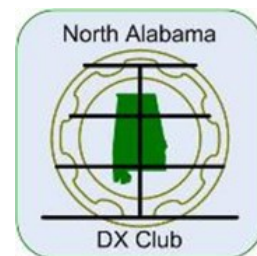


The LongPath

May 2022 — Volume 46 Issue 5

A North Alabama DX Club Publication



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Contributors:

AC4G

K8KI

KI4KWR

N4NM

NG3K

NN5NT

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From the President

By Bob DePierre, K8KI

Have you been listening to the HF bands recently? Something has changed, and it's for the better! You can see it in the ARRL propagation forecasts, but better yet, you can hear it (see it) on the air. I've spent days recently working nothing but Asia, and Central Asia at that. One day I worked three stations in Kazakhstan. Where is that? I didn't know they had three radios in the whole country. We have a couple of propagation articles in our newsletter for you this month.

Another new twist is the heavy migration to FT8. When I turn my radio on, I pull up HRD and look at the spots, especially the ones I don't have. I'm finding pretty quickly that the rarer ones are just on FT8, and not at all on CW or phone. If I camp on the higher bands (i.e., on my tower), I can work JA stations for hours on end. When was the last time I could do that on a Tuesday?

I heard from Steve/AG4W that he did a zoom presentation for the Long Island CW Club last week. If you remember, he presented the program for us recently, then submitted an article on EME to CQ Magazine. That went over so well that a European Club asked him to do it for them on Zoom. Then the LICWC asked him for a repeat.

They liked it so well that they awarded him an honorary life membership! Quite an honor for one of our members. Congratulations, Steve!

I've had the opportunity to work with Barry/WA4HR over the past month on his newly built go-kit. I usually think of EMCOMM when I think of go-kits, and I'm guilty of not paying much attention. But Barry has focused his in on FT8 and has done an extraordinary job of making it do precisely what he wants. It's both simple and elegant. Take a close look if you get the chance.

We're getting baby steps closer to final plans for our DX Banquet in August. Since we decided not to go to a major hotel this year, we have to take care of all those forgettable details ourselves. (The idea was to save the extra kilobuck and spend the profits supporting DXpeditions). Now we have to spend the effort finding affordable liability insurance (mostly because of the alcohol), tableware, and tablecloths. Not my cup of tea (Volunteers??). I had thought I had the ticket price nailed down, but that thought has gone out the door. I hope to hear from our proposed speaker soon.

We'll have a couple of short programs at the meeting this time. First, Janet Duncan, widow of Tom/KG4CUY,

From the President (continued)

has decided to donate Tom's Theremin to the museum. She lent it to me a week ago, and I had the opportunity to inspect it closely. This is a work of art that you have to see! I'll play some tunes for you, and you can see for yourselves if you can do as well as the Beach Boys (Good Vibrations).

Second, Marc Bendickson will demonstrate either a pre-1910 spark transmitter or the 1923 C-7 Superhet receiver. The C-7 didn't quite work (little audio) the last time he showed it, and the secondary wasn't working on the sparkers. If he shows those, you'll have to bring your welding goggles.

So, let's have the next NADXC club meeting



The Museum of Information Explosion

on Tuesday, May 10, at the Museum of Information Explosion at 1806 University. The Zoom sign-on will be exactly the same as in the past. I'll send members the Zoom invitation on Sunday just before the meeting. Again, remember to pick up your dinner on the way over. I'll get a few of you to help set up the tables and we'll just eat here. I'll open the doors by 5:45. The meeting will start at 6:30, and the program by 6:45.

Solar Activity: By the Numbers

By Rob Suggs, NN4NT

We've all been enjoying improved HF propagation for the past few weeks. We hear the numbers SFI, F10.7, a, Kp, proton flux, and M class flares, but what does all this mean as I sit at the radio trying to work a new one? When do I want these numbers to be big and when would I rather they be small?

First some basics. We all know that most long-range HF propagation is via the F-layer of the ionosphere which is at an altitude of approximately 400km and above. This is at the upper fringes of the Earth's atmosphere and it is generated by extreme ultraviolet (EUV) radiation from the Sun. As I discussed in my article in the Long Path a couple of months ago, EUV is correlated to the F10.7 Solar Flux Index (SFI) which is radio noise from the Sun at 10.7 cm wavelength. This is easily measured from Earth and the international source is from the Dominion Radio Astrophysical Observato-

ry in Canada. Since atmospheric atoms eject an electron when they absorb one of the EUV photons, we like to see a large EUV flux which is pretty well tracked by the SFI or F10.7. So, a larger F10.7 is better for propagation. That just means there are more of those lovely deep purple photons from the Sun, and we can expect more electrons to be dislodged from their parent atoms so they can happily participate in propagation of our HF signals.

The National Oceanographic and Atmospheric Administration (NOAA) has a bunch of wizards tracking all this using ground- and space-based sensors from which they generate forecasts and put data on a really useful website <https://www.swpc.noaa.gov/communities/radio-communications>. At the top of that page there are some general "stoplights" showing the R (radio), S (solar), and G (geomagnetic) conditions. Green is

Solar Activity: By the Numbers (continued)

good, red is bad and there are severity levels associated with each color. I will be discussing some of the more detailed info on that page. The 10.7 cm radio flux measured at noon each day is given in the upper right of that page. Its units are in 10⁴ Janskys, which are 10⁻²² W / m² Hz or 10⁻¹⁹ erg / s cm² Hz. Aren't you glad we just call them solar flux units? Recall that during the past solar minimum the F10.7 was around 70 for what seemed like several years. It has reached 160 lately which has really opened up the higher bands.

