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ARLP051 Propagation de K7RA

ZCZC AP51
QST de W1AW
Propagation Forecast Bulletin 51 ARLP051
>From Tad Cook, K7RA
Seattle, WA December 13, 2013
To all radio amateurs

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Solar indicators rose over the past week, for both solar flux and sunspot numbers. The highest were on Tuesday, December 10 when the sunspot number was 169 and solar flux 175.2. In an otherwise quiet week the planetary A index reached 26 on Sunday, December 8, sparked by a strong solar wind surging from a coronal hole. We could see a repeat this weekend. Geomagnetic activity during the ARRL 10 Meter Contest this weekend should be more active than contesters would prefer, with predicted planetary A index values of 20 and 15 on Saturday and Sunday.

NOAA said Thursday night that the geomagnetic field may be anywhere from quiet to minor storm levels this weekend.

For the past six 10-Meter Contests, geomagnetic conditions have been very quiet. But in 2006 the contest (always the second full weekend in December) fell right between two very active periods. The 2006 contest was held on December 9-10, and checking the record at http://www.swpc.noaa.gov/ftpdir/indices/old_indices/2006_DGD.txt we see the planetary A index on those dates was 7 and 14. But just prior on December 6 the A index was 28, and 25 on December 7-8.
Following the contest that year the planetary A index on December 11-15 was 15, 26, 5, 63 and 104. The last two figures indicate a major geomagnetic storm. Lucky it didn't hit earlier, but the contest weekend was still feeling the effects of the higher activity in the days before. Reports included much trans-equatorial propagation. North-South propagation across the equator is not enhanced during periods of high geo-activity, but rather that is often the only propagation path available.

Compared to the previous seven days, over December 5-11 the average daily sunspot number rose from 102.9 to 122.1, and average daily solar flux increased from 132.9 to 162.4.

The predicted values in the 45-day outlook for solar flux took a substantial leap on December 8. For example, on December 7 the predicted average solar flux for December 10-15 was 141, and on December 8 the projected average for the same period was 170. The predicted values for the following 45 days increased across the board, but have since scaled back somewhat.

The latest prediction has solar flux at 165 on December 13, 160 on December 14-15, 155 on December 16-18, 150 on December 19-20, 172 on December 21-22, 175 on December 23-25, 172 on December 26, 170 on December 27-29, 165 on December 30, and 160 on December 31 through January 2, 2014. After dipping to

150 on January 4, solar flux is expected to rise to a short term peak of 172 on January 7-8.

Predicted planetary A index is 12, 20 and 15 on December 13-15, then 5 on December 16-25, then 12, 10 and 8 on December 26-28, 5 on December 29 through January 2, 2014, then 10, 20, 15, 10 and 8 on January 3-7.

OK1HH believes the geomagnetic field will be quiet December 13-14, mostly quiet December 15, quiet to unsettled December 16, quiet December 17-18, quiet to unsettled December 19, quiet December 20-24, mostly quiet December 25, quiet to unsettled December 26, quiet to active December 27, quiet December 28, mostly quiet December 29, and quiet on December 30-31.

Predicted solar flux shows this weekend's 10 Meter Contest should have the highest solar flux and sunspot numbers since the 2002 contest. Conditions may be similar to the 1999 contest, when solar flux and sunspot numbers were about the same as now. This was before the peak of the last solar cycle, cycle 23.

To test this out and see where conditions are compared to previous ten meter contests, I averaged sunspot numbers and solar flux since 1997 for the contest weekend including the Friday before.

>From 1997 through 2012, the average solar flux on the second full weekend in December was 90.6, 143.5, 160.9, 139.9, 224.2, 185.3, 89.1, 88.4, 91.2, 92.8, 87.5, 69.8, 74, 88.2, 139.3, and 100.6. For Friday through Saturday this weekend the average of predicted flux values is 161.7, very close to what it was in 1999, and as you can see, stronger than any contest weekend after 2002.

Over the same period using the same method, average sunspot numbers were 66.7, 153.3, 120.3, 70.7, 201.3, 202.3, 41.3, 27, 55.7, 22.7, 34, 4.7, 13, 27, 103 and 32.7. We don't have a source for predicted daily sunspot numbers, but the average reported at the end of this bulletin was 122.1. This is also stronger than any contest weekend since 2002.

Note that in 2008 the average sunspot number on the second weekend in December was only 4.7. This may seem strange, because the arcane method used for determining sunspot number produces no non-zero sunspot numbers below 11. But on that Friday through Sunday period, over the three days sunspot numbers were 14, 0 and 0. That produces an arithmetic average of 4.667, or 4.7.

You can find information on the ARRL 10 Meter Contest at http://www.arrl.org/10-meter.

I used past ARRL Propagation Bulletins from the archive at http://arrl.org/w1aw-bulletins-archive-propagation as a source for data on past 10 Meter contests. While browsing, in ARLP050 in 2010 I found an interesting resource that I had forgotten about at http://www.helioviewer.org/ . With this tool you can set up a movie of recent or past solar images, and have them continually animated at a variety of rates and representing a time period of your choosing.

I also ran into a bulletin by Tony, G4CJC concerning 10 meter DX and propagation news from Europe at http://www.southgatearc.org/bands/10metres/december2013/december_12.htm#.Uqls0-JC2UU
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Jon Jones, N0JK writes The World Above 50 MHz column in QST, and sent this note:

"The Winter 6 meter Es season is underway.

Tuesday Dec. 10 - 6 meters was open before sunrise (1230 UTC) from KS, NE to Florida, and strong Es from W1 to Florida.

Geminids meteor shower to peak this weekend."

That's right, and the meteor shower should enhance 10 meter propagation, because of all those ionized meteor trails. In fact, the story goes that the second weekend in December was picked for the 10 meter contest because it coincides, with some variation year to year, with the Geminids shower.

Max White, M0VNG sent along an article about threats from massive solar events. Read it at at http://www.colorado.edu/news/releases/2013/12/09/cu-boulder-scientist-2012-solar-storm-points-need-society-prepare .

Ray Soifer, W2RS of Green Valley, Arizona wrote: "Interesting to read about Larry, W0OGH's experience with VU7AG. Mine was very similar. I am 113 miles south of Larry's QTH and worked VU7AG on 20 CW a minute before he did. I too noticed the auroral flutter on the VU7's signal. Most of their times and frequencies seemed to favor Europe and the eastern half of North America so it was good to have this opening.

On 20 CW I have 600 watts to a Hy-Gain AV620 vertical mounted on a 10-foot pipe. It isn't a 4- element monobander but it does pretty well on DX paths due to its fairly low radiation angle."

Funny. My word processing program did not like the word "monobander" above, and suggested "mindbender" as the correct spelling.

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 December 5 through 11 were 103, 105, 104, 83, 125, 169, and 166, with a mean of 122.1. 10.7 cm flux was 149.6, 150.5, 156.9, 165.5, 168.1, 175.2, and 170.8, with a mean of 162.4.
Estimated planetary A indices were 5, 4, 6, 26, 5, 5, and 4, with a mean of 7.9. Estimated mid-latitude A indices were 4, 3, 4, 14, 2, 3, and 2, with a mean of 4.6.
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