

SOLAR WEATHER

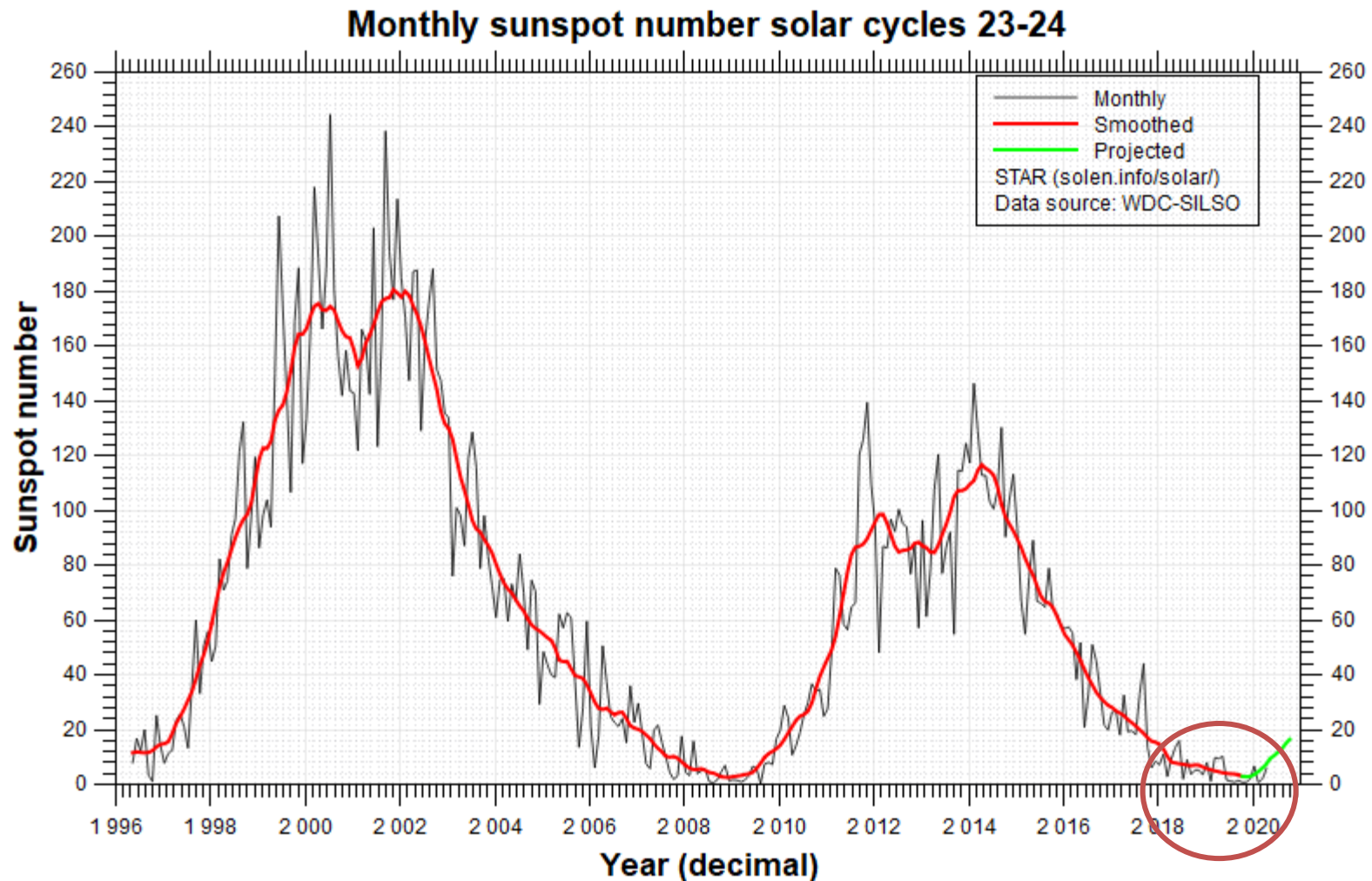
5 MAY 2020

Lewis Thompson
W5IFQ

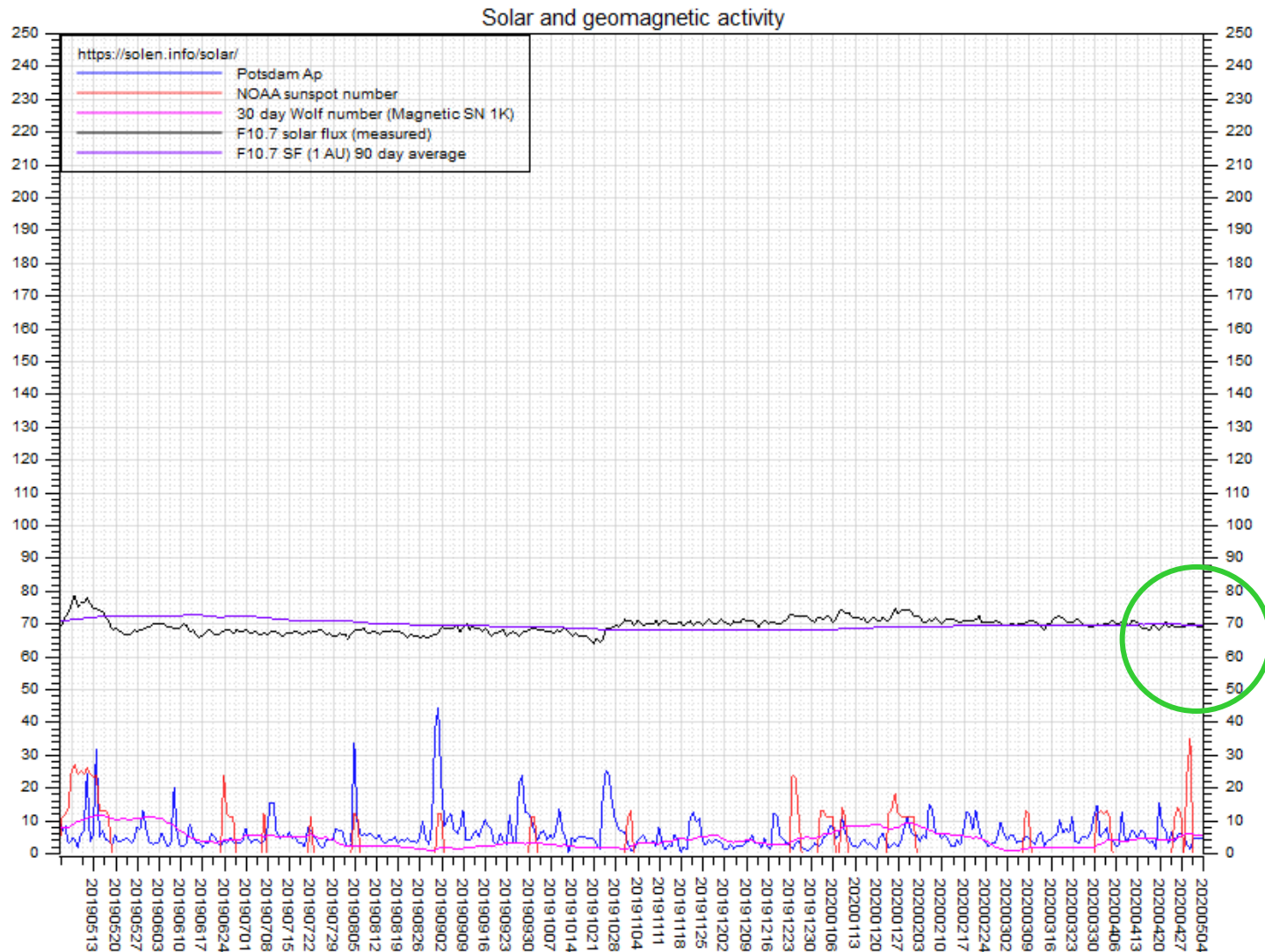


Yellowknife NWT, Canada – 30 APR 2020

SOLAR CYCLE COMPARISON



SOLAR FLUX INDEX – 2020



SF 69.3 (0.6 decrease from one previous 27 day solar rotation)

