

SOLAR WEATHER

4 JAN 2022



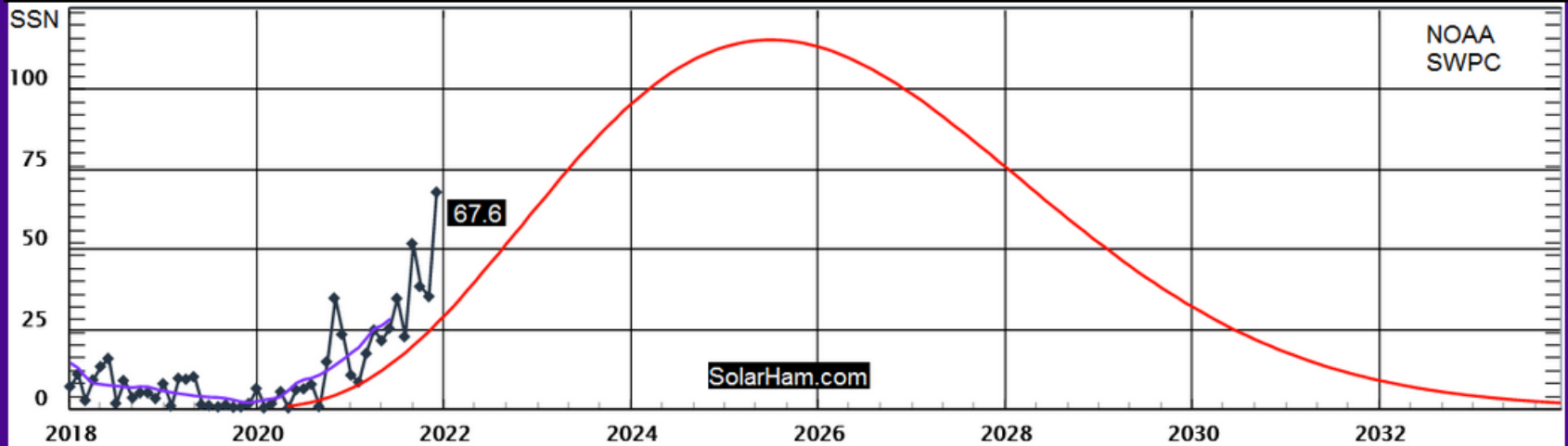
Lewis Thompson
W5IFQ

Taken by Marianne
Bergli on January 1,
2022 @ Dåfjord,
Ringvassøy, Tromsø,
Norway

Cycle 25 Progress

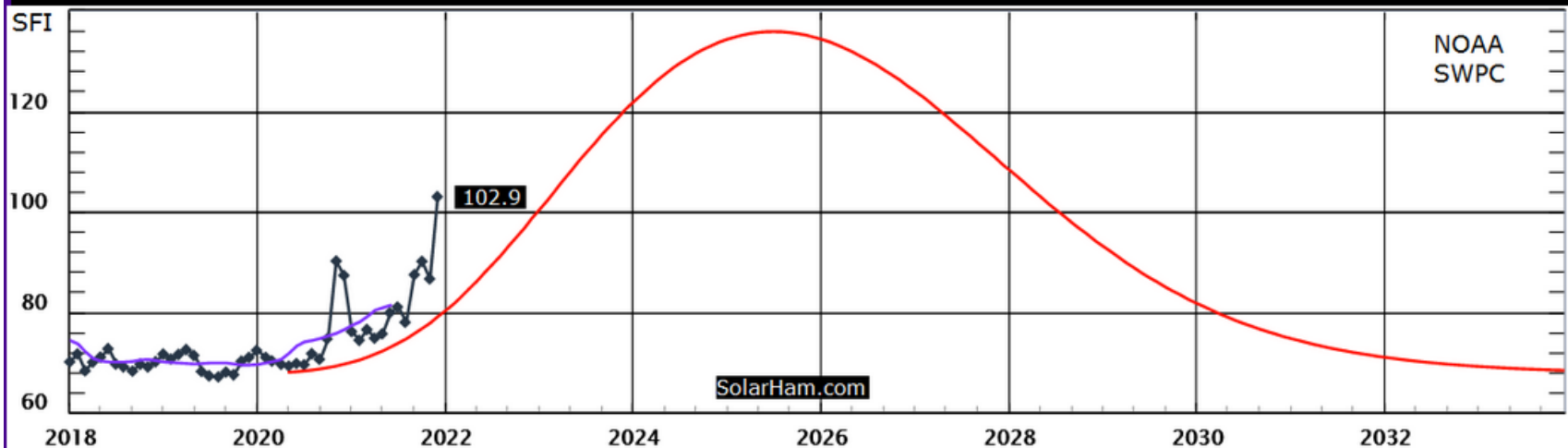
Sunspot Number Progression (December 2021)

Predicted SSN: 26.6 **Actual: 67.6** Latest **Smoothed Predicted SSN (6/2021): 13.7** **Actual: 27.8**



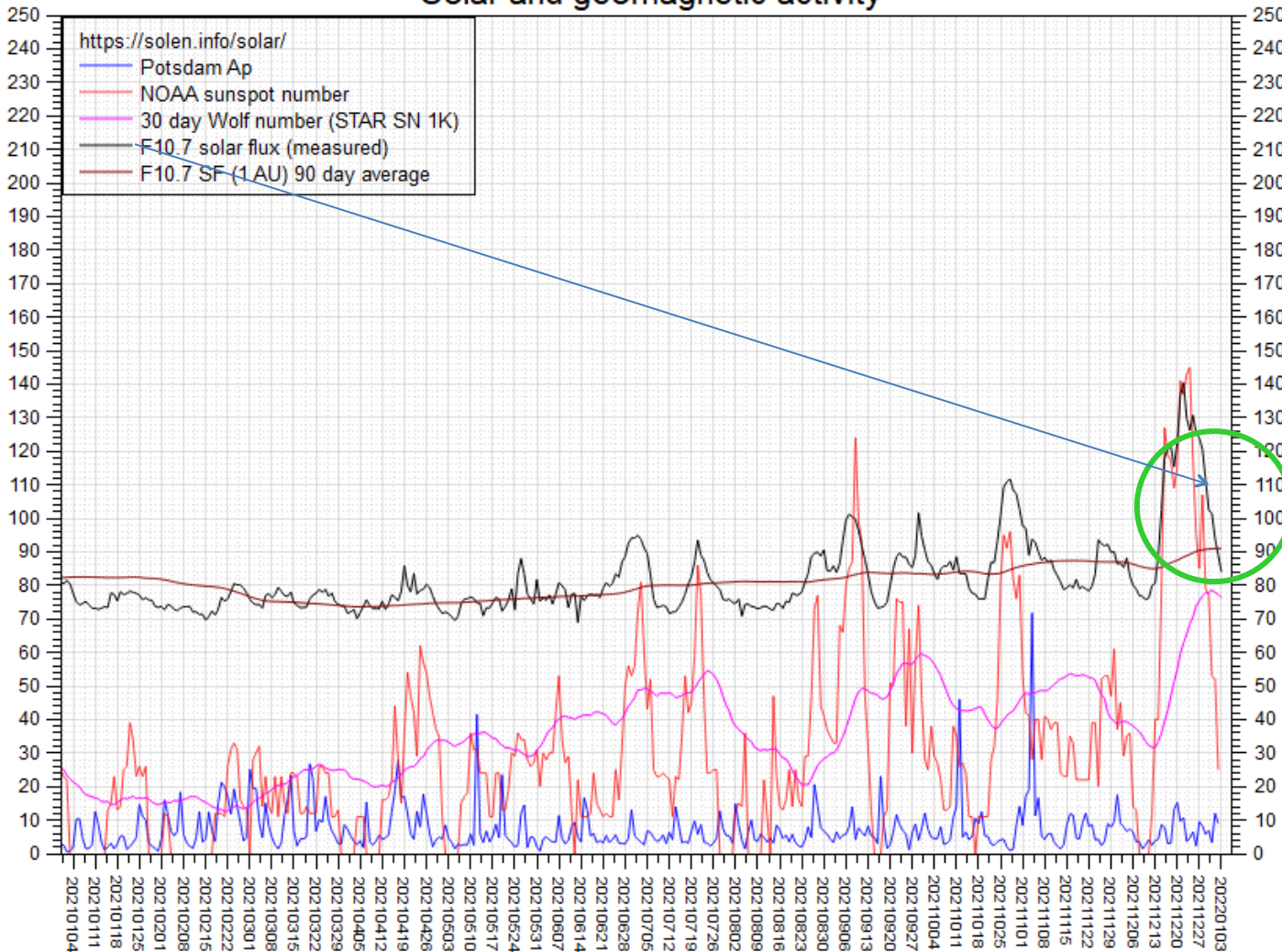
10.7cm Solar Flux Progression (December 2021)