Unfortunately, when the F10.7 is larger there are more active regions and sunspots which

could result in solar flares and coronal mass ejections. Those can have a negative impact on HF propagation. Let's look at solar flares first. These occur when the magnetic fields around active regions get all twisted up and break, releasing charged particles which propagate outward. This process also generates X-rays which can have a negative effect on propagation. This is because the X-rays come from the Sun and blow right past the F-layer and penetrate down to 50 – 90 km or so where they ionize this denser portion of the atmosphere. This enhances the D-layer. You might think, hey, free electrons, let's propagate our signal with those! But, because they are deeper in the atmosphere and thus surrounded by more ions and neutral atoms, these electrons aren't so free and they actually absorb our precious HF, especially at the lower frequencies. The important

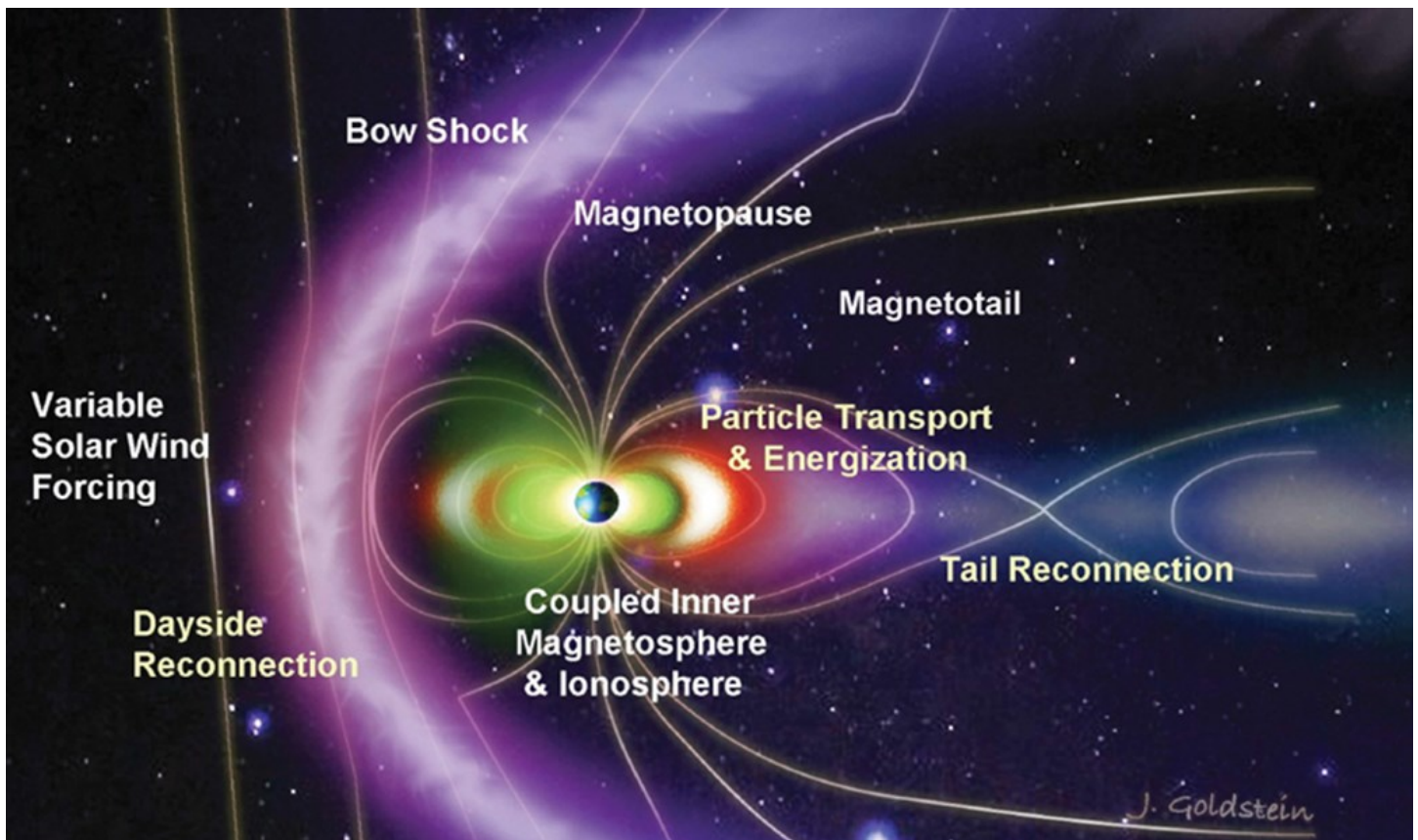


Figure 1. The Earth's magnetosphere. The Sun is to the left. When a coronal mass ejection and its embedded magnetic field impacts the dayside of the geomagnetic field, it causes geomagnetic disturbances and aurora as described later.