SolarHam.net Forecast

Solar-Terrestrial Data

05 May 2020 1334 GMT

SFI: 70 SN: 0
304A: 150.0 @ EVE
A 6 K 1
X-Ray: n/a
Aurora: /n=
Mag (Bz): 2.0
Solar Wind: 327.9
MUF Boulder NoRpt

Data provided by NONBH

Solar Flare Risk

M-Class: 01%

X-Class: 01%

Active Watches

Geomag. Storm NO

Radiation Storm NO

Past 24 Hrs

Solar X-Rays:

NORMAL

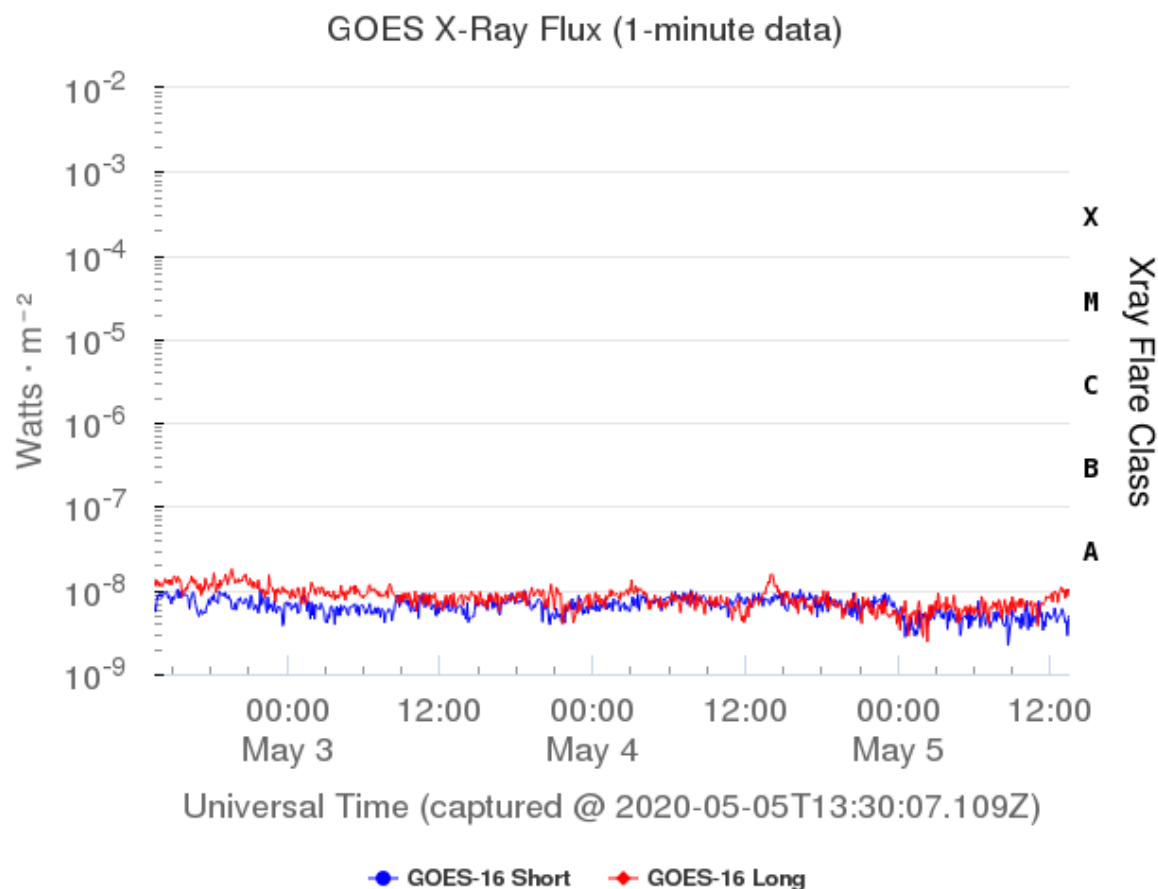
Geomagnetic Field:

QUIET

3-Day Geomagnetic Forecast [\[Details\]](#)

May 5	May 6	May 7
2-3 (G0) Max Kp	2-3 (G0) Max Kp	2-3 (G0) Max Kp
Prob-M 01% Prob-H 20%	Prob-M 01% Prob-H 20%	Prob-M 01% Prob-H 20%

