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ARLP037 Propagation de K7RA

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Propagation Forecast Bulletin 37 ARLP037
>From Tad Cook, K7RA
Seattle, WA September 12, 2014
To all radio amateurs

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We saw a nice increase in the level of solar activity this week, and the outlook for the near term looks good, or at least, interesting.

Average daily sunspot numbers for the period September 4-10 increased from 85.1 to 152.1, and average daily solar flux rose from 126.7 to 155.8. Geomagnetic indicators were quiet, with average planetary A index declining from 14.7 to 7.9, and average mid-latitude A index dropped from 13.4 to 8.3. These latest numbers are compared to the previous seven days, August 28 through September 3.

[Http://www.SpaceNews.com](http://www.SpaceNews.com) reports a couple of CME blasts are headed toward Earth, and they were launched September 9 and 10 from sunspot 2158. The sunspot was in a most favorable position for launching ejections in our direction. It was right in the center of the visible solar disc from Earth's perspective. Don't worry, this is not some doomsday event, although it is strong.

At 0520 UTC on September 11 (which was 10:20 PM September 10 on the West Coast) the Australian Space Forecast Centre issued a geomagnetic warning. They predict increased geomagnetic activity on September 11-13 due to coronal mass ejections. Their forecast calls for unsettled conditions with possible minor storm periods on September 11, active to major storm levels September 12, and active geomagnetic conditions September 13.

>From NOAA/USAF the predicted planetary A index is 40, 60, 25 and 12 on September 12-15, 5 on September 16-24, then 18 on September 25, 15 on September 26-27, 12 on September 28-29, 10 on September 30 and 5 on October 1-4.

Predicted solar flux is 152 on September 12, 150 on September 13-14, 148 on September 15-16, 146 on September 17, 145 on September 18-20, then 150, 145 and 135 on September 21-23, 130 on September 24-25, 125 on September 26-27, 130 on September 28-29, 145 on September 29-30, then 150, 145 and 140 on October 1-3, 135, 140 and 145 on October 4-6 and 150 on October 7-11.

Expect aurora in northern latitudes (in the Northern Hemisphere) and rough HF conditions on Friday, September 12. The predicted planetary A index of 40 on Friday and 60 on Saturday indicates a moderate to strong geomagnetic storm.

You can watch the fun at <http://www.swpc.noaa.gov/ftpdir/latest/DGD.txt> which is updated every three hours. When you see the K index above 3, this indicates active geomagnetic conditions. Each single point higher represents a

large increase in activity.

The A index represents an average of each 3-hour K index over 24 hours. It is not meaningful to average the K index directly because it is non-linear, so the number is converted back into a value which has a direct linear relationship to the magnetometer readings upon which the K index is based, then it is averaged.

So if over the course of a day all eight K index values were 4, the A index is 27. If all readings were 5, then the A index is 48 and a K index of 6 is equivalent to an A index of 80. You can see the scale at the bottom of the page on <http://www.solarham.net/a.htm> . This also shows an example of the averaging used to produce a daily A index.

Because the A index predicted for Saturday is 60, we know that the K index should be between 5 and 6 all day. Looking at the chart of the Space Weather Scale for Geomagnetic Storms at http://www.swpc.noaa.gov/NOAA_scales/ shows this correlating to a Minor to Moderate geomagnetic storm. Of course the K index could briefly go much higher, perhaps to 7 and still result in an A index somewhere around 60, so during that brief period when the planetary K index is 7 the storm level would be Strong.

Let's look at the prediction of geomagnetic activity from OK1MGW in the Czech Republic. He predicts the geomagnetic field will be active to disturbed September 12-15, quiet to unsettled October 16-17, mostly quiet September 18-19, quiet September 20-21, quiet to active September 22, active to disturbed September 23-24, quiet to unsettled September 25-26, quiet to active September 27-28, quiet to unsettled September 29 to October 1, quiet to active October 2-3, and mostly quiet October 4-8. He expects an enhanced solar wind on September 12-15, 22-23 and 26-29.

On September 10 Jon Jones, N0JK wrote, "An impressive sporadic-E opening appeared September 7, which later formed Es links to TEP on to South America September 8, UTC.

"There was an early morning (1230z) double hop Es opening from Puerto Rico to the southern states as far west as New Mexico on the September 7. Later in the afternoon single hop Es ran from the Midwest to the southeast states, then a strong double hop Es opening from Puerto Rico to the Midwest states. NP4A was over S-9 for over an hour to Kansas, Missouri and Nebraska around 2215z. Later Es - TEP from IA, MN, IL, and W4 to CE, CX, LU and PY.

"It will be interesting to see what develops from the two CMEs en route to Earth."

Over the next few days expect diminished HF propagation due to high geomagnetic activity, but this may produce interesting propagation on 6 meters. After a few days the effects should wear off. Now we are just 11 days away from the Autumnal Equinox, which is a time of improving HF propagation. The equinox occurs at 0229 UTC on Tuesday, September 23.

With the recent flare activity, the popular press has taken note. This article appeared locally here in Seattle, and mentions the possibility of aurora:

<http://mynorthwest.com/11/2606078/Northern-Lights-could-dazzle-Seattle-sky-this-weekend>

The professor quoted in the article is WB7NWP. Note his suggestion to check this online tool, which I am not sure I've seen before:

http://www.swpc.noaa.gov/wingkp/24_hour.html .

If you would like to make a comment or have a tip for our readers, email the author at, k7ra@arrl.net.

For more information concerning radio propagation, see the ARRL Technical Information Service web page 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 4 through 10 were 136, 124, 170, 154, 158, 162, and 161, with a mean of 152.1. 10.7 cm flux was 146, 143.9, 157.3, 160.2, 163.9, 159, and 160, with a mean of 155.8. Estimated planetary A indices were 7, 8, 9, 8, 6, 8, and 9, with a mean of 7.9. Estimated mid-latitude A indices were 7, 10, 7, 10, 7, 8, and 9, with a mean of 8.3.

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