

DXING DURING AURORA

by Robert Kramer

Earlier this fall I wrote an article dealing with aurora DX at Sunrise. This time, I will write a general article about this DXing phenomenon. I do not intend to make this a technically oriented article, as I am totally incapable of doing so. I will basically look at different types of Aurora DX, including specific examples from the Chicago Area, SSS Aurora and some of the better aurora openings in past days. I also plan to discuss 2 types of unusual Aurora influenced DX: The "Marshall Effect" and the "Johnstown Effect" (both Chicago Area jargon for specific types of aurora DX).

Aurora DX is the result of a storm in the earth's geomagnetic belt. This disturbance is the consequence of a high level of solar activity, or so it is theorized. As of yet, no one has been able to determine the exact triggering mechanism for the aurora borealis. In fact, many times scientists will predict a severe aurora, because of an unusually high level of sunspots, or solar flares, only for above normal DX conditions northward to result. There may even be reports on your local TV weather forecast and in the newspapers that people in your area should be on the lookout for a display of the northern lights. There also may be predictions of disrupted radio communications and WWV forecasts of major storm levels. Nearly every time I have heard these forecasts the aurora has not occurred. When an aurora does take place, many times, the forecast concerning its severity will be inaccurate. The big aurora in early September of this year is an excellent example. 3 hours after WWV said that a minor geomagnetic storm had begun, and that conditions would be at minor storm levels, a major storm broke out, with an A index of 140. Thus, while you should monitor WWV when aurora is expected, don't base your DXing activities solely upon a forecast of a geomagnetic storm.

Since I brought up WWV in the previous paragraph, I may as well discuss the valuable propagation services available through this station. At 18 past the hour, each hour, WWV provides a propagation conditions report. The portions of the report that pertain to the aurora consist of 3 parts: 1. The current conditions via the K index, 2. the previous day's activity via the A index, 3. a geomagnetic forecast for the next 24 hours. The K index is based on a 0-9 scale. A K-index of 0-3 would indicate normal propagation conditions. 4-6 usually means a minor geomagnetic storm, although the K index can reach 4 occasionally without aurora being present. K index 7-9 indicates a major geomagnetic storm in progress at the time you are listening. The A index is a gauge of the previous GMT day's geomagnetic activity. Basically, anything less than 20 is normal conditions (although you probably would not hear Alaska with an A index of 19), 20-29 usually active conditions (just below a minor storm, but often great at sunrise & sunset for DX). When the A index reaches 30 or more a geomagnetic storm has taken place. An A index of 30-50 is usually considered a minor storm. Anything over 50 is a major geomagnetic storm.

Many people confuse good southern conditions with aurora. They refer to good southern conditions as aurora. This is not the case. An aurora is a specific type of DX condition. It is totally possible to have good southern conditions without there being an aurora present. Even if stations from the south are in, without reception from any other direction, the only way to determine if there is an aurora is to consult WWV. Just as good openings to the east, west or north can take place with dead conditions elsewhere, so can southern openings. Even South American stations dominating regional channels does not positively mean that there is a geomagnetic storm.

One thing that you will notice is that auroras are never the same. They always seem to produce a different set of stations, even different directions, each time that they occur. In the Chicago Area there are 5 general types: 1. South America-Caribbean, 2. Central American-Caribbean, 3. Southeast, 4. Due South, 5. Southwest. Since most of you do not live in the Chicago Area, you may have different types where you live. In the preceding paragraphs I will discuss each Chicago Area type opening briefly, as an aid to finding the aurora reception types and patterns in your area.

South American-Caribbean: This type of opening usually takes place in the evening hours, beginning right around Chicago Sunset. There have been AN openings of this type, but they are somewhat rare. The most likely time for this to occur is on the first day of the aurora, when the storm begins in the early morning hours, producing good SRS aurora (usually the SRS aurora will be to the southeast or due south). In this variety of opening you will find the dial dominated by mostly Venezuelans & Colombians. There also may be unusual reception from Caribbean Areas such as Dominica. These signals will be quite strong, though somewhat fady. Many times, unless there is a groundwave received station, there will be no domestic station interference. This type of opening can take place even on regional channels that are usually dominated by strong pests. However, for this to happen, the aurora must be of fairly strong severity (although strong reception to South America on regional and clear channels does not require a major geomagnetic storm).

Central America-Caribbean: This type of opening takes place at sunrise skip. Many times, stations from the Caribbean, particularly Cuba, will be in. As their local sunrise approaches, the opening drifts westward into Central & Southern Mexico, Guatemala and Honduras. An opening of this type is the best time to log the Yucatan area of Mexico from Chicago, and probably all of the Midwest. Again, a tremendously severe aurora is not required for an opening of this variety to be successful.

