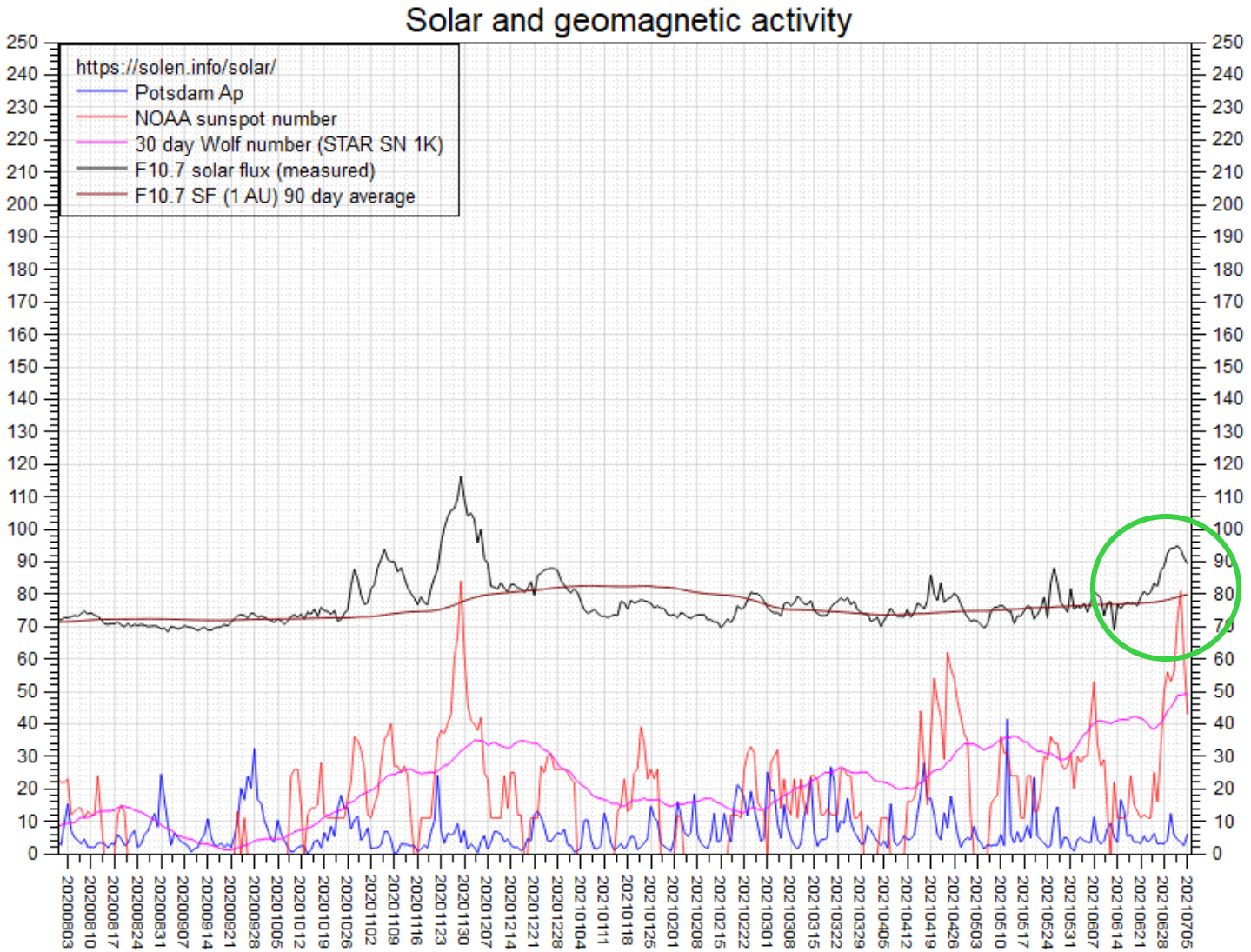
# SOLAR WEATHER
# 6 JUL 2021


Lewis Thompson
W5IFQ

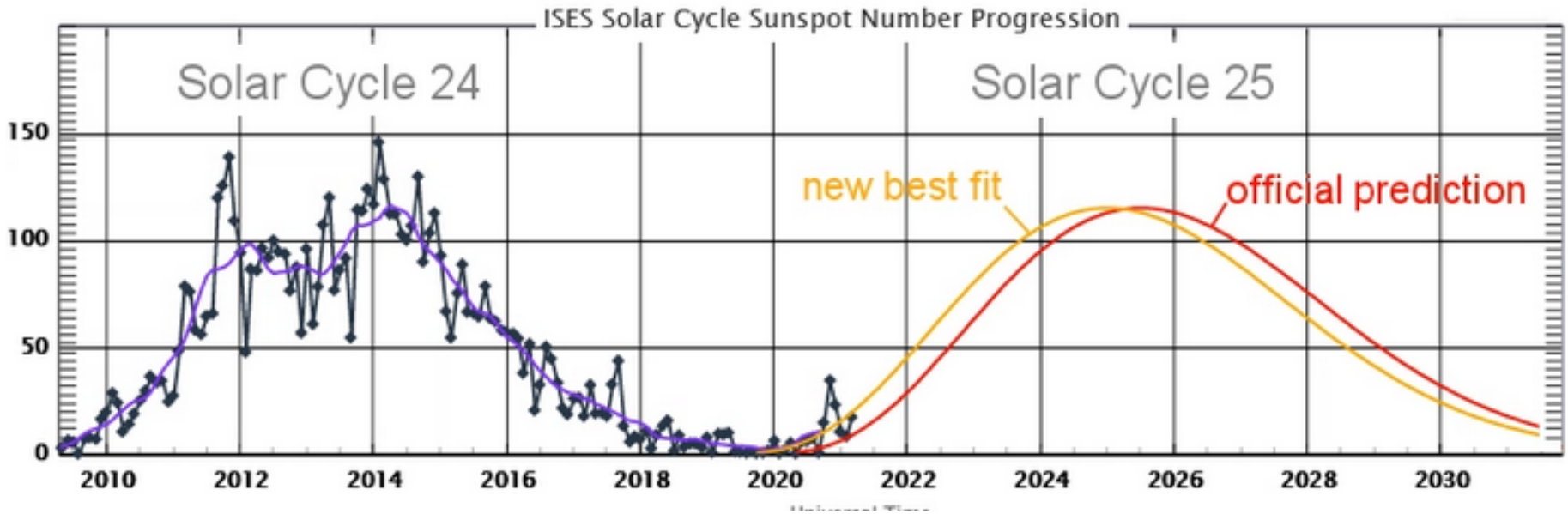
Taken by Catalin Tapardel on June 30, 2021 @ Municipal District of Opportunity Nr.17, Alberta, Canada.

# SOLAR FLUX INDEX – 2021

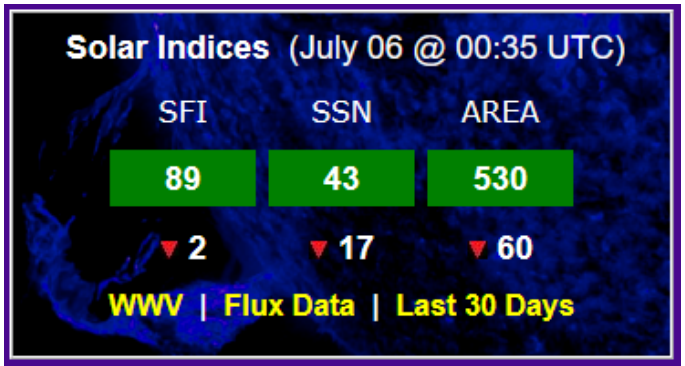


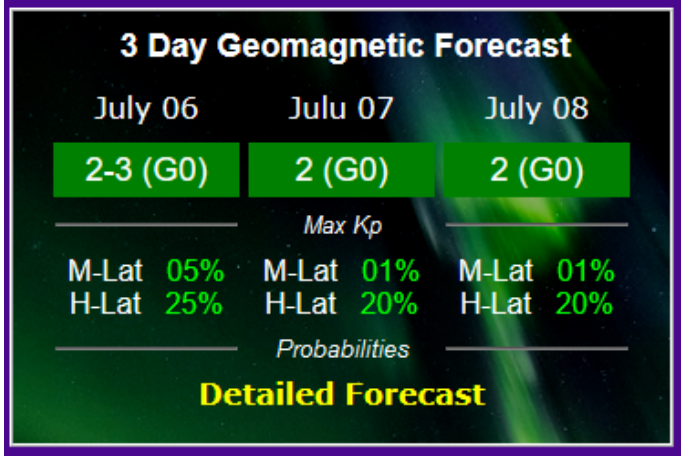

SF 89.4 (9.5 increase from one previous 27 day solar rotation)