Predicted SFI: 79.0 **Actual: 102.9** Latest **Smoothed Predicted SFI (6/2021): 73.0** **Actual: 81.3**



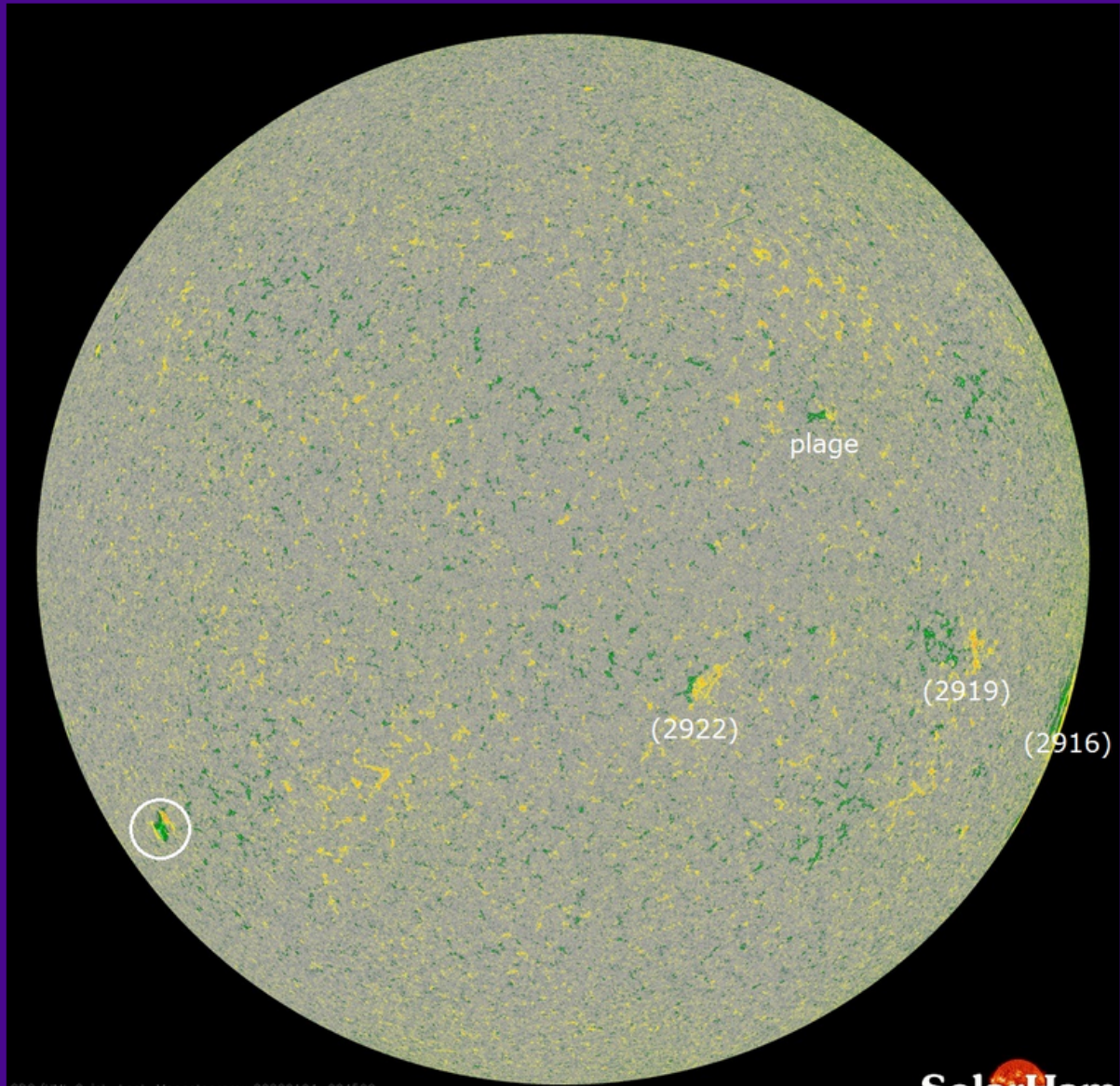
SOLAR FLUX INDEX - 2021/2022

Solar and geomagnetic activity



SF 86 (increase from one previous 27 day solar rotation)

Magnetogram image on January 4, 2022



SDO/HMI Quick-Look Magnetogram: 20220104_004500

SolarHam

SolarHam.org Forecast

Solar Indices (Jan. 4 @ 00:35 UTC)

SFI	SSN	AREA
84	12	140
▼ 5	▼ 13	▼ 200

[WWV](#) | [Flux Data](#) | [Last 30 Days](#)
[Cycle 25 Progression](#)

3 Day Geomagnetic Forecast

Jan. 4	Jan. 5	Jan. 6
2-3 (G0)	2 (G0)	2 (G0)
<i>Max Kp</i>		
M-Lat 10%	M-Lat 01%	M-Lat 01%
H-Lat 40%	H-Lat 20%	H-Lat 20%
<i>Probabilities</i>		

[Detailed Forecast](#)

Solar Flare Detection
 Data provided by NOAA/SWPC GOES-16 X-Ray Flux [Click to expand data](#)

X-Rays
B1.5
Current
D Layer
Solar SOFT

Radio Blackout Level: R5, R3, R1, R0

Current Solar Flare Threat | [Probability Details](#)