Solar Activity: By the Numbers (continued)

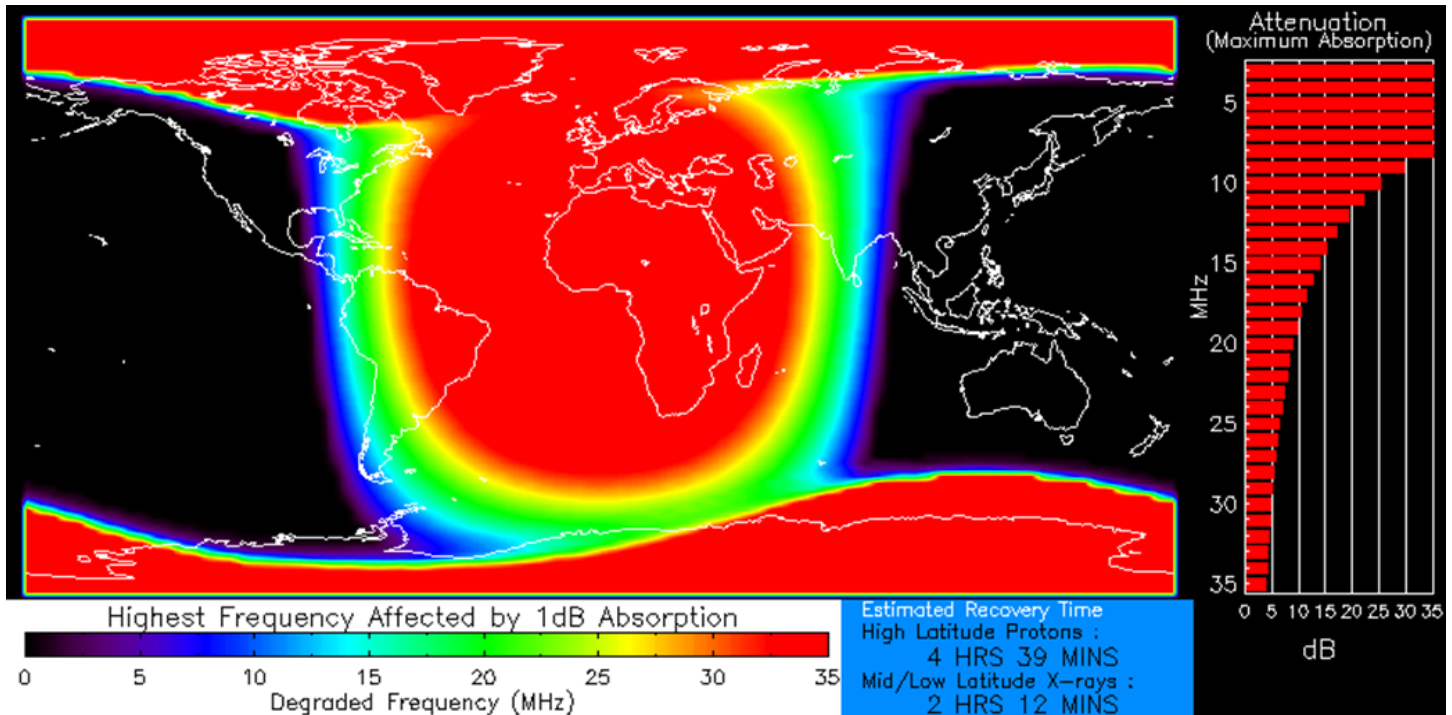
number here is the X-ray flux and, because its values are so hard to remember, the flares are classified with a letter with A being a low background level, followed by B, C, M and X. Each of these letters indicates an X-ray flux (watts / meter²) a factor of 10 higher than the previous letter. We have seen a few X class flares already this cycle. When we get them, you can expect a short wave fade (reduction in HF signal strength) on the day portion of Earth. For a really big one there might be no HF propagation. Fortunately, the effects subside after a couple of hours and we can get back to our DXing.

Figures 2 and 3 show a significant solar event in 2017. HF propagation was severely re-

duced due to both the X-ray and energetic proton fluxes. Notice that the night portion of Earth was unaffected by the X-rays since the Sun was down, but the high latitudes were disturbed because the solar protons could access the polar regions along the geomagnetic field lines.

The prior example was a very significant solar event. Figures 4 and 5 show more docile recent solar and geomagnetic activity.

I recently worked Nepal on 20m and that is an across-the-pole path which wouldn't have worked if there had been a large proton flux resulting in a polar cap absorption event. Satellite operators don't like to see high solar energetic particle fluxes because they can cause bit flips and even burnout of spacecraft avionics. Astronauts outside of low-Earth orbit, like on the way to the Moon or Mars, can receive greater radiation



Strong X-ray flux
Product Valid At : 2017-09-06 12:00 UTC

Minor Proton Flux
NOAA/SWPC Boulder, CO USA

Figure 2. D-region absorption estimate from the X-class X-ray flux on 6 September 2017. The worst absorption is shown in red indicating 1dB at up to 35 MHz. The panel at the right shows the estimated absorption in dB at various frequencies. For example, 20m has about 15 dB of absorption and 40m has over 35 dB. The absorption in the polar regions is from the increased solar energetic proton flux.

Solar Activity: By the Numbers (continued)

dose from the energetic protons. The International Space Station is mostly protected from the protons by the geomagnetic field except at the highest latitudes of its orbit.

