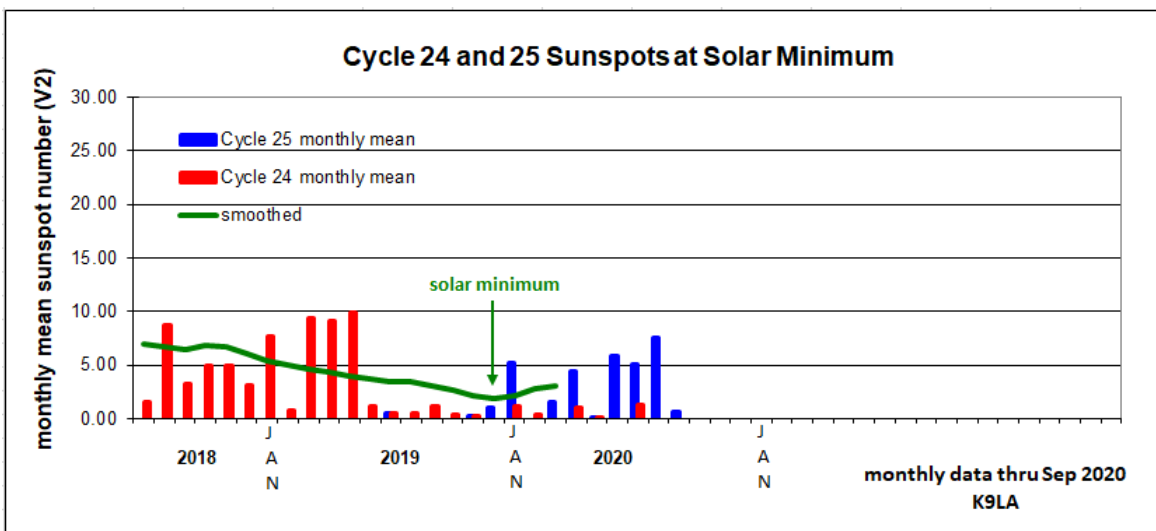


More on Solar Minimum Terminology  
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On September 15, 2020, NASA and NOAA announced that Solar Cycle 25 is officially underway. They based that on the fact that the smoothed sunspot number fell to 1.8 in December 2019 – the lowest value in our current solar minimum period. January 2020 and onward have given higher smoothed sunspot numbers. They also noted that the smoothed sunspot number minimizing in December 2019 brought Solar Cycle 24 to an end, and heralded the new Solar Cycle 25.

In my humble opinion, the last sentence of the previous paragraph is somewhat confusing. Take a look at the following plot of monthly mean sunspot numbers from Cycle 24 and Cycle 25, and the resulting smoothed sunspot numbers including both Cycle 24 and Cycle 25 sunspots.



It's easy to see that the smoothed sunspot number minimized in December 2019 as NASA and NOAA announced. But we still had some Cycle 24 sunspots out to July 2020. So did Cycle 24 really end in December 2019? It sure doesn't look like it did.

On the flip side, we had Cycle 25 sunspots in July 2019, six months before December 2019. The July 2019 sunspots were the first 'official' sunspots of Cycle 25 – they were big enough and lasted long enough to be assigned an Active Region number. But we even had some earlier Cycle 25 sunspots (November 19, 2018, for example), but they weren't big enough nor did they last long enough to be assigned an Active Region number. Thus they don't show up in the data. But they happened, and they challenge the December 2019 starting date of Cycle 25.

All of this confusion comes from the fact that historically the indication of solar minimum (which also defined the end of the old cycle and the start of the new cycle) has been the month and year when the smoothed sunspot number numerically minimizes.

The August 2020 column reviewed the predictions for Cycle 25. Of note was the prediction by McIntosh, et al. They based their prediction of Cycle 25 on the end of the magnetic cycles within

the Sun. I think this has the potential of better defining a solar cycle – in other words, when sunspots from the old cycle end and sunspots from the new cycle begin.. For example, McIntosh, et al, defined the end of the magnetic cycle for Cycle 23 to be January 2011. This makes sense as the last ‘official’ sunspot for Cycle 23 was in April 2009. It very well could be that there were small and short duration sunspots (that weren’t counted because they weren’t assigned an Active Region number) that occurred after April 2009 but before January 2011.

Unfortunately there appears to be a discrepancy with their prediction for the end of the magnetic cycle for Cycle 24. It was predicted to be April 2020, but the last ‘official’ sunspot for Cycle 24 was in July 2020. It seems to me that their prediction for the end of the magnetic cycle of Cycle 24 is too early – which would then reduce the magnitude of their prediction for Cycle 25.

The bottom line here is that we need to better define a parameter that gives the actual start and end of a solar cycle in terms of sunspots being produced – regardless of their size and duration. I just don’t think solar minimum, using the month/year when the smoothed sunspot number minimizes, is the correct point in time. Sunspots from the old cycle can occur after this definition of solar minimum and sunspots from the new cycle can occur before this definition.

A final note – September 2020 had some Cycle 25 sunspots, but nothing like the previous months. This shouldn’t be a concern, as this was seen in the solar minimum period between Cycles 23 and 24. But if the number of Cycle 25 sunspots stays at a low level, we may have to re-think what’s going on.