

# The McIntosh Maximum?

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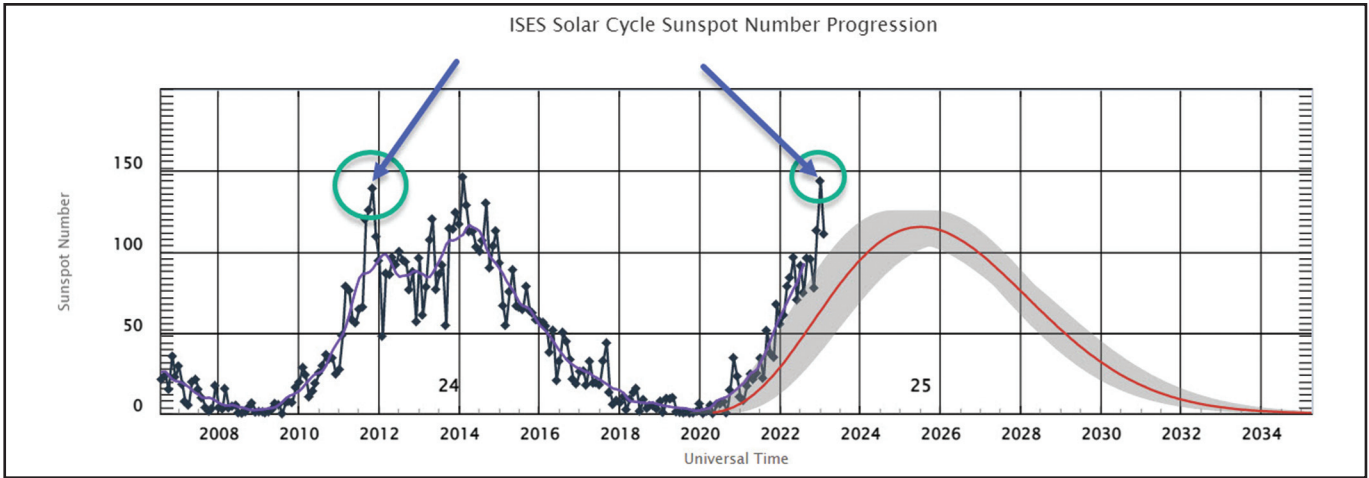


Figure 1. Sunspot numbers so far in Cycle 25 are rising much more quickly and sharply than in Cycle 24, and are way ahead of the “official” prediction. The 10.7-centimeter radio flux readings (page 94) show an even more dramatic increase. (Source: NASA Space Weather Prediction Center)

Many hams who have been around for a few solar cycles, or who have studied ionospheric propagation, are familiar with the Maunder Minimum, a period between 1645 and 1715 during which there were virtually no sunspots and no evidence of solar cycles.<sup>1</sup> Of course, this didn’t have much impact on the primary communication method of the day, which was written correspondence carried on horseback (plus the occasional carrier pigeon).

Today, of course, solar activity and its impact on our planet and ionosphere are much more important for everything from our electric grid to our ever-growing network of communication satellites. For hams, the solar cycle’s impact on ionospheric propagation is of major interest, so it was not good news when the Solar Cycle 25 Prediction Panel (SC25PP), a NASA/NOAA co-chaired international group of space science experts, predicted in 2019 that Cycle 25 would be very similar to the just-concluded Cycle 24 – the weakest in most of our memories.<sup>2</sup>

There was one outlier among the pessimists – an international team led by Dr. Scott McIntosh of the National Center for Atmospheric Research in Boulder, Colorado. Dr. McIntosh and his fellow researchers developed a theory that there is a “terminator event” at the end of each 22-year solar cycle (the Sun’s magnetic field flips during the

