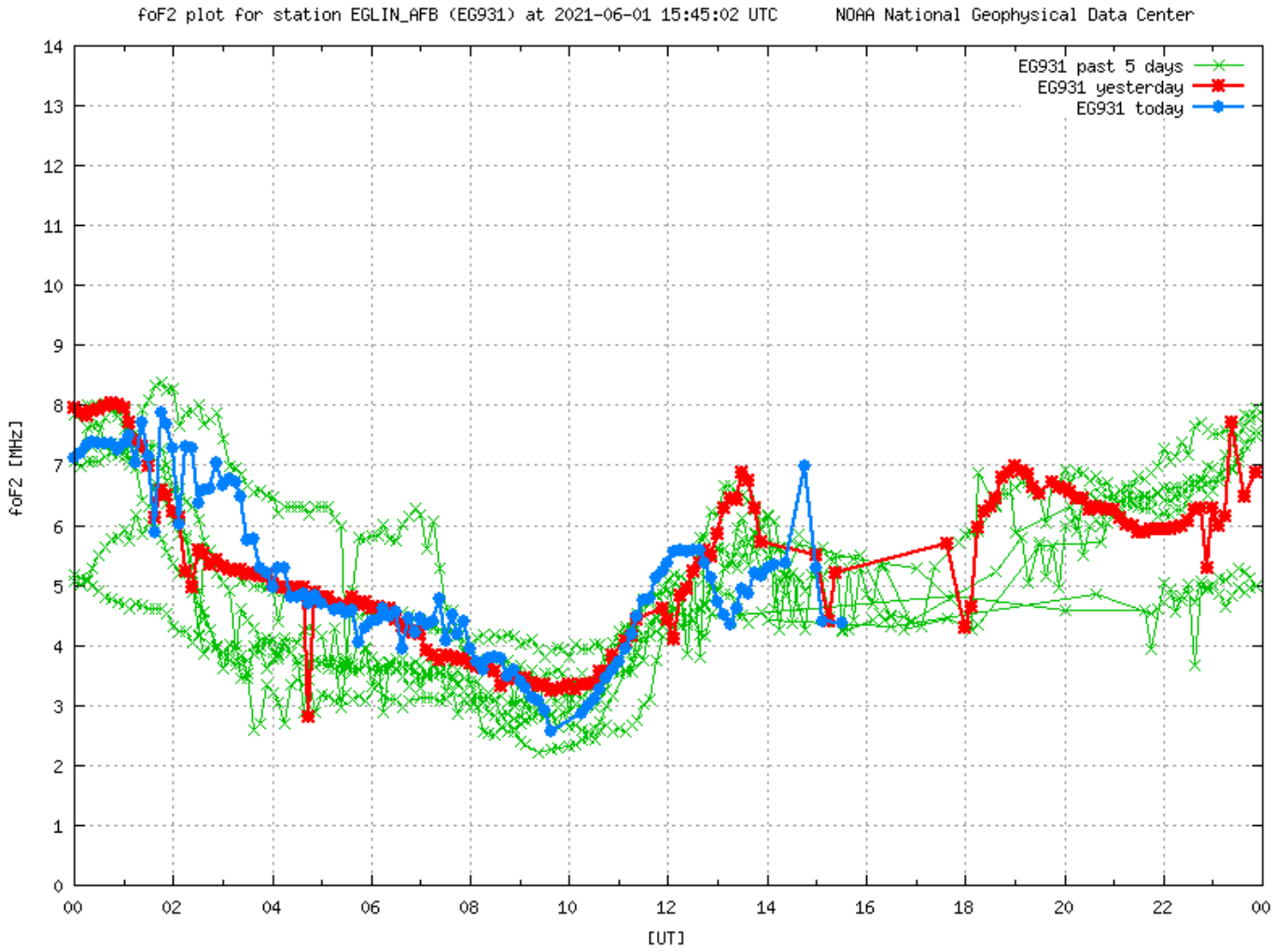


Elgin AFB Ionogram – May 31

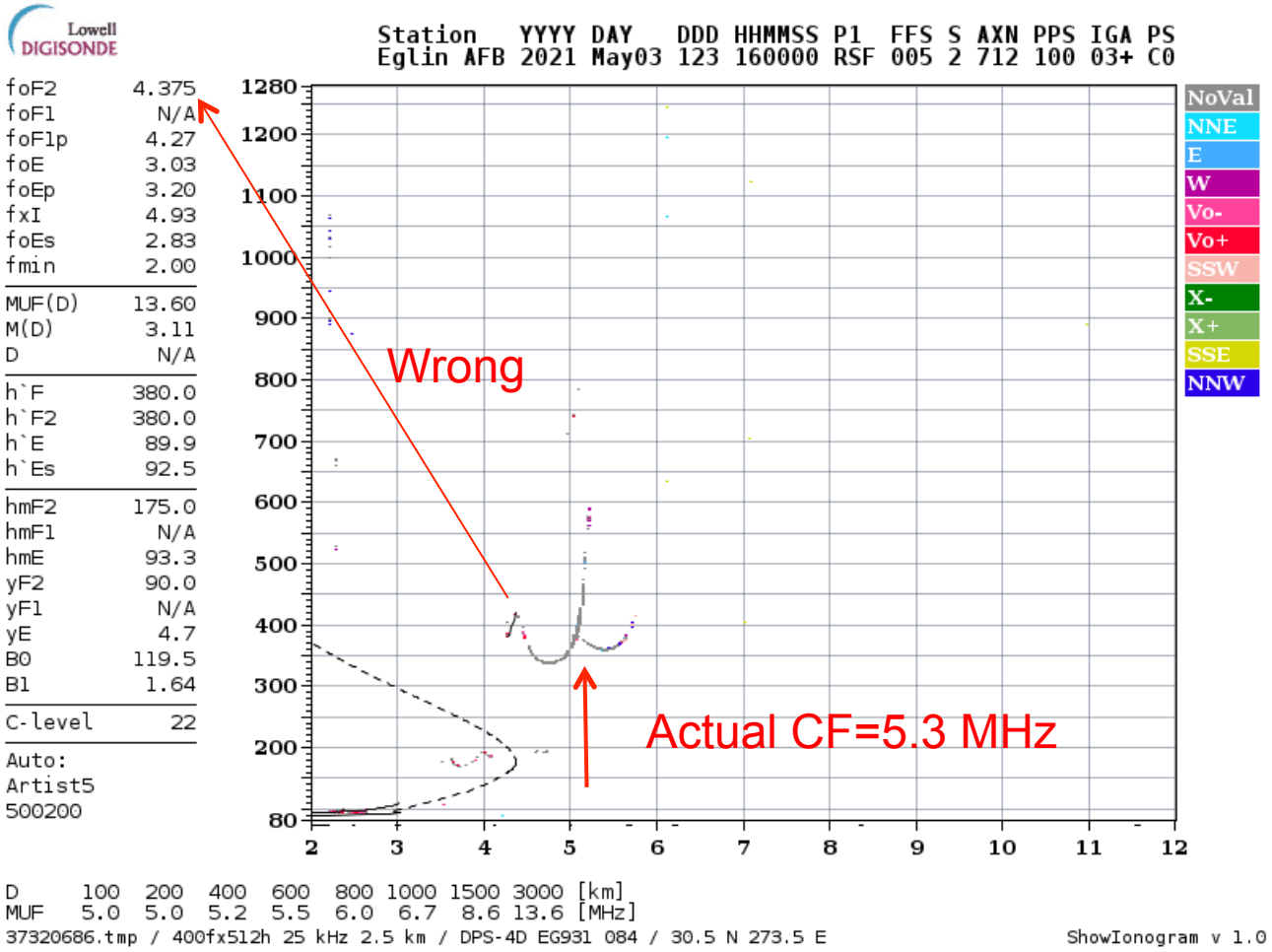


foF2 Trend – Eglin Ionosonde

This is a graph of real-time data from the Eglin AFB, FL ionosonde updated every 15 minutes. This data is 45 minutes old, so move time axis left 45 minutes, i.e. what happened over Eglin Fl will happen over Austin TX, 45 minutes later.