Solar X-Ray Flux: 3 – 5 MAY 2020

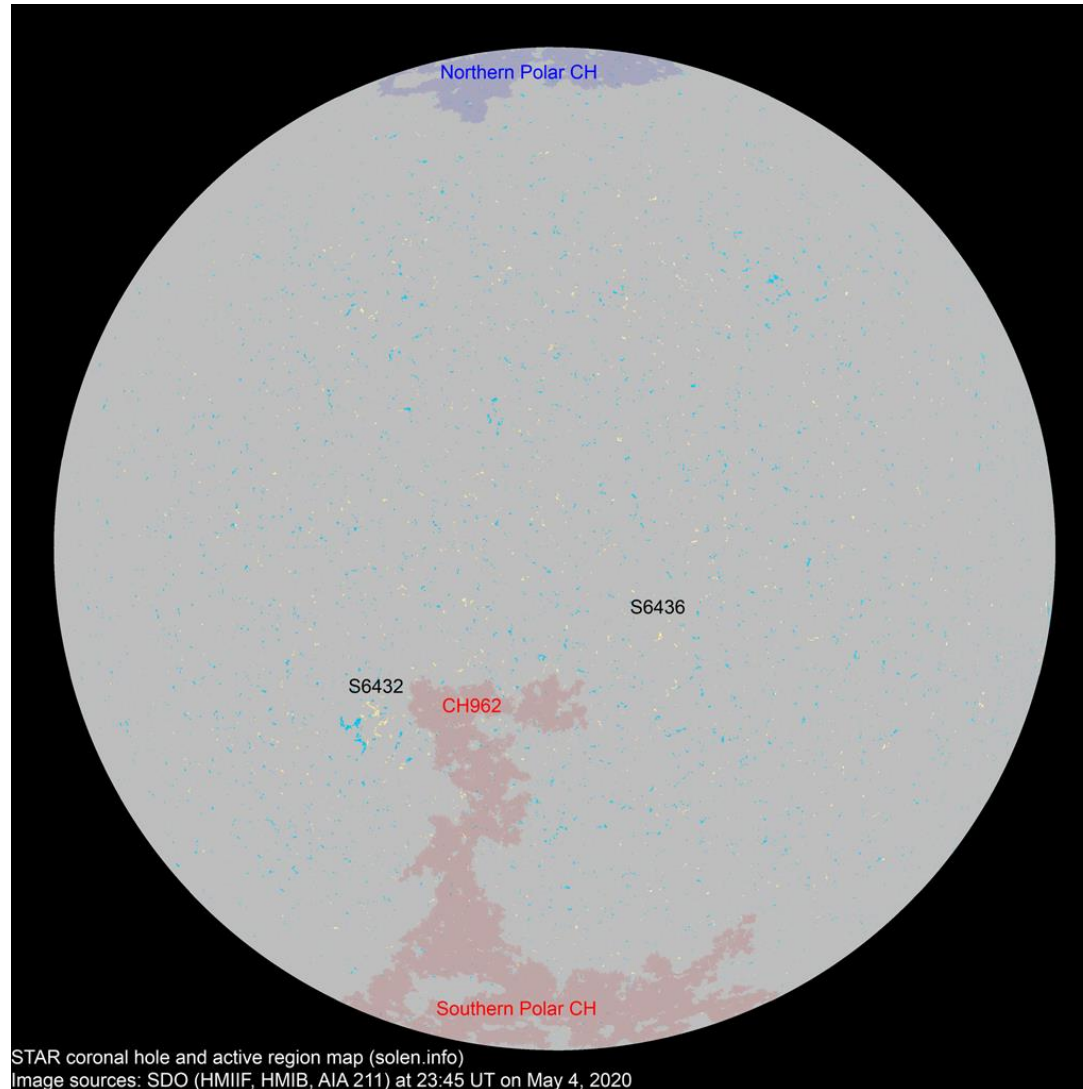


The X-ray radiation that ionizes the D-layer is the 1.0 - 8.0 Å (red) plot. These measurements currently taken from the [GOES 16](#) satellite.

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

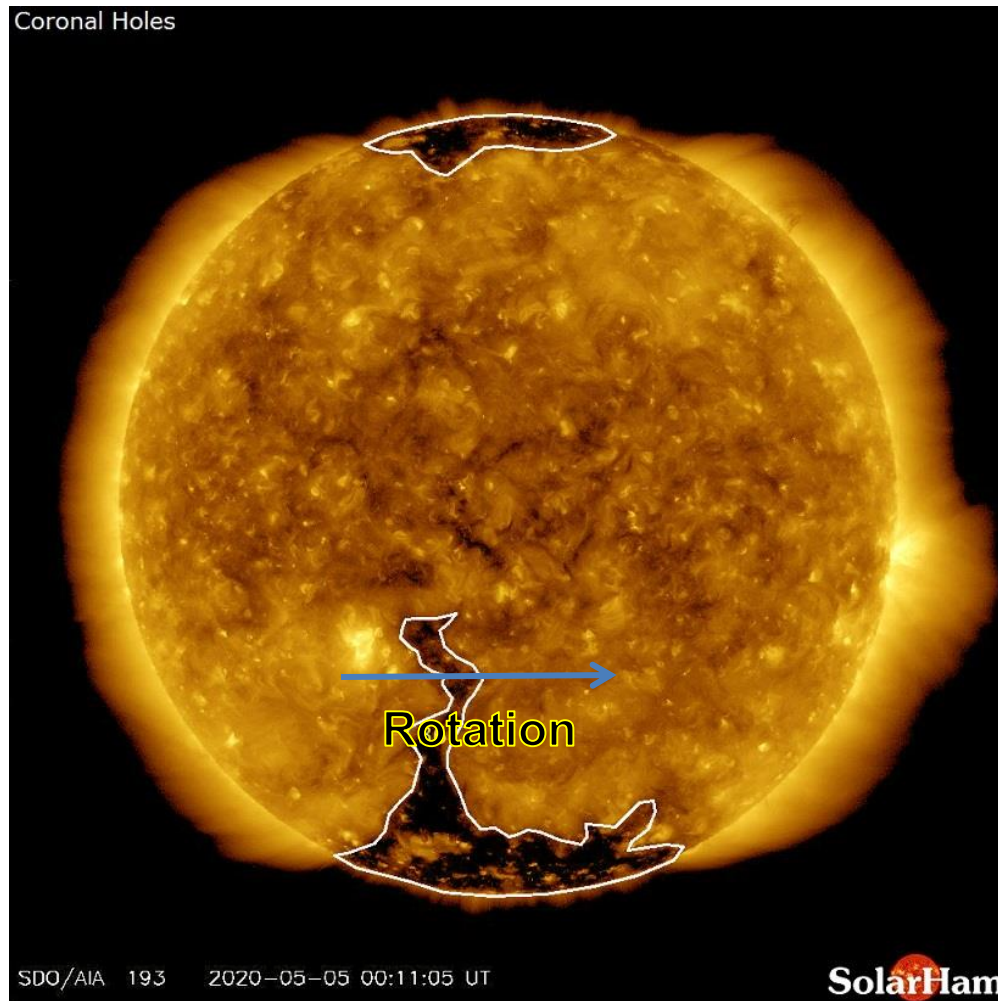
Note: GOES 14 & 15 have been turned off and placed in storage orbit

