Learning about Propagation Patterns

This paper is about 40 – 10m the rest are excluded due to my lack of operating experience.

What I have learned by data analysis of NCDXF beacon monitoring stations (10 to 20m only) receiving data:

- Gray line is not an enhancement with an up-shot of propagation – it is a steady at best and likely worse extension of illumination (which is really an extension of ionization and thus MUF)
- Sunrise gray line is weak compared to sunset gray line extension- (EZC opinion – solar flux is excited at sunset and remains excited sometime for an hour or more until it dissipates. At sunrise it is not pre excited and the build up to operational level is required)
- It takes sunlight illumination of path to have strong signal propagation on these bands
- Where a beacon is received during illumination, in majority of cases, the same beacon will be heard as weaker but with significant presence on 20m during the following dark hours (and in some cases several hours on 10m)
- Of three data histories for beacon monitor stations analyzed K0, IZ and CT- the longest distance consistently received (in nautical miles) was:
    - K0 (Frederick, MD) - 7079 South Africa
    - IZ (Rivarolo Canavese , Italy) - 3187 Kenya
    - CT (Sagres, Portugal) - 3686 Russia

  It is almost as if there is conducting path to favorite beacons for some monitor stations (water, mountains, high building in path of antenna?)
- This means long distance beacons like Australia, New Zealand and Japan were never recorded as heard (the maximum power interval of all NCDXF beacons is 100 wts). The IZ monitoring station is particularly sophisticated with SDR and big vertical antenna. The sound card monitoring program Faros used by all has a 5db resolution (one S unit).
- This suggests to me that the Faros judges a CW signal as noise when in real world it is workable. If this is true, automated processed beacon data only includes the strongest signals and the human ear can process better.

Summary of positioning for DX winter of 2011-12

	Opinion of mostly others
	Opinion of EZC
	Opinion of both

	160	80	40	20-17	15	12-10
Gray line enhancement expectation	high	high	high	Look for	Look for	Look for
Path illumination required for propagation					15-10	12-10
EZC gray line expectation			rare	rare	low	none

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Ranking the tools for cycle 24 DX:

1. <http://dxcluster.ham-radio.ch/> HRD DX spot cluster but you need a way to quickly filter up to 250 spots to just the less than 10- 20 that you are interested in
2. Directional antenna (during the day best propagation moves from AS, EU, AF, SA, OC and back to AS. Particularly rare areas for TN hams is 270 to 15º to take in Pacific and Asia) The advantage of a rotating dipole is that it addresses long and short path simultaneously without you needing know which has the present gain. For the south east USA the short path across the North Pole (NP) is not illuminated for several winter months. The same constraint is there for the South Pole (SP) but due to no entities require signal crossing the SP it does not present a limit to our south east USA region. As the short path across the NP is not illuminated for certain months, Long Path (LP) may produce better signals than short path. See LP indicators below. As LP is longer by definition, this adds to the difficulty of working these entities in the winter months.

	Nov - Jan	Dec	Oct - Feb
No illumination Included angle degrees	339.5º – 21.5º	336.5º – 23.5º	347º -14.8º
Russian Federation (7º)	LP	LP	LP
Hong Kong (339º)		LP	
Sri Lanka (21º)	LP	LP	

3. Awareness of path illumination for particularly 10 – 12m and somewhat for 15m. This requires a table of sunrise- sunset times for world locations which can be obtained from ki4ezc as an example. (when path illumination is required for 10,400 nm then knowing what light conditions are at your home is only a small part of the variables)