Correct Critical Frequency



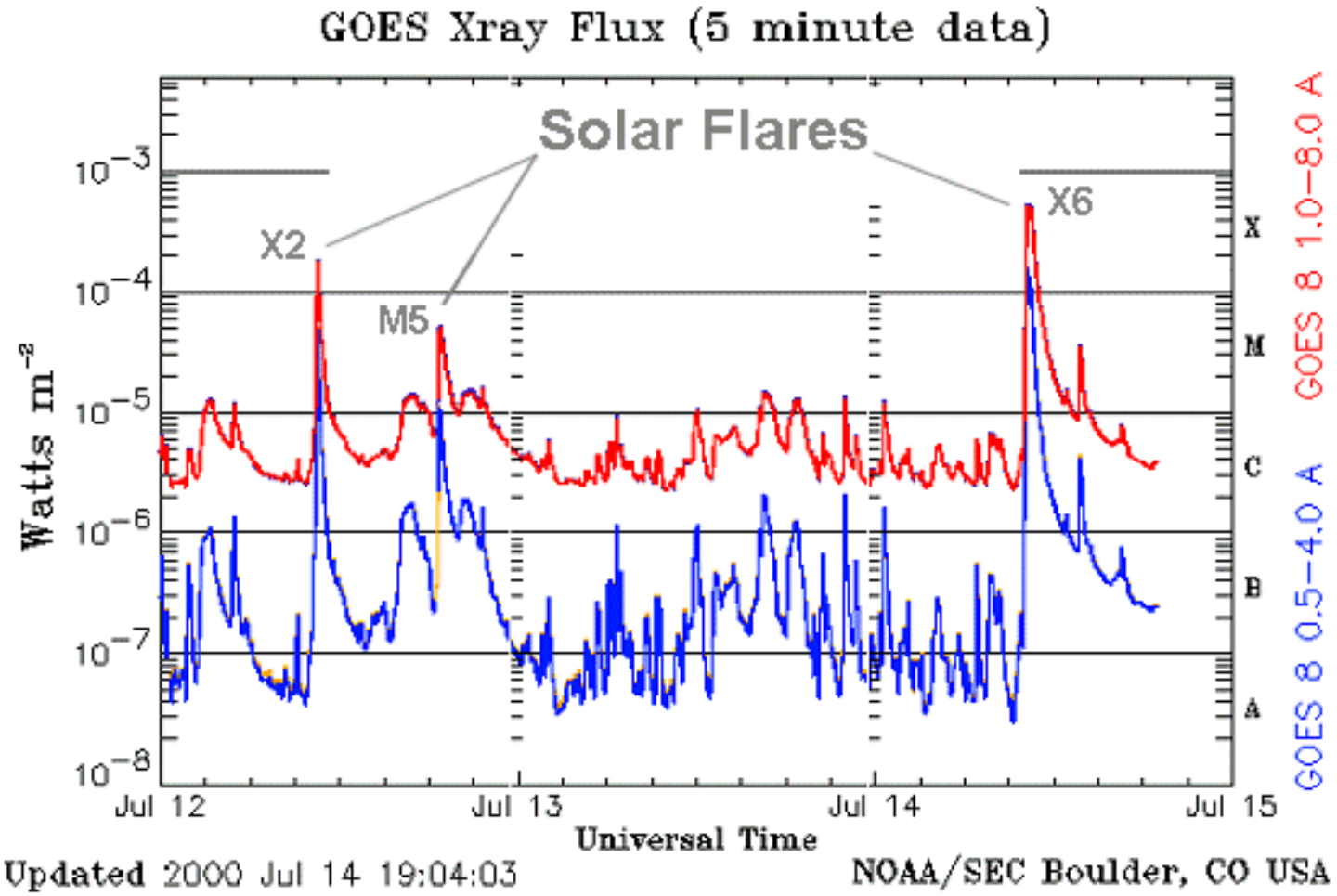
Verification of foF2 Trending Chart

- When it is important to have the correct Critical Frequency (foF2) and you see an unexpected trend, check actual Ionogram.
- The Ionosonde can be “fooled” by echo drop out due to exclusion of certain transmit frequencies by US government.
- Blanketing Sporadic-E will confuse the processing computer.