Sunspots – 4 MAY 2020



No Sunspots

Coronal Holes – 5 MAY 2020



Geomagnetic Conditions: 5 MAY 2020

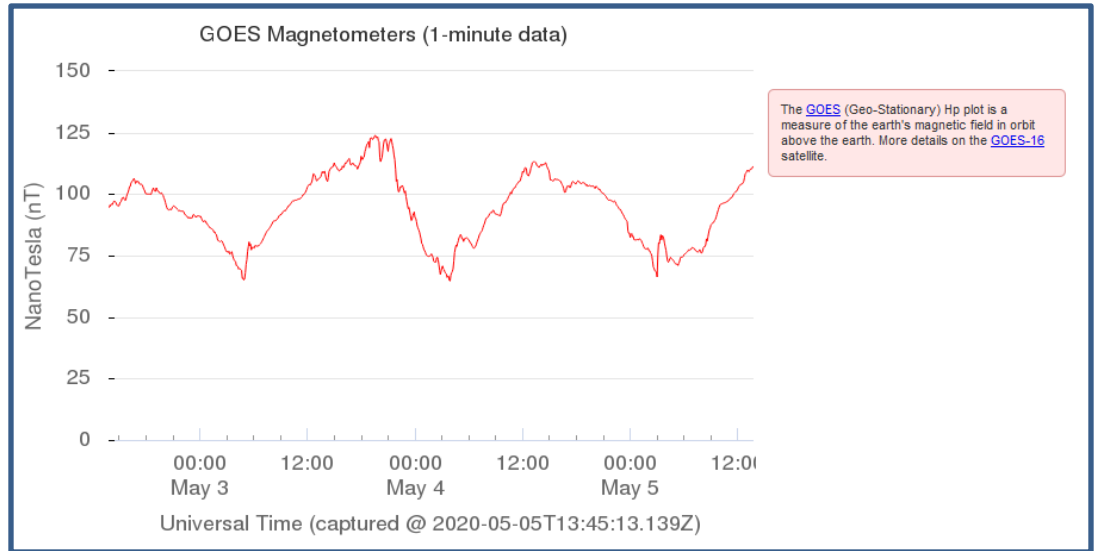
Solar wind

Bz = -5 nT South

speed = 317 km/sec

density = 2.5 protons/cm³

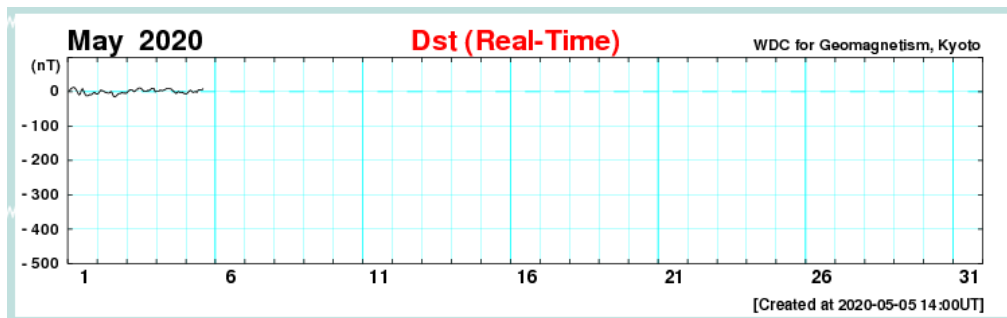
**(From – NOAA DSCOVR
In L1, Lagrange Point)**



Dst = 5 nT (Ring Field)

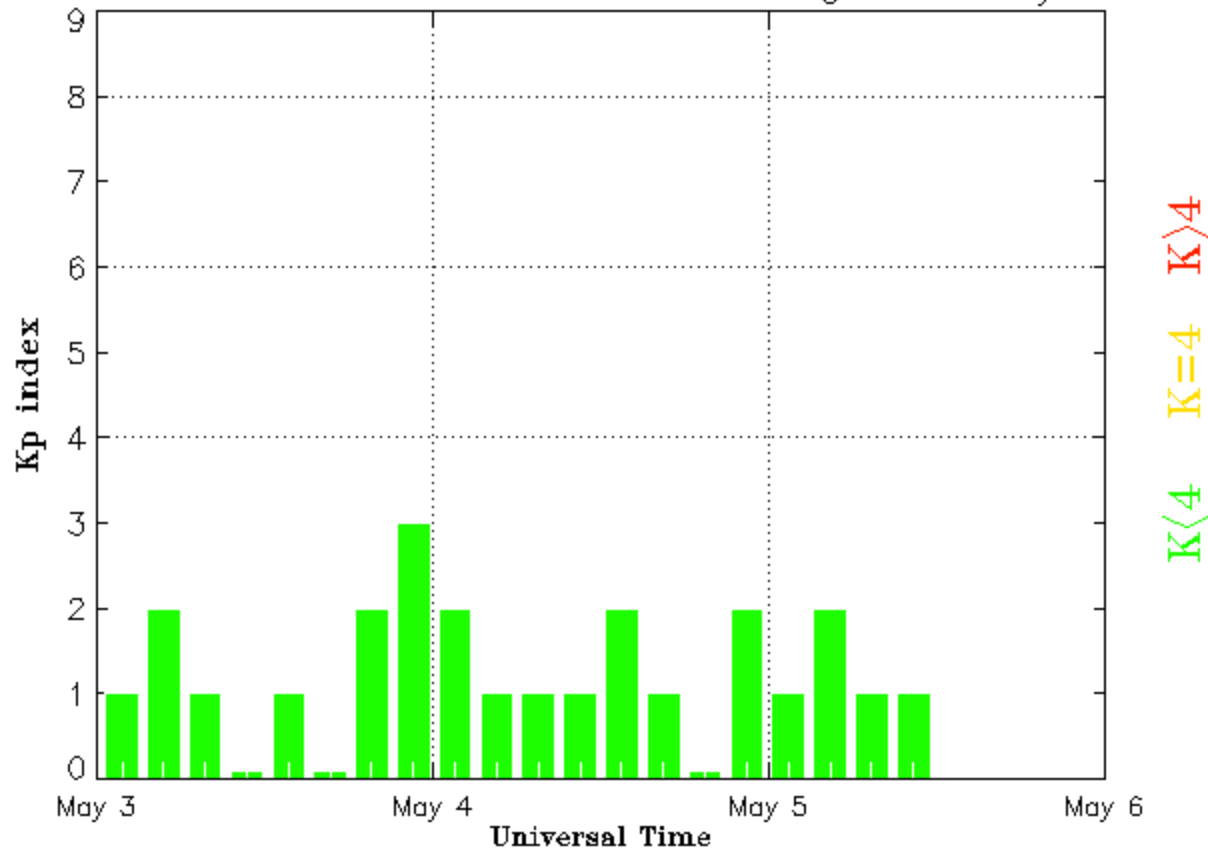
**(From – Data Analysis Center
For Geomagnetism and Space
Magnetism – Kyoto University)**

