I would like to start with a bit of information on how the solar cycles work, the first solar cycle is approximately 11 years. The cycle changes when solar flares go from the weakest part of the cycle through the strongest and back to the weakest again. This is also when the magnetic poles swop positions, north becomes south and vis versa. The reason we say approximately 11 years is because it starts and ends at the at the weakest occurrence of solar flares. The longer Solar cycle is 22 years and the cycle changes when the sun switches it polar polarity back to its original position.

the number of sunspots observed on the "surface" of the Sun varies from year to year. This rise and fall in sunspot counts varies in a cyclical way; the length of the cycle is around eleven years on average. The cyclical variation in sunspot counts, discovered in 1843 by the amateur German astronomer Samuel Heinrich Schwabe, is called "the Sunspot Cycle".

The Sun is typically very active when sunspot counts are high. Sunspots are indicators of disturbances in the Sun's magnetic field, which can generate energetic solar events like solar flares and coronal mass ejections. Since reasonably reliable records of sunspot counts extend back to the early 1700s, long before other measures of solar activity could be observed, sunspot counts serve as a valuable, relatively long-term indicator of solar activity. The Sun emits significantly more radiation than usual in the X-ray and ultraviolet portions of the electromagnetic spectrum during solar max, and this extra energy significantly alters the uppermost layers of Earth's atmosphere.

You might be asking why this is important for armature radio communications. As electromagnetic waves, and in this case, radio signals travel, they interact with objects and the media in which they travel. As they do this the radio signals can be reflected, refracted or diffracted. These interactions cause the radio signals to change direction, and to reach areas which would not be possible if the radio signals travelled in a direct line.

The condition of the Sun has a major impact on ionospheric radio propagation. Accordingly, it affects a variety of forms of HF radio communications including two-way radio communications, maritime mobile radio communications, general mobile radio communications using the HF bands, point to point radio communications, radio broadcasting and amateur radio communications.

As the Sun provides the radiation that governs the state of the ionosphere and hence HF radio propagation, any flares or other disturbances are of great importance. Under some circumstances these can enhance radio communications and the HF radio propagation conditions. Under other circumstances they can disrupt radio communications on the HF bands, while at the same time providing some radio propagation conditions that can be used at VHF by radio amateurs.

We are currently in cycle 25, Cycle 25 started in September of 2020. I looked forward to finding out what the professionals had to say about what to expect from cycle 25, I’m hoping to get a bit of help from solar flares as I work towards my DXCC. However, the forecast(s) are almost as hard to understand as the timing of the cycles.

A board made up of scientist from the National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) have been providing solar forecast for years, and are predicting a cycle similar to cycle 24, very mild. Cycle 25 may get off to a slow start but is anticipated to peak between 2023 and 2026 with a sunspot range of 95 to 130. This is well below the typical average of 140 to 220 sunspots per solar cycle. But scientists led by the National Center for Atmospheric Research (NCAR) disagree. They announced on December 7, 2020, their prediction that Solar Cycle 25 will be one of the strongest on record.

In a new article published November 24, 2020, in the peer-reviewed journal Solar Physics, the research team predicts that Sunspot Cycle 25 will peak with a maximum sunspot number somewhere between approximately 210 and 260, which would put the new cycle in the company of the top few ever observed.

In the end, we’ll see whose prediction is correct. In my mind, I lean towards the old standard, NOAA and NASA, but I have to route for NCAR. Either way it looks like the cycles will peak somewhere between 2023 and 2026. I’m still hoping to get some good DXing in this year.

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