

SB PROP @ ARL \$ARLP040
ARLP040 Propagation de K7RA

ZCZC AP40
QST de W1AW
Propagation Forecast Bulletin 40 ARLP040
>From Tad Cook, K7RA
Seattle, WA October 3, 2014
To all radio amateurs

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We saw a rise in solar activity this week. Last Friday and Sunday, September 26 and 28, the daily sunspot number was 203 and 200 respectively. This level of activity was last seen on July 4 to 8, when sunspot numbers were 199, 213, 256, 197 and 209.

Geomagnetic indicators were stable this week, but the latest 45 day forecast shows some active days ahead.

Average daily sunspot numbers increased from 80.9 to 170.1, and average daily solar flux rose from 128.3 to 168.9. This compares the current September 25 through October 1 reporting week with the earlier September 18 to 24 period.

Significantly, the GOES-15 x-ray background flux has been between C1.0 and C1.3 every day since September 25. We haven't seen this many days in a row of x-ray values at that level since last January. You can see the x-ray values at <http://www.swpc.noaa.gov/ftpdir/latest/DSD.txt> .

The latest forecast has solar flux at 145 on October 3, 140 on October 4 to 6, 135 on October 7 and 8, 130 on October 9, then 135, 140, 135, 130, 120, and 135 on October 10 to 15, then 150, 165, 170 and 165 on October 16 to 19, 160 on October 20 and 21, 165 on October 22 and 23, and 170 on October 24 to 26. Flux values are expected to rise to 180 on October 28 and 29, then fall below 120 after November 8.

Predicted planetary A index is 8 on October 3 and 4, 5 on October 5, 8 on October 6 and 7, 5 on October 8 to 14, then 8, 15 and 8 on October 15 to 17, and 5, 8, 10 and 20 on October 18 to 21, 15 on October 22 to 24, and 10 on October 25 to 27.

OK1HH has his own prediction for geomagnetic conditions, and he sees quiet to unsettled conditions on October 3 and 4, quiet on October 5, quiet to active October 6, quiet to unsettled October 7, quiet to active October 8, active to disturbed October 9, mostly quiet October 10, quiet again on October 11, mostly quiet October 12, quiet to active October 13, mostly quiet October 14, quiet to active October 15, quiet to unsettled October 16, quiet for October 17 to 19, mostly quiet October 20, active to disturbed again on October 21 and 22, quiet to active October 23 and 24, quiet to unsettled October 25 to 27 and mostly quiet again on October 28 and 29.

September ended a few days ago, so let us look at the monthly averages.

The average daily sunspot number for September 2014 was 127.4, not

bad considering May through August monthly averages were 116.8, 107.8, 113.6, and 106.2. I will admit to some optimistic cherry-picking of data, as the averages for October 2013 through April 2014 were 127.2, 125.7, 118.3, 126, 174.6, 141.5 and 130.6.

We track 3-month moving averages, intended to smooth out the data. Every month an old month of data is dropped off, and a new month is included. It is a simple arithmetic average in which the daily sunspot numbers for the last three months are totaled, then divided by the number of days. The average for July 1 through September 30 is 115.6, so this is the value centered on August 2014.

The three month moving averages of daily sunspot numbers centered on August 2013 through August 2014 were 77.4, 91.2, 102.9, 123.7, 123.3, 138.5, 146.4, 148.2, 129.6, 118.4, 112.8, 109.2 and 115.6.

Another interesting number is the yearly average of daily sunspot numbers, which is 4.7, 5.1, 25.5, 80.1, 82.3 and 97.1 for 2008 to 2013, and so far in 2014 is 126.8, far above the previous numbers, and the highest value since 2002, when it was 176.7.

Ted Leaf, K6HI of Kailua Kona, Hawaii asked an interesting question. He wrote, "Which is worse, X flare or CME? Note, sometimes get hit by both."