The final indices we'll address are a and K which both represent geomagnetic activity. The K index on 27 April reached the minor storm level. Both a and K are derived from measurements of fluctuations in the Earth's geomagnetic field measured by ground-based magnetometers at various stations on Earth at 3-hour intervals. The sub p indicator is for planetary index which means the measurements from the stations have been combined. K is a quasi-logarithmic value running

from 0 to 9 and a is a linear representation of the Kp values more suitable for calculations. The cause of geomagnetic storms is the interaction of the magnetic field carried along with coronal mass ejections (CME) with the magnetic field of Earth. See Figure 1. The CME compresses the dayside of the geomagnetic field and this can result in field lines breaking and reconnecting in the night side or geotail. A southward solar magnetic field (B_z negative) more effectively couples energy into the Earth's field. That number is given at the top of the NOAA website along with the solar wind speed. The reconnection of the field lines can release electrons trapped in the magnetic fields into the high latitudes of Earth's atmosphere. The effect of a high Kp and these so-called "precipitating electrons" is possible reduction in HF propagation especially at high latitudes. It is also responsible for

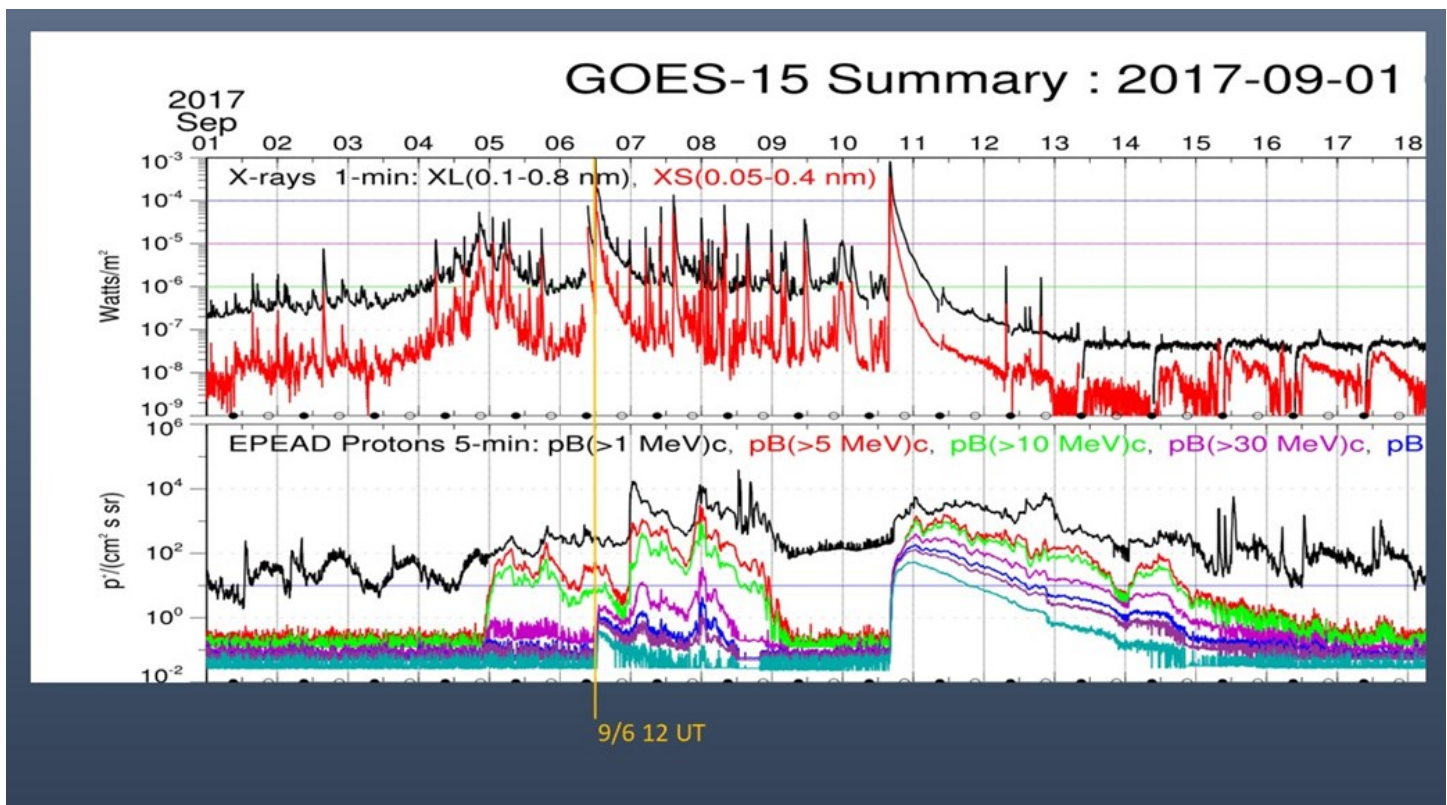


Figure 3. 6 September 2017 Solar Event. The X-ray flare at 12 UT (top panel) was responsible for the HF outage in the midlatitudes of Figure 2. The elevated proton flux shown in the bottom panel is responsible for the polar cap absorption on Figure 2 (all the red at the high latitudes). The proton flux is given as number/cm² sec steradian, usually just called proton flux units (PFU).

Solar Activity: By the Numbers (continued)

auroral activity so VHF aurora scatter enthusiasts might like a higher Kp. Most of us prefer low Kp values. The electrical power and oil industry at

high latitudes prefers low Kp values because the voltages induced on long-haul power lines and pipelines by the magnetic field fluctuations can throw breakers and fry transformers.

