

# IRCA Technical Column

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## Using the A-index to predict good propagation?

As was mentioned in "Signal Strength Recording as an Aid to Propagation Studies" in DX Monitor, Volume 37, Number 5 and 6, I have been using a computer controlled radio to continuously record signal strengths of various DX stations from Victoria, B.C. So far, I have seriously analyzed only receptions from HLAZ-1566, and almost all receptions of that station over the period from September 1997 to March 2000 occurred in the hour previous to receiver sunrise.

In an effort to understand why sunrise enhancement occurs on some mornings and not others, I tabulated the dates of the strongest enhancements over this period, and attempted to correlate these dates at least with geomagnetic activity by using the planetary A index  $A_p$ . Other than the rather bizarre observation that the 30<sup>th</sup> of November seems to have been a good morning for East Asian DX for each of the last three years, I have not yet been able to find any obvious common circumstances behind each of these good openings. **Table 1** doesn't really show us that these good DX mornings were related to geomagnetic activity or its lack, beyond the fact that no openings occurred as a major geomagnetic storm was taking place, i.e. the  $A_p$  index was not greater than 36 on the date of reception.

The rule of thumb that good high latitude conditions are preceded by prolonged periods of geomagnetic quiet has been popular among medium wave DXers, but is not borne out by this data. The rule is likely more applicable to paths through the auroral zone, such as those between western North America and Europe. It should be noted that the path from eastern Asia to the Pacific Northwest, although high latitude, runs to the south of that zone, so we really should not expect much absorption of signals from auroral activity except during geomagnetically stormy periods. However, that relatively clear path doesn't seem to guarantee good receptions. In fact, the last two weeks of December 1997 had quiet enough geomagnetic conditions to allow many receptions in Europe of western North American MW stations, yet good reception of HLAZ was limited to a single date during that period, so something other than a quiet geomagnetic field must determine reception of that station.

One could observe that the slightly fewer good openings in the last two DX seasons compared with the '97-98 season corresponded with increasing solar and geomagnetic activity as we approach the peak of the solar cycle, but it should also be noted that the strongest enhancement of HLAZ over the entire monitoring period was on 25 January 2000, after periods of minor geomagnetic storminess during the previous two days.

date	$A_p$ average over 3 days previous	$A_p$ on date itself	date	$A_p$ average over 3 days previous	$A_p$ on date itself	date	$A_p$ average over 3 days previous	$A_p$ on date itself
15-Sep-97	12.7	16	29-Nov-98	6.3	6	30-Nov-99	6.3	8
27-Sep-97	6.7	13	30-Nov-98	8.0	13	1-Dec-99	5.3	4
6-Oct-97	3.0	3	28-Dec-98	8.0	5	9-Dec-99	13.0	12
7-Oct-97	4.0	7	5-Feb-99	12.7	8	17-Dec-99	4.7	5
18-Oct-97	3.7	3	13-Feb-99	14.7	7	26-Dec-99	7.3	2
9-Nov-97	19.3	9	27-Feb-99	5.0	5	18-Jan-00	4.3	4
17-Nov-97	7.7	7	17-Mar-99	8.3	5	25-Jan-00	16.3	7
30-Nov-97	2.7	4	22-Mar-99	5.0	3	6-Mar-00	7.7	11
29-Dec-97	2.3	3						
9-Jan-98	15.0	9						
28-Jan-98	3.7	2						
1-Feb-98	11.7	7						

**Table 1—average geomagnetic activity for previous 3 days, and for each day of every major sunrise enhancement of HLAZ-1566 in Victoria, B.C. 1997-2000**

About 75% of these openings occurred when the solar flux was decreasing, and there does seem to be a preponderance in the above data set of good openings that recur after approximately one month, but any relationship between solar activity and sunrise enhanced signals seems difficult to establish. For example, the one month repetition rate in good receptions seems to be closer to 30 days rather to the solar equatorial rotation period of roughly 27 days. Unless someone wants to argue for a lunar influence on radio propagation, it's not certain where that leads us.