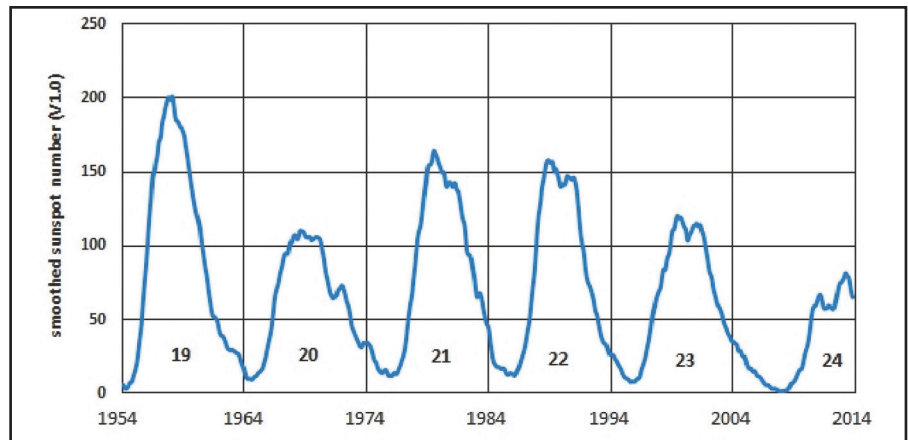


Figure 2. The rise in Cycle 25 seen in Figure 1 looks much more like the strong Cycles 21 and 22 of the 1980s and early ’90s than the weaker and more recent Cycles 23 and 24. Dr. McIntosh predicts that the current cycle could even compare with the “once in a lifetime” conditions enjoyed in Cycle 19. (Source: *The CQ Shortwave Propagation Handbook*, 4<sup>th</sup> edition, p. 2-7)

start of each new 11-year cycle, but it takes roughly 22 years to return to the starting point), and that this terminator event says a lot about the magnitude of the coming cycle.

Their conclusion: “Our method predicts that SC25 *could* be among the strongest sunspot cycles ever observed ... and it is highly likely that it will certainly be stronger than present SC24 (sunspot number of 116) and most likely stronger than the previous SC23 (sunspot number of 180). This is in stark

contrast to the consensus of the SC25PP, sunspot number maximum between 95 and 130, *i.e.*, similar to that of SC24.”<sup>3</sup>

We are now roughly two-and-a-half years into Cycle 25 and all indications so far are that Dr. McIntosh’s team is much closer to the mark than the “official” panel of experts. If you look at Figure 1 (borrowed from this month’s Propagation column), you will see that the actual number of sunspots has risen much more sharply than predicted and

has already exceeded the first peak of Cycle 24, with about two years still to go on the upward portion of the cycle. The rise is even more dramatic in the 10.7-centimeter radio flux graph on page 94.

If you compare the rise of Cycle 25 in Figure 1 to the previous cycles shown in Figure 2, you'll see that it looks much more like the climbing phases of Cycles 21 and 22 in the 1980s and early '90s than the more recent (and much weaker) Cycles 23 and 24. Dr. McIntosh and his team believe the current cycle could even rival Cycle 19 in the late 1950s, which so far has set the benchmark for a super-strong solar cycle. On-air experience suggests that he could be right, with the high HF bands hopping with worldwide DX after many years in the doldrums, and F<sup>2</sup> propagation even extending to 6 meters and allowing intercontinental DX there as well.

During the long solar minimum between Cycles 24 and 25 (roughly three years), and with the pessimistic SC25PP prediction, some hams wondered whether we were entering into another Maunder Minimum. The reality, however, is that we might instead be heading to a McIntosh Maximum. Here's hoping!

## In This Issue

Our focus in this issue is on DXing and contesting, with three stories related to the 3Y0J DXpedition to Bouvet Island in the far South Atlantic, plus the CW results of the 2022 CQ World Wide DX Contest. Finally, Propagation Editor NW7US discusses (p. 87) another aspect of this very active sunspot cycle – solar flare-induced auroras visible much farther south than usual, and their impact on propagation.

Enjoy the spring weather and, if you're going, the Dayton Hamvention (we hope to return next year).

73, Rich W2VU

### Notes:

1. Leutzelschwab, et. al., *The CQ Shortwave Propagation Handbook*, 4<sup>th</sup> edition, p. 2-7, CQ Communications, Inc., 2021. The Maunder Minimum was named for Walter Maunder, who first described the phenomenon, based on historical data, in the 1890s.

2. NOAA/NASA Solar Cycle 25 Forecast Up-date, 12/9/2019 <<https://tinyurl.com/yntph8uz>>

3. McIntosh, S.W., Chapman, S., Leamon, R.J. *et al.*, Overlapping Magnetic Activity Cycles and the Sunspot Number: Forecasting Sunspot Cycle 25 Amplitude. *Sol Phys* **295**, 163 (2020). <<https://doi.org/10.1007/s11207-020-01723-y>>