No, none of these effects will kill your electronics like a nuclear electromagnetic pulse

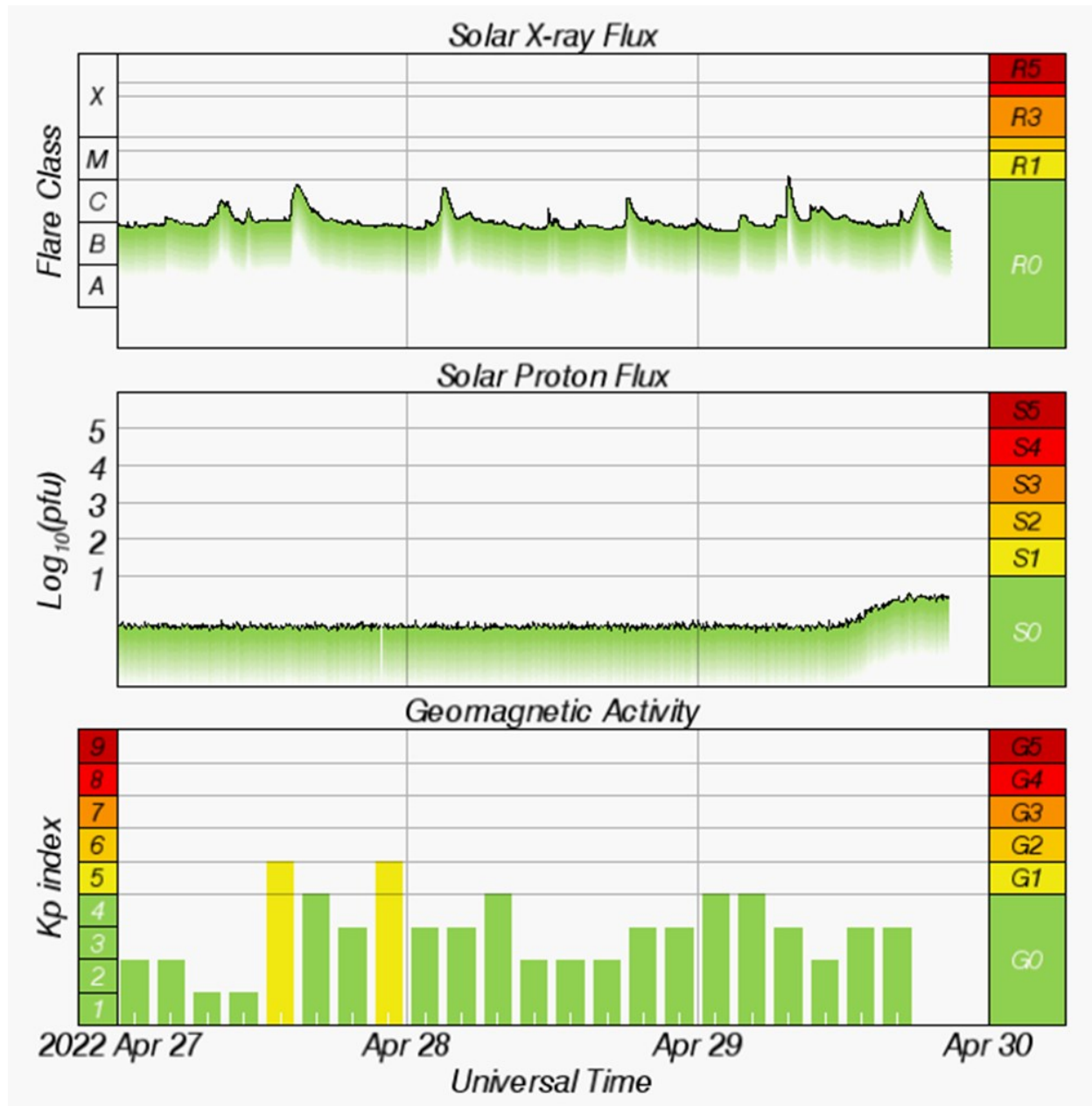


Figure 4. Recent solar and geomagnetic activity. The top panel shows the X-ray flux. None of the blips reached M-class level but would have resulted in degradation of 40m during the day. The middle panel shows the proton flux is near background but elevates late on the 29th causing the polar cap absorption in Figure 5. The bottom panel shows there has been some geomagnetic activity due to elevated solar wind and its interaction with the geomagnetic field.

Solar Activity: By the Numbers (continued)

(EMP). The power grid and high-altitude satellites can be affected but they know how to protect their systems. Even the largest solar events are not going to fry your BaoFeng.

So, there you have it. If you are an HF operator you like to see a high F10.7 solar flux index. All the other indices should be low for optimum

propagation. However, the Sun has its own ideas about this. The same rising solar cycle that gives us those higher F10.7 values can also give us greater X-ray flux (and D-layer absorption), greater proton flux (and polar D-layer absorption) and higher geomagnetic indices from coronal mass ejection collisions with our magnetic field (and high latitude propagation disturbances). When it comes to HF propagation, the Sun giveth and the Sun taketh away.