**From – GOES 16
In geostationary orbit**



Planetary K index – 2-5 MAY 2020

Estimated Planetary K index (3 hour data) Begin: 2020 May 03 0000 UTC



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

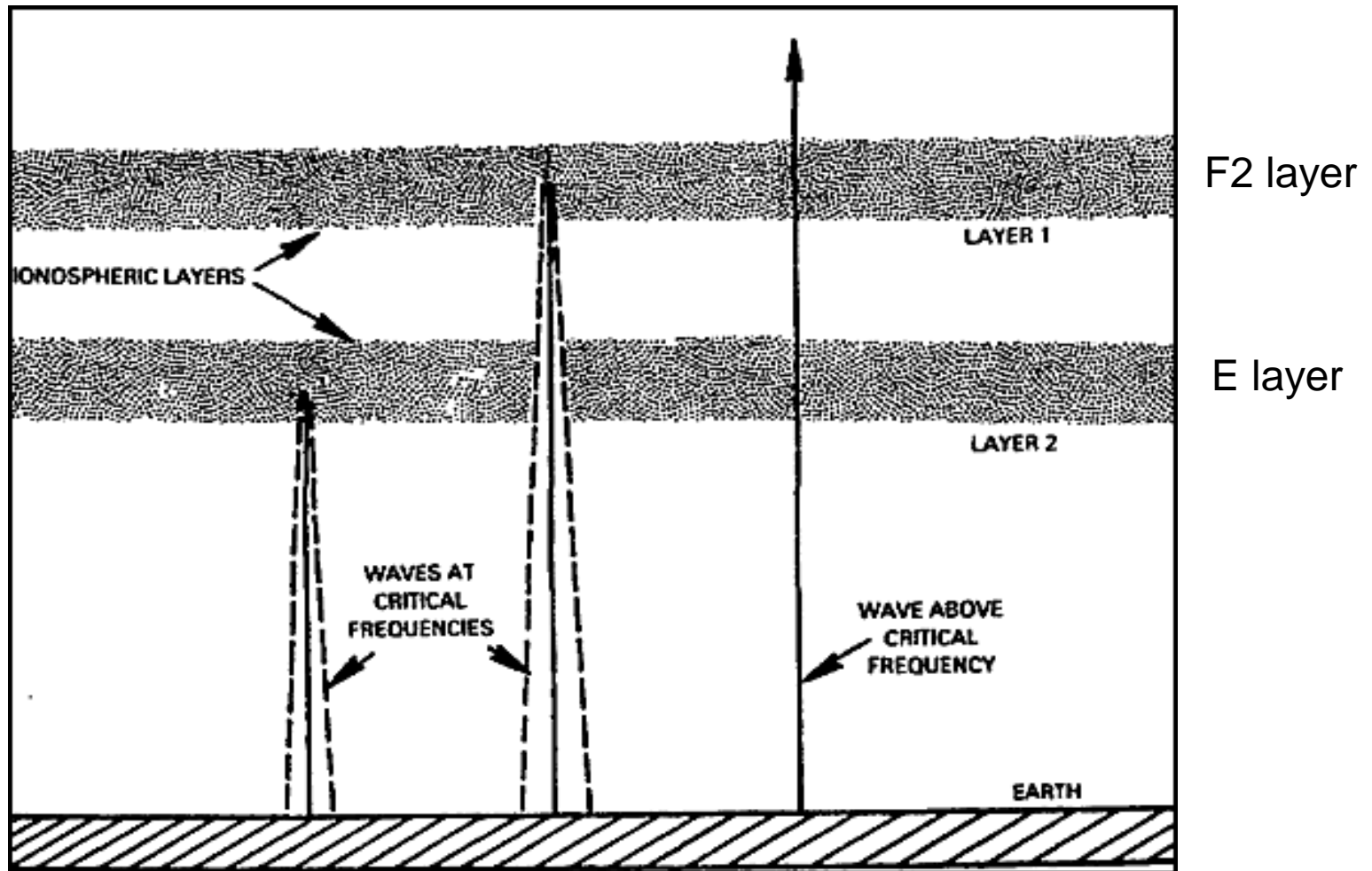
K-Index	Effect
0-2	Inactive/Quiet, no impact on HF
3-4	Unsettled/Active, minor HF fade in higher latitudes
5-6	HF fade at higher latitudes
7-8	HF sporadic
9	HF impossible above 40M

Updated 2020 May 5 12:30:02 UTC

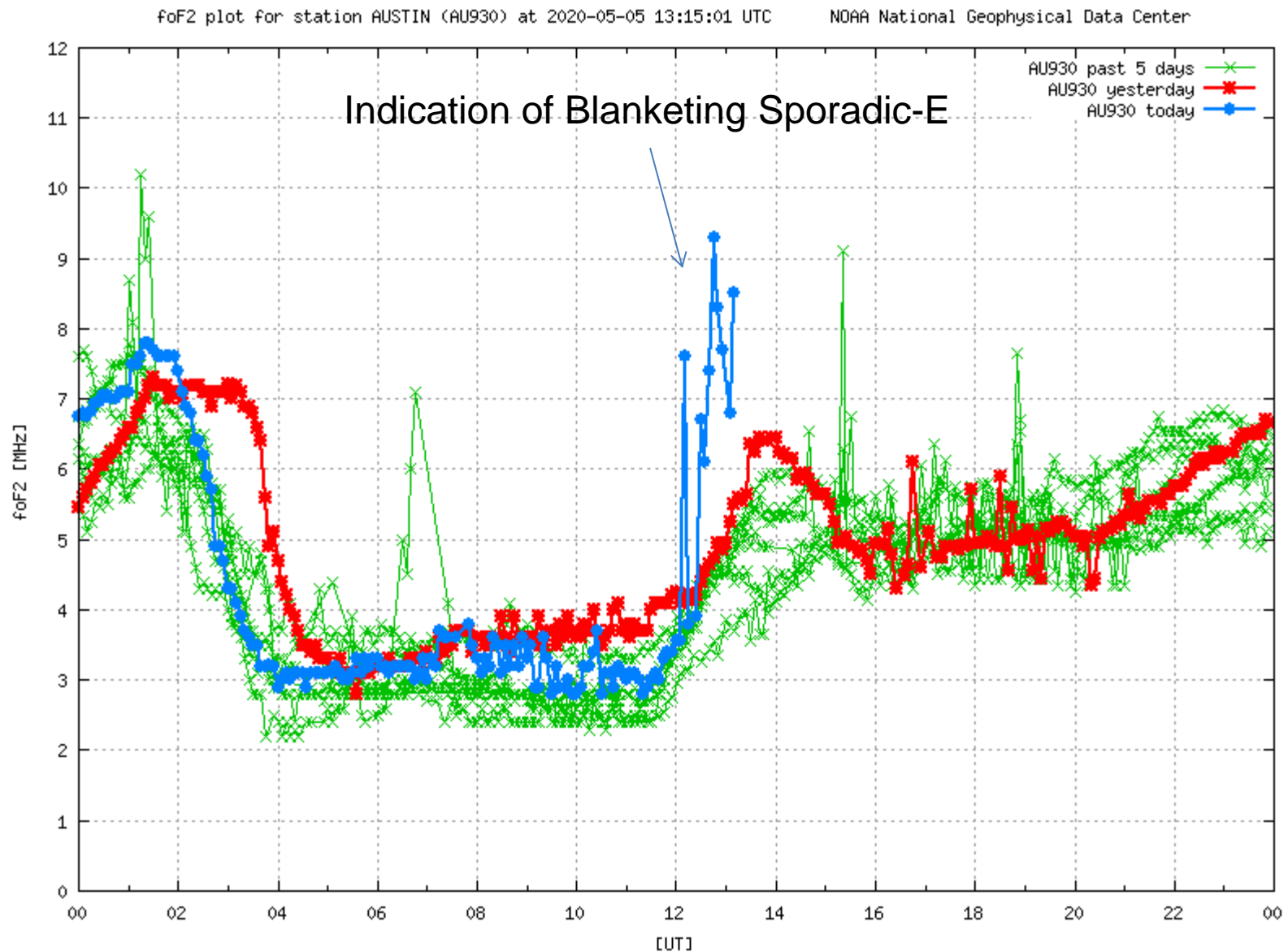
NOAA/SWPC Boulder, CO USA

Critical or foF2 Frequency Definition

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



foF2 Trend – Austin Ionosonode



Austin Ionosonde – 0810 CDT, 5 MAY



Statio YYYY DAY DDD HHMMSS P1 FFS S AXN PPS IGA PS
Austin 2020 May05 126 131005 MMM 1 045 100 32+ A1