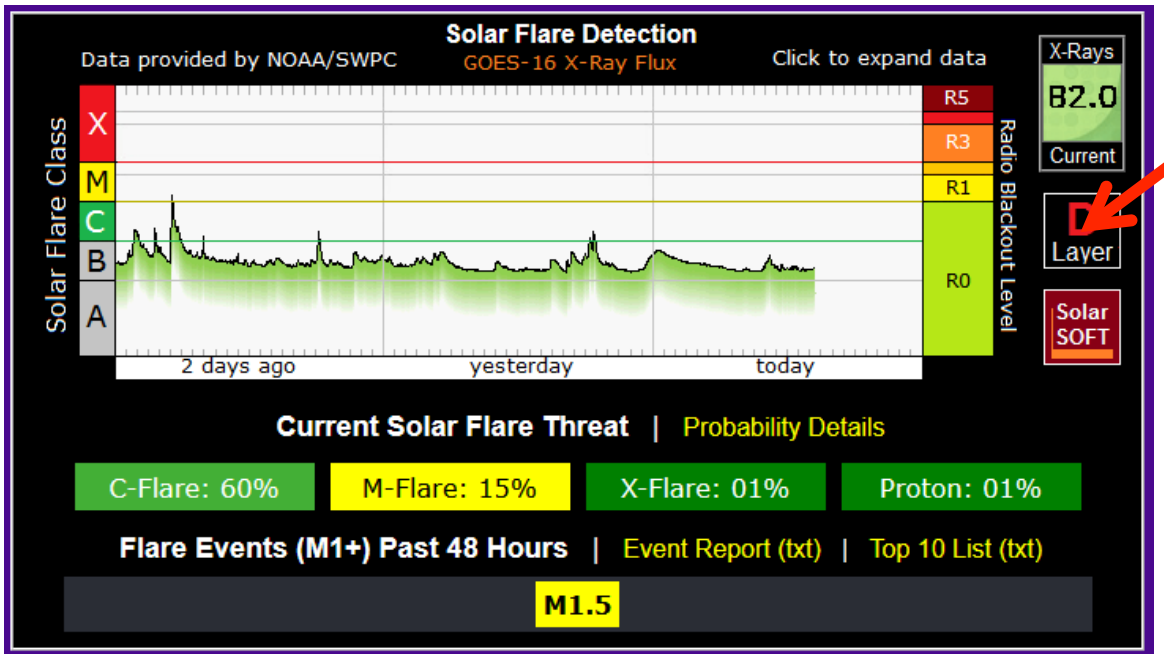
# Solar Cycle 25 Prediction



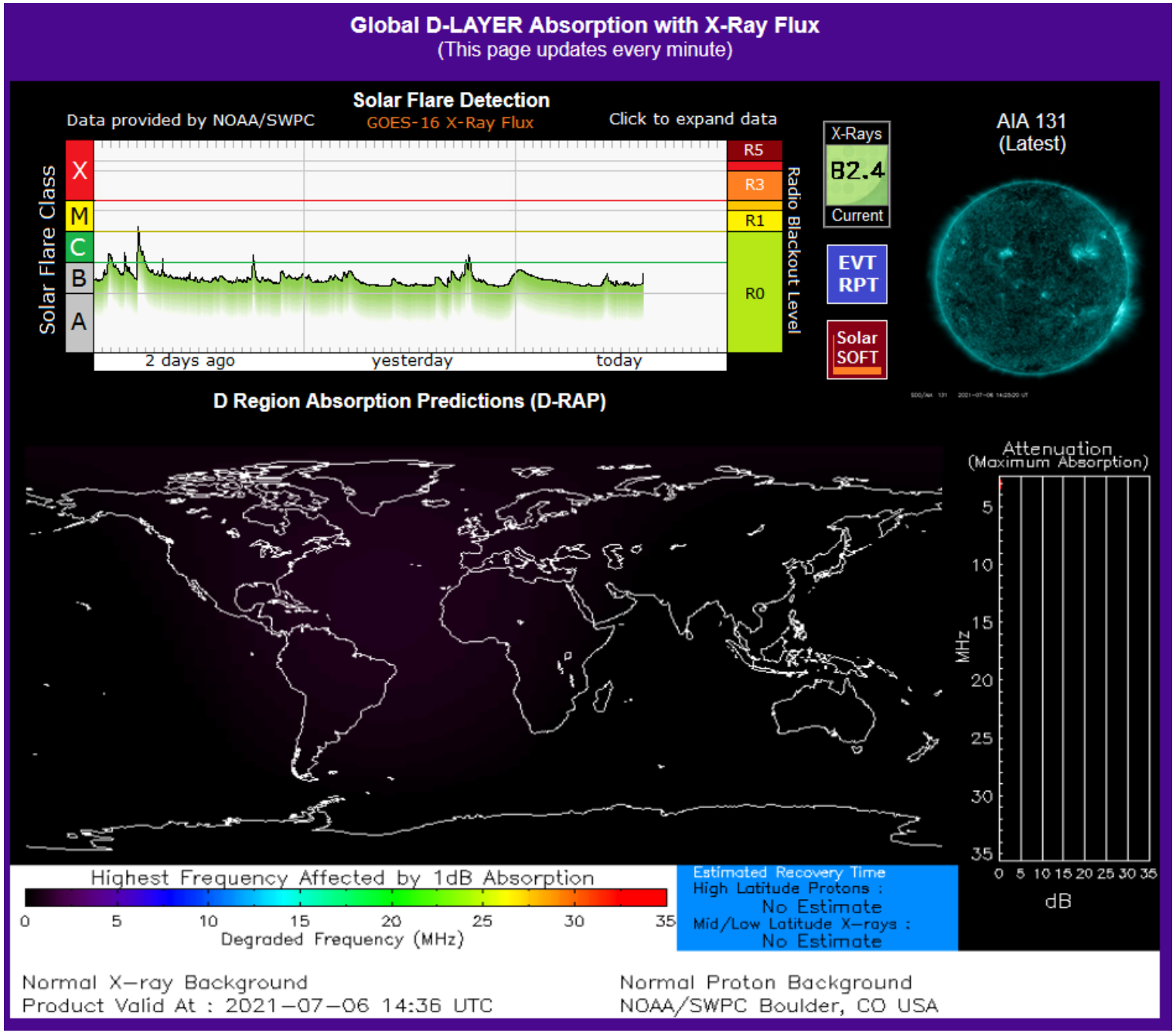
# SolarHam.org Forecast



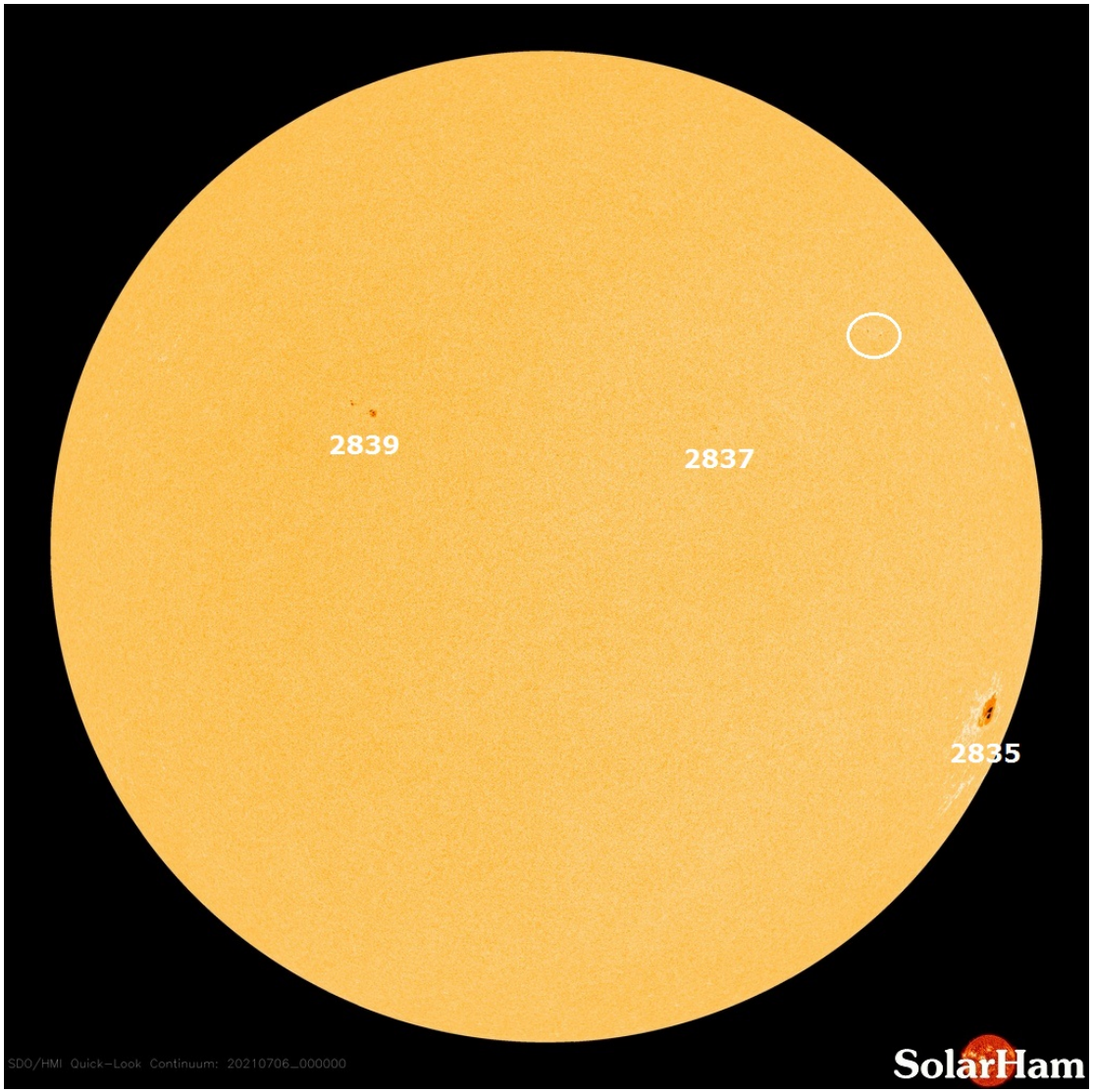



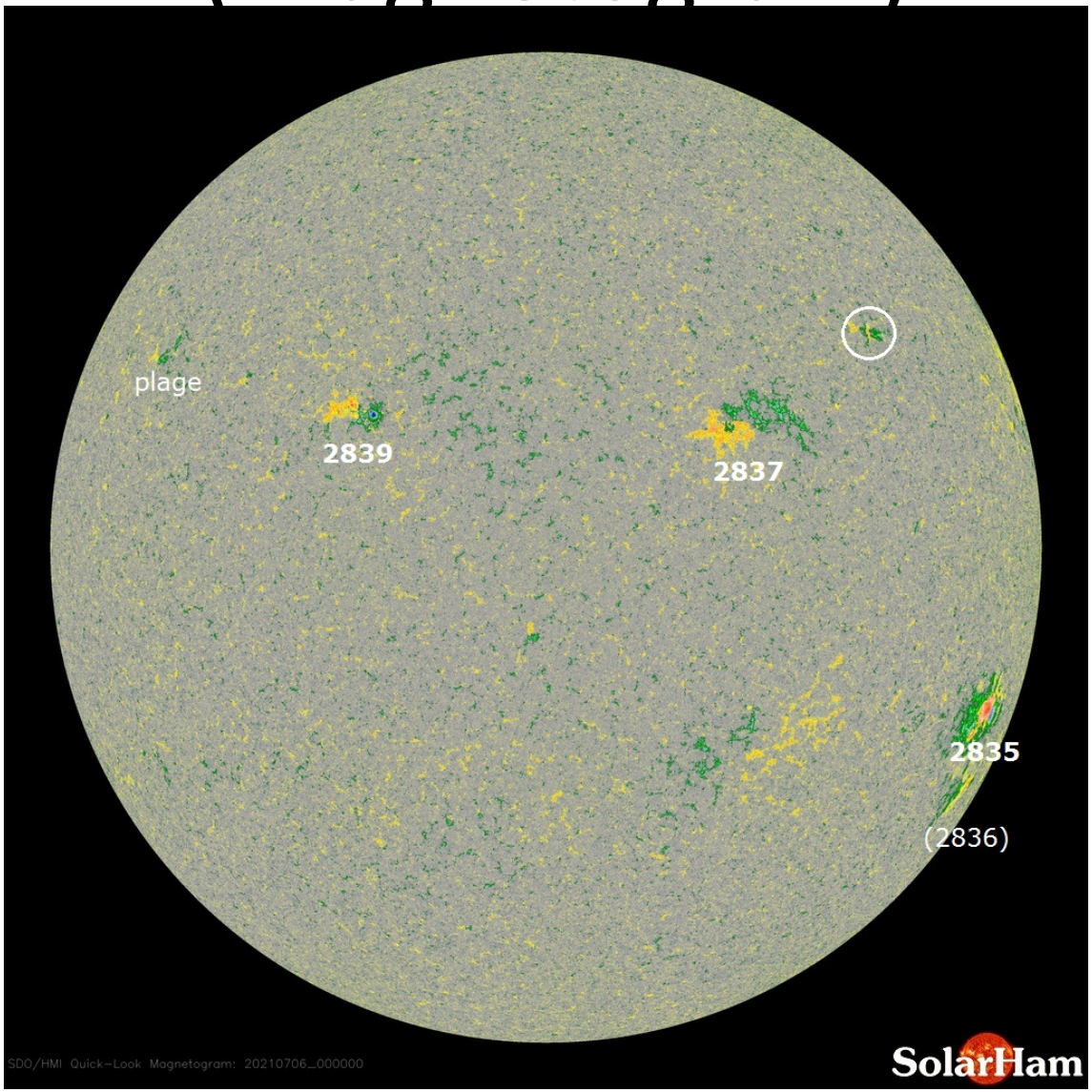

```
.24 hr Summary...
Solar activity was low. Region 2835 (S18W75, Cko/beta) produced a C1
flare at 05/1824 UTC, exhibited slight decay in the trailer and
approached the western limb. A subsequent C1/Sf flare was observed at
05/1843 UTC from old Region 2836 (S26, L=063) that had decayed to plage
as it transited the western limb. Region 2837 (N17W31, Axx/alpha) was
inactive and nearly decayed to plage. Region 2839 (N19E16, Cao/beta)
appeared to be in slight decay as the leader spots began to consolidate
and the trailer spots started to fade. There were no Earth-directed CMEs
observed in available imagery.
```


Global D-LAYER Absorption with X-Ray Flux
(This page updates every minute)
Solar Flare Detection
Data provided by NOAA/SWPC