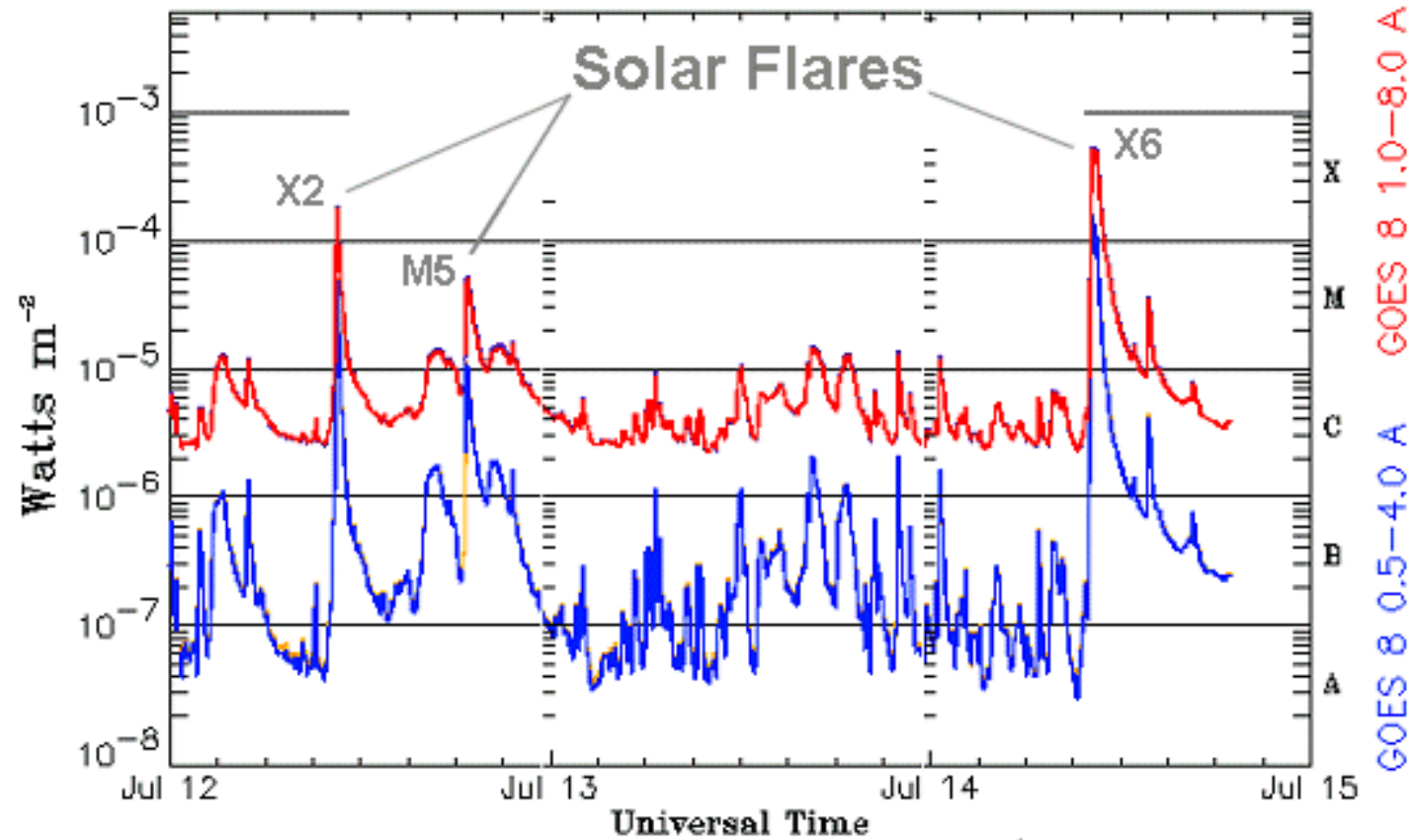
C-Flare: 10%
M-Flare: 01%
X-Flare: 01%
Proton: 01%

[Flare Events \(M1+\) Past 48 Hours](#) | [Event Report](#) | [Top Solar Flares](#)
No Noteworthy Events Detected.

Solar Flare Classification - Intensity

(Why is This Important?)

GOES Xray Flux (5 minute data)

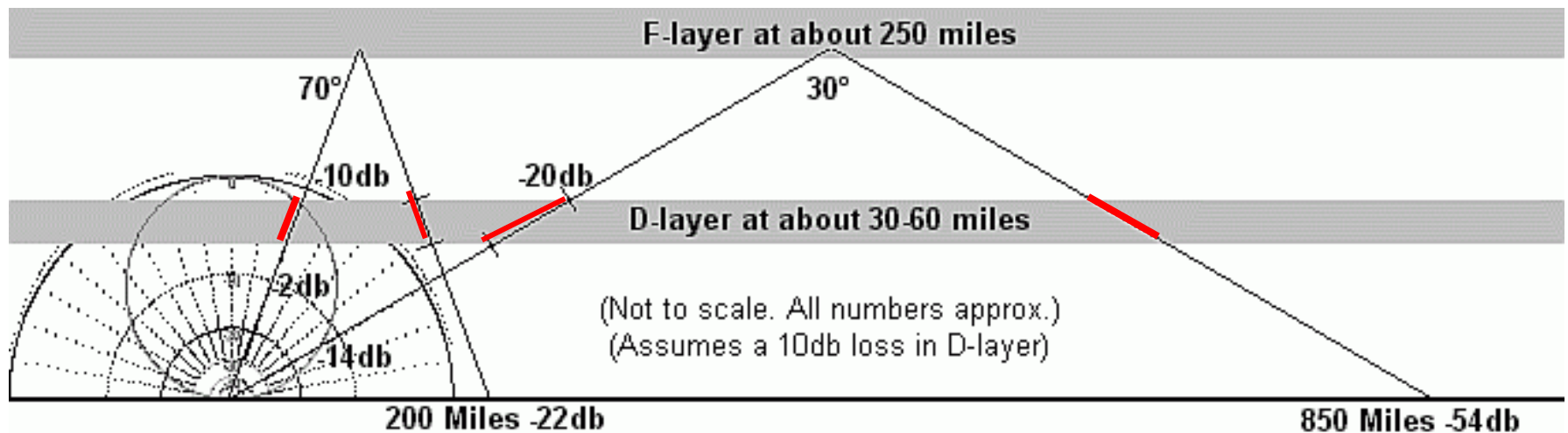


Updated 2000 Jul 14 19:04:03

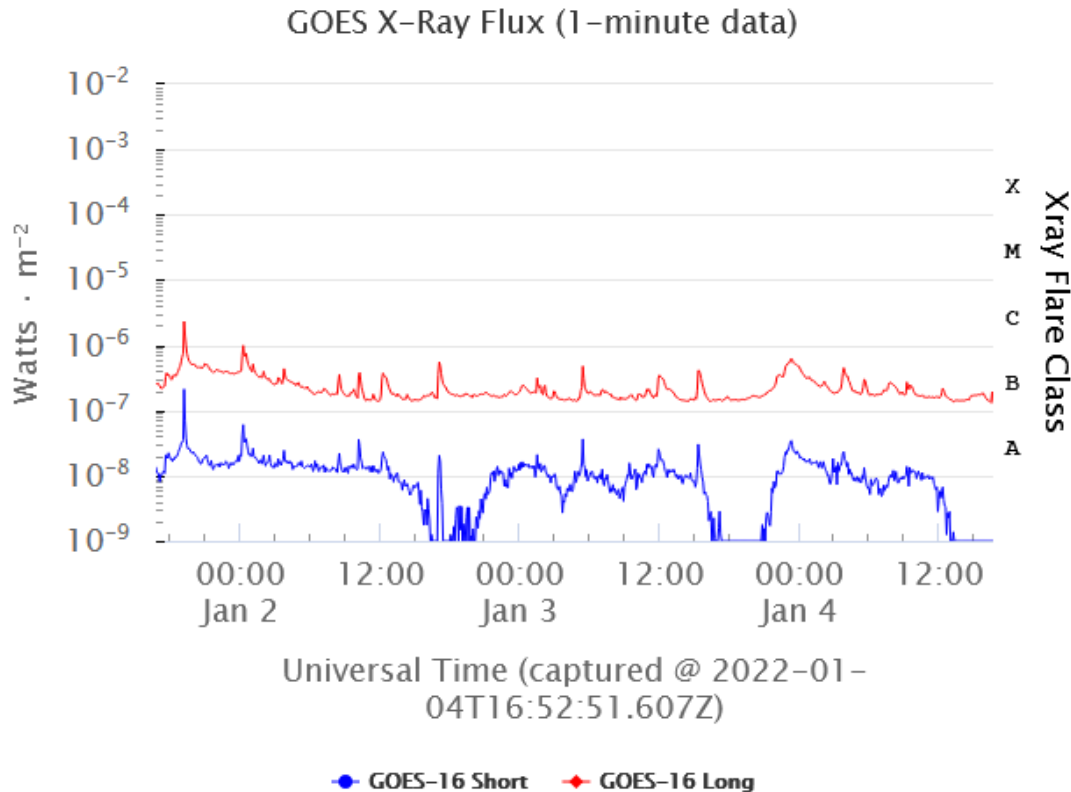
NOAA/SEC Boulder, CO USA

D-Layer Absorption

- Day-time effect
- Absorption is a function of $1/f^2$
- Can sometimes be compensated by power or bandwidth reduction