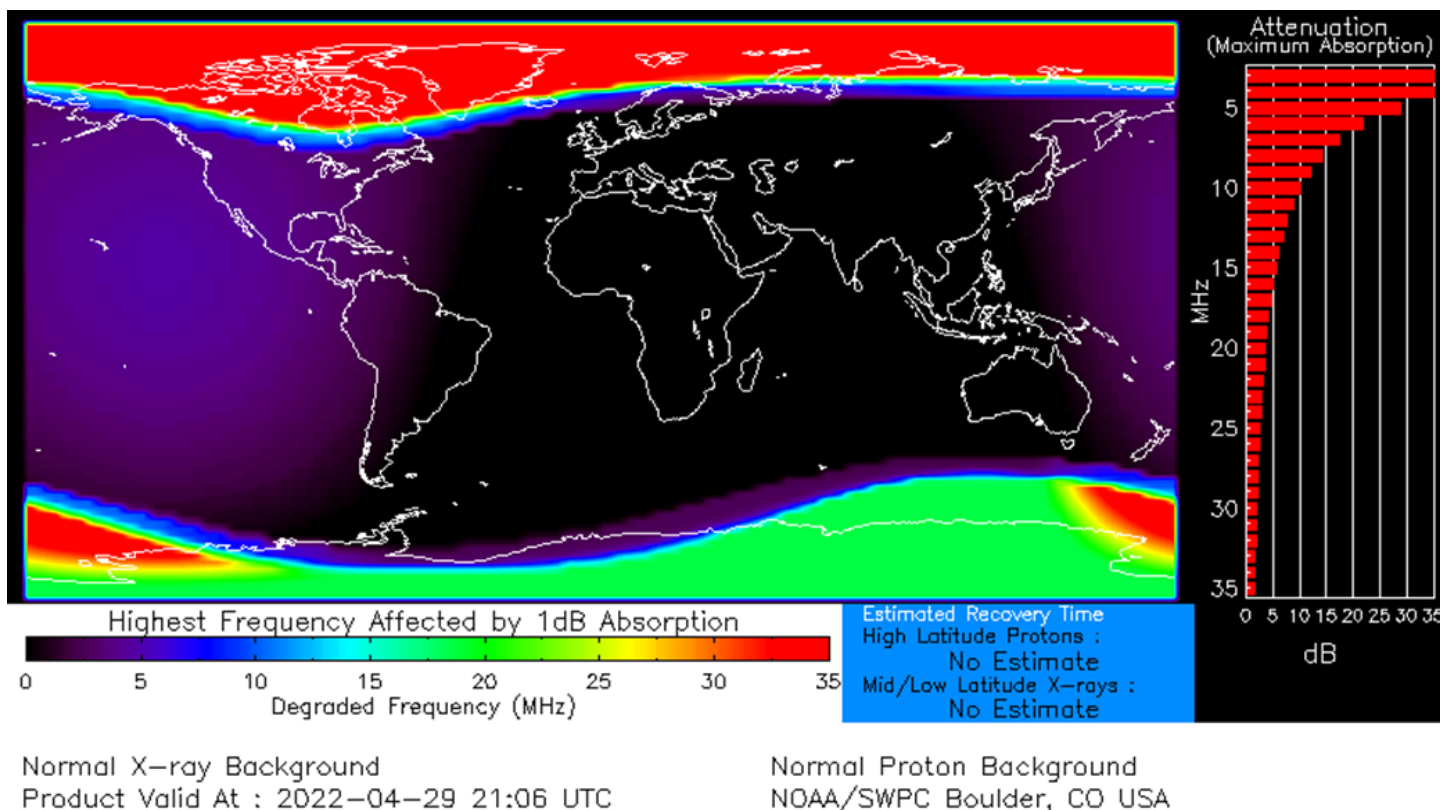


Figure 5. Recent D-region absorption prediction

Taking Advantage of the Solar Activity on the HF Bands Lately?

By Bruce Smith, AC4G

It is amazing to me how mankind can predict the 11-year solar cycle down to a science. For the past several years, my niche has been to increase my DXCC totals on the low bands. I have been very successful to do so with my DXCC total for 160m standing at 224 DXCC countries con-

firmed. I worked very hard to test out various receive antennas and transmit antennas to achieve this level. Now my direction has changed to the high bands, since we are on the upswing of cycle 25.

When the Covid pandemic hit, I began look-

Taking Advantage of the Solar Activity on the HF Bands Lately? (continued)

ing at my DXCC totals for the higher bands such as 10m and 12m. This was only about two years ago. I noticed several not-so-rare DXCC entities had never hit my logbook for 10m and 12m. I began to build an EXCEL spreadsheet for these bands and realized I should be able to work these DXCC entities effortlessly. Typically, these entities would be on the air daily. Why did I never log them? I had an excuse. I was tirelessly working my career job bringing home the paycheck to feed my family. I guess adding fuel to fire was thinking back when I would drive home and listen to the NADXC DX Club repeater hearing what I had missed each and every day on 10m and 12m being informed by two retired workers: DXers N4KG and KR4F.

Recently, I have noticed lots of activity on the high bands that were closed for several years due to lack of sunspot activity. I am elated that the scientific predictions are coming true once again. I remember back 5 years ago the solar flux was between the high-60s and as high higher 70s. Wow, this made the low bands (80m and 160m) very hot and the high bands (10m and 12m) terrible.

My question to the DX community is: have you been missing the recent activity on the high bands? First of all, I write this article not to pat myself on the back, but to make you aware that the HF high bands are full of activity if you have not noticed and are still in the doldrums of lack of HF band activity. Almost every morning, I point my antenna in various typical directions on 10m and 12m not to hear a peep in the typical directions such as 45 for Europe and 330 degrees for south-east Asia. But when I point my Yagi south, there is

so much activity it is unreal. All of the stations are coming in via the long path. Yes, stations are so strong when I point approximately 210 degrees which is longpath to Europe and Eastern Asia. They are S9 coming in very strong. Likewise, pointing my antenna to approximately 190 degrees southward directions over South America reveals Southwest Asia coming via the long path very strong. I was so excited to be able to work new DXCC entities that I had to share this with you and those that are asleep in the operator positions.

It looks like we are getting back to the good ole days when I remember every night pointing my antenna north to hear tons of UAO's for several hours on 20m blended with polar flutter and the Russian Woodpecker OTH radar. Recently, I have worked or heard the following stations via the long paths in the morning on 10m and 12m and our evenings on 17m and 20m via short path over the North pole. Note that I have heard new callsigns that I never have heard before or even know to exist. Again, I point out stations that are a great difficulty to work from southern Tennessee and northern Alabama.