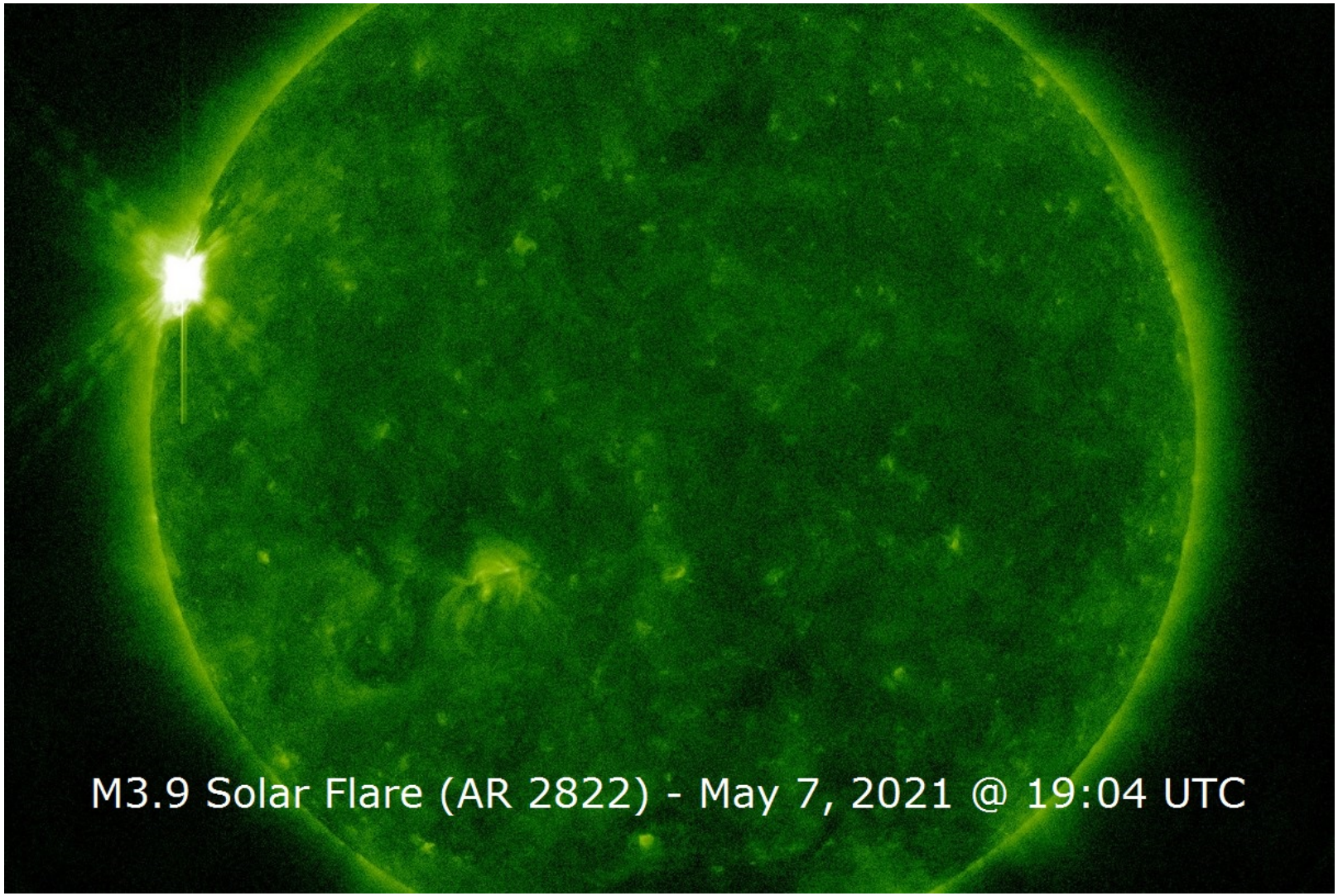
May Solar/Geomagnetic Events

- C-Flares – 36
- M-Flares – 4 (Radio blackouts)
- X-Flares – 0
- CME’s impacting Earth – 2
- Proton Event - 1
- Solar Wind events (> 500 Km/s) - 2

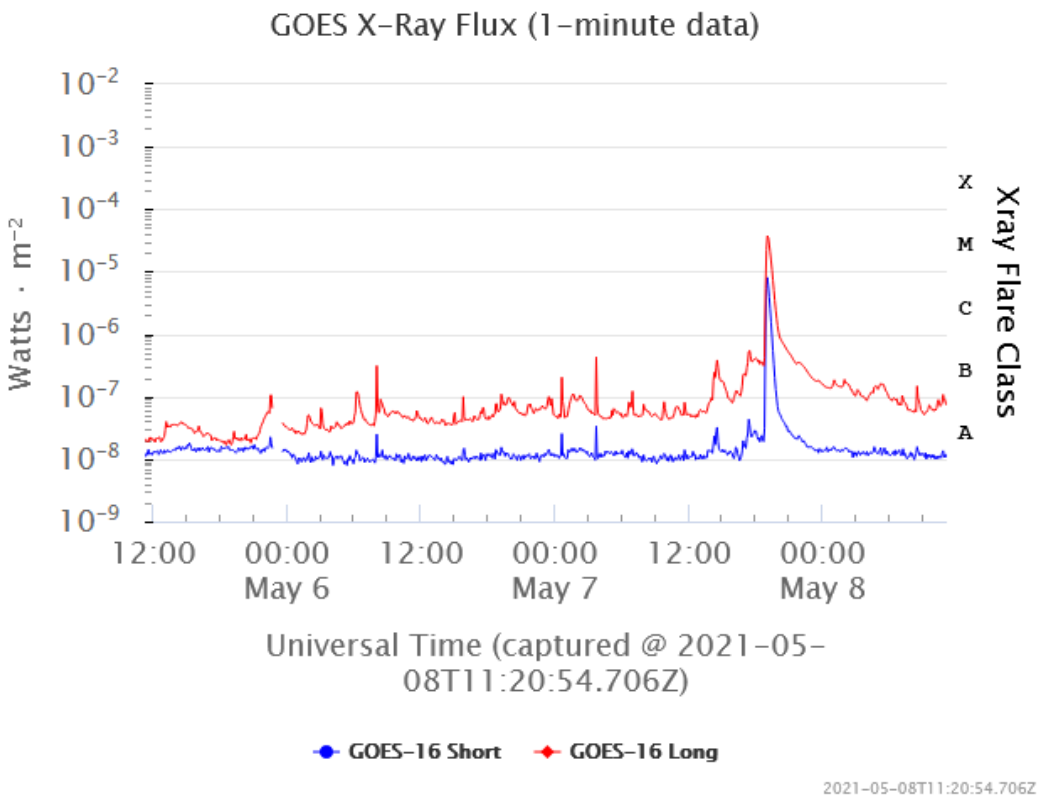
Solar Flare Classification - Intensity



M3.9 Solar Flare – 7 May



M-Flare – 2822, 7 May



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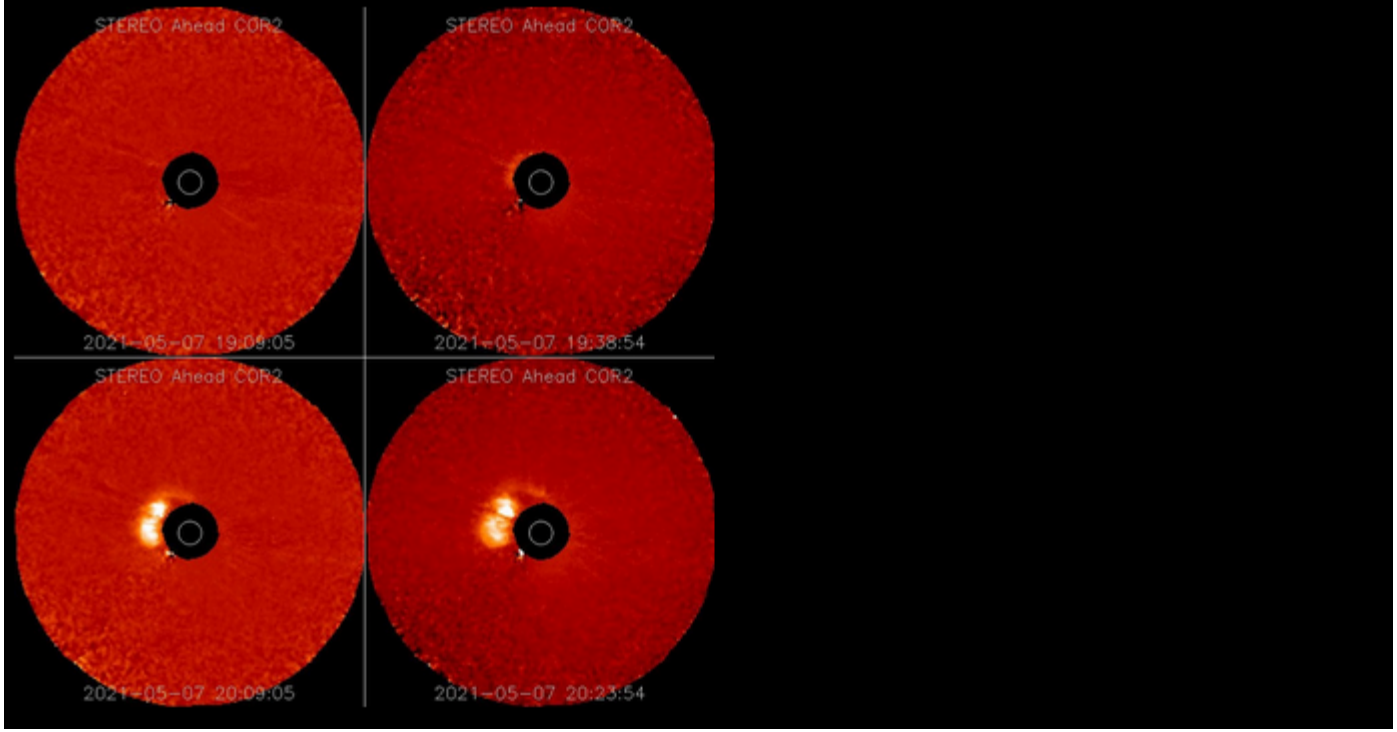
X20	Complete HF blackout of all sun-lit areas lasting hours

M-Flare 7 May

UPDATE: Coronagraph imagery courtesy of STEREO Ahead reveals a CME leaving the Sun following the M3.9 solar flare around AR 2822. More updates regarding a possible Earth directed component once Earth facing coronagraph imagery becomes available.