GOES-16 X-Ray Flux
Click to expand data
Solar Flare Class
X
M
C
B
A
2 days ago
yesterday
today
R5
R3
R1
R0
Radio Blackout Level
X-Rays
B2.4
Current
EVT RPT
Solar SOFT
AIA 131
(Latest)
D Region Absorption Predictions (D-RAP)
Attenuation
(Maximum Absorption)
MHz
5
10
15
20
25
30
35
0 5 10 15 20 25 30 35
dB
Highest Frequency Affected by 1dB Absorption
0 5 10 15 20 25 30 35
Degraded Frequency (MHz)
Estimated Recovery Time
High Latitude Protons :
No Estimate
Mid/Low Latitude X-rays :
No Estimate
Normal X-ray Background
Product Valid At : 2021-07-06 14:36 UTC
Normal Proton Background
NOAA/SWPC Boulder, CO USA

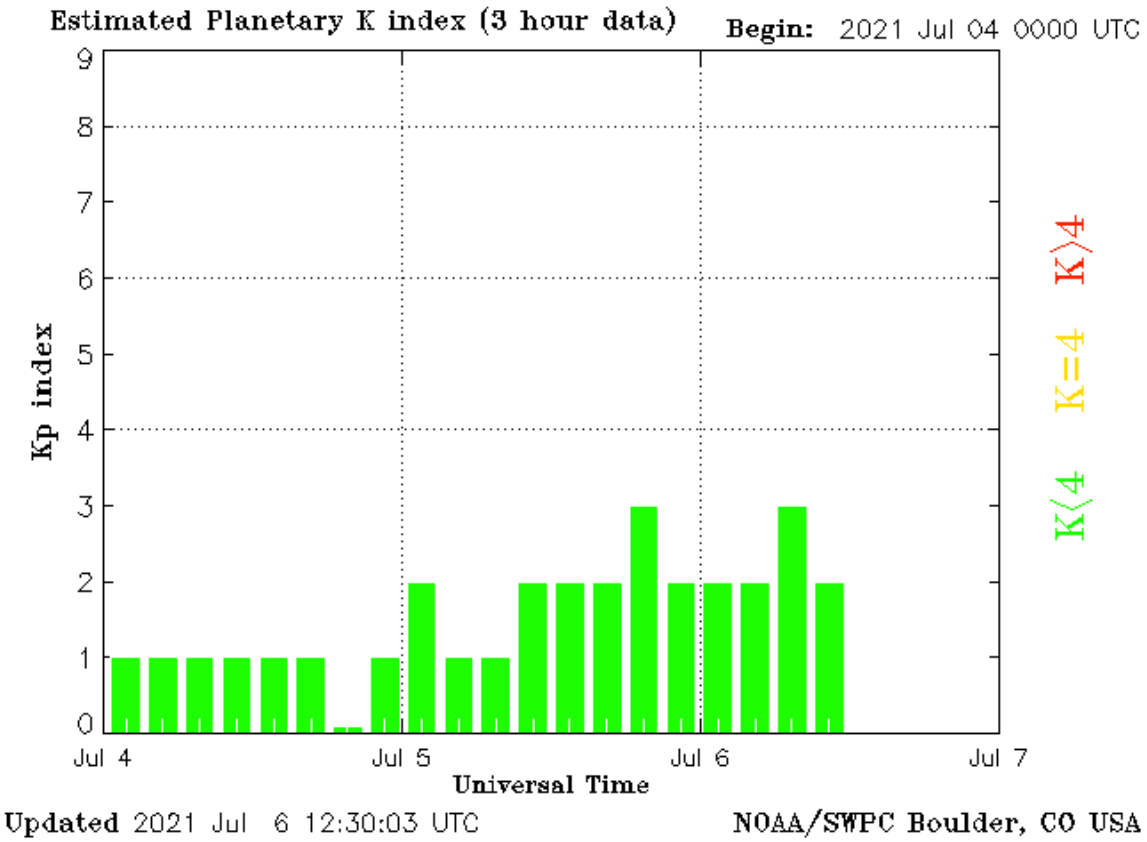
# Visible Sun Spots – 6 JUL 2021



# Sun Spots – 6 JUL 2021 (Magnetogram)



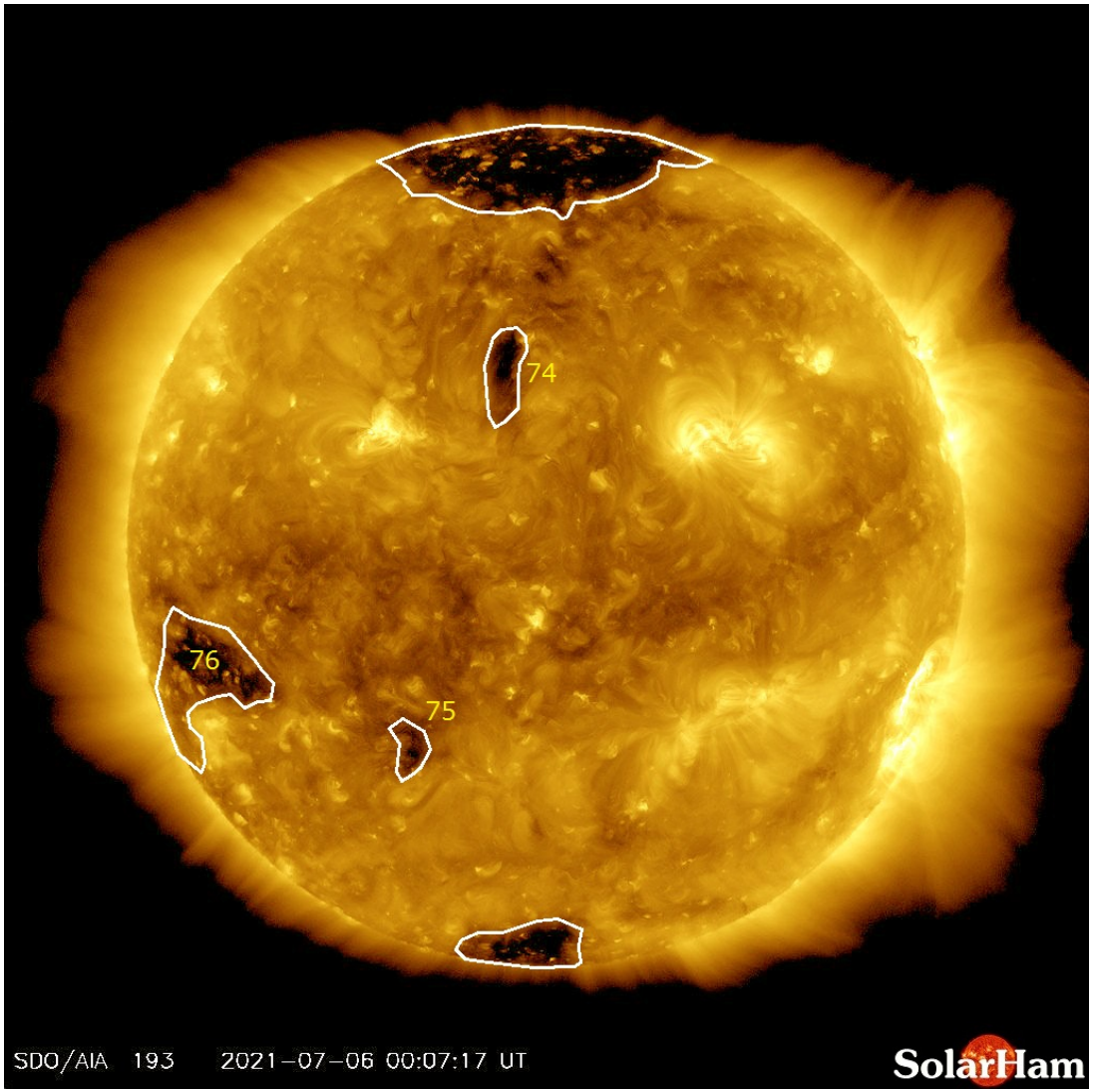
# Planetary K index 4-6 JUL




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 – 6 JUL 2021




**Analysis**

There are currently no large coronal holes facing Earth.

