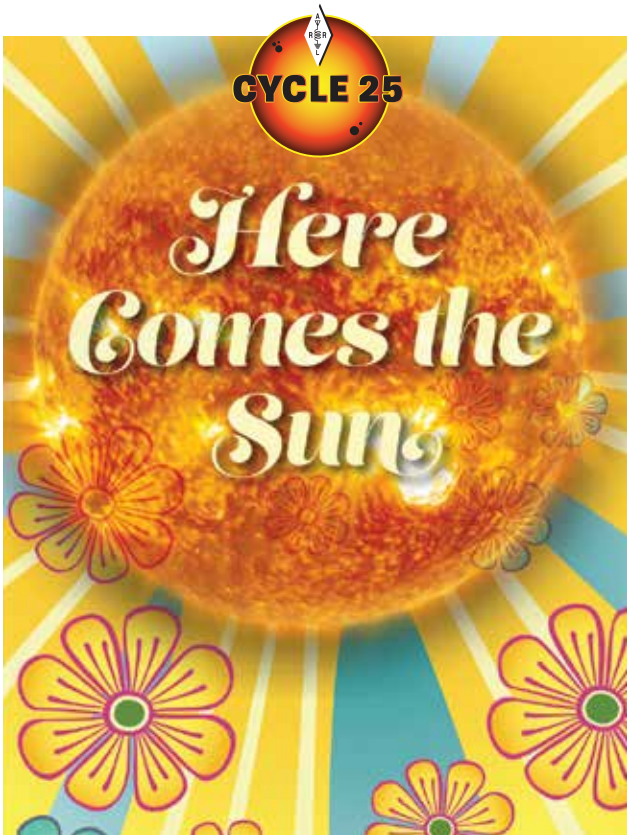
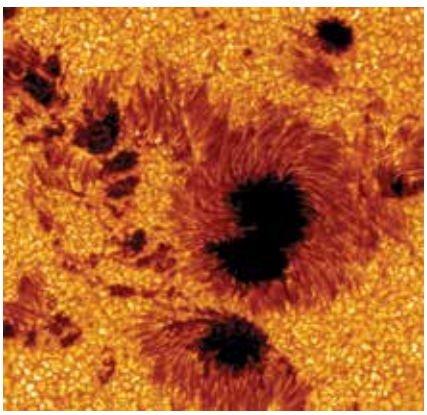


With all due respect to the Beatles song of the same title, our nearest star really *is* on the rise — and not just above your nearest horizon.

Many years ago, curious people noticed that our sun's activity seemed to wax and wane in cycles that lasted about 11 years. They also noticed that when the sun was experiencing years of high activity, *sunspots* became more numerous. These are dark areas on the sun's surface that scientists later determined are caused by magnetic fields rising from below the sun's surface.

It wasn't until the 20th century that scientists began assigning numbers to these cycles, and they extended this numbering system well into the past. They spoke of cycle peaks as *solar maximums* and cycle troughs as *solar minimums*.



Dark areas on the sun's surface are known as *sunspots*. When the sun becomes more active, the number of sunspots tends to increase.

In late 2019, solar scientists agreed that we had reached the deepest part of the Cycle 24 trough. New and somewhat different sunspots were appearing — spots that had all the signs that a new cycle had begun: Cycle 25.

Happy Days are Here Again

Why do hams care so much about solar cycles? (And, yes, we're borrowing from another classic song.) The answer starts about 30 miles above your head.

At the upper reaches of our atmosphere, you find the *ionosphere*, an electrically charged region that is responsible for bending radio signals and sending them to far-flung locations on the Earth below. Thanks to the ionosphere, hams can launch signals from their homes and have reasonable confidence that those signals will be heard hundreds or even thousands of miles away. Without the ionosphere, ham radio would be much less enjoyable!

But the *electron density* — the concentration of electrons in that region of the atmosphere — tends to fluctuate. When solar activity increases, the ionosphere becomes home to many more electrons, and it more readily bends radio signals back to Earth, particularly signals in a range between about 1 and 50 MHz. Long-distance communication (which hams refer to as *DX*) becomes much easier to achieve.

On the other hand, when solar activity decreases, the ionosphere becomes less electron dense and less able to bend signals. As a result, DX communication becomes more challenging and less common.

At solar minimums, such as the one we recently experienced, conditions on the HF bands can often be mediocre. Hams usually head for lower frequencies, where even a diminished ionosphere is still effective. For those who remain on the higher HF frequencies, the DX pickings can be slim.

That's why hams are so obsessed with solar cycles. The end of Cycle 24 was long and deep, and hams have been waiting for what seems like forever for the start of Cycle 25. To everyone's immense relief, the new cycle is here at last, and it promises interesting times to come for all amateurs, regardless of license class.

What Lies Ahead?