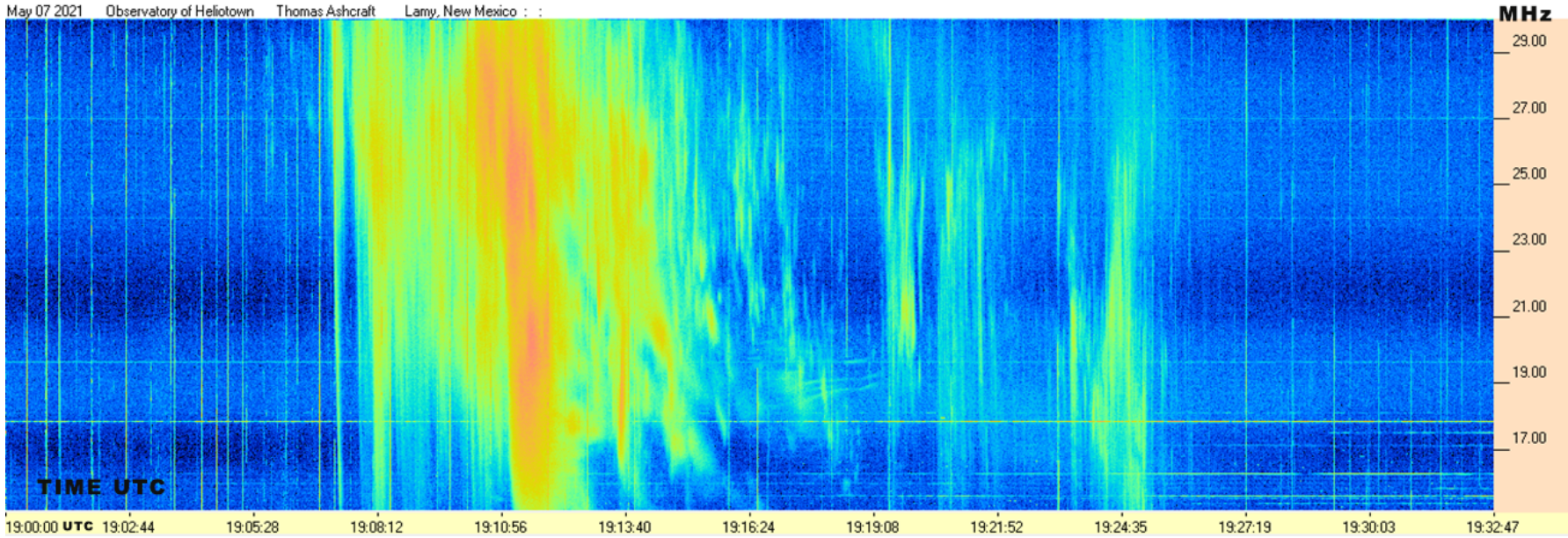
M-Flare 7 May

UPDATE #2: Earth facing coronagraph imagery shows that the CME is directed to the east and away from Earth. An impact to our geomagnetic field is unlikely.

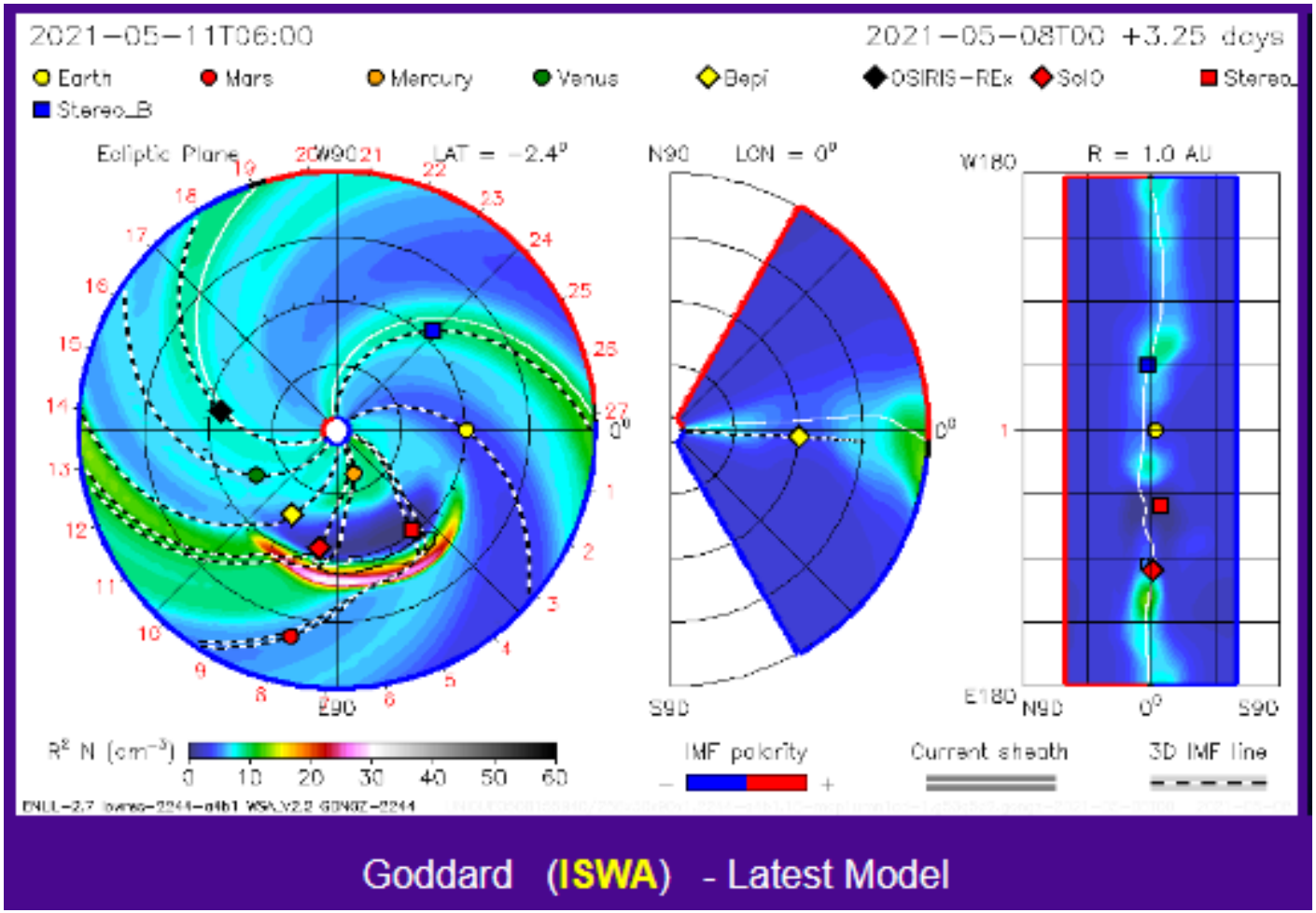
-

An M-Class solar flare reaching near the M4 level (M3.9) was just detected around AR 2822 in the northeast quadrant. The event was associated with Type II and IV radio emissions, a sign that a potential CME is possible. The region is not yet directly facing our planet, so any potential eruption would not be fully directed towards Earth. This will change in the days ahead. More to follow.