10m Stations (Long path): BY's; 9V; BV's; VR's; etc.

12m Stations (Long path): BY's; YB's; VU's; 4S7's; UAO's; HS's; VR's; UN's; TA's; 9N's; 9V; 9K's; JA's; FR's; C9; 5R; ZS; Most of Europe; etc.

15m Stations (Long path): VR's; BY's; UAO's; 9N's; JT's; OH's; etc.

17m Stations (Short path): UAO's; 9K's; UK's; UN's; EX's; A7's; A9's; JW's; 9N's; S79; etc.

20m Stations (Short path): A9; A7; A4; 9K; JW; etc.

These may not be too exotic for you, but for me after DXing for years, these are the hardest for me to make a QSO from my QTH is southern Tennessee.

Taking Advantage of the Solar Activity on the HF Bands Lately? (continued)

So why is this happening? Yes, the sunspots and solar activity are increasing like predicted by teams like NASA and others. Below is a table of some common solar indices that I view to determine band conditions and activity, but the best judge of band activity is to get on-the-air. Remember back a few years ago, we were lucky to see the solar flux above 80. Below is why the ac-

tivity has increased on the high bands.

From the table, one can see why the high band activity has increased. If you have not taken advantage of these openings, I encourage you to do so. Lots of activity is on FT8 digital mode, but even SSB and CW are being great modes these days. I have worked some new ones and this is just the beginning, so I look forward to hearing from everyone and their success on the high band as we begin our climb on solar cycle 25. Dust off those rigs and enjoy some chair-time on-the-air. 73 and Good DX!

DATE	Solar Flux	Sunspot Number	A Index	K Index	On-Air Conditions
4/28/2022	132	118	14	3	Fair/Noisy
4/27/2022	142	95	21	2	Great
4/26/2022	150	126	3	0	Great
4/25/2022	157	94	5	1	Good
4/24/2022	159	112	5	2	Good
4/23/2022	160	118	13	2	Noisy
4/22/2022	163	101	7	1	Good
4/21/2022	164	119	1	3	Good
4/20/2022	160	80	9	3	Fair/Noisy
4/19/2022	135	68	7	3	Fair/Noisy
4/18/2022	135	79	8	2	Fair

Products in the Spotlight

By Steve Molo, KI4KWR

Chameleon CHA MPAS (Modular Portable Antenna System) 2.0

With Parks on the Air being so active these days, not only in the United States, but now Internationally, several POTA operators are looking for a portable antenna that offers 160-6m and is easy to use. Without a doubt, that antenna is the Chameleon CHA MPAS 2.0. I own and use one. It works shockingly well and assembly is very easy. I tagged it locally as “So easy even my wife can as-

semble it” and it is true. Less than 15 minutes and we are on the air every time. Also, there is a VHF/UHF option that can be paired with this unit. In my many uses so far, I had only one experience where the NVIS did not perform as I expected, but that was on 160m.

The Modular Portable Antenna System (MPAS 2.0) is a concept allowing the radio operator to configure and deploy the antenna system in a variety of configurations. Some of the possible

Products in the Spotlight (continued)

deployment configurations:

- Vertical
- Horizontal
- Sloper
- Inverted "V"
- Inverted "L"
- NVIS
- Balcony
- Vehicle (Stationary)
- Man-Pack

Specifications:

Frequency: 6M - 160M

Power: 100 SSB or 50W CW.

Mounting Configuration: 3/8-24 Thread



Portable Dual-Band Vertical or Horizontal Antenna for MPAS 2.0

The Chameleon Antenna Portable Dual-Band Vertical/Horizontal Antenna is an ideal accessory for the Modular Portable Antenna System (MPAS 2.0) as part of a total portable communication system. It will greatly extend communications range when using a portable VHF/UHF hand-held transceiver (HT) as compared to the typical flexible whip "rubber duck" antenna.

The Portable Dual-Band Vertical/Horizontal Antenna also provides horizontally polarized capability, that is usually forgotten by most manufacturers of portable VHF/UHF antennas, for use with transceivers that have CW/SSB modes. It is especially suitable for use when camping or in a Recreational Vehicle (RV), apartment, condominium, HOA, or inside an attic - anywhere you need portability or have limited space or restrictions against permanent antennas. It would also be useful as a backup base station antenna or for EMCOMM. The Chameleon Antenna Portable Dual-Band Vertical/Horizontal Antenna is made from a durable weather-resistant case and easily attaches to an antenna mast that has a 3/8" x 24 stud socket, such as the CHA MIL EXT 2.0 collapsible mast or the CHA JAW MOUNT (both sold separately).

Specifications:

Frequency: 2M - 70CM

Power: 150W SSB or 150W CW

Weight: 2.0 Lb.

