2024 Solar Eclipse DXing

DXing the mediumwaves promises to be an exciting event on April 8 during the 2024 total solar eclipse.

I've been mulling over the DX possibilities a lot lately and have come to some conclusions. I think it boils down to three promising DX scenarios.

Scenario 1. For those who live within or very near the path of totality, I believe best chances of DX would be first to listen to your southwest, along the path where totality is approaching. Darkness will already have happened in that direction, and a certain amount of residual de-ionization of the ionosphere will still remain. After the point of totality passes your location, I would swing my attention to the northeast.

Scenario 2. For those living within about 800 km (or about 500 miles) of the path of totality I believe best chance would be a perpendicular path across the totality path to a point roughly equidistant on the other side. This puts the signal reflection point right at the center of the totality path, or the deepest point of darkness.

Scenario 3. For those living more than about 800 km from the path of totality I believe best chance would be along a line from your receiving site to a perpendicular intersection to the totality path. This should define the greatest shaded path.

I think scenarios #1 and #2 have the best possibility for DX.

Across the U.S. and Canada, from its entry at Texas to its exit through NE Canada and into the Atlantic Ocean, the totality path width varies from a maximum of 199 km at U.S. entry to about 160 km at Atlantic exit, or 123 to 99 miles.

Important to keep in mind - skywave signal strength analysis is based almost entirely on the condition of the ionosphere at the reflection point, not at the receiving site. For single hop propagation, normally the reflection point is at the halfway point to the station along the great circle route.

That 800 km distance from the totality center I wouldn't hold as gospel. I'm throwing that figure out as a point where scenario #2 may start to transition to scenario #3.

Timing is of the essence for DXing. The shadow velocity exceeds 1000 mph, increasing from 1587 miles per hour at Eagle Pass, Texas to 3176 mph at Houlton, Maine. You may have only minutes to DX.

I'll be in Rochester, NY at the time of totality, and we are right at dead center. I'll be scenario #1. My plan is to listen to my southwest initially, where totality is approaching. I'll be listening particularly for WLW-800 in Cincinatti, OH, WHAS-840 in Lexington, KY, and others along or near that path.

Scenario #2 possibly holds the most promise. Calculate your distance to the path center line and look for stations on a direct line across the totality path and at an equal distance on the opposite side of the path from you. One such scenario might be WSB-750, Atlanta to a reception point in northwestern Illinois, central Iowa, or southern Wisconsin or southern Minnesota. Many possibilities on cross-paths exist here. I feel best results would be with a signal path that crosses the path of totality closest to 90 degrees.

A question was raised about the possibility of DX from Spokane, Washington, an extreme distance from the path of totality. That particular scenario would be scenario #3, more than 800 km to the path of totality. Maximum obscurity should be when northeast Texas (let's say the Dallas area) is experiencing full totality, as the great circle line to the totality path intersects at approximately 90 degrees to the line at that point. This would be at about 1848 UTC. I would listen for any signals along a great circle path between Spokane to anywhere from the Dallas area and northward.

Obviously, Spokane to Dallas is an extremely long one hop path, at about 2450 km. At that distance, the reflection point is near Denver, which will have a solar obscuration of 65.1 percent at maximum.

A Dallas area reception would be next to impossible I would think, but there are many more stations along that great circle path one could try for. Closer stations will obviously move the reflection point closer and start to reduce the solar obscurity. I did a scan along that path and there are some 340 stations within 200 km either side of the line of the great circle path between Spokane and Dallas.

A presumed Scenario #4.

Another scenario was suggested by Nick Hall-Patch, that of reception parallel to the path of totality and outside the 100% totality band. The 2017 solar eclipse across the northern part of the U.S. was DXed extensively and produced some interesting results. It is well documented. Check their document repository here:

http://dxer.ca/images/stories/2019/irca-reprint-index.pdf

Nick reports: The receptions of KSL-1160 described in the report showed the results of 3 DXers listening across the path of the eclipse (Scenario #1), but the fourth, Dave Aichelman, was monitoring KSL from a location parallel to the eclipse path (Scenario #2) and got very good enhancement as well.

We might name this "Scenario #4".

I checked out that document on the KSL reception from the solar eclipse of 2017. It looks like the Dave Aichelman (at Grants Pass, OR) reception of KSL had a mid-path reflection point of about 95% solar obscurity. The distance was 971 km (602 miles). Graphing KSL, I see it has a nice fat low angle takeoff and impressive skywave strength at 900 km, some 1.3 mV/m for that distance.

Better yet, the article indicated Aichelman also received XEPE-1700 across the Mexican border from San Diego too. That was a mid-point reflection obscurity of only about 83% as far as I can deduct from the maps. The distance was 1238 km (769 miles). The mid-path reflection point there was in the neighborhood of 700 km from the central path of totality.

So, DX is indeed possible where both the station and the receiver are off center from the totality path. It's looking like anything from at least 80% obscurity at mid-path reflection may have some real possibilities, particularly if you are at the end nearest the path of totality. Lower obscurities, perhaps down to 50% or so may even produce results.

Check out these links.

https://nationaleclipse.com/cities_partial.html

https://eclipse.gsfc.nasa.gov/SEpath/SEpath2001/SE2024Apr08Tpath.html

https://eclipse2024.org/eclipse_cities/statemap.html

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Posted by RADIO-TIMETRAVELLER at 9:00 AM