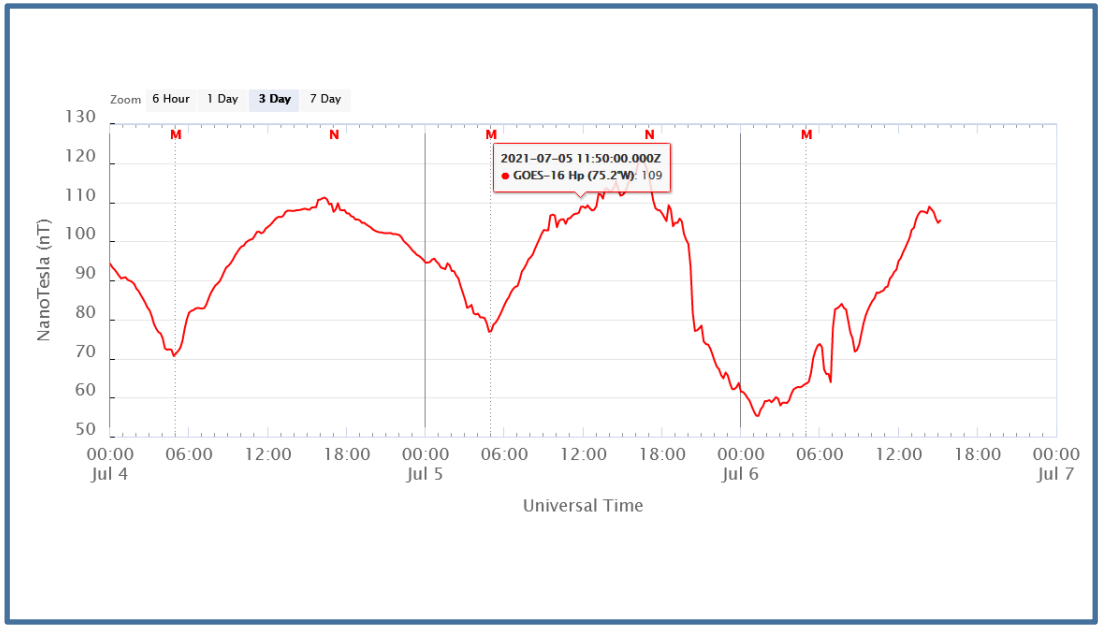
# Coronal Hole History –JUN 2021

| 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 |
|---|---|---|---|---|---|---|
| CH1021 | southern | 2021.07.09-2021.07.10 | | -/-/- | | ref. CH1016 |
| CH1020 | northern | 2021.07.05 | | -/-/- | | |
| CH1019 | southern | 2021.07.02 | 2021.07.06 | -/-/- | | |
| CH1018 | northern | 2021.06.27 | 2021.06.30-2021.07.01 | 3/4/27 | 522 | |
| CH1017 | northern | 2021.06.19-2021.06.20 | 2021.06.24-2021.06.25 | 2/3/18 | 387 | |
| CH1016 | southern | 2021.06.12-2021.06.13 | 2021.06.15-2021.06.17 | 3/4/32 | 608 | ref. CH1013 |
| CH1015 | northern | 2021.06.08-2021.06.09 | 2021.06.11-2021.06.13 | 2/4/27 | 487 | closed on 2021.06.08 |
| CH1014 | southern | 2021.06.04-2021.06.05 | 2021.05.07 | 3/4/22 | 497 | |

# Geomagnetic Conditions: 6 JUL 2021

Solar wind:
Bz = 1 nT North
speed = 350 km/sec
density = 11.34 protons/cm$^3$

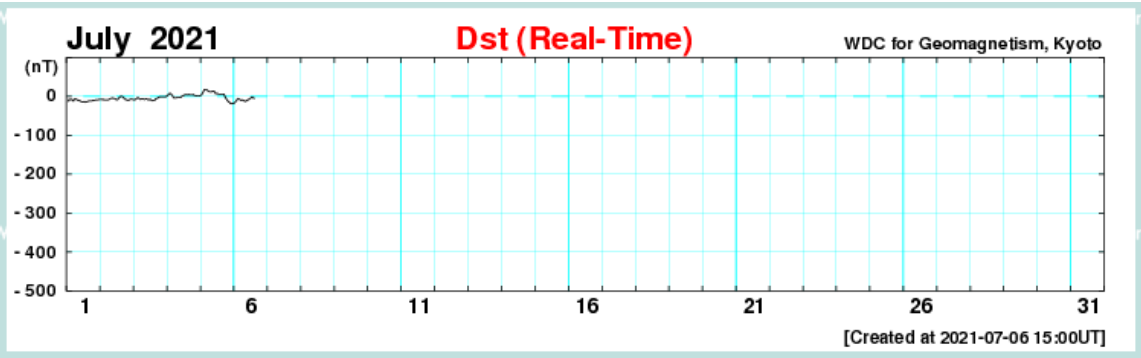
(From – NOAA DSCOVR
In L1, Lagrange Point)



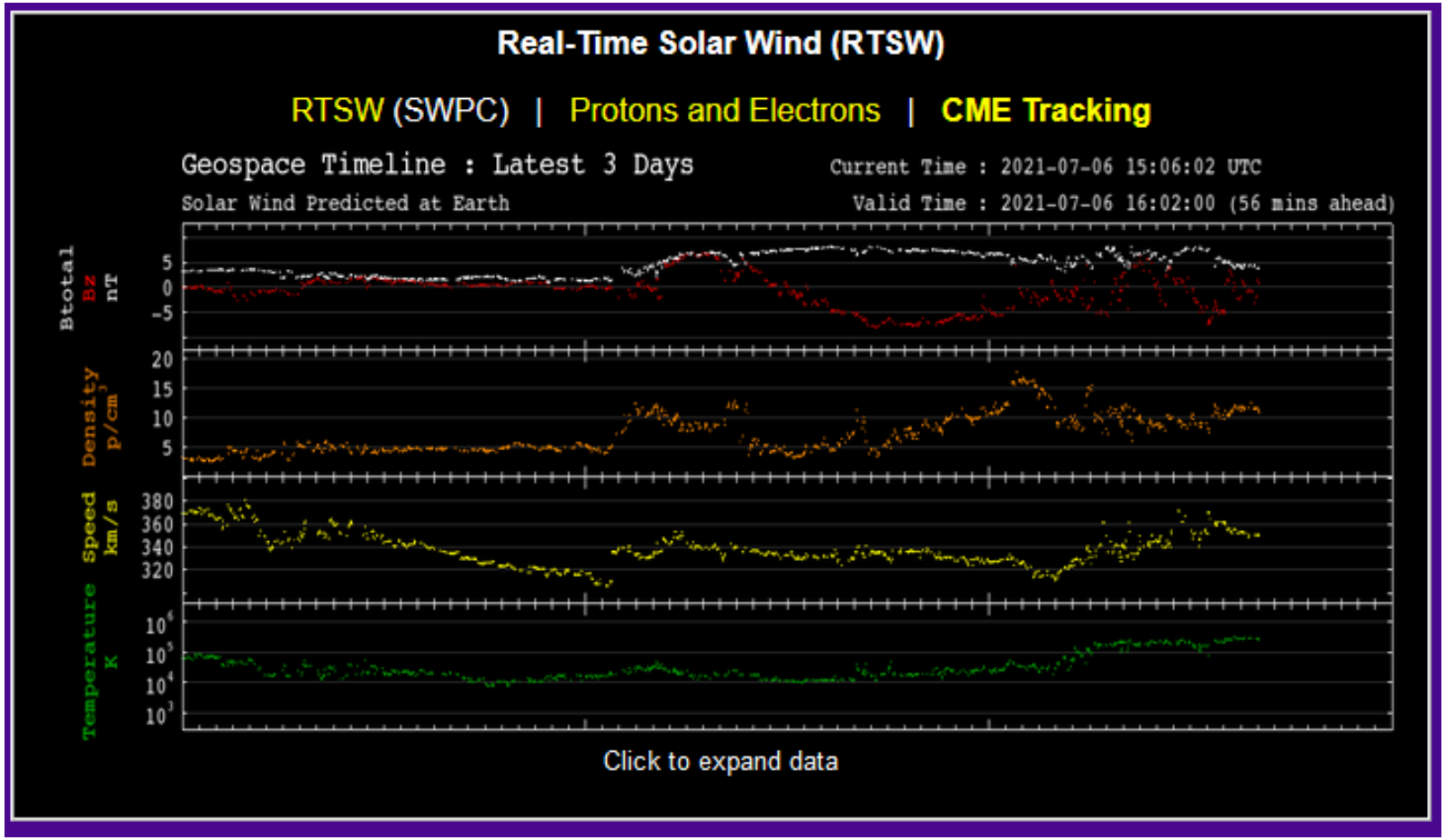

Dst = -5 nT (Ring Field)