ALERT: Type II Radio Emission
Begin Time: 2021 May 07 1902 UTC
Estimated Velocity: 848 km/s



Predicted CME Track of M3.9 (No CME Impact)



C 9.3 Flare (LDE) 2824, May 28

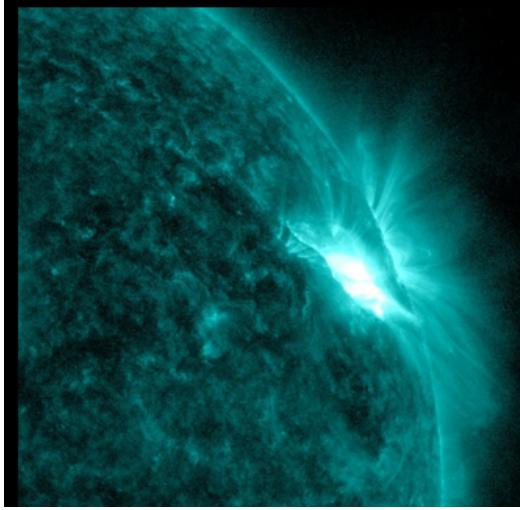
Long Duration Eruption and CME (UPDATED)

May 28, 2021 @ 23:05 UTC

A long duration eruption (LDE) measuring C9.4 was observed around AR 2824 towards the northwest limb on Friday evening (UTC). Imagery courtesy of SDO/AIA, along with STEREO coronagraph imagery shows that an impressive coronal mass ejection (CME) is associated. A **Minor (S1) radiation storm**, the first for Solar Cycle 25, is currently in progress. More updates to follow.

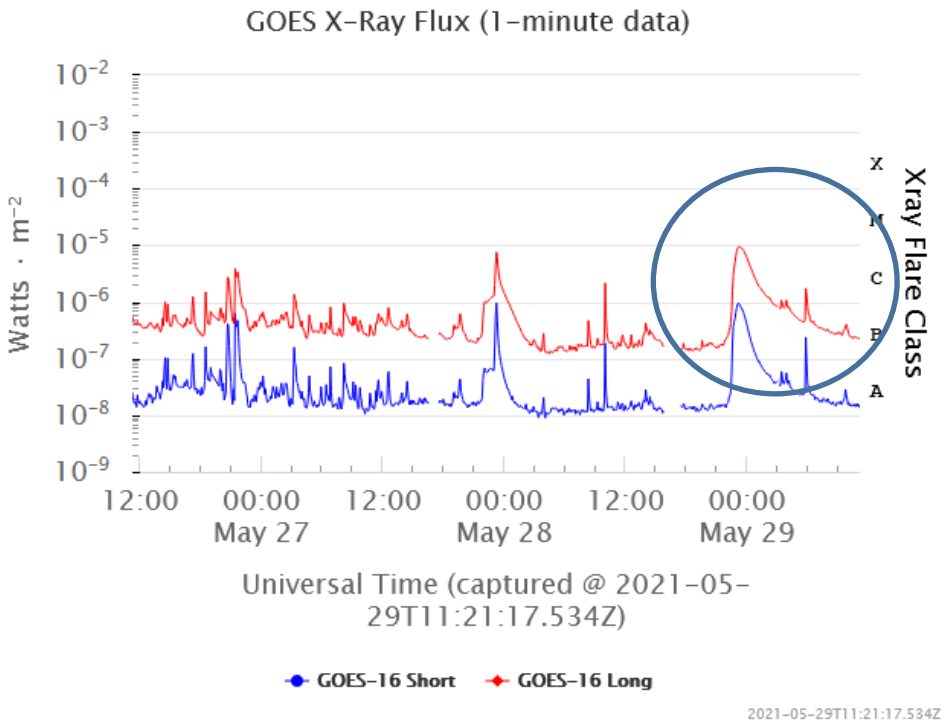
ALERT: Type II Radio Emission
Begin Time: 2021 May 28 2303 UTC
Estimated Velocity: 2087 km/s

WARNING: Proton 10MeV Integral Flux above 10pfu expected
Valid From: 2021 May 29 0042 UTC
Valid To: 2021 May 29 1200 UTC
Warning Condition: Onset
Predicted NOAA Scale: S1 - Minor



X-Ray Flare C9.3 2824, May 28

SOLAR X-RAY FLUX



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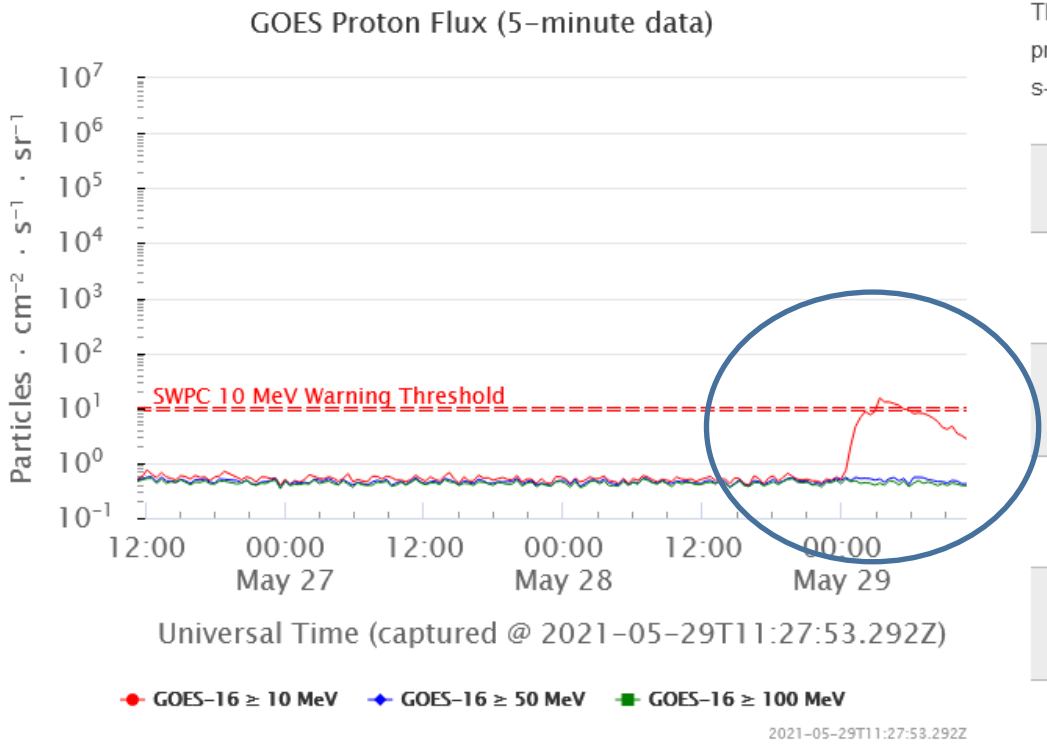
Proton Event from May 28

