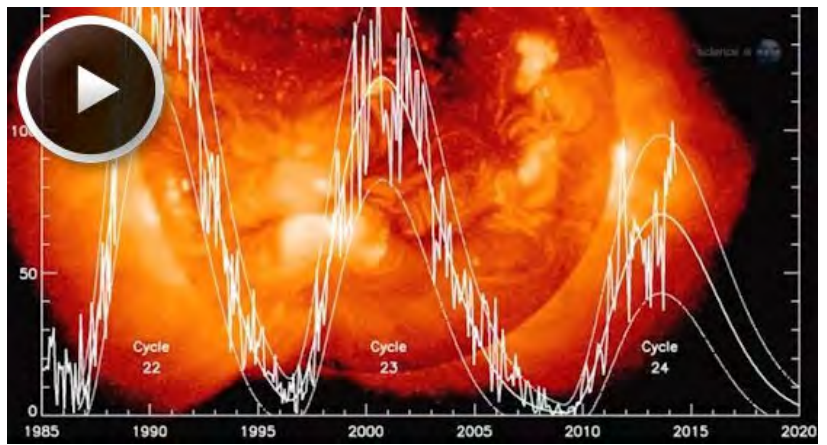


A SOLAR MINI-MAX

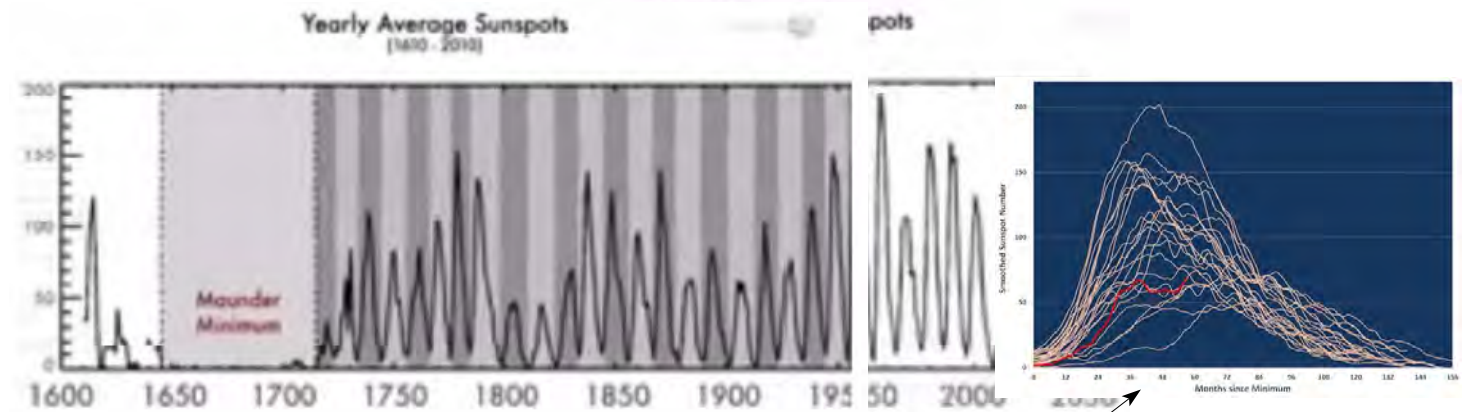
Years ago, in 2008 and 2009 an eerie quiet descended on the sun. Sunspot counts dropped to historically-low levels and solar flares ceased altogether. As the longest and deepest solar minimum in a century unfolded, bored solar physicists wondered whether "Solar Max" would ever return.

They can stop wondering, it is back!

At the NOAA/NASA Solar Cycle Prediction Panel, a blue-ribbon group of solar physicists meet from time to time to forecast future solar cycles. It's not as easy as it sounds. Although textbooks call it the "11-year solar cycle," the actual cycle can take anywhere from 9 to 14 years to complete. Some Solar Maxes are strong, others weak, and, sometimes, as happened for nearly 70 years in the 17th century, the solar cycle can vanish altogether.



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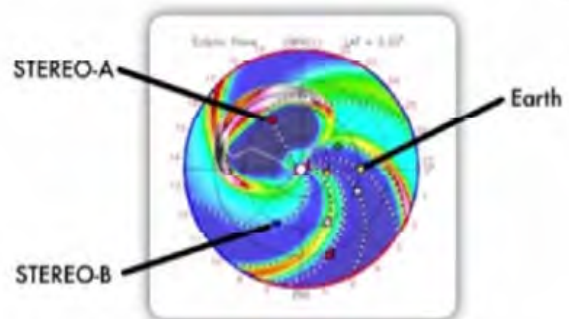


A number of factors signal Solar Max conditions in 2014: The sun's magnetic field has flipped; we are starting to see the development of long coronal holes and sunspot counts are cresting. Although it is not very impressive, Solar Maximum is here. The sunspot number for Solar Cycle 24 is near its peak right now. This solar cycle continues to rank among the weakest on record. To illustrate the point, plotting the smoothed sunspot number of Cycle 24 vs. the previous 23 cycles since 1755, there are only a few Solar Maxima weaker than this one.

As a result, many researchers have started calling the ongoing peak a "Mini-Max."

It is suspected that Solar Cycle 24, such as it is, will probably start fading by 2015. Ironically, that is when some of the bigger flares and magnetic storms could occur. Analysed historical records of solar activity show that most large events such as strong flares and significant geomagnetic storms typically occur in the declining phase of solar cycles—even weak ones.

Indeed, this "Mini-Max" has already unleashed one of the strongest storms in recorded history. **On July 23, 2012, a plasma cloud or "CME" rocketed away from the sun as fast as 3000 km/s**, more than four times faster than a typical eruption. The storm tore through Earth orbit, but fortunately Earth wasn't there. Instead it hit NASA's STEREO-A spacecraft, which recorded the event for analysis. **Researchers now believe the eruption was as significant as the iconic Carrington Event of 1859**—a solar storm that set telegraph offices on fire and sparked Northern Lights as far south as Hawaii. If the 2012 "superstorm" had hit Earth, the damage to power grids and satellites would have been significant.



It all adds up to one thing: The Sun is far from predictable. Even a "Mini-Max" can stir up major space weather—and we can expect more to come as the cycle declines.