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

From – GOES 16
In geostationary orbit



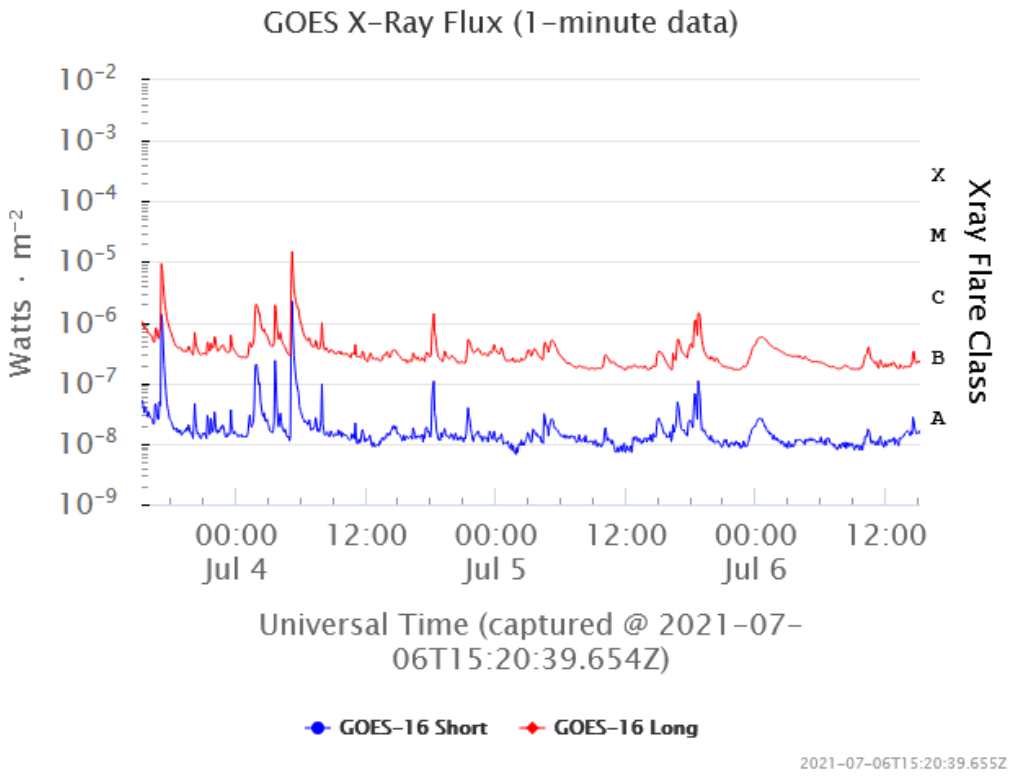
# Real Time Solar Wind




SolarHam

# Solar X-Ray Flux: 4 – 6 JUL 2021

SOLAR X-RAY FLUX

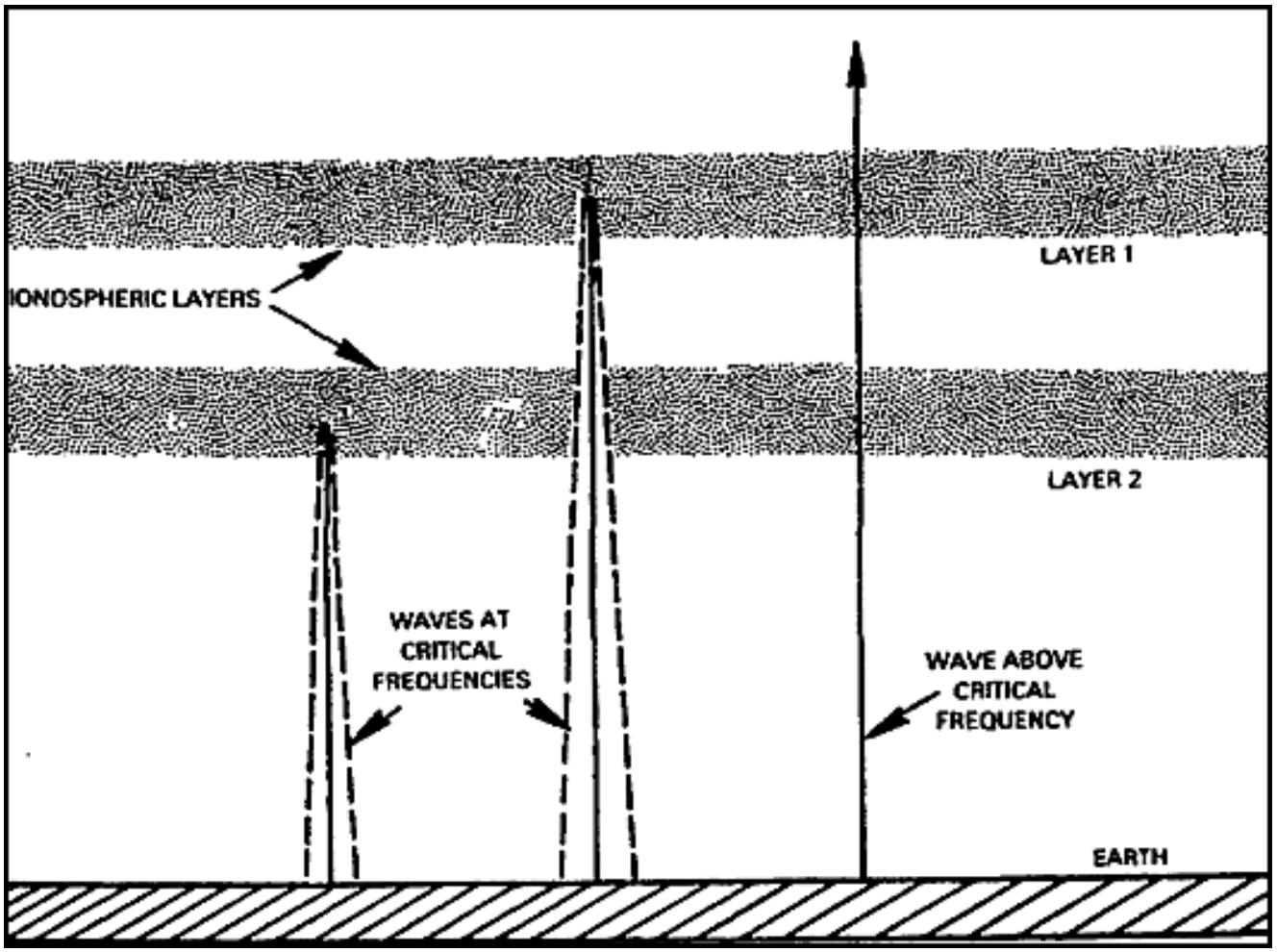



The X-ray radiation that ionizes the D-layer is the 1.0 - 8.0 A (red) plot. These measurements currently taken from the GOES 16 satelite.

| 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

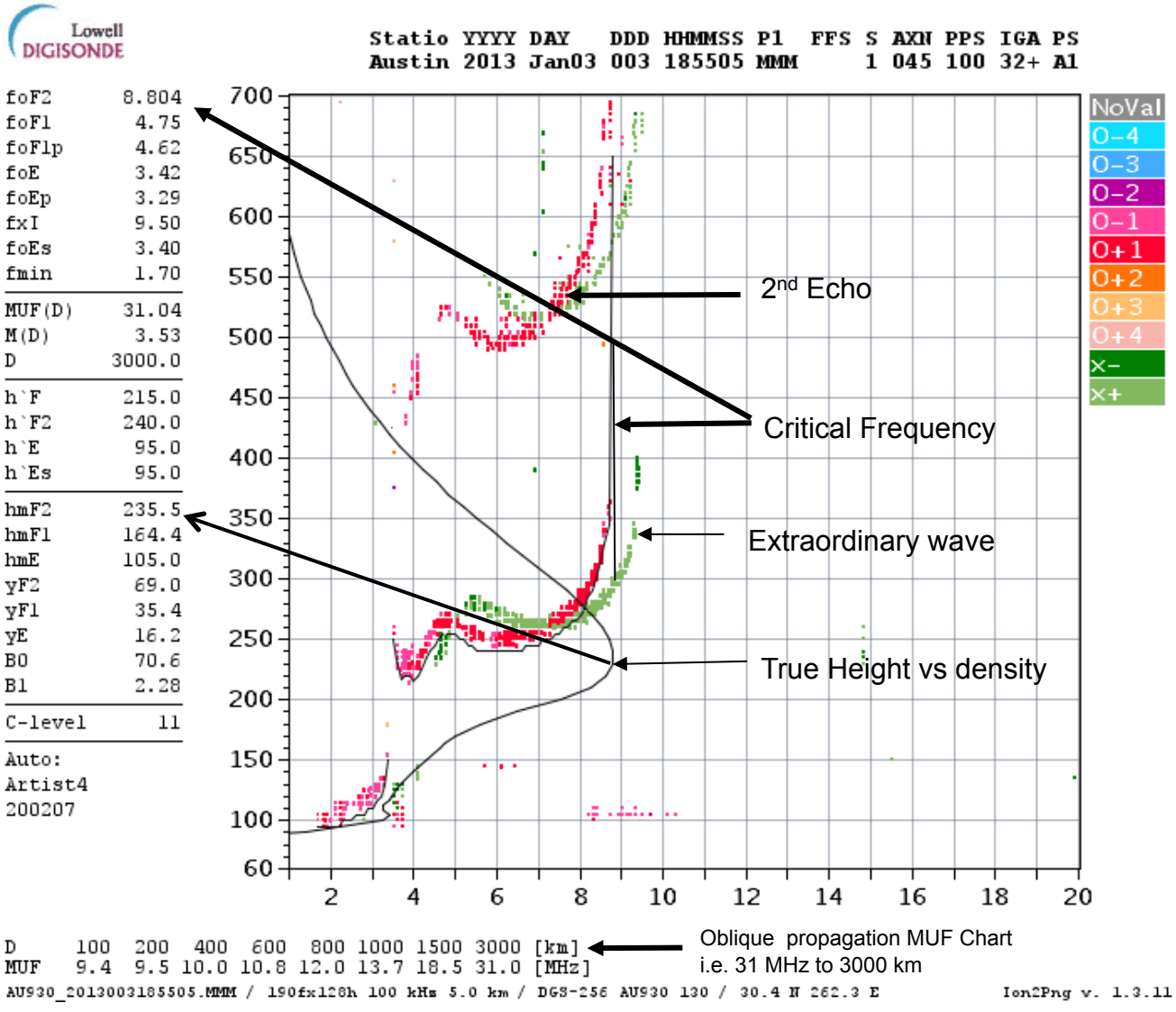
- For State-Wide HF communications (NVIS), but operate at or below CF