Solar X-Ray Flux: 2 - 4 JAN 2022



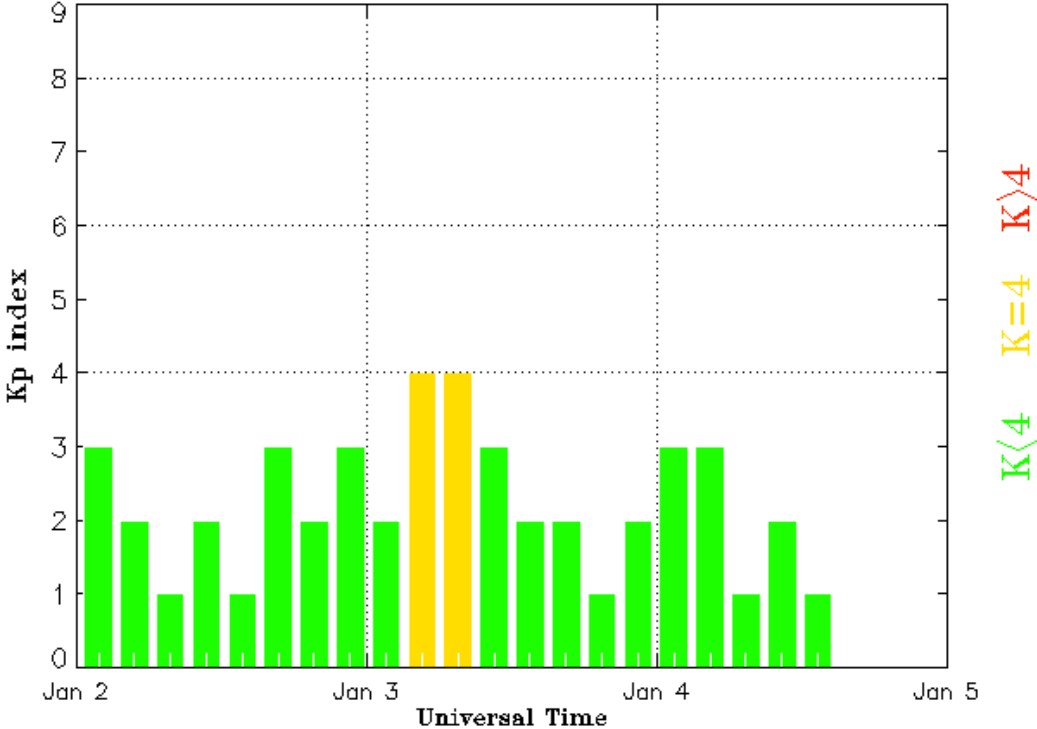
2022-01-04T16:52:51.607Z

The X-ray radiation that ionizes the D-layer is the 1.0 - 8.0 Å (red) plot. These measurements currently taken from the [GOES 16](#) satellite.

Flare Category	Effect
A1-B9	No or minor impact on HF
C1	Low absorption of HF signals
M1	Occasional 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

Planetary K index 2 - 4 JAN 2022

Estimated Planetary K index (3 hour data) Begin: 2022 Jan 02 0000 UTC



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

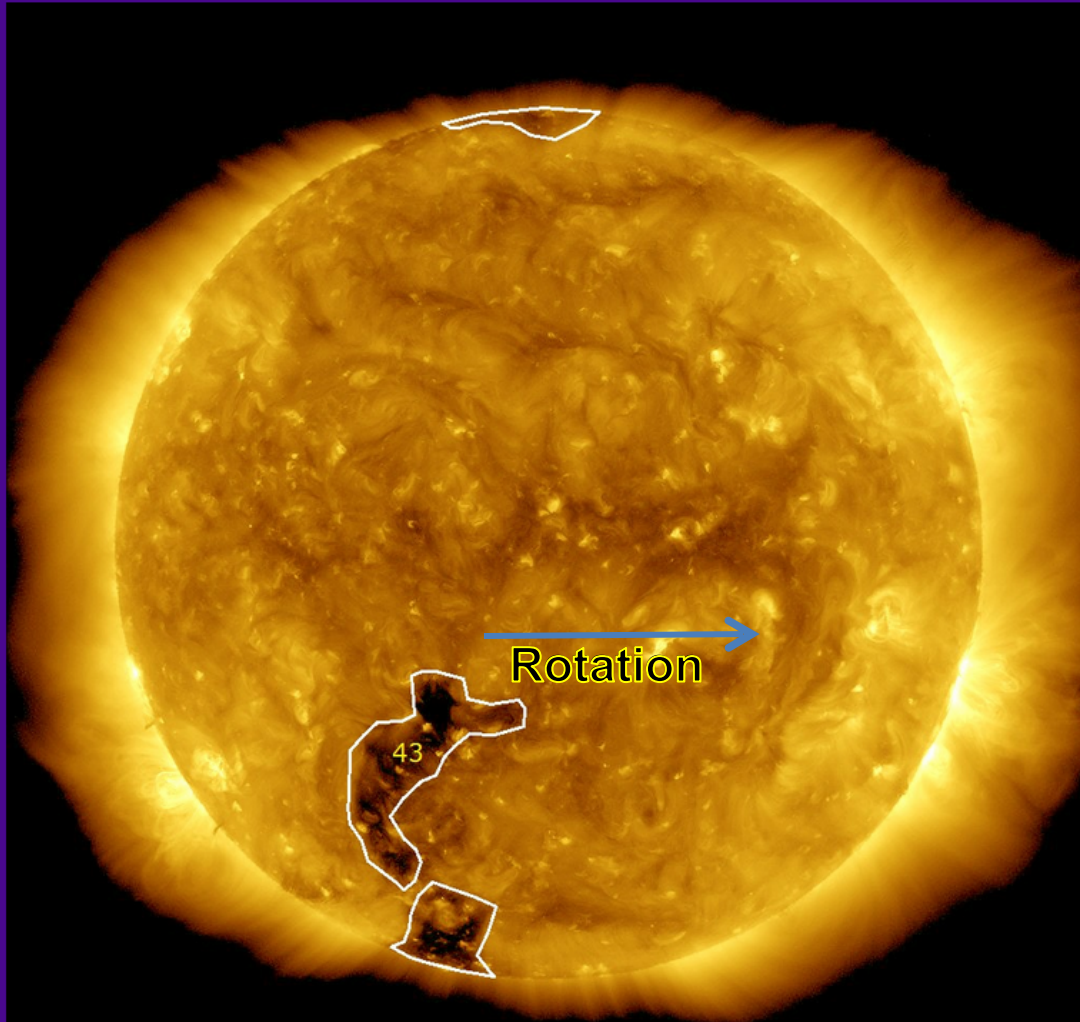
K-Index	Effect
0-2	Inactive/Quiet, no impact on HF
3-4	Unsettled/Active, minor HF fade in higher latitudes
5-6	HF fade at higher latitudes
7-8	HF sporadic
9	HF impossible above 40M

