NEWCOMERS FORUM

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I mentioned Sporadic-E last month and the DX that can be worked via this mode. Another 'DX-getting' mode is that obtained by auroral reflection.

If you haven't yet heard an aurora in full swing then you are missing something. It's not something you can mistake for any other propagation mode because of the characteristic sound that Aurora puts on the signals. CW takes on a familiar 'raspy' note, that sounds as if the other station's transmitter has gone haywire. So much so that the 'T' part of the RST report (representing the tone quality of the CW note) is abandoned, and an A (for Auroral) substituted instead. A typical report would be 57A.

On SSB, signals are rather disconcerting to copy as they are extremely rough — so much so that I always start clearing my throat when listening to them! It is generally agreed that CW is the better mode under these conditions, and you will certainly work the best DX using it. This isn't a case of CW for the sake of it — auroral SSB is difficult to copy at weak signal levels.

QSOs during aurora are usually short — just signal reports, QTH locators and maybe names, so that as many contacts as possible can be made while the aurora lasts.

Mechanism

Auroral reflection cannot occur until there is something to reflect the radio signals in the first place. The cause of the event is the release of large amounts of energy from the Sun in the form of a solar flare. The immediate result of this is often a sudden fade-out (Dellinger fade) on the HF bands, causing a sudden loss of communication. This does not always mean that an Aurora will follow, but if the fade-out is followed by a magnetic storm, an aurora is almost certain. Eventually, this radiation from the Sun will cause the formation of an auroral curtain (which may not be visible), and conditions are set for some good DX.

Another indicator is the state of the 3.5 and 7MHz bands. Weak and 'watery' signals are often a sign that things are going to happen.

Once the ionisation curtain has been formed radio signals will be reflected off it at 2m, or even at 70cm. Because the curtain is continually moving and changing, VHF signals will have a form of distortion caused by the path length changing when they arrive at the receiving station — so much so that Doppler shift can be as much as 2kHz at 2 metres. Hence the peculiar sound which aurora produce.

Beam headings

One of the first things you will notice is that the beam heading for maximum signal strength is not the same as for a normal contact. You will often find yourself working others to the West of you when you are beaming NE. Also, unlike other propagation modes, an aurora does not cause polarisation changes, so horizontal polarisation is the best choice.

Signals will peak from somewhere between North and East, at the start of the event, usually going further North as the Aurora progresses (depending on the magnitude of the Aurora the direction may not change much). The best place to start is at 45 degrees, then 'peak up' on the wanted stations, checking every so often that you have the optimum heading.

The beacon sub-band is one of the best places to listen and it will give you some idea of the extent of the event. If you can hear a number of beacons spread over Scandinavia and Germany, then the aurora should be a good one.

Predicting aurora

Besides the fade-out warnings already mentioned, you may find there is a 'warning system' in your locality. Many amateurs have an arrangement whereby a chain of telephone contacts is set up. When one person learns of an Aurora (or Sporadic-E) then he sets the chain in motion. (This is why large numbers of stations suddenly appear out of thin air!)

Rings

The chain should actually be a 'ring' of contacts, with everyone knowing the structure of the ring. The first person to hear an opening telephones his immediate neighbours in the ring, then each of these telephones the next person. Providing everyone answers (phone the next person in the ring if not) then eventually someone will get two calls and the ring is complete.

Timings

Once an aurora has taken place, there is often a repeat event, or repeats, at approximately 27 day intervals, if the activity on the Sun that caused the first event persists (the rotational period of the Sun is 27 days). You can therefore keep an 'auroral calendar' which will remind you to look for a repeat event.

Aurora normally occur during the afternoon, late evening, and after midnight. You may get activity at all three times on the same day, with fade-outs in between, or only one. It is worth noting that those that occur after midnight often mean there will be a much larger event the next day, so be prepared. Certainly, if there is an afternoon or evening event which then stops, don't leave the shack. Keep monitoring, as it is all likely to start happening again in as little as half an hour!

The peak auroral seasons of the year occur at around the equinoxes. Also, there is a peak about two years after Sunspot maximum

The distance of stations contacted/heard under auroral conditions is variable but about 1300km is normal, with a maximum of about 2000km under exceptional circumstances.

Enjoy the next aurora!