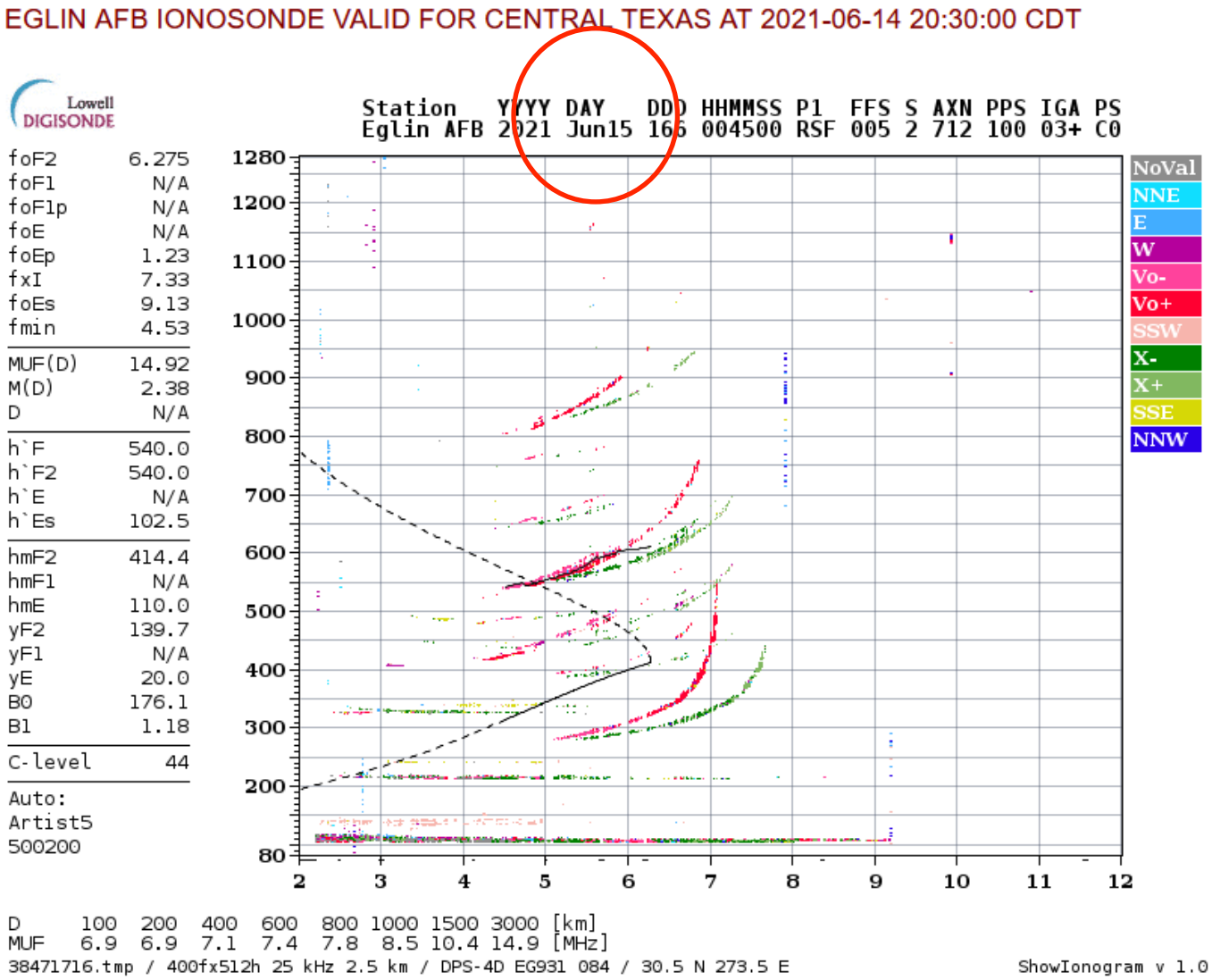

F2 layer

E layer

# Ionogram Interpretation



# Elgin AFB Ionogram – 15 JUN



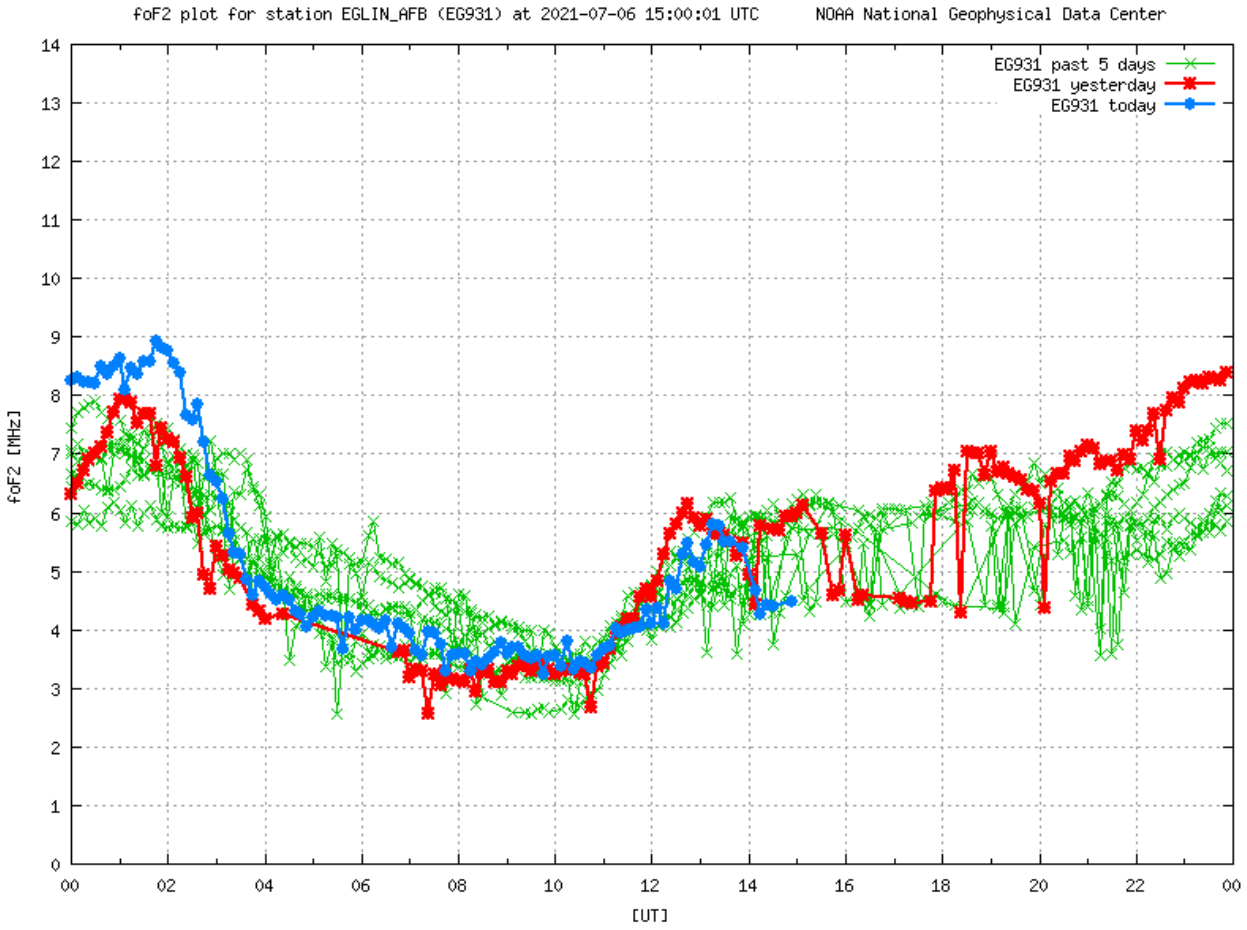
# World-Wide DIDBase Down

- The world-wide Ionosonde data base, DIDBase, operated by University of Mass. Lowell is completed down due to an IT security issue since 15 JUN.
- The Austin Ionosonde is down, but repairs are on-going.
- Fortunately, the foF2 Trending Chart for Eglin AFB Ionosonde is reporting from NOAA to the R6 Army MARS Website. Data is sent FTP to NOAA from Eglin. NOAA then generates the foF2 Trending Chart that we download.