He provided a couple of references:

<http://cse.ssl.berkeley.edu/coronalweather/CMEsFlares/index.html>

<http://www.nasa.gov/content/goddard/the-difference-between-flares-and-cmes/>

I passed this question on to Carl Luetzelschwab, K9LA. Carl wrote:

"Big flares can cause polar cap absorption events (PCAs) and radio blackouts on the sunlit side of the earth. PCAs (also called solar radiation storms by NASA) can adversely affect paths that go over the north and south poles (but not affect them necessarily the same) - like the West Coast to Europe path, and the Midwest to India and deep into Russia paths. Radio blackouts can increase D region absorption on a path in daylight, and they affect the lower bands the most.

CMEs can cause aurora and depleted F2 region ionization at mid and high latitudes. NASA lumps these together as a geomagnetic storm. Aurora is usually associated with increased absorption at HF (but VHFers like it for aurora!). Depleted F2 region ionization means lower MUFs at mid and high latitudes.

The effect of radio blackouts can last for several hours, and as mentioned above they affect the lower frequencies the most (since absorption is inversely proportional to the square of the frequency). The mitigation for radio blackouts is to go higher in frequency.

The effect of PCAs can last for several days. The mitigation for them is to try the other way around. In other words, try long path across the other pole.

The effect of CMEs can last for up to a week. The mitigation for lower MUFs at mid and high latitudes is to look for low latitude paths - for example, the southern US to VK/ZL.

In my opinion, CMEs are the most detrimental due to decreased MUFs

over large areas and the longest duration."

After several years, we received another message from Aki Akai, JQ2UOZ, who uses extreme low power (never running more than one-half watt) and only simple antennas from an apartment balcony:

"This is JQ2UOZ, Aki, of Nagoya, Japan. I enjoy QRPp DX using an output power of 500mW and a dipole antenna. You mentioned me in your following articles:

<http://www.arrl.org/w1aw-bulletins-archive/ARLP010/2007>

<http://www.arrl.org/w1aw-bulletins-archive/ARLP035/2008>

<http://www.arrl.org/w1aw-bulletins-archive/ARLP048/2009>

<http://www.arrl.org/w1aw-bulletins-archive/ARLP039/2011>

I have linked my QRP QSO data to the gray line on a great circle chart, and published the resulting charts on my website at <http://jq2uoz.blogspot.jp/>

The charts represent low energy-loss propagation because almost all of the QSOs shown were made using a very low power level (500 milliwatts) and a dipole antenna. I do not know very well the exact relationship between the gray line and the radio propagation on higher HF bands, but I believe that the gray line is one of the important factors for low energy loss propagation even on higher HF bands."

Be sure to check out the links to photos of the various simple antennas Aki has used over the years. He calls himself "One of the weakest DXers in the world."

And finally, Douglas Moore sends a fascinating article from the New York Times about sprites above thunderclouds and the work of Thomas Ashcraft of New Mexico. Ashcraft has been featured in the past on Spaceweather.com. The article is linked from <http://nyti.ms/YAzlr1> .

For more information concerning radio propagation, see the ARRL Technical Information Service at <http://arrl.org/propagation-of-rf-signals>. For an explanation of the numbers used in this bulletin, see <http://arrl.org/the-sun-the-earth-the-ionosphere>. An archive of past propagation bulletins is at <http://arrl.org/w1aw-bulletins-archive-propagation>. More good information and tutorials on propagation are at <http://k9la.us/>.

Monthly propagation charts between four USA regions and twelve overseas locations are at <http://arrl.org/propagation>.

Instructions for starting or ending email distribution of ARRL bulletins are at <http://arrl.org/bulletins>.

Sunspot numbers for September 25 through October 1 were 139, 203, 159, 200, 160, 166, and 164, with a mean of 170.1. 10.7 cm flux was 158, 170, 181, 181, 175, 162, and 155, with a mean of 168.9. Estimated planetary A indices were 13, 14, 15, 8, 10, 15, and 10, with a mean of 12.1. Estimated mid-latitude A indices were 13, 12, 12, 6, 7, 12, and 10, with a mean of 10.3.

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