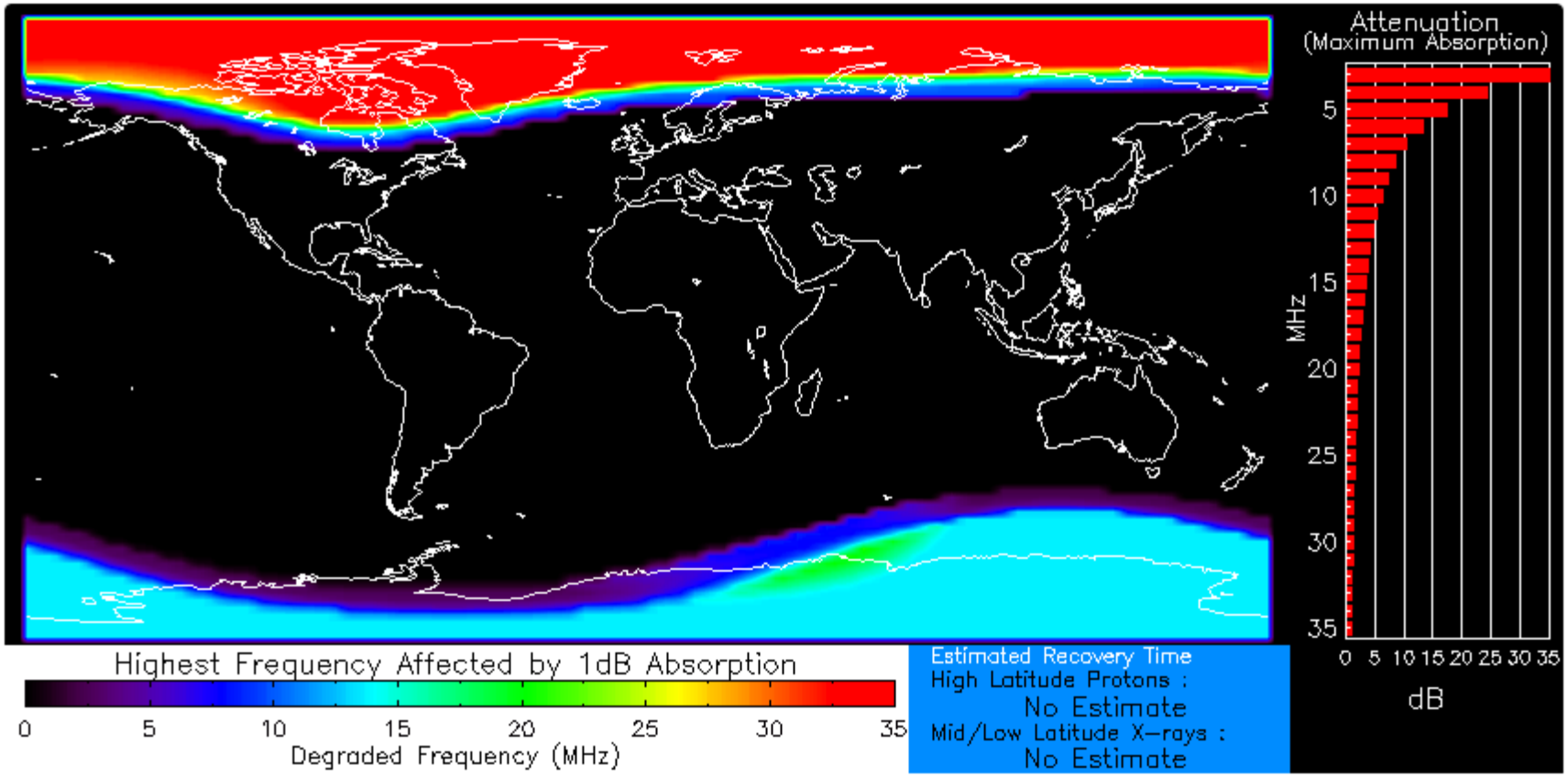
PROTON FLUX



The NOAA Space Weather Prediction Center's proton event threshold is the 10 protons/cm2-s-sr at >=10 MeV (red) plot.

Proton Flux	Effect
1.0e+06	Complete HF blackout in polar regions
1.0e+05	Partial HF blackout in polar regions
1.0e+04	Degraded HF propagation in polar regions
1.0e+03	Small effects on HF in polar regions
1.0e+02	Minor impacts on HF in polar regions
1.0e+01	Very minor impacts on HF in polar regions
1.0e+00	No impacts on HF