Updated 2022 Jan 4 15:30:07 UTC

NOAA/SWPC Boulder, CO USA

Coronal Holes - 4 JAN 2022

Coronal Hole Map for January 4, 2022



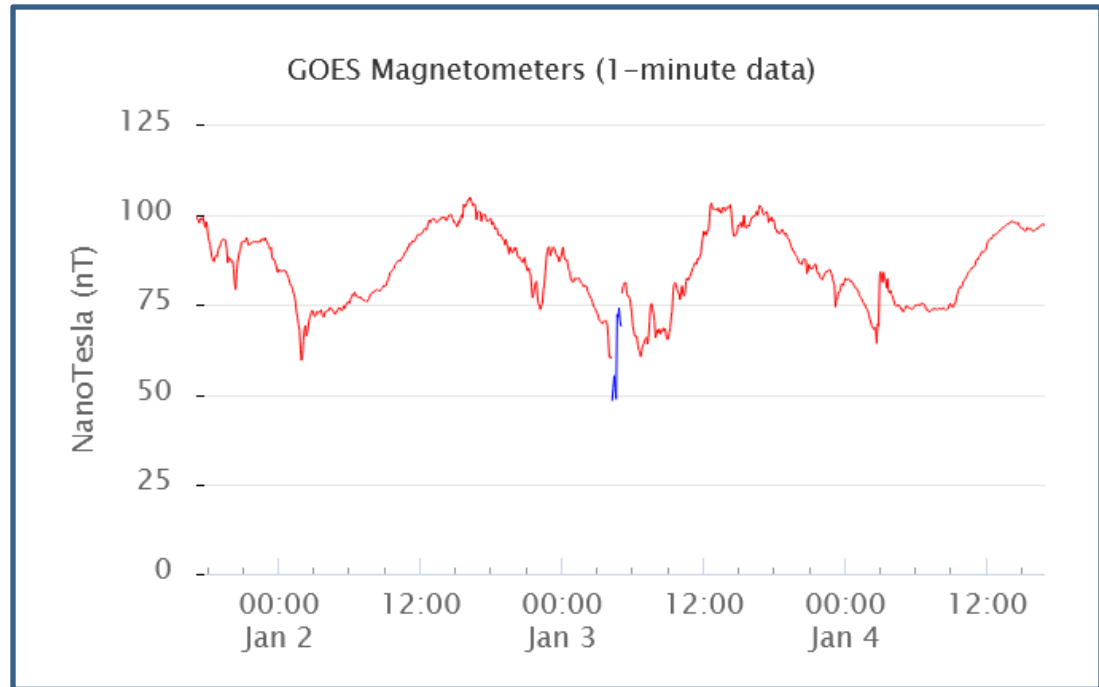
Analysis

There are currently no large coronal holes facing Earth.

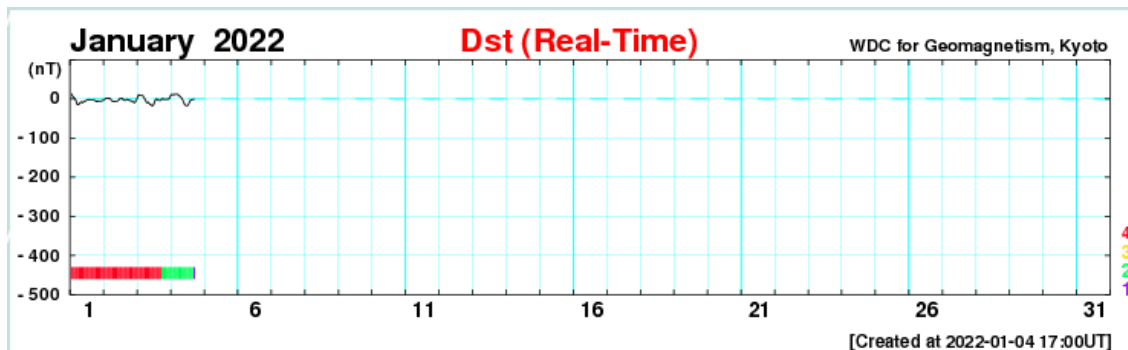
Geomagnetic Conditions: 4 JAN 2022

Solar wind:
Bz = 0 nT North
speed = 432 km/sec
density = 4.16 protons/cm³
(From – NOAA DSCOVR
In L1, Lagrange Point)

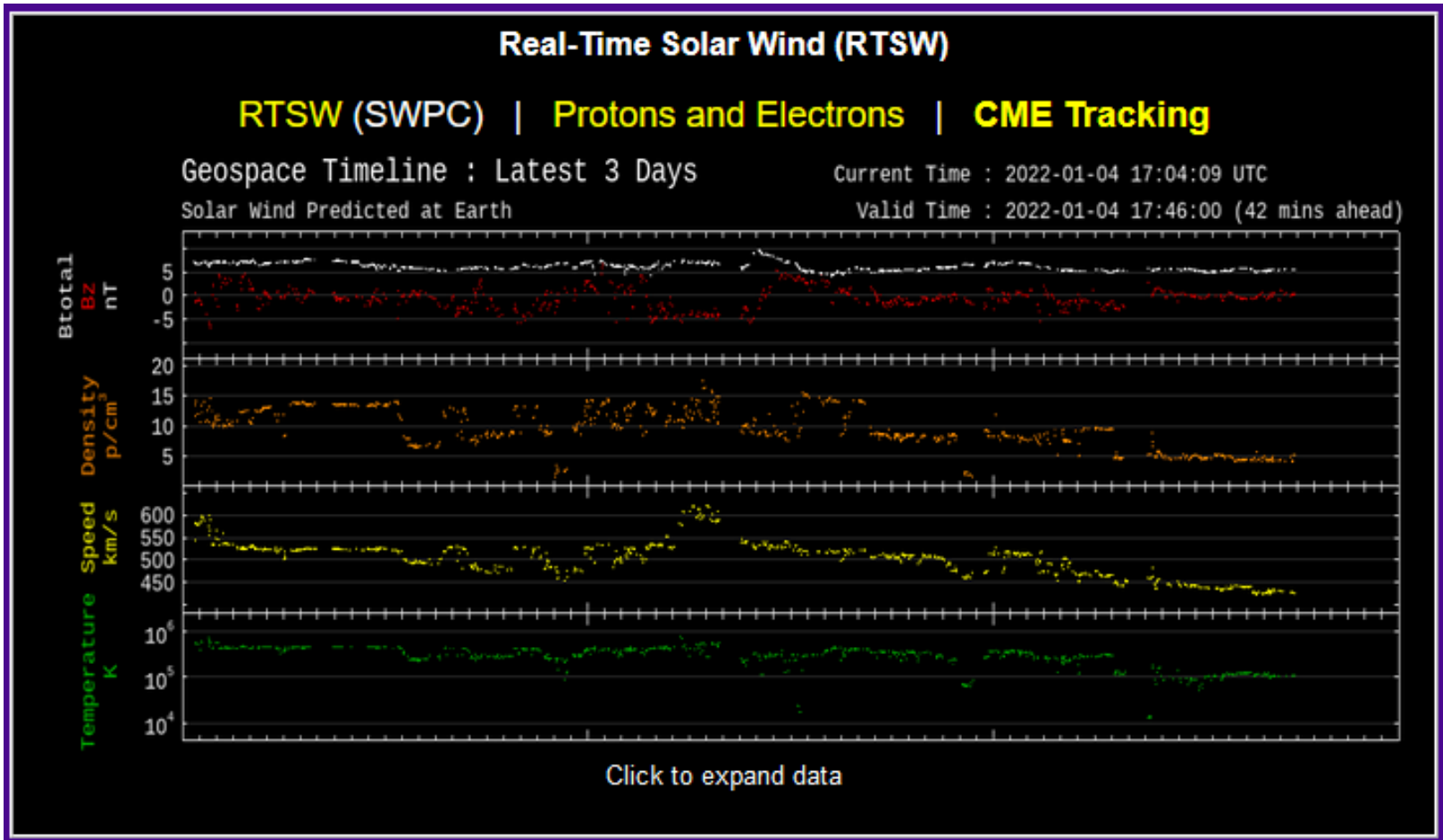
Dst = -1 nT (Ring Field)
(From – Data Analysis Center
For Geomagnetism and Space
Magnetism – Kyoto University)