foF2 8.500
foF1 N/A
foF1p N/A
foE 2.42
foEp 2.36
fxI 9.10
foEs 4.90
fmin 1.60

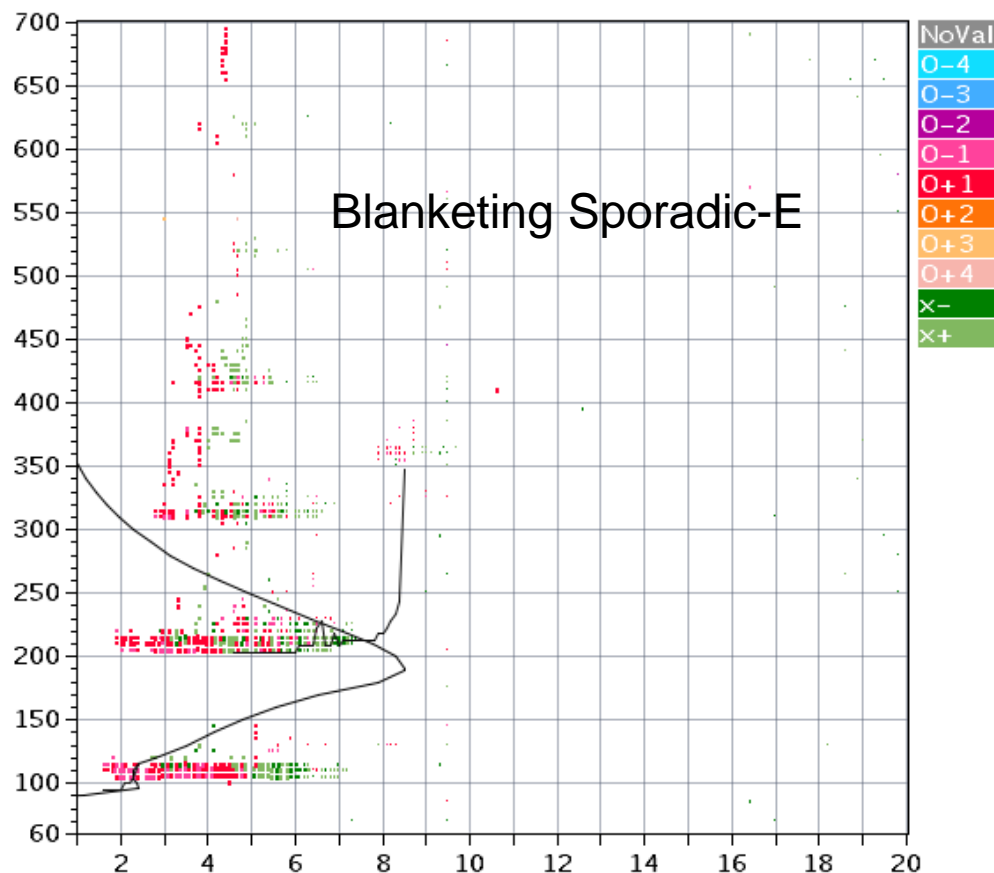
MUF(D) 34.73
M(D) 4.09
D 3000.0

h'F 203.0
h'F2 N/A
h'E 95.0
h'Es 100.0

hmF2 189.6
hmF1 N/A
hmE 96.2
yF2 32.4
yF1 N/A
yE 6.9
B0 47.1
B1 1.02

C-level 51

Auto:
Artist4.5
200311



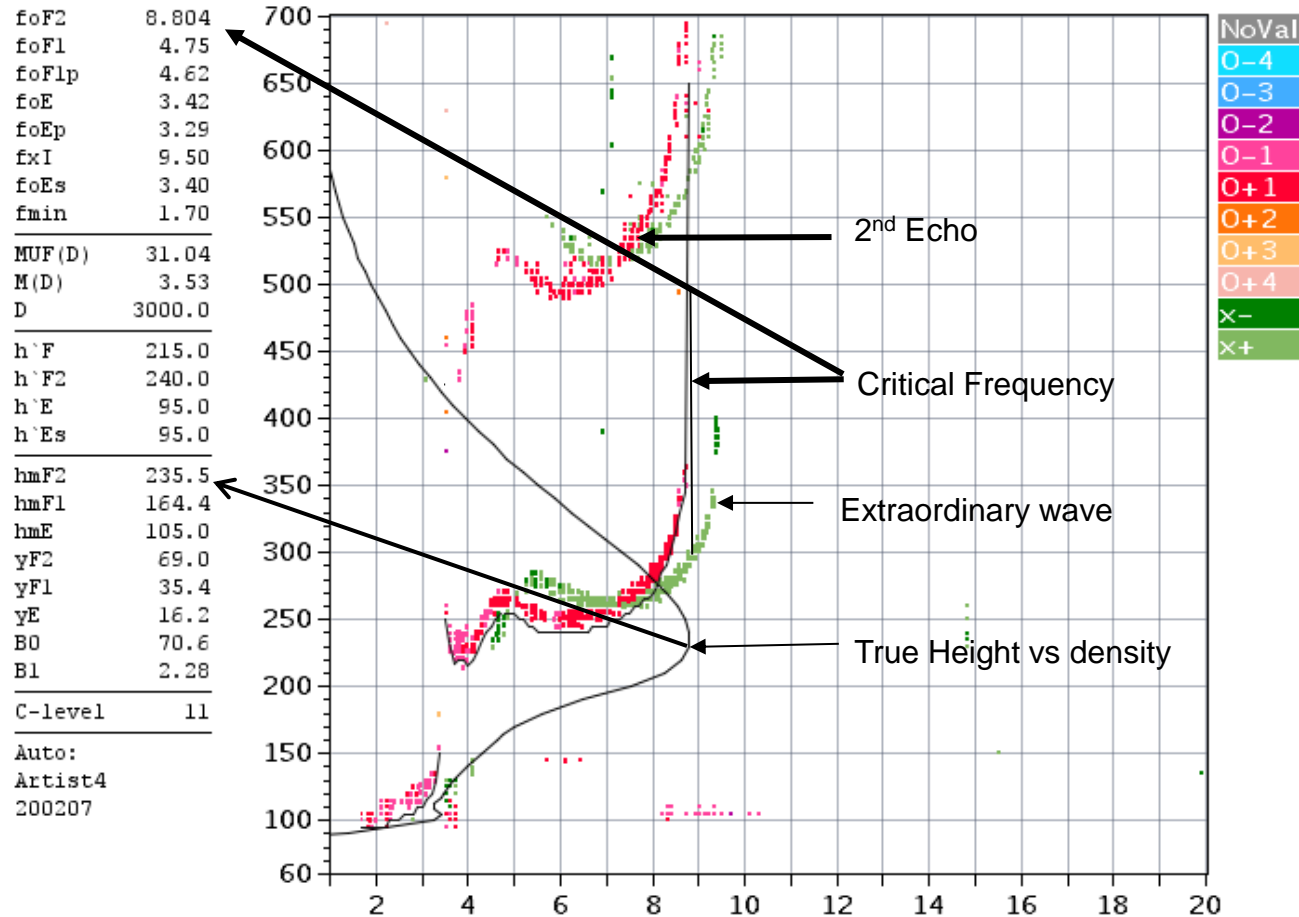
D 100 200 400 600 800 1000 1500 3000 [km]
MUF 9.1 9.3 9.8 10.8 12.1 14.1 19.8 34.7 [MHz]
AU930_2020126131005.MMM / 190fx126h 100 kHz 5.0 km / DGS-256 AU930 130 / 30.4 N 262.3 E