Southeast: This is the first basically domestic dominated type of aurora. The most likely times of day for this type of opening are in the evening and SRS. Although some Cuban stations will be in, the bulk of the DX will be from Northern Georgia during a moderate aurora, Southern Georgia & Northern-Central Florida during a severe aurora. There also may be some reception from the Carolinas. The evenings will most likely produce higher power stations (such as 5000 watt WWVQ-1430 Panama City, FL), although stations such as WHIZ-1330 Dublin, GA do make it occasionally. The best time for the lower powered stations is at SRS. Then, with the skywave building up overnight, along with the weakening-obliteration of usual pests, and the vast number of PSAs operating, DX can become almost impossible to keep up with. You will find that the severity of the aurora will determine what is heard. The slightest aurora will produce plenty of stations in Northern GA plus some stuff from the Carolinas. The more intense auroras are required for Southern Georgia and Florida to be received, although some Florida stations will make it with weaker geomagnetic storms. Southern Florida is extremely rare, and only is received with very severe storms (usually with an A index well over 100).

The South: This type of opening, believe it or not, is probably the rarest of the aurora openings. It is most likely to take place in the evening, with another time being SRS. Occasionally, a southern aurora will pop up at SSS, but these do not occur often because of the slowed skywave recovery during aurora. One of the reasons for the lack of openings in this direction is that there are few fulltime stations in the states received via this aurora type. The openings are restricted to SRS, for the most part, when the southwestern type of opening is at its peak. The states to look for in this area are: Tennessee, Alabama, Mississippi, Louisiana, and, to a lesser extent, Kentucky. When aurora conditions are good to this area in the evening, the same stations will appear opening after opening. Stations such as WXVI-1600, WEUP-1600 & WHHY-1440 have become indicators of this type of opening. Unfortunately there are few stations left on the air to DX for from this area, so these indicator stations are best used to predict good SRS DX. Many times they will. Other times they can indicate SRS to the last & most common area, southwest.

Southwest: This is the area most common to the Chicago Area during aurora. The predominant area is Texas and Northern Mexico, with Arkansas & Oklahoma also being good. At times, Arizona, New Mexico and Southern California will also be heard. This is the only direction of aurora reception that is consistently in evidence at all times of skywave propagation (evening, AM, SSS & SRS), although it isn't always good during aurora. Often, at SSS, Arkansas and Oklahoma will be fairly good, with Texas being great. It is not at all uncommon to receive a 500 or 250 watt station from Southern or Western Texas interference free. The evenings, when aurora DX is going southwest, will be all Texas, with some Mexican stations also appearing. These Texas openings usually follow a geographic pattern not at all influenced by the severity of the aurora. There will be few "pest" stations in such as KXYZ-1320 & KRYS-1360. Nearly all of the rest of the reception will come from a specific region of Texas, such as the Gulf Coast, Panhandle or Northeast portions of the state. It is extremely rare for the entire state to produce outstanding loggings (although some SSS sessions will produce DX from east to west as sunset moves westward, but these usually are localized such as the northern portion of the state from the Arkansas to the panhandle. It would be rare to also get Southern Texas, & vice versa). The Texas reception will continue all night into the SRS hours, where it could improve (or die out if the rising sun burns up the skywave prematurely) due to the westward movement of sunrise. In addition to Texas, Arkansas, and sometimes Oklahoma, can be good at SRS.

Now that you are aware of aurora DX types, one thing should be remembered, not all auroras are productive DX while. In order for aurora to be a success, skywave reception from the south must be present. If there is no skywave, then all that will be received will be stations via groundwave and line noise. Aurora does not, or at least I have never seen any data suggesting that it does, improve skywave propagation southward. What it does is eliminate interference. With a good aurora the conditions are as if all of the stations outside of the south went off, leaving such southern DX. Thus, no matter how empty the channels, if the skywave reception from the south is dead, then you will get nothing.

One type of aurora DX that, at least for now, defies explanation is what we in Chicago call the "Marshall Effect", named after the first instance of this type of reception: WJHL-1400 Marshall, MN. What the "Marshall Effect" is is reception to the north of your DX location during aurora conditions. The reception is normally taking place from a location well within the aurora curtain. It also is usually only one station, although it may come from an entire region. Many times this station will be interfering with aurora reception on its frequency, and will be skipping over stations that are in the same direction, but nearer, and are blocked out by the aurora. An example of this was KLTG-1460 Dickinson, ND in all alone with WACO-1460 Waco, Tx. KSO-1460 Des Moines, IA, in the same general direction as Dickinson, normally dominates 1460. But the aurora knocked KSO out, along with other regular pests WOHB Harrisburg, PA & WBNS Columbus, OH, allowing KLTG to come through. Exactly what causes reception of this variety is not really known. There have been several theories though. One involves the existence of a hole in the aurora curtain. Another suggests that low angle reflection may take place in isolated instances during aurora. Low angle reception would not explain the KLTG logging, since low angles

would produce a nearby station, such as KSO, and shouldn't cause reception of a station nearly 1000 miles away.