Unfortunately, solar forecasts aren't anywhere near as accurate as those provided by earthbound meteorologists. Scientists still don't know why solar activity runs in 11-year cycles, nor can they accurately predict what a new cycle may bring. Pessimistic forecasts predict Cycle 25 to be very much like Cycle 24 — in other words, rather mediocre, but with reasonably good DX conditions around the peak in the years 2025 and 2026. Optimistic forecasts call for a highly active cycle. They believe it will be like Cycle 23, which peaked in 2000 and 2001.

Let's take the middle path and anticipate the behavior of Cycle 25 falling somewhere between Cycles 23 and 24. What will this mean for you?

More Long-Range Conversations

As we move into the early years of this decade, you'll notice that the 20-meter band will start remaining open well after sundown. This behavior on the "Queen of the DX Bands" will become pronounced by 2025, and you're likely to see episodes of 20 meters remaining open all night for long-range contacts. The 30-meter band will probably do the same.

Activity on 17 and 15 meters will begin to increase as these bands open for longer stretches of time during the day. As with 20 meters, 17 and 15 meters will likely remain open for a few hours after sunset.

Twelve and 10 meters will open almost every day. During the peak years, watch for 6 meters to occasionally become a long-range band as well. And don't forget *sporadic E* propagation on 6 meters, especially during the summer months, for long-range contacts. This mode of propagation is independent of the solar cycle.

Fun Times with QRP and Mobiles

With a more effective ionosphere in play, it becomes much easier to make contacts with low power and smaller antennas. QRP (low power) enthusiasts — hams who use 5 W output or less — will benefit from the improved conditions to come. QRP has long been popular because the radios are simpler (especially kit radios) and, at such a low output levels, their signals are far less likely to cause interference. Even at the bottom of Cycle 24, we saw the blossoming of activities such as Parks on the Air (POTA) and Summits on the Air (SOTA), with hams taking transceivers into the great outdoors. As it becomes easier to make QRP contacts, look for these activities to increase considerably.

HF mobile activity slumped with the decline of Cycle 24 because poor conditions made it more difficult to enjoy operating from a vehicle. Even with 100 W transceivers, mobile antennas are sub-optimal at best, and this handicap becomes more burdensome when the sun refuses to cooperate. But with the rise of Cycle 25, look for more HF mobile activity to accompany the improving conditions. By the time we approach the peak, mobile signals will become more common, especially on the upper HF bands where their antennas are more efficient and effective.

Preparing for Cycle 25

If you are a Technician licensee, 10 meters is going to become your "money band," especially as we near the cycle's peak. With that in mind, it would be wise to invest in a radio that has 10-meter capability and a 10-meter directional antenna, such as a small Moxon design, to go along with it.

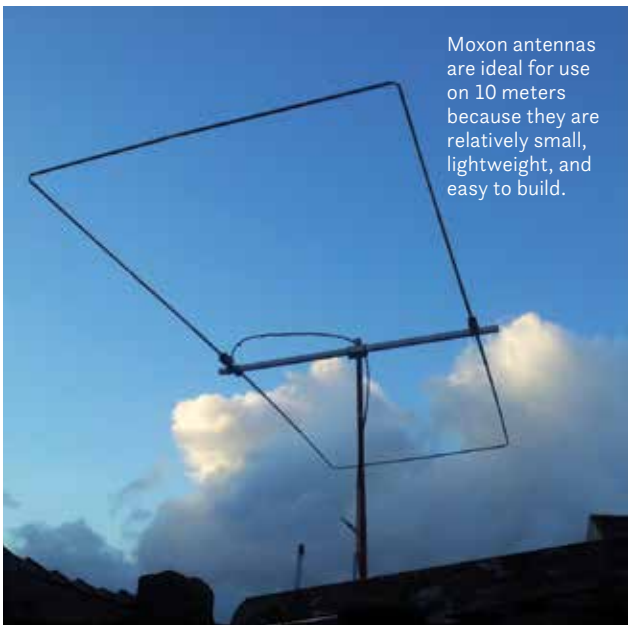
Most of the 10-meter activity you'll encounter will be on SSB voice, although you will also see a major boost in digital communication, mostly likely with the FT8 mode. During contests and similar activities, watch for CW at the low end of the band as well.

James McDowell, K8AK, set up his portable HF station in a state park. As conditions improve on the HF bands, look for more amateurs to take their gear outdoors for activities such as Parks on the Air and Summits on the Air. [Norm Fusaro, W3IZ, photo]

If your HF interests lie beyond 10 meters, this would be a good time to consider upgrading your license to General or Amateur Extra. These licenses will give you access to many more HF frequencies and communication modes.

If you intend to upgrade, explore antennas for 30 through 12 meters — either single or multiband designs. When solar activity is high, you won't need large, elaborate antennas to get in on the action. Of course, you will need an HF transceiver to go along with your antenna! See the article, "Buying Your First HF Radio" in this issue.

Better days are on the way; it is only a question of *how much* better. As the saying goes, a rising tide lifts all boats, meaning that all hams will benefit, regardless of your license class.



Moxon antennas are ideal for use on 10 meters because they are relatively small, lightweight, and easy to build.