Ion2Png v. 1.3.11

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



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

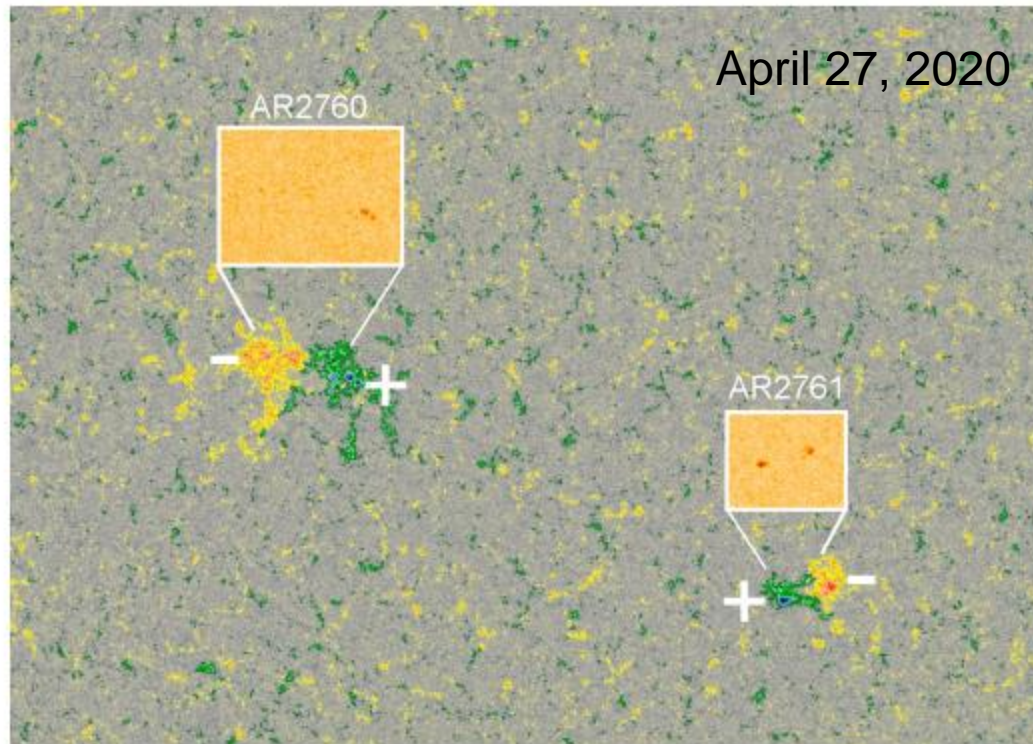
AU930_2013003185505.MMM / 190fx128h 100 kHz 5.0 km / DGS-256 AU930 130 / 30.4 N 262.3 E

Ion2Png v. 1.3.11

Sunspot Magnetic Polarity

Cycle 24

Cycle 25



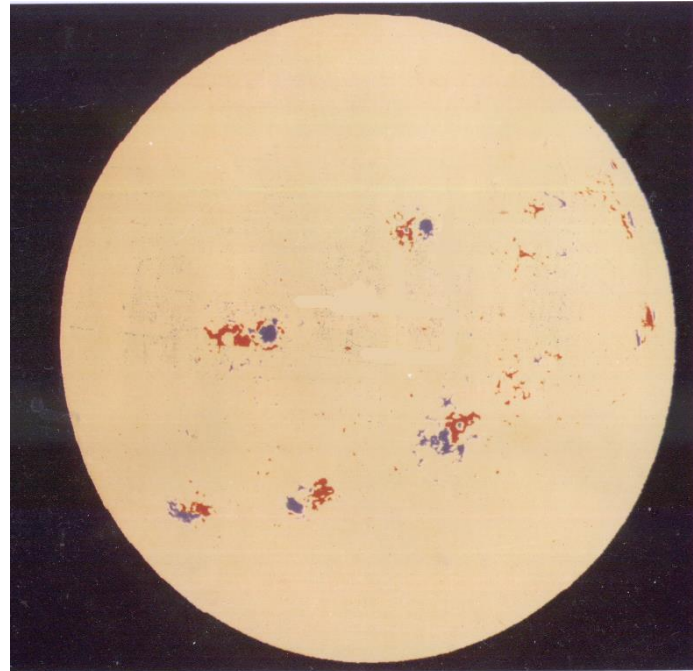
One sunspot (AR2760) belongs to old Solar Cycle 24, while the other (AR2761) belongs to new Solar Cycle 25. We know this because of [Hale's polarity law](#). AR2760 is +/- while AR2761 is -/+, reversed signs that mark them as belonging to different cycles.

Zeeman Effect

The Zeeman effect, named after the Dutch physicist Pieter Zeeman, is the effect of splitting of a spectral line into several components in the presence of a static magnetic field.

George Hale, in 1908, was the first to notice the Zeeman effect in the solar spectra, indicating the existence of strong magnetic fields in Sunspots.