One pattern that has been noticed over the years is what we call the Johnstown Effect, named after reception of WJZR-930 (now WMYL) Johnstown, New York, which occurred at SRS the day before the Great Aurora of the 16th (Sept. 16, 1974). This Johnstown Effect, which doesn't take place every time aurora hits, consists on unusual reception to a Northern latitude or direction not normally received in your area, on a frequency generally congested due to interference, just prior to the beginning of a geomagnetic storm. Many times, Johnstown Effect reception will be almost interference free. The best instance of this reception type took place in the fall of 1981 with the reception of KTOQ-1340 Rapid City, South Dakota in Chicago. Unfortunately, when receiving a station of this variety, you won't know it was Johnstown Effect until the aurora begins (thus it can't be used to forecast aurora), since you won't know if it was caused by good radio conditions or an approaching aurora. The exact cause of this Johnstown Effect is unknown. I have two possible theories. One is that nature can somehow sense the impending arrival of the solar energy that induces aurora and attempts to compensate. A second possibility is that the first solar energy to arrive may enhance rather than obliterate northern latitude reception. In any case, this is a question for scientists to answer.

Since this is an article about aurora DX, it is only fitting that the reception conditions present during an aurora be discussed. In order to do this I will use as an example what we in Chicago use as the yardstick to measure auroras, the one that took place on September 16, 1974... THE GREAT AURORA OF THE 16TH. Everybody in CADX who was DXing that morning received in the range of 15 new stations. Tales and accounts of this great opening, disseminated to DXers not in the hobby at the time, causes their eyes to open wide and say such intellectual phrases as... wow! The morning was completely dominated by the deep south. Nearly every frequency, even the graveyards, had incredible loggings. The morning was so spectacular that the bottle of Coke I had opened at 11 PM was still 3/4 full at 3 AM (to coin the CADX phrase "A one Coke morning" to describe a good DX session). There was just too much in to keep up with (I gave up logging the new stations by midnight & just scribbled down reception details for logging later). Some examples of what was heard: 1230 was being dominated by WWVY Pensacola, Florida & WHPH Huntsville, Alabama. Other GY channels produced Florence, Alabama; Springfield, Missouri; Perry, Florida; Jacksonville, Florida; Many, Louisiana; Houston, Texas; Greensboro, North Carolina; & Kingsport, Tennessee.... And there was no interference. Sunrise skip was also unbelievable with 250 watt WSST-800 Largo, Florida dominating its frequency. Another very unusual logging, WPUL-1130 Bartow, Florida, was made on a frequency normally cluttered by high powered stations. What caused this morning to be so great was the combination of a moderate aurora (A index around 50) with a Monday morning and the sensational southern conditions that prevailed throughout the 1974-75 DX season (even when conditions weren't auroral there was good DX to the south). Thus the Great Aurora of the 16th combined the 2 ingredients necessary to produce a sensational aurora opening: an aurora of moderate-major levels and great skywave reception to the south.

The above example of great aurora shows one important thing about aurora DX, don't ignore the GY channels. While not all auroras will produce good GY channel DX, some will. In fact, some will provide sensational loggings, as with the Great Aurora of the 16th. Here in Chicago we frequently get the Carolinas, Florida, Georgia, Alabama, Mississippi, Louisiana, Kentucky & Tennessee GYers during aurora. Sometimes they will be in for only brief stretches, as many times southern skywave will last for only a short time. Most will be nowhere as spectacular as the Great Aurora of the 16th, but if you are there at the right time you may get something good. The biggest hinderance to good GY aurora DX is interference from groundwave signals. I have found, over the years, that groundwave reception seems to be improved by aurora. Sometimes stations you rarely hear will be in on aurora. This improved aurora groundwave seems to particularly effect the GY channels. In Chicago, stations such as WJSM & WRJN, both on 1400, make the channel unusable for DX (both of the stations are received via groundwave during the daytime & during aurora seem to be about as strong on nightpower as in the daytime).

As is my custom, I will close this article with some aurora DX pointers:

1. Regularly consult WWV for current propagation conditions. When aurora is present, check every 3 hours for the current K index.
2. Don't always assume that an aurora will occur when one is forecast. Often the forecasts prove to be inaccurate.
3. When DXing aurora try to determine reception patterns in your area, such as the 5 types I discussed for the Chicago Area. This will help you log new stations when future auroras develop.
4. Not all auroras are good. If there is no skywave to the south there will be no DX.
5. Keep an eye out for unusual type reception to the north of your location during an aurora. Sometimes Marshall Effect type loggings will occur.
6. DX the graveyard channels. Many times they are great.
7. Aurora DX often goes up and down in quality during an opening. For this reason it is important to keep tuning around looking for DX. Sometimes dead conditions one hour will be very productive the next.

8. Aurora many times will improve groundwave. While this can create interference, & increased slop from locals, it can also provide an opportunity to log real close stations that may have been top interference laden in the past. I once got very rare WKKM-1150 Rockford, Illinois via aurora groundwave S9+40. WKKM had only been heard twice before in 10 years.

DX Monitor

Devoted Exclusively to
Broadcast Band DXing