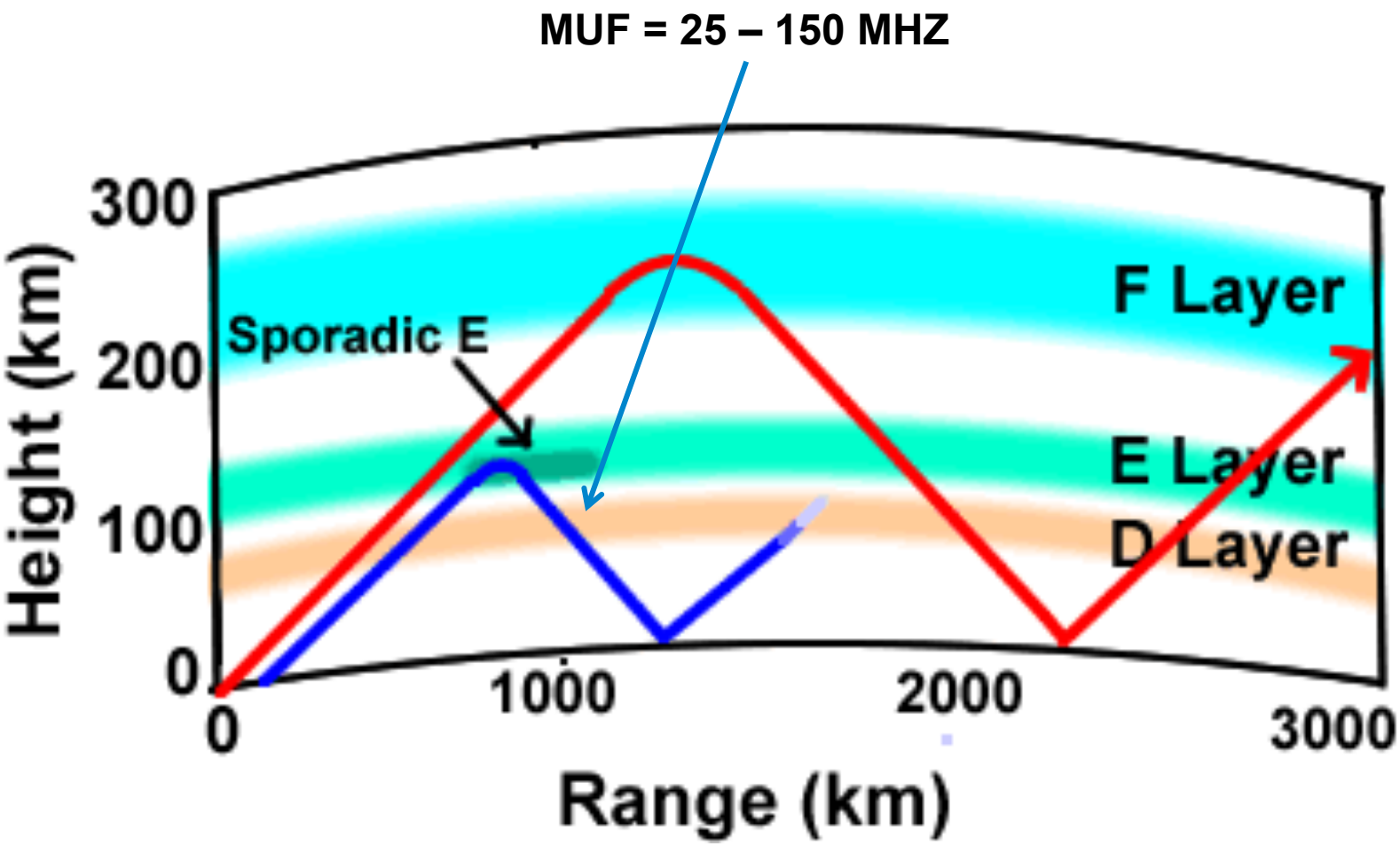
UNUSUAL D-REGION ABSORPTION PATTERNS



Normal X-ray Background
Product Valid At : 2021-05-29 11:12 UTC

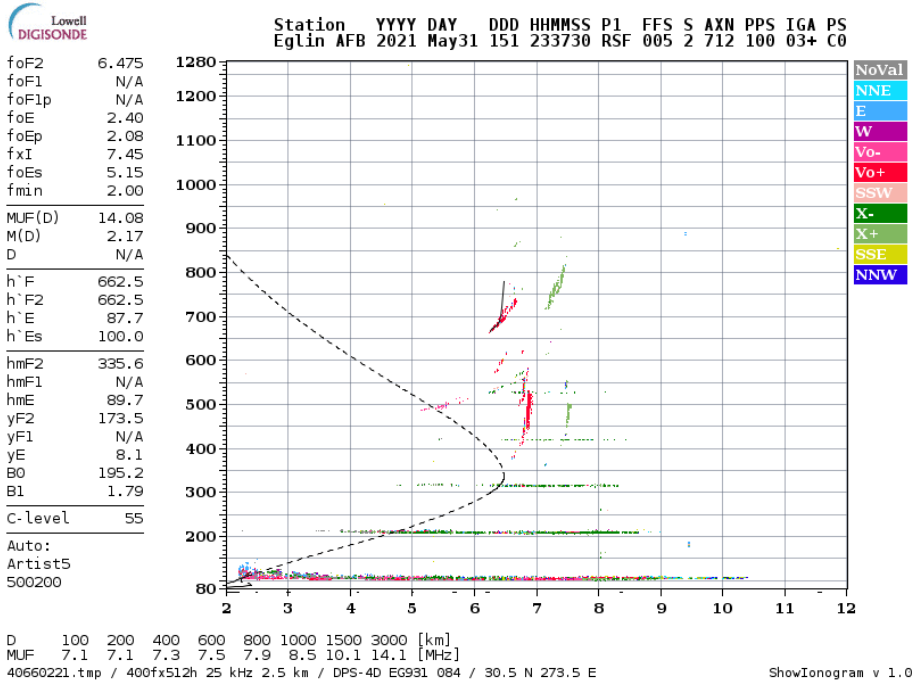
Normal Proton Background
NOAA/SWPC Boulder, CO USA