The antenna system consists of:

- 1 X CHA DB VHF/UHF matching box
- 2 X DUAL BAND WHIP

Left (top): Chameleon CHA MPAS (Modular Portable Antenna System) 2.0

Left (bottom): Portable Dual-Band Vertical or Horizontal Antenna for MPAS 2

Club Business and Announcements

Budget Forecast

<u>Budget Category</u>	<u>2022 Targets</u>	<u>April Activity</u>	<u>Year to Date</u>
Dues In	720	+60	945 (61 members)
Recurring expenses	-668	-200	-550
Sales	300		300
Discretionary Exp	-1000		
Dx Banquet profit	650		
-----	-----		-----
Bank Delta	2		695

Bank Account Summary - April 2022

Beginning Balance	7885.44
Deposit from PayPal (includes membership payments)	877.36
Repeater bill	-200.00
Ending Balance	8562.50

2022 NADXC Officers and Directors

President	Bob De Pierre, K8KI
Vice-President	Steve Molo, KI4KWR
Sec./Treasurer	Chris Reed, AI4U
Directors:	Bruce Smith, AC4G
	Fred Kepner, K3FRK
(Ex-Officio)	Steve Werner, AG4W

How to Join

Come to a club meeting or send in an application by mail (form on www.NADXC.org)

This edition of The LongPath published by:
Fred Kepner, K3FRK

**Upcoming NADXC
meeting:**

**Tuesday, May 10th,
2022**

**5:45 PM Doors Open /
6:30 PM Meeting**

**Location: Museum of
Information Explosion
and via Zoom**

— GET PREPARED. GET OUT THERE. —



**Adventure
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OFF GRID
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Upcoming DX Contests

By Chuck Lewis, N4NM



CQ-M Intl. DX Contest (CW & SSB), 160-10M

May 148, 1200Z to May 15, 1159Z

Exchange: RS(T) plus Serial #

See page 71, May QST and http://ua9qcq.com/en/contestinfo.php?lang=&t_id=115&mo=4&Year=2018

Volta WW RTTY DX Contest, 80-10M



May 14, 1200Z to May 15, 1200Z

Exchange: RST, plus S/N, and CQ zone

See page 71, May QST and

www.contestvolta.com

His Majesty King of Spain Contest, (CW), 160 – 10M



May 21, 1200Z to May 22, 1200Z

Exchange: RS(T) plus Serial # or EA Province

See page 71, May QST and <https://concursos.ure.es/en/s-m-el-rey-de-espana-cw/bases/>

UN DX Contest, (CW & SSB), 80 -10M



May 21, 0600z to may 21, 1200Z

Exchange: RS(T) plus serial or Kazakhstan district code

See page 71, May QST and www.undxc.kz/rules-eng

EU PSK DX Contest, (DIG), 80 – 10M



May 21, 1200Z to May 22, 1200Z

Exchange: RST plus Serial or EU area

See page 71, May QST and www.eupsk.club/eupskdx/eupskdxrules.pdf

Baltic Contest, (CW & SSB), 80M



May 21, 2100Z to May 22, 0200Z

Exchange: RS(T) plus serial

See page 71, May QST and www.lrsf.it/en/balticcontestrules/

CQ WPX CW Contest (CW), 160-10M



May. 28, 0000Z to May 29, 2359Z

Exchange: RST plus serial #

See page 71, May QST or www.cqwpw.com/rules.htm

ARRL International Digital Contest, (DIG), 160 – 6M



June 4, 1800z to June 5, 2400Z

Exchange: 4-character grid square

See: <https://contests.arrl.org/dig/>

Dates & times often change or are misprinted in the journals; beware.



DXpeditions in May 2022

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Start Date	End Date	DXCC Entity	Call	QSL via	Info
2022 May01	2022 Jun15	Namibia	V5	LoTW	By ZS2PS as V5/ZS2PS; 80 60 40 30 20 10m; QSL via ZS2PS direct
2022 May01	2022 May02	Martinique		DF8AN (B/d)	By DF8AN as FM/DF8AN; HF; mainly CW + digital; 100w; dipoles
2022 May01	2022 May05	Svalbard	JW9DSA		By LA9SDA JW/HB9DQM JW/LB1RH JW/LB8CG; JW/LB1RH and JW9DSA will focus on 20 17 15m, SSB JW/LB8CG; JW/HB9DQM will focus on CW in 30 20 17 15m; 100w; trapped vertical w/ elevated radials
2022 May01	2022 May31	Philippines	DU	LoTW	By W6QT as DU/W6QT fm Subic Bay; 80-6m; SSB FT8; QSL via W6QT; operation to continue until 15 Sep
2022 May02	2022 May06	Azerbaijan	4K7DK	LoTW	By DK1DKE fm Baku; 80-10m; SSB FT8; 100w; dipole QSL OK via DK1DKE (Buro)
2022 May03	2022 May08	Svalbard	JW4D	LA4D	By 8 op LA team fm IOTA EU-026 (JQ78tf); 80-10m; CW SSB + digital
2022 May03	2022 May16	Andaman Is	VU4W	TBA	By YL2GM; 160-10m; verticals
2022 May04	2022 May08	Galapagos	HD8FG	HC2FG	By HC2FG fm Santa Cruz I; 6m; FT8 and Satellite; 170w; J-pole, halos; part-time operation
2022 May05	2022 May11	New Caledonia	FK	LoTW	By F5NHJ as FK/F5NHJ; HF; CW SSB + digital; holiday style operation
2022 May06	2022 May12	San Andres I	HK0	PY8WW	By PY8WW as HK0/PY8WW; 40-6m, focus on 6m
2022 May21	2022 Jun04	Martinique	FM	ON4RU Direct	By ON4RU as FM/OQ3R fm IOTA NA-107; 160-10m; CW; holiday style operation
2022 May22	2022 Jun08	Gambia	C5C	LoTW	By F5RAV F5NVF M0NPT; 20 15 10m; CW SSB FT4 FT8; possible sidetrip to Bijol Is (IOTA AF-060) using C5B; QSL via F5RAV direct (3 US \$ or IRC and SAE)
2022 May27	2022 Jun10	Guadeloupe	TO2AZ	DL2AAZ	By DL2AAZ fm Basseterre (IOTA NA-102); 40-10m; CW SSB; 300w; groundplanes