# foF2 Trend – Eglin Ionosonde

EGLIN AFB IONOSONDE FOF2 TREND

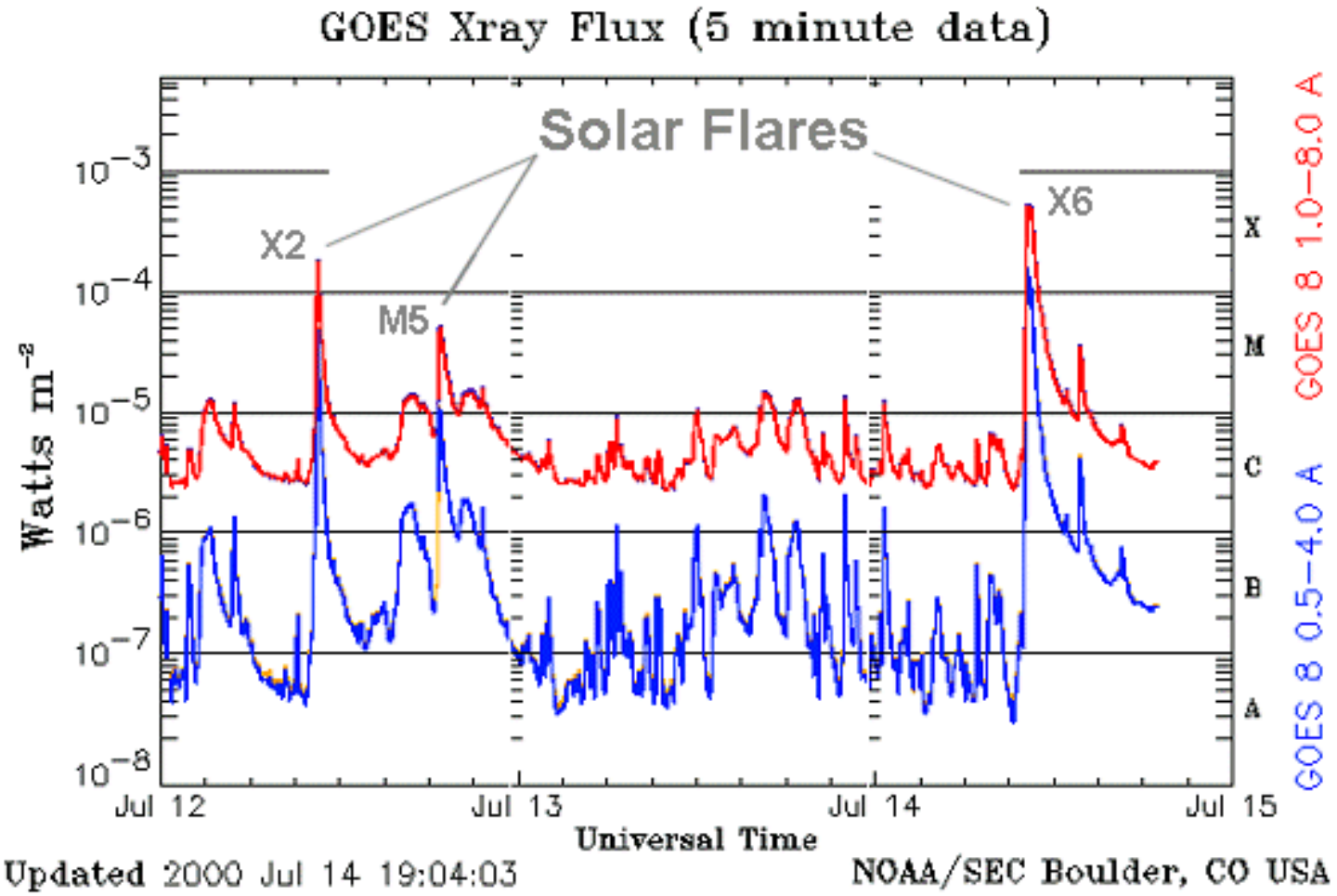
This is a graph of real-time data from the Eglin AFB, FL ionosonde updated every 15 minutes. This data is 45 minutes old, so move time axis left 45 minutes, i.e. what happened over Eglin Fl will happen over Austin TX, 45 minutes later.



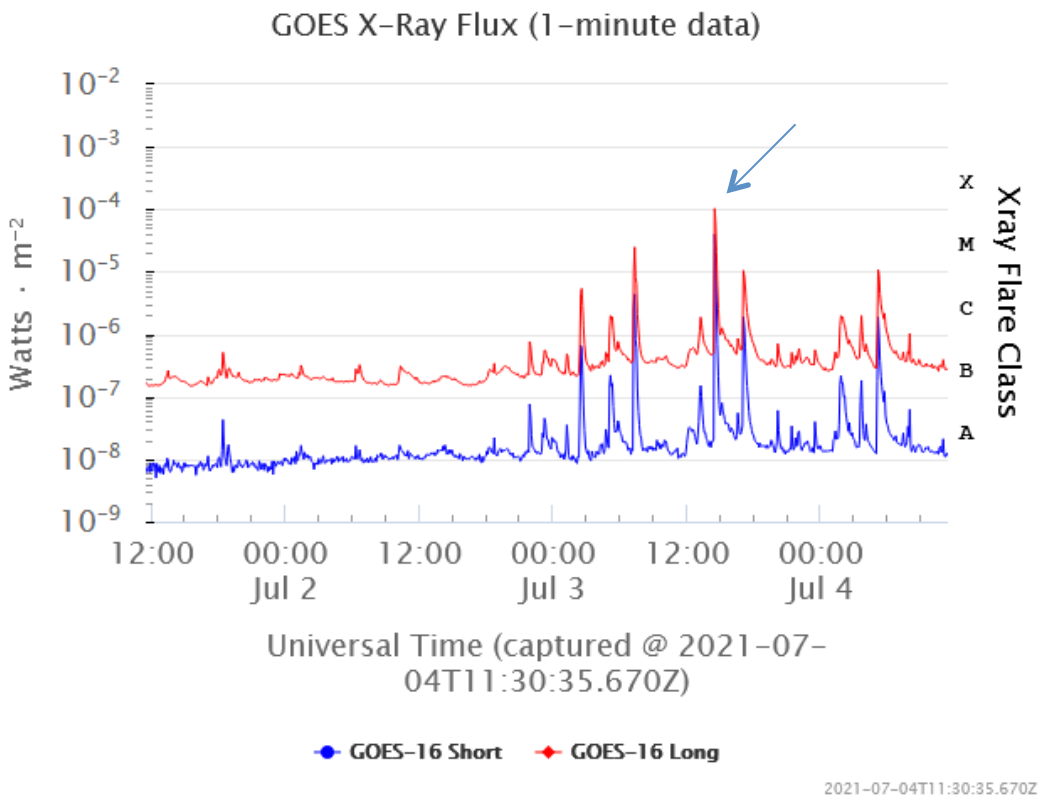
# JUN Solar/Geomagnetic Events

- C-Flares – 25
- M-Flares – 3 (Radio blackouts)
- X-Flares – 1 (Radio blackouts) JUL 3
- CME’s impacting Earth – 0
- Proton Event - 0
- Solar Wind events  - 5

# Solar Flare Classification - Intensity



# X1.5 Solar Flare – 3 JUL

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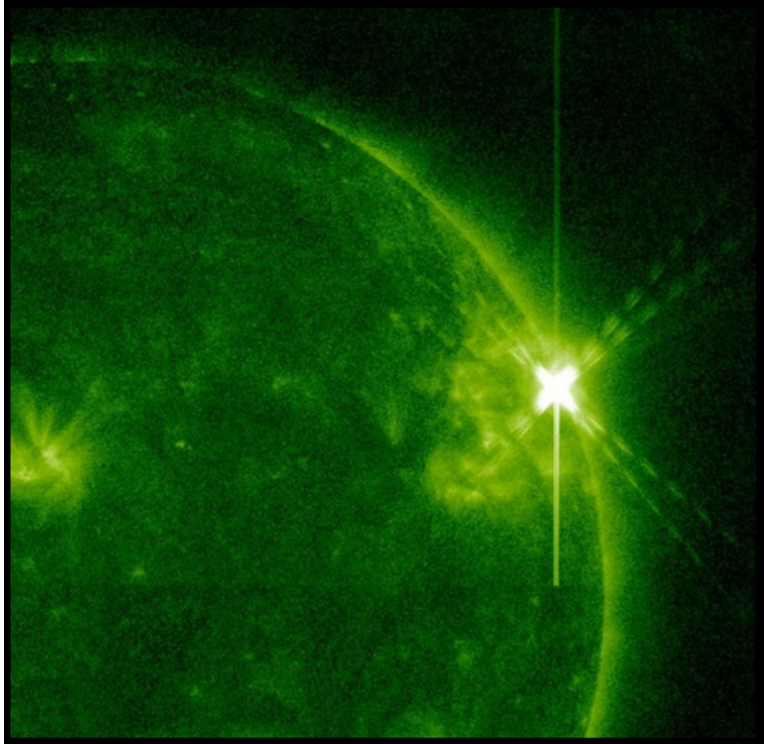
## X-Flare!

**July 3, 2021 @ 16:05 UTC**

Hello again folks. I just returned back from a trip to the zoo with my 6 year old daughter and luckily for me, nothing much of interest occurred on the Sun.

Okay well, that is not entirely true. A new spotted region assigned AR 2838 formed rapidly and produced an X1.5 solar flare at 14:29 UTC (Jul 3). This is now the largest solar flare of Cycle 25, at least in terms of peak X-Ray flux. The region also produced an impulsive M2.7 @ 07:17 UTC (Jul 3). Because AR 2838 is already approaching the west limb, any associated CME activity would likely be directed away from Earth. Elsewhere, large AR 2835 located in the SW quadrant remained mostly stable with only very small B-Class flares detected. There will remain a chance for at least another moderate M-Flare during the next 24 hours.