Sporadic–E Propagation

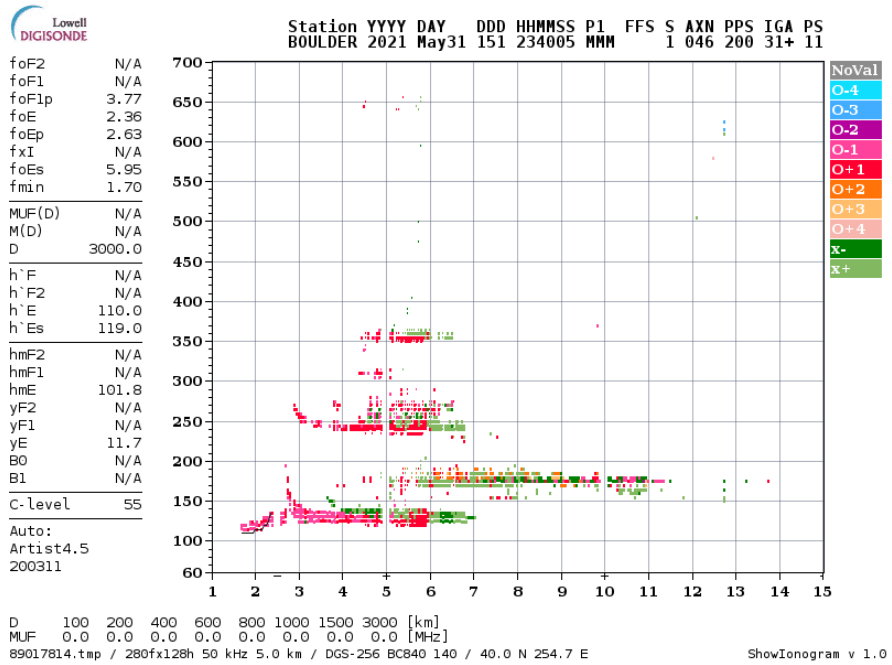


Sporadic-E Examples

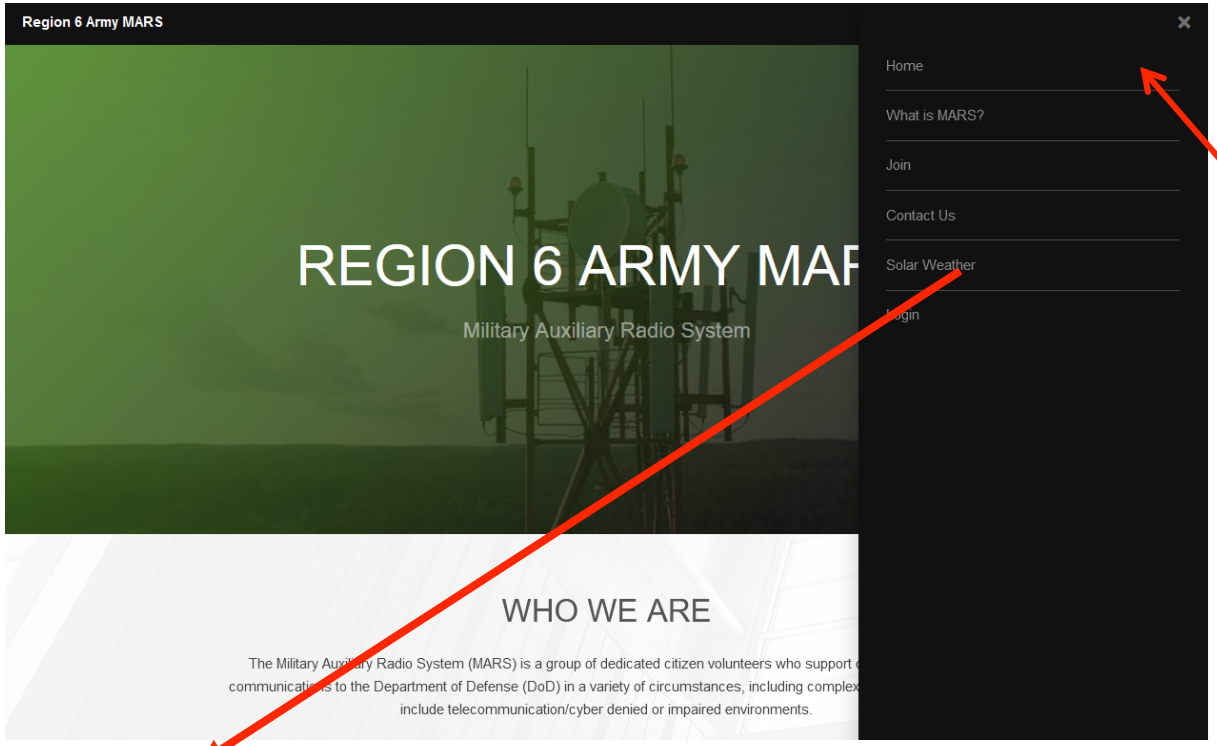
EGLIN AFB IONOSONDE VALID FOR CENTRAL TEXAS AT 2021-05-31 19:22:30 CDT



BOULDER IONOSONDE AT 2021-05-31 18:40:05 CDT



Solar Weather Data



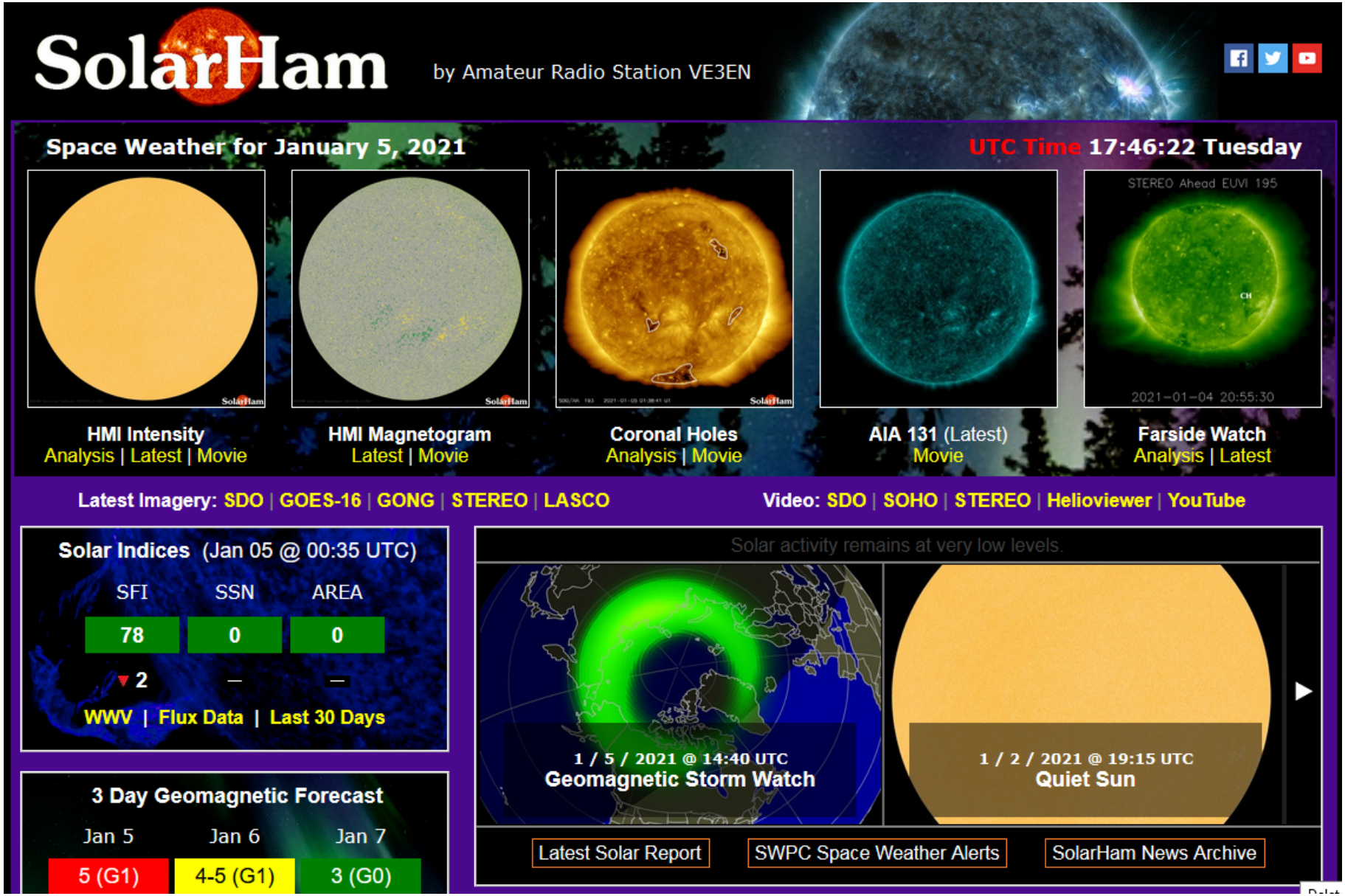
Menu

Solar Weather

Other Solar Weather Links of Interest

All Ionosondes →

- DIDBase - Select Station List then EGLIN then year/month/day/time for Ionosonde plot.
- NOAA Solar Weather - Solar Weather plots of Kp and X-Ray and other solar emissions.
- Solen Solar Weather - Good general solar forecast from an individual.
- Solar Ham - SolarHam provides real time solar news, as well as consolidated data from various sources.


SolarHam
by Amateur Radio Station VE3EN
Space Weather for January 5, 2021
UTC Time 17:46:22 Tuesday
STEREO Ahead EUVI 195
2021-01-04 20:55:30
HMI Intensity
Analysis | Latest | Movie
HMI Magnetogram
Latest | Movie
Coronal Holes
Analysis | Movie
AIA 131 (Latest)
Movie
Farside Watch
Analysis | Latest
Latest Imagery: SDO | GOES-16 | GONG | STEREO | LASCO
Video: SDO | SOHO | STEREO | Helioviewer | YouTube
Solar Indices (Jan 05 @ 00:35 UTC)
SFI
SSN
AREA
78
0
0
▼ 2
—
—
WWV | Flux Data | Last 30 Days
Solar activity remains at very low levels.
1 / 5 / 2021 @ 14:40 UTC
Geomagnetic Storm Watch
1 / 2 / 2021 @ 19:15 UTC
Quiet Sun
3 Day Geomagnetic Forecast
Jan 5
Jan 6
Jan 7
5 (G1)
4-5 (G1)
3 (G0)
Latest Solar Report
SWPC Space Weather Alerts
SolarHam News Archive

spaceweather.com

News and information about the Sun-Earth environment

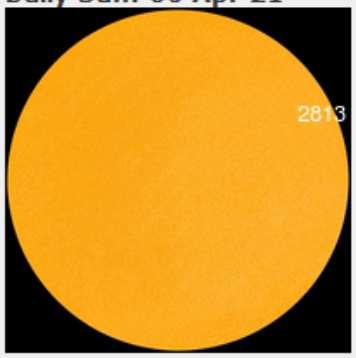
https://www.spaceweather.com/

Current Conditions

Solar wind
speed: **314.8** km/sec
density: **9.9** protons/cm^3
more data: ACE, DSCOVR
Updated: Today at 1225 UT

X-ray Solar Flares
6-hr max: **A1** 1027 UT Apr06
24-hr: **A1** 1515 UT Apr05
explanation | more data
Updated: Today at: 1230 UT

Daily Sun: 06 Apr 21



Sunspot AR2813 is decaying, and poses no threat for strong flares.
Credit: SDO/HMI

FLYING TO THE VOLCANO: Iceland's Geldingadalur volcano has turned into an popular tourist attraction---especially since auroras were sighted above the glowing lava. Early this morning, Tuesday, April 6th, Brian Emfinger saw auroras before he even reached the Reykjanes peninsula:

QUESTIONS?

Lewis Thompson

W5IFQ@att.net

512-587-9944