From – GOES 16
In geostationary orbit

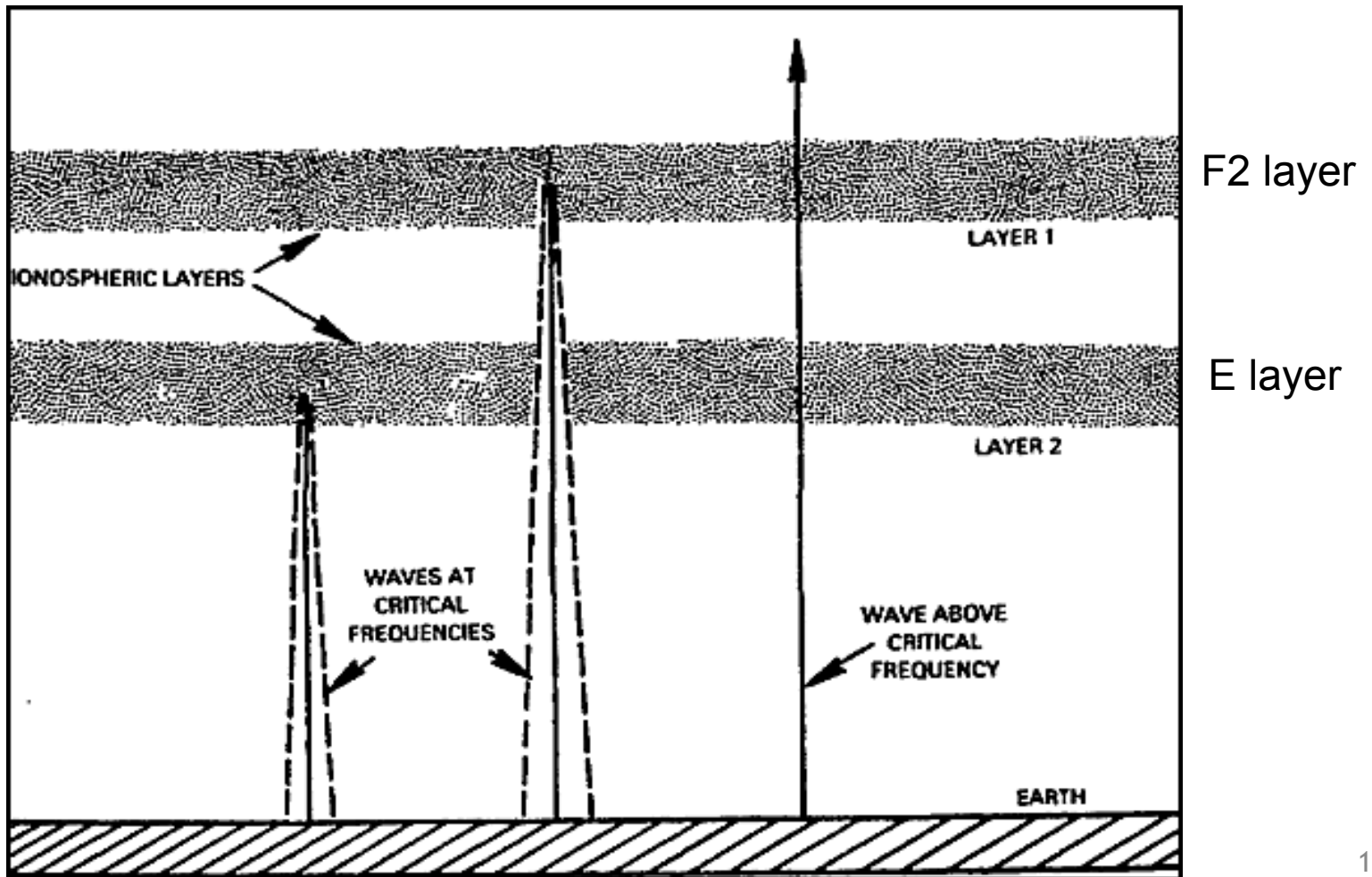


Real Time Solar Wind



Critical or foF2 Frequency Definition (Why is This Important?)

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

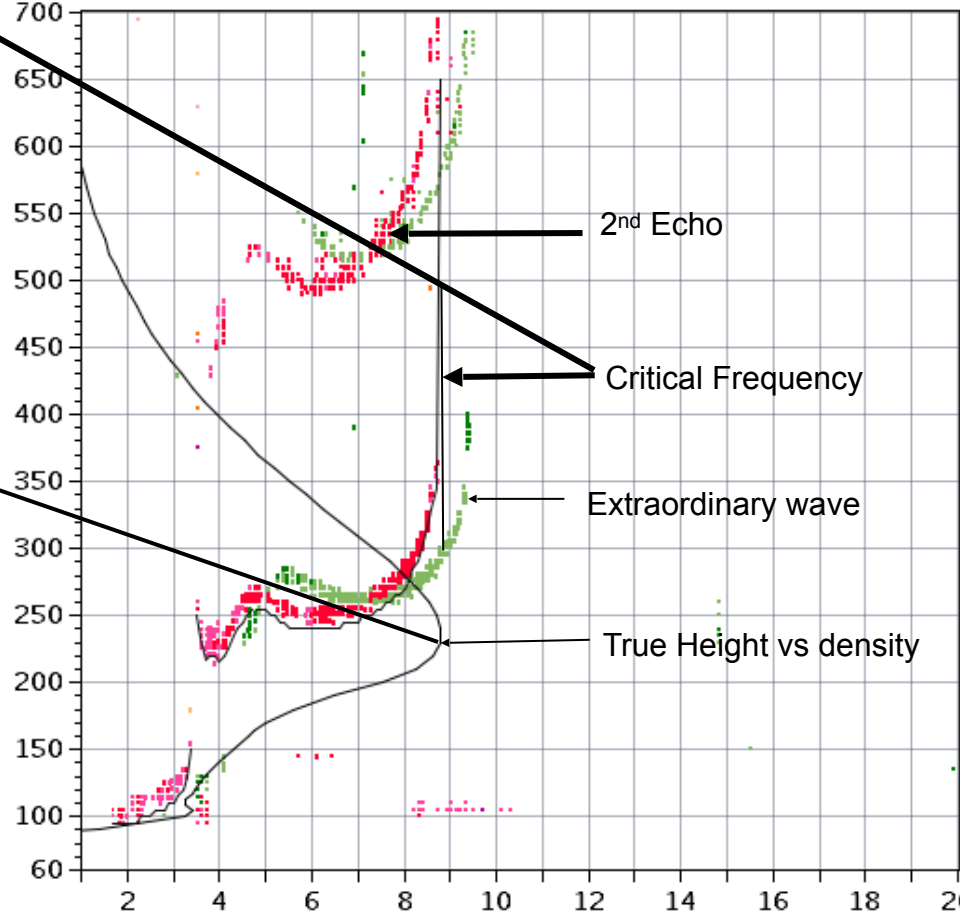


Ionogram Interpretation



Statio YYYY DAY DDD HHMMSS P1 FFS S AXN PPS IGA PS
 Austin 2013 Jan03 003 185505 MMM 1 045 100 32+ A1

foF2	8.804
foF1	4.75
foF1p	4.62
foE	3.42
foEp	3.29
fxI	9.50
foEs	3.40
fmin	1.70
<hr/>	
MUF(D)	31.04
M(D)	3.53
D	3000.0
<hr/>	
h`F	215.0
h`F2	240.0
h`E	95.0
h`Es	95.0
<hr/>	
hmF2	235.5
hmF1	164.4
hmE	105.0
yF2	69.0
yF1	35.4
yE	16.2
B0	70.6
B1	2.28
<hr/>	
C-level	11
<hr/>	
Auto:	
Artist4	
200207	



D 100 200 400 600 800 1000 1500 3000 [km] ← Oblique propagation MUF Chart
 MUF 9.4 9.5 10.0 10.8 12.0 13.7 18.5 31.0 [MHz] i.e. 31 MHz to 3000 km

