Another Day Without Any Sunspots

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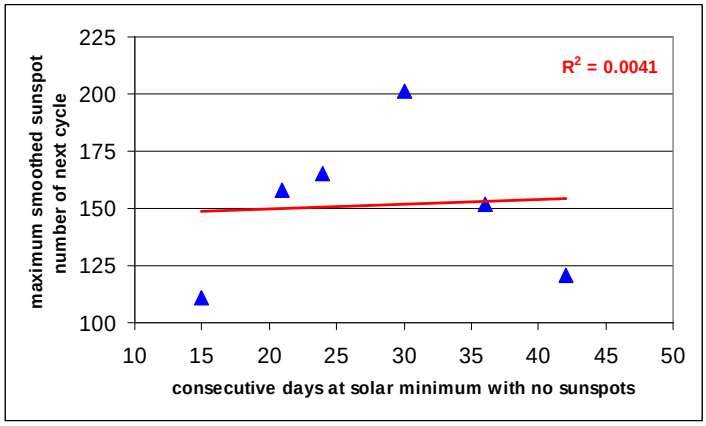
As of Saturday November 3, we have had 27 consecutive days without any sunspots. This latest run started on October 8. Prior to this we had a run of 21 days with no sunspots (September 7 through September 27). Is this unusual to have so many days without any sunspots at solar minimum? Not really. For example, between Cycle 22 and Cycle 23 we had a run of 42 days with no sunspots (September 13, 1996 through October 24, 1996). And does the length of consecutive days with no sunspots tell us anything about the maximum of the next cycle? That's easy to determine by looking at historical data.

Solar minimum between Cycles	Greatest number of consecutive days without any sunspots	Maximum smoothed sunspot number of next cycle
17 and 18	**36** (18Apr1944 – 23May1944)	**152** (Cycle 18)
18 and 19	**30** (31Jun1954 – 2Jul1954)	**201** (Cycle 19)
19 and 20	**15** (15Sep1964 – 29Sep1964)	**111** (Cycle 20)
20 and 21	**24** (8Jul1976 – 31Jul1976)	**165** (Cycle 21)
21 and 22	**21** (23Dec1985 – 12Jan1986)	**158** (Cycle 22)
22 and 23	**42** (13Sep1996 – 24Oct1996)	**121** (Cycle 23)

A quick glance at the data suggests no correlation, as the biggest cycle (Cycle 19) had more consecutive days without any sunspots than three smaller cycles (Cycles 20, 21, and 22). Doing a scatter plot of the number of consecutive days versus the maximum smoothed sunspot number of the next cycle confirms this.



The blue triangles are the six data points, and the red line is a best-fit linear trend line. The R^2 value in the upper right indicates the correlation. A value of 0 is no correlation, and a value of 1 is perfect correlation. The R^2 value of 0.0041 says there is no correlation.

If we haven't had any sunspots for 27 days (and counting), why have we had such good propagation recently on the higher bands (for example, on 15m during CQWW Phone)? There are three reasons for this. First, sunspots (along with 10.7 cm solar flux) are proxies for the true ionizing radiation of the F_2 region (wavelengths of 10 to 100nm) so they don't tell the true story (especially on a day-to-day basis). Second, we're moving into the fall and winter months, and a change in the composition of the upper atmosphere results in higher daytime F_2 region maximum usable frequencies. And third, the day-to-day variability of the F_2 region depends more on geomagnetic field activity and events in the lower atmosphere coupling up to the ionosphere than on small changes in solar radiation. With 15m being borderline good-bad around solar minimum, any geomagnetic field activity and/or traveling ionospheric disturbances could push the maximum usable frequency up enough to give life to 15m on certain "good" days. This appears to be what happened for CQWW Phone (more details on this will be in the January/February issue of The National Contest Journal).