Solar cycle 20 Magnetogram



Excellent HF Propagation Web Site

<https://www.hfunderground.com/propagation/>

HFUnderground.com Propagation Data and Tools

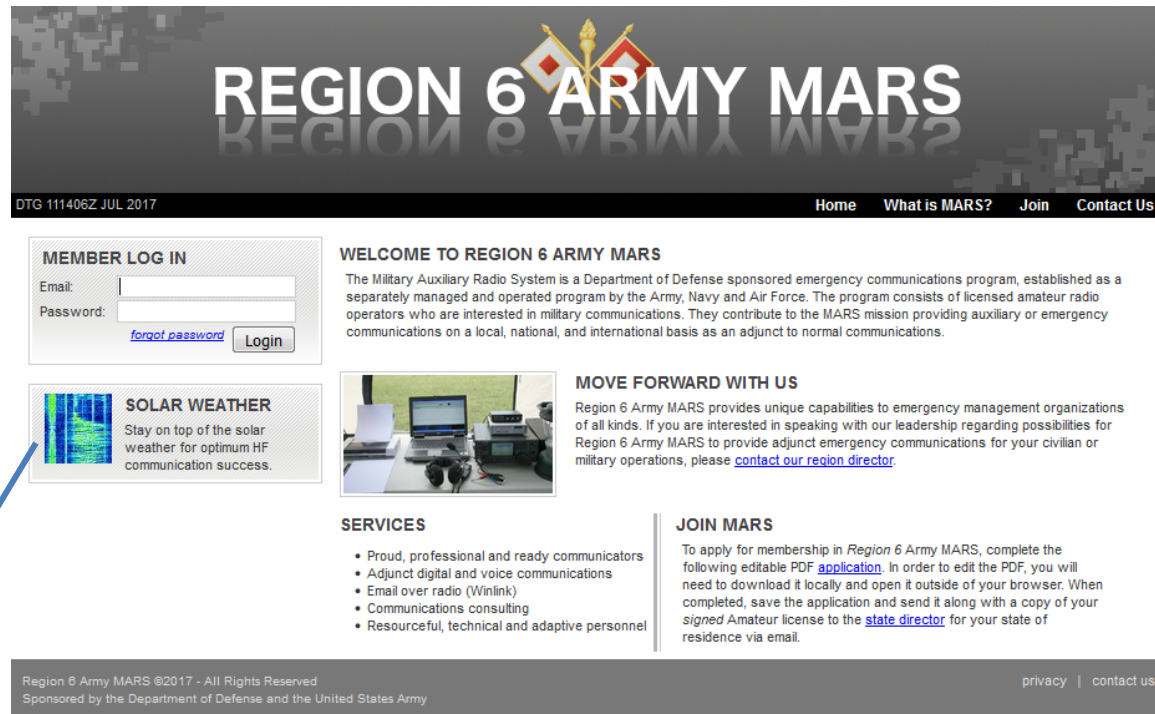
[RadioHobbyist.org](#) Blog

[AtmosFEAR](#) Regular (non space) Weather discussions

Current UTC time and date: 1226 02-07-2019

- [X-Ray Flux](#)
- [A Index](#)
- [K Index](#)
- [Ionosphere](#)
- [Aurora](#)
- [Longwave](#)
- [foF2 and T Index](#) —————> foF2 Trending charts for all US Ionosondes
- [Skip Zone](#)
- [Solar Cycle](#)
- [Solar Map](#)
- [Geospace](#)

Solar Weather Sites



REGION 6 ARMY MARS

DTG 111406Z JUL 2017

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Password: [forgot password](#)

SOLAR WEATHER

Stay on top of the solar weather for optimum HF communication success.

WELCOME TO REGION 6 ARMY MARS

The Military Auxiliary Radio System is a Department of Defense sponsored emergency communications program, established as a separately managed and operated program by the Army, Navy and Air Force. The program consists of licensed amateur radio operators who are interested in military communications. They contribute to the MARS mission providing auxiliary or emergency communications on a local, national, and international basis as an adjunct to normal communications.

MOVE FORWARD WITH US

Region 6 Army MARS provides unique capabilities to emergency management organizations of all kinds. If you are interested in speaking with our leadership regarding possibilities for Region 6 Army MARS to provide adjunct emergency communications for your civilian or military operations, please [contact our region director](#).

SERVICES

- Proud, professional and ready communicators
- Adjunct digital and voice communications
- Email over radio (Winlink)
- Communications consulting
- Resourceful, technical and adaptive personnel

JOIN MARS

To apply for membership in Region 6 Army MARS, complete the following editable PDF [application](#). In order to edit the PDF, you will need to download it locally and open it outside of your browser. When completed, save the application and send it along with a copy of your signed Amateur license to the [state director](#) for your state of residence via email.

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Solar Weather

Texas Army MARS would like to thank the scientists and research teams at The University of Massachusetts Lowell Center for Atmospheric Research for providing this valuable resource allowing us to determine the critical frequency (foF2) and maximum usable frequency (MUF).

Other Solar Weather Links of Interest

- [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.

NEW NOAA SPACE WEATHER SITE

<http://www.swpc.noaa.gov/>



SPACE WEATHER PREDICTION CENTER
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Tuesday, January 06, 2015 20:38:45 UTC

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FORECASTS

27-Day Outlook of 10.7 cm Radio Flux and Geomagnetic Indices
3-Day Forecast
Forecast Discussion
Predicted Sunspot Numbers and Radio Flux
Report and Forecast of Solar and Geophysical Activity
Solar Cycle Progression
Space Weather Advisory Outlook
USAF 45-Day Ap and F10.7cm Flux Forecast
Weekly Highlights and 27-Day Forecast

SUMMARIES

Solar & Geophysical Activity Summary
Solar Region Summary
Summary of Space Weather Observations

REPORTS

Forecast Verification
Geoalert - Alerts, Analysis and Forecast Codes
Geophysical Alert
Solar and Geophysical Event Reports
USAF Magnetometer Analysis Report

ALERTS, WATCHES AND WARNINGS

Alerts, Watches and Warnings
Notifications Timeline

MODELS

Aurora Forecast – 30 Minute
D Region Absorption Predictions (D-RAP)
Relativistic Electron Forecast Model
STORM Time Empirical Ionospheric Correction
U.S. Total Electron Content
WSA-Enlil Solar Wind Prediction
Wing Kp

EXPERIMENTAL

Aurora Forecast – 3 Days
Predicted Solar Wind at Earth
Solar Wind Transit Time

DATA ACCESS

OBSERVATIONS

ACE Real-Time Solar Wind
GOES Electron Flux
GOES Magnetometer
GOES Proton Flux
GOES Solar X-ray Imager
GOES X-ray Flux
LASCO Coronagraph
Planetary K-index
Satellite Environment
Space Weather Overview

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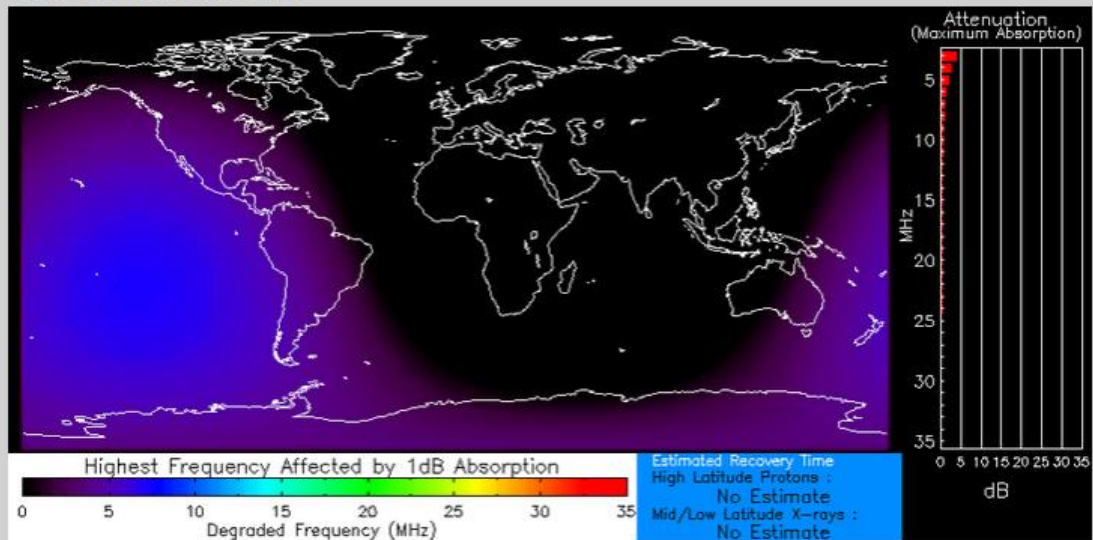
AVIATION ELECTRIC POWER EMERGENCY MANAGEMENT GLOBAL POSITIONING SYSTEM RADIO SATELLITES

SPACE WEATHER ENTHUSIASTS

DASHBOARD - RADIO

RADIO COMMUNICATIONS DASHBOARD

D REGION ABSORPTION PREDICTION



Normal X-ray Background
Product Valid At : 2015-01-06 20:39 UTC

Normal Proton Background
NOAA/SWPC Boulder, CO USA



SPACE WEATHER OVERVIEW