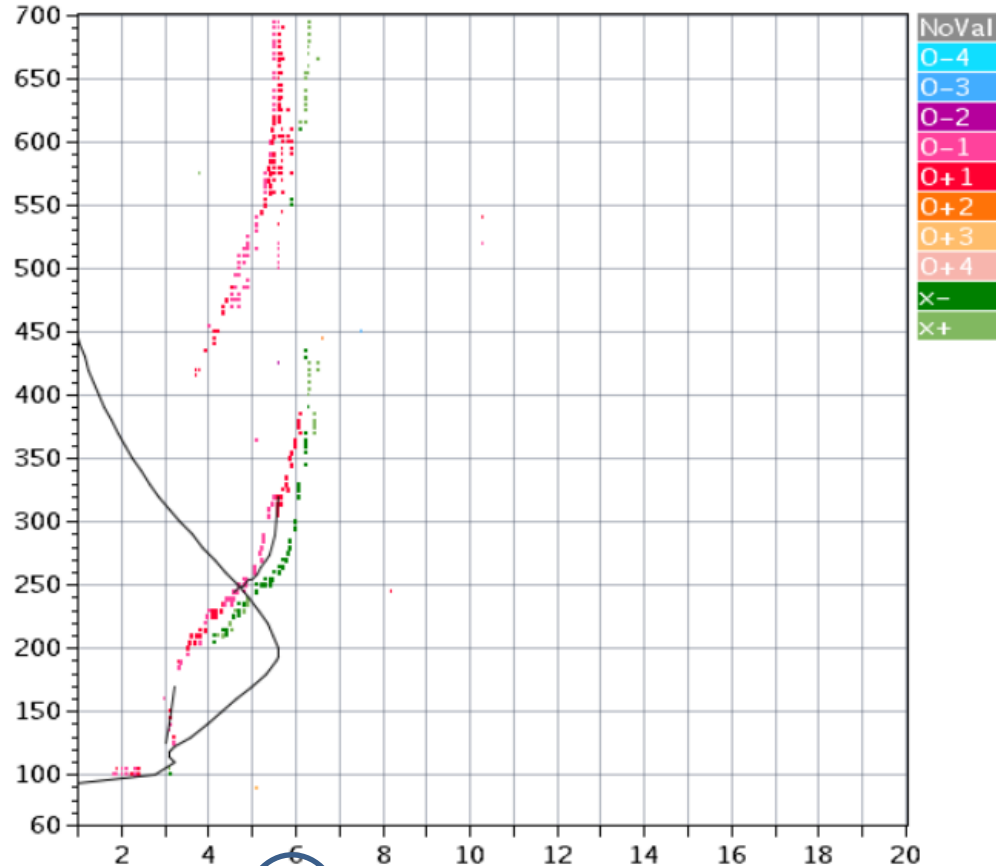
Austin Ionogram - 4 JAN 2022, 1705Z(11:05 CST)

This is the **latest** ionogram captured from the Austin ionosonde. Updated every 5 minutes. This data is pushed to region6arr becomes available.



Statio YYYY DAY DDD HMMSS P1 FFS S AXN PPS IGA PS
 Austin 2022 Jan04 004 170505 MMM 1 045 100 32+ A1

foF2	5.600
foF1	N/A
foF1p	4.15
foE	3.22
foEp	2.99
fxI	6.30
foEs	3.20
fmin	3.00
<hr/>	
MUF(D)	20.70
M(D)	3.70
D	3000.0
<hr/>	
h'F	244.0
h'F2	N/A
h'E	140.0
h'Es	140.0
<hr/>	
hmF2	193.5
hmF1	N/A
hmE	110.0
yF2	56.6
yF1	N/A
yE	20.0
B0	90.9
B1	1.20
<hr/>	
C-level	11
<hr/>	
Auto:	
Artist4.5	
200311	

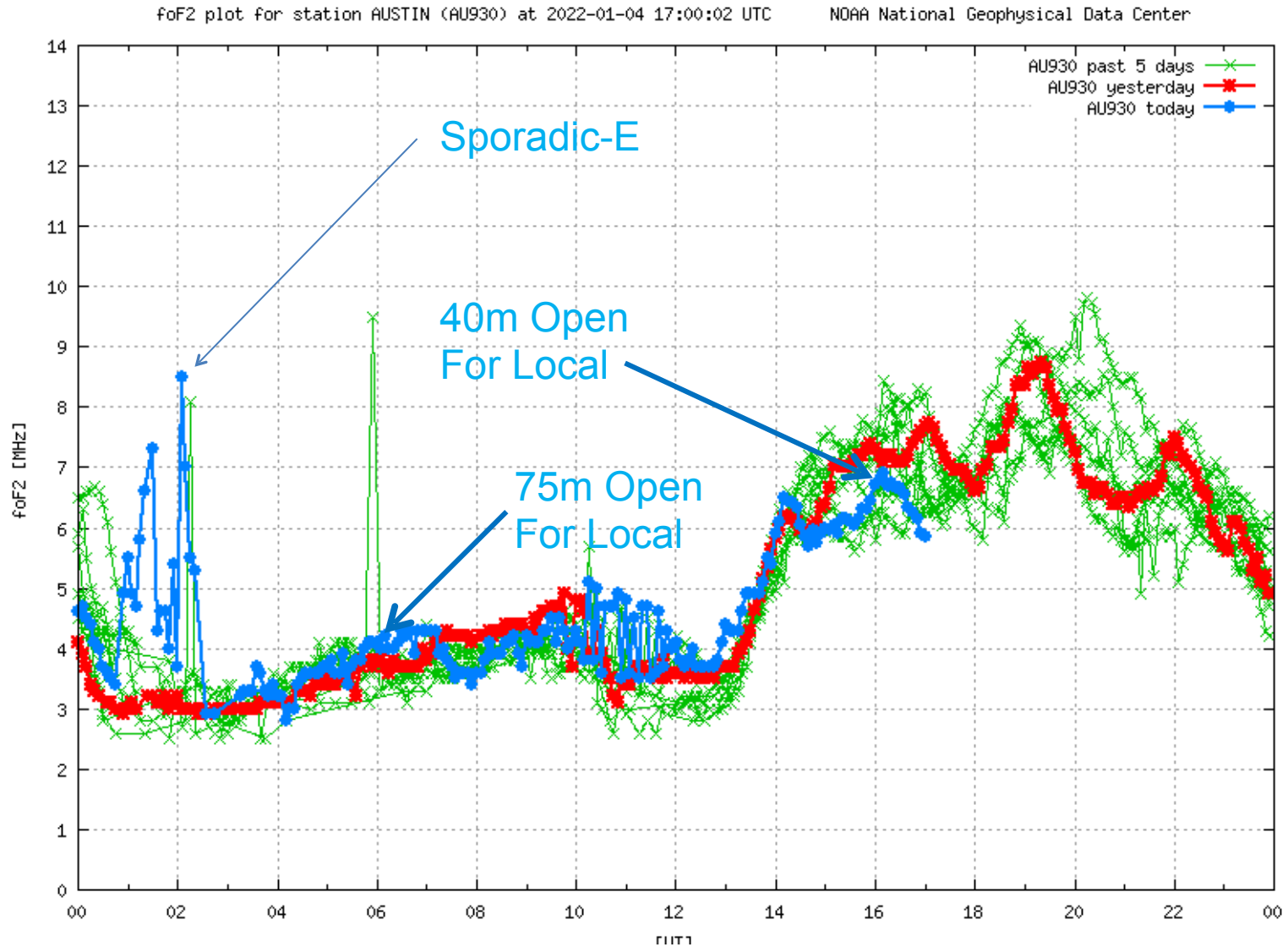


D	100	200	400	600	800	1000	1500	3000	[km]
MUF	6.2	6.3	6.6	7.1	7.9	9.0	12.3	20.7	[MHz]

AU930_2022004170505.MMM / 190fx120h 100 kHz 5.0 km DGS-256 AU930 130 / 30.4 N 262.3 E

