

SB PROP @ ARL \$ARLP038
ARLP038 Propagation de K7RA

ZCZC AP38
QST de W1AW
Propagation Forecast Bulletin 38 ARLP038
>From Tad Cook, K7RA
Seattle, WA September 19, 2014
To all radio amateurs

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On September 11 and 12 two powerful CMEs hit Earth, producing a G3 class geomagnetic storm. The result was a planetary A index of 44 on Friday, and during the final three hours of the UTC day (2:00 PM to 5:00 PM PDT) the planetary K index reached 7, which is very high.

Overall solar activity is down, with the average daily sunspot number declining from 152 to 124.9 in the latest reporting period (September 11-17). Average daily solar flux dropped from 155.8 to 139.8.

Predicted flux values have declined as well. As an example, the daily 45 day forecast for solar flux on September 21 was 120 on August 6-10, 125 on August 11-17, 135 on August 18 through September 7, 150 on September 8-12, 130 on September 13, 120 on September 14-15 and 115 on every day since.

Predicted solar flux is 120 on September 19, 115 on September 20-21, 110 on September 22-25, 115 on September 26, 120 on September 27-28, 130 on September 29, 135 on September 30 and October 1, 140 on October 2, 145 on October 3-5, 150 on October 6-7, 145 on October 8-9. and 140 on October 10-12. Flux values then dip to 125 on October 17, rise again slightly, then go down to 115 on October 21-23. After that solar flux values are expected to rise again, perhaps to 150 by early November.

Predicted planetary A index is 5 on September 19-25, 15 on September 26-27, 12 on September 28-29, 10 on September 30, 5 on October 1-2, 8 on October 3-4, 5 on October 5, 10 on October 6-7, then quieting down to 5 on October 8-11, then rising to 8, 10 and 8 on October 12-14, and quieting down to 5 again on October 15-21. The next really active period is predicted to have a planetary A index of 20 on October 22.

Petr Kolman, OK1MGW of the Czech Propagation Interest Group believes geomagnetic conditions should be quiet to unsettled on September 19-20, quiet on September 21, active to disturbed September 22-23 (although he is uncertain about this), quiet to unsettled September 24-26, quiet to active September 27-28, quiet to unsettled September 29 through October 3, quiet to active October 4-5, mostly quiet October 6-9, quiet October 10-12. mostly quiet October 13-14, and quiet to unsettled October 15.

Petr expects an increase in solar wind on September 22-23 (although he is less than certain about this, just as in the geomagnetic prediction for those two days), and also on September 26-29 and October 3-4.

The Autumnal Equinox is just a short time away, in the early hours of September 23 at 0229 UTC. This is Monday night in North America. The equinox portends improved worldwide communications on the HF bands. As an example, modeling propagation using W6ELprop and a modest solar flux of 120, 20 meter signals between California and Japan on the equinox run about 6 dB hotter in the early evening on the West Coast than they would a month earlier.

Rich Zwirko, K1HTV of Amissville, Virginia (FM18ap) sent this report about recent activity in the ARRL September VHF Contest last weekend (September 13-15):

"The Wednesday, September 10 CME and X1.6 solar flare resulted in an aurora which occurred on Friday evening, Sept. 12. Unfortunately, this was the day before the ARRL VHF Contest. I managed to work W1AW/1 and a couple of VEs on 6 meter CW via the buzz mode. On 2 meters I worked W9EWZ (EN52) and heard W9ZIH (EN51) and K9MRI (EN72) via the auroral curtain. During the VHF contest, the first sign of Es occurred just before 2030Z Saturday. A number of Florida stations were worked plus stations in Cuba (CO3VR and CO3JA) and Mexico (XE3/K5ENS). Just before 2200Z our Es opening to the south coupled into the Florida-to-South America TEP. This resulted in K1HTV QSOs with two LU stations in GF05 (LU9AEA and LU6DRV) and two stations in GF15 (CX2TQ and CX9AU). By 2220Z Saturday the Es and TEP had disappeared.

"As September VHF contests go, I would rate the overall conditions to be above what is normally expected in the inland Mid-Atlantic region. Normally the Summer Es conditions have gone, but the Saturday Es opening, coupling to the TEP resulted in some interesting QSOs.

"73, Rich - K1HTV"

Thanks, Rich!

I'll clarify a couple of terms, for readers who might be new. When Rich refers to "Es" he is talking about E-layer propagation, which can appear sporadically and propagate signals at 10, 6 and 2 meters during certain seasons of the year, such as summer and again and less often in December. Long distance HF propagation relies on the higher and more predictable F-layer of the ionosphere.

TEP refers to Trans-Equatorial Propagation, or propagation in an approximate north/south path across the equator. When we have a big solar flare and geomagnetic storm such as the one last week, sometimes on HF TEP is the only available propagation mode.

"Buzz mode" refers to auroral propagation, in which VHF stations aim their antennas north toward the Aurora Borealis. The reflected signals are distorted, hence the reference to "buzz."

Wikipedia has a pretty good description of sporadic-E propagation at http://en.wikipedia.org/wiki/Sporadic_E_propagation, and K9LA has a treatise on TEP at http://k9la.us/Trans-Equatorial_Propagation.pdf.

As mentioned every week at the end of this bulletin, K9LA has a great web site devoted to propagation at <http://k9la.us/>.

[Http://www.spaceweather.com](http://www.spaceweather.com) reports "No geomagnetic storm was in the forecast for September 19, but a storm occurred anyway. Sky watchers around the Arctic Circle saw the midnight sky turn green as magnetometers registered an unexpected G1-class disturbance between

0300 and 0600 UTC. The source of the display was a fluctuation in the interplanetary magnetic field (IMF). During the early hours of September 19 the IMF tipped south, opening a crack in our planet's magnetosphere. Solar wind poured in to fuel the storm."

The planetary K index was 4 at 0300 UTC and 5 at 0600 UTC. NOAA forecasters estimated a 20% chance of more polar geomagnetic storms overnight. See <http://www.swpc.noaa.gov/ftpdir/latest/DGD.txt> .

Dennis Condron, K0LGI of Marion, Iowa posted his observations about last week's big flare, and you can read it here:

<https://groups.google.com/forum/?fromgroups#!topic/radiometeors/cKA0M9bokRM>

Dave Sublette, K4TO of Winchester, Kentucky pointed out that the report from N0JK in last week's bulletin never mentioned what band he was talking about. Later, after putting the bulletin to bed I received an email from N0JK to let me know it was 6 meters.

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 11 through 17 were 164, 157, 165, 120, 92, 85, and 91, with a mean of 124.9. 10.7 cm flux was 151.4, 152, 145.1, 139.3, 132.9, 133, and 125, with a mean of 139.8. Estimated planetary A indices were 12, 44, 13, 3, 3, 7, and 6, with a mean of 12.6. Estimated mid-latitude A indices were 16, 35, 13, 3, 2, 7, and 4, with a mean of 11.4.

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