## **SWPC Forecast Discussion** (txt)

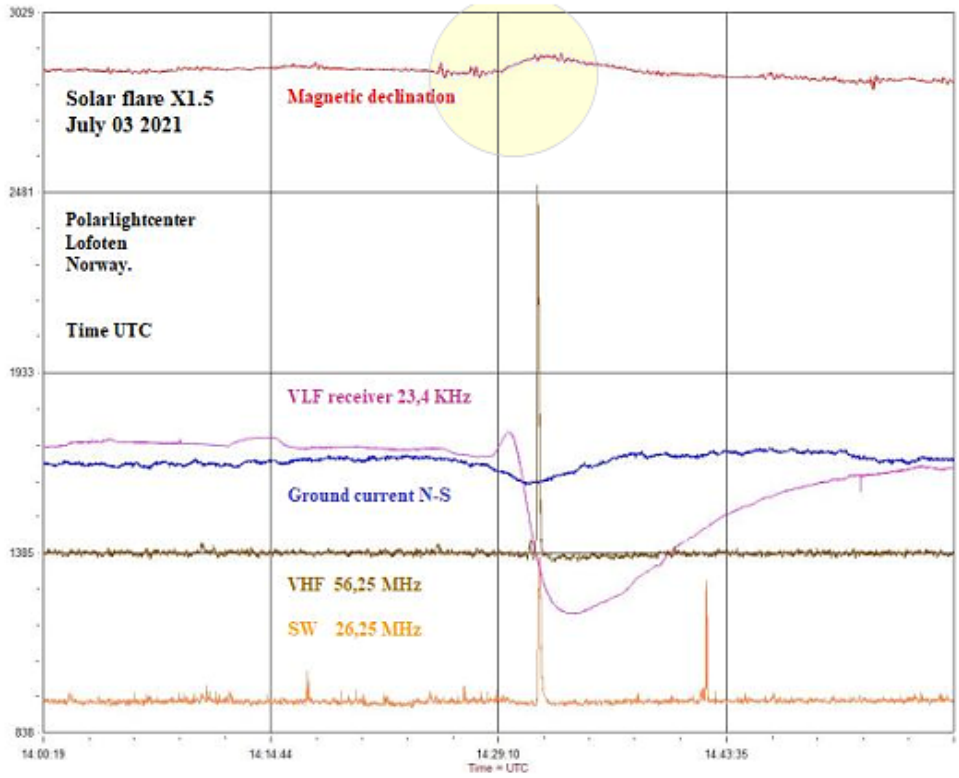
```
:Product: Forecast Discussion
:Issued: 2021 Jul 04 0030 UTC
# Prepared by the U.S. Dept. of Commerce, NOAA, Space Weather Prediction Center
#
Solar Activity

.24 hr Summary...
Solar activity reached high levels today as Region 2838 (N24W88,
Cro/beta) produced an M2/Sf at 03/0717 UTC, an X1/Sn at 03/1429 UTC, and
an M1/Sf flare at 03/1703 UTC. Associated with the M2 and X1 flares were
CMEs off the W limb beginning at 03/0748 UTC and 03/1448 UTC. Two
additional CMEs were observed off the W limb at 03/0412 UTC and 03/0848
UTC but were likely from around the W limb as the source region was
undiscernible. Model results of the CMEs indicated no geoeffective
component.

Accurate sunspot/magnetic analysis of Region 2838 was hampered due to
limb proximity.

.Forecast...
Solar activity is likely to be moderate (R1:Minor Radio Blackouts) with
a chance for high levels (R2-R3:Moderate-Strong Radio Blackouts) on 04
Jul due to continued activity from Region 2838. Activity is expected to
slowly decrease to a chance for moderate levels with a slight chance for
high levels on 05 Jul as Region 2838 rotates around the NW limb. By 06
Jul, solar activity is likely to be at low levels with a slight chance
for moderate levels.
```

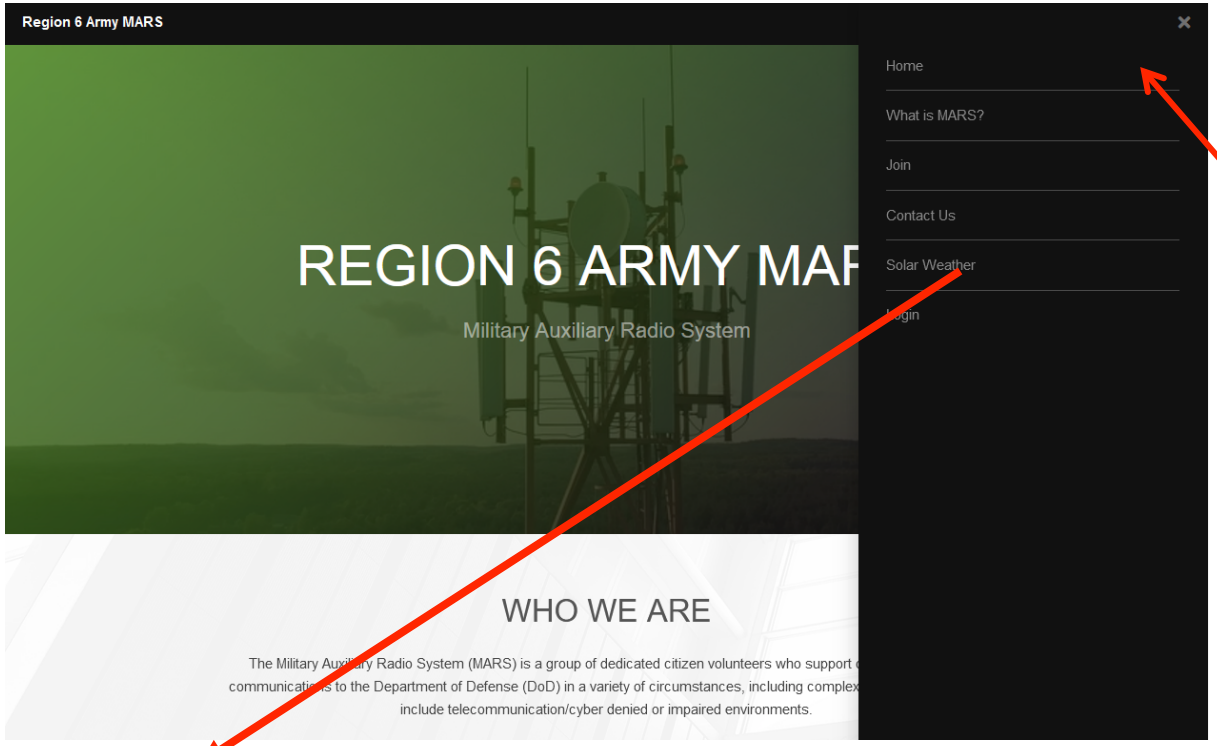
**SOLAR FLARE CAUSES RARE 'MAGNETIC CROCHET':** The X-flare of July 3rd did something rare. "It disturbed *all* of my instruments," reports Rob Stammes, who operates a space weather observatory in Lofoten, Norway. The flare produced a radio burst, an ionospheric disturbance, a surge of electrical currents in the ground, and a deflection of the observatory's local magnetic field. All of these are shown in the strip chart recording, below.




"This is a first in many years," says Stammes. "The magnetic disturbance (circled in yellow) is especially rare."

The phenomenon is called a 'magnetic crochet.' Radiation from the flare ionized the top of Earth's atmosphere and caused currents to flow 60 km to 100 km above Earth's surface. These currents, in turn, altered Earth's polar magnetic field. Unlike geomagnetic disturbances that arrive with CMEs days after a flare, a magnetic crochet occurs *while the flare is in progress*. They tend to occur during fast impulsive flares like this one.

# Solar Weather Data



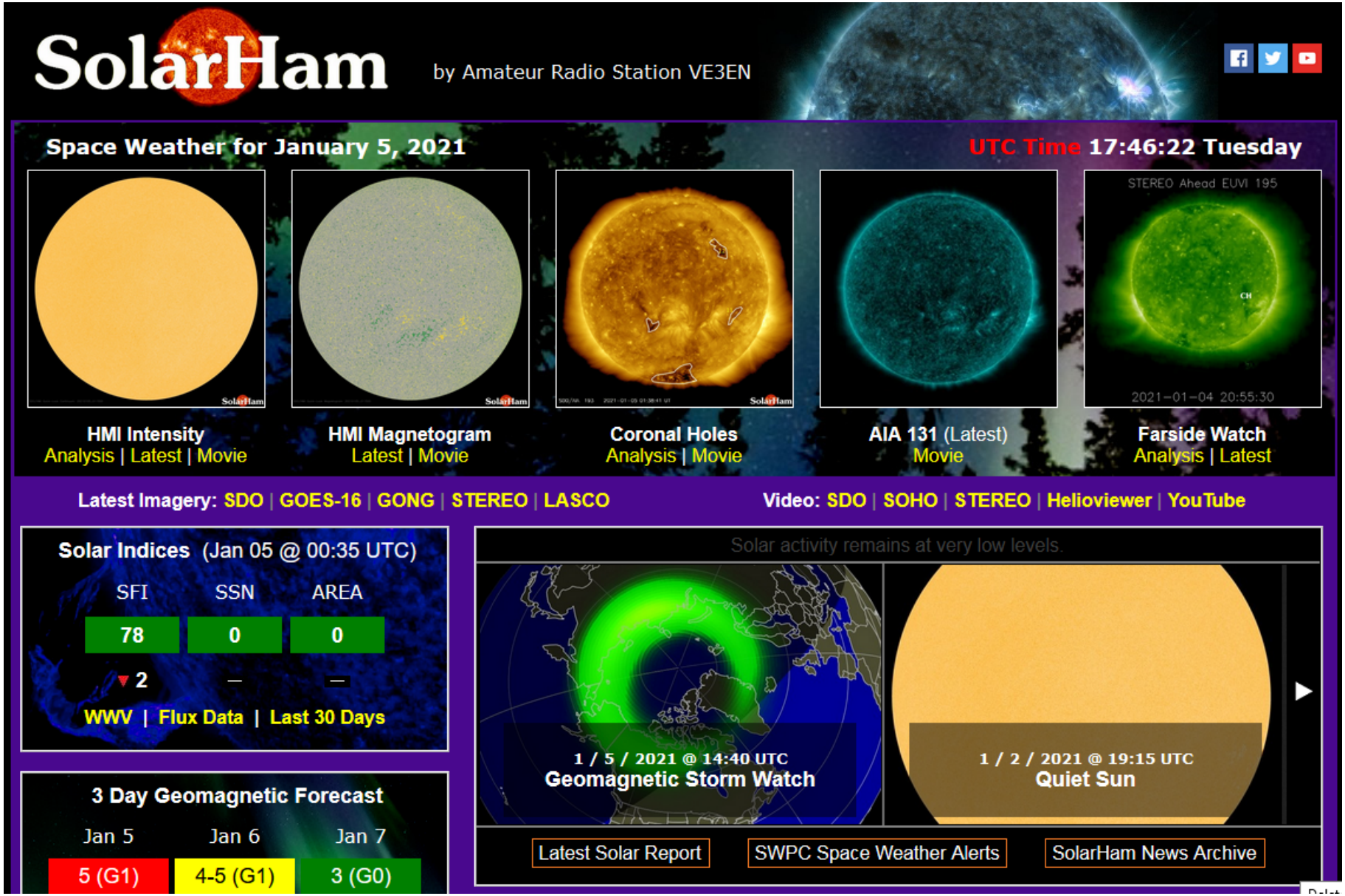

Menu

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

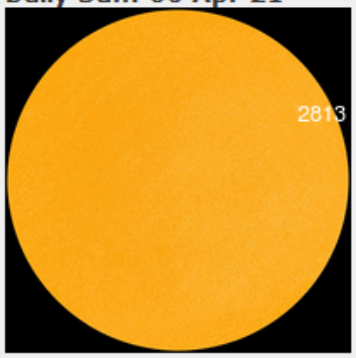
https://www.spaceweather.com/

## 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

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