Ion2Png v. 1.3.11

foF2 Trend - Austin Ionosonde

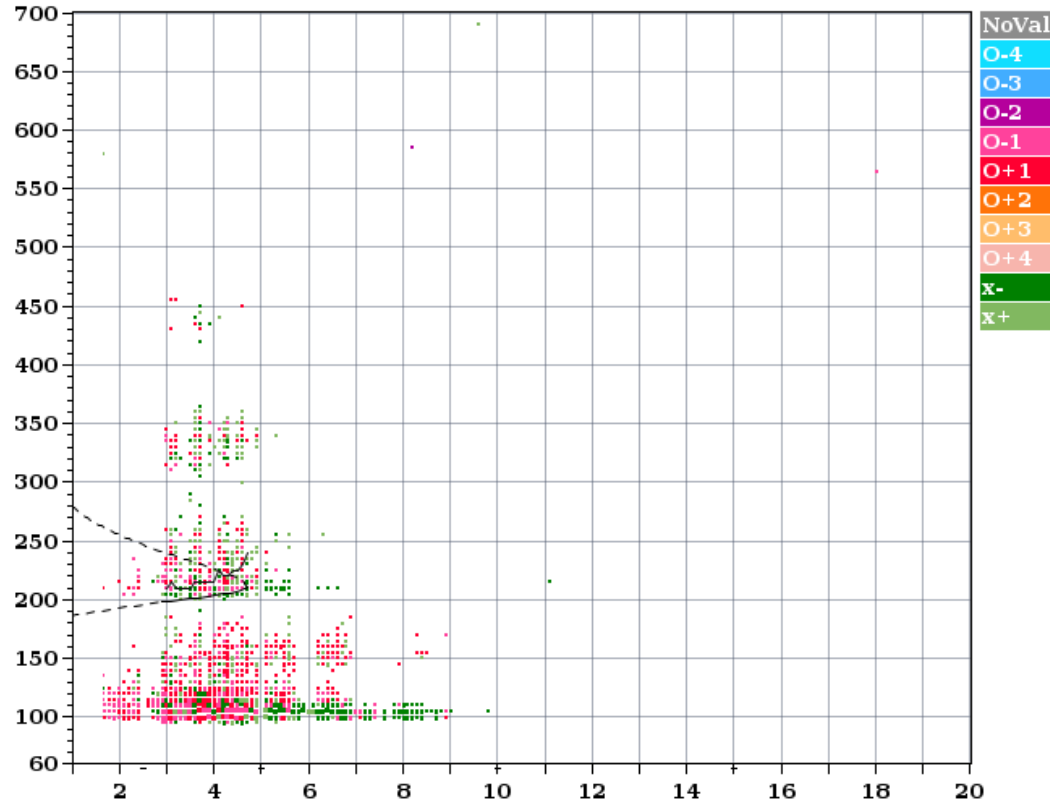


Blanketing Sporadic-E - 0110Z



Statio YYYY DAY DDD HHMMSS P1 FFS S AXN PPS IGA PS
 AUSTIN 2022 Jan04 004 011005 MMM 1 045 100 34+ 11

foF2	4.700
foF1	N/A
foF1p	N/A
foE	N/A
foEp	0.40
fxI	5.40
foEs	5.70
fmin	2.20
<hr/>	
MUF(D)	19.48
M(D)	4.15
D	3000.0
<hr/>	
h`F	210.0
h`F2	N/A
h`E	N/A
h`Es	95.0
<hr/>	
hmF2	210.7
hmF1	N/A
hmE	110.0
yF2	15.2
yF1	N/A
yE	20.0
B0	15.8
B1	1.78
<hr/>	
C-level	11
<hr/>	
Auto:	
Artist4.5	
200311	



D 100 200 400 600 800 1000 1500 3000 [km]
 MUF 5.3 5.4 5.7 6.2 7.0 8.1 11.2 19.5 [MHz]
 61733898.tmp / 190fx128h 100 kHz 5.0 km / DGS-256 AU930 130 / 30.4 N 262.3 E

ShowIonogram v 1.0

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.

December Solar and Geomagnetic Numbers

- X-flares - 0
- M-flares - 9 (Temporary radio blackouts)
- C-flares - 168
- Kp = 4 or greater - 4 days
- Soar wind velocity > 500 km/sec - 7 days

Solar Weather Data

The screenshot shows the website for Region 6 Army MARS. The main header area has a green background with the text "REGION 6 ARMY MARS" and "Military Auxiliary Radio System". A dark sidebar menu is open on the right, listing "Home", "What is MARS?", "Join", "Contact Us", "Solar Weather", and "Login". A red arrow points from the "Solar Weather" menu item to the text "Solar Weather" below the screenshot. Another red arrow points from the "Menu" label to the top of the sidebar menu. Below the main header, there is a section titled "WHO WE ARE" with a paragraph of text.

Solar Weather

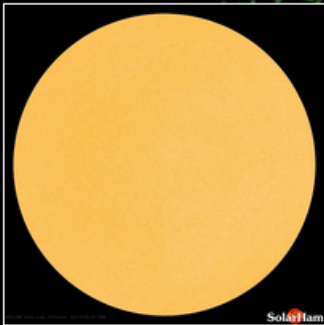
Other Solar Weather Links of Interest

All Ionosondes

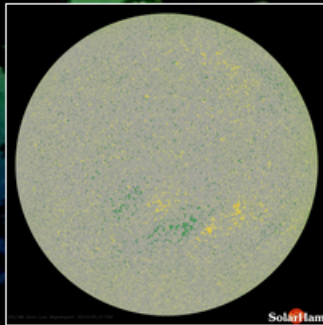
- • [DIDBase](#) - Select Station List then EGLIN then year/month/day/time for Ionosonde plot.
- [NOAA Solar Weather](#) - Solar Weather plots of Kp and X-Ray and other solar emissions.
- [Solen Solar Weather](#) - Good general solar forecast from an individual.
- [Solar Ham](#) - SolarHam provides real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

Space Weather for January 5, 2021

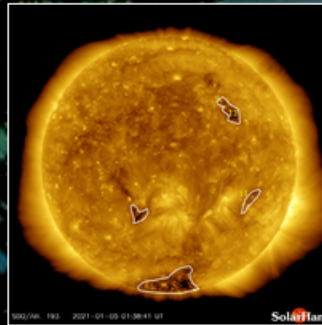
UTC Time 17:46:22 Tuesday



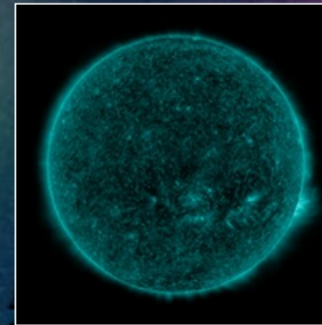
HMI Intensity
Analysis | Latest | Movie



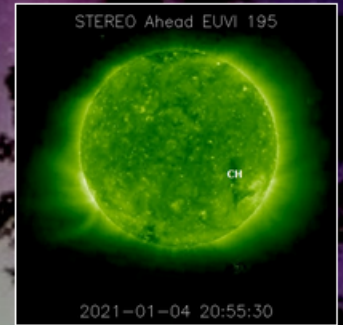
HMI Magnetogram
Latest | Movie



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** — —

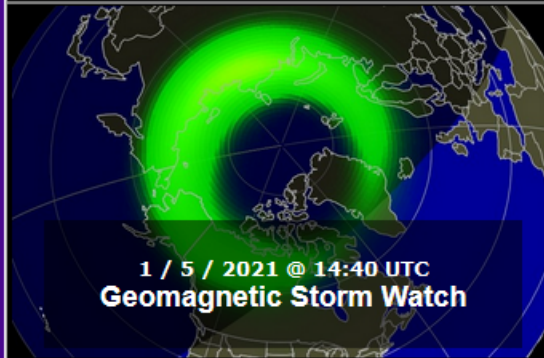
[WWV](#) | [Flux Data](#) | [Last 30 Days](#)

3 Day Geomagnetic Forecast

Jan 5 Jan 6 Jan 7

5 (G1) **4-5 (G1)** **3 (G0)**

Solar activity remains at very low levels.



1 / 5 / 2021 @ 14:40 UTC
Geomagnetic Storm Watch



1 / 2 / 2021 @ 19:15 UTC
Quiet Sun

[Latest Solar Report](#)

[SWPC Space Weather Alerts](#)

[SolarHam News Archive](#)

<https://www.spaceweather.com/>

Current Conditions

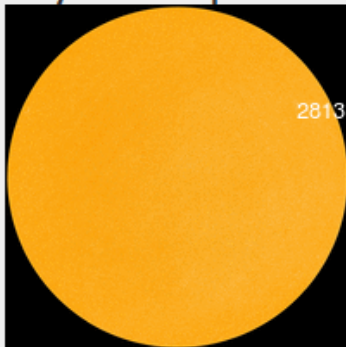
Solar wind

speed: **314.8** km/sec
density: **9.9** protons/cm³
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 a 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?

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