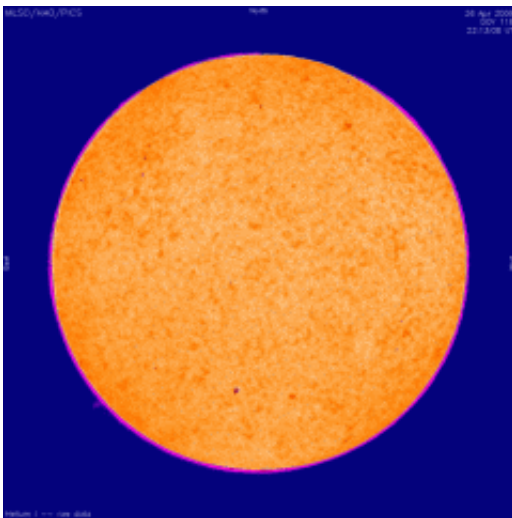


Our Sun: A Little Slow On the Uptake for Cycle 24

April 27 2009, by Mary Anne Simpson



Current Image of Sun-April 26, 2009. Via: Mauna Loa Solar Observatory

A very recent article carried by the BBC called, 'Quiet Sun Baffling Astronomers' sent me in a twitter of research activity. The BBC article's head notes include "The Sun is the Dimmest It Has Been for Nearly A Century" and a suggestion we could be possibly looking at another Maunder Minimum which occurred in the mid-seventeenth century and lasted some 70-years which some believe led to a mini ice age causing havoc throughout North America and Europe.

In fact, according to the Hinode (Solar-B) project and the High Altitude Observatory in Boulder, Colorado and other experts on the Sun, Solar

Cycle 24 is beginning slowly. Current thinking aided by sophisticated equipment suggest more precise information is needed to connect the Mini Ice Age to low sunspot activity. Some definitions and background are necessary for a full understanding of the propositions advanced.

Sunspot Cycles:

A sunspot is visible from Earth without the aid of a [telescope](#) and is identified as a dark spot on the Sun's surface. It is a dark spot because it is cooler than the rest of the Sun, with a temperature running 4,000 K compared to the rest of the Sun's surface material which runs over 5,800 K. The brightness factor of sunspots compared to the rest of the Sun's surface is relative. A sunspot if excised from the Sun would shine as bright as the Moon. The Sunspot is noted for intense magnetic activity which inhibits convection and results in the reduced temperature.

Sunspot Cycles recordings were first made by Chinese astronomers in 800 B.C. Early mystics and astrologers kept track of Sunspots because it was believed the activity of the Sun foretold important events. Soon after the telescope was discovered in the 1600s scientists were able to observe and record the Sun's 27-day rotation, but there were mixed theories on the spots on the Sun's surface. Some thought the spots were dark clouds in the atmosphere of the Sun while others thought the spots represented undiscovered planets crossing the Sun's surface.

German astronomer Samuel Schwabe discovered the increase and decrease of yearly sunspot counts in 1843 and guessed the cycle length to be around 10-years. His work was enhanced by French physicists Foucault and Fizeau and they captured the first photographs of the Sun and sunspots in 1845. Their work was followed by the discovery in 1852 that the period of the sunspot cycle coincided with a period of geomagnetic activity on Earth. The Sun-Earth connection was made and the founding of space weather science debuted.

The period of 1645 to 1715 called the Maunder Minimum is noted for a period where there were very few sunspots and a corresponding bitter cold Winters in Europe and North American. This period on Earth is known as the Little Ice Age. Parenthetically, drawing a direct cause and effect relationship between the two events is the subject of heated debate among scientists. The Medieval Maximum period occurred in 1100 to 1250 marked by unusually warm temperatures on Earth and a very high level of solar activity and sunspots. The Dalton Minimum occurred in the 1800s and is noted for fairly low sunspot activity and cooler temperatures on Earth. Since 1900, with the exception of very recent history, scientists have called the relatively high sunspot count a period called the Modern Maximum.

Current Thinking:

Cooperation between NASA, EESA, The Royal Swedish Academy of Sciences, HAO, The Max Planck Institute for Solar System Research, Hinode (Solar-B). IAC and counterparts around the globe have demystified and almost laid to rest previously advanced ideas about the Sun-Earth link and sunspots.

Dr. Peter Gilman's, the recipient of the prestigious Hale Prize from the American Astronomical Society has spent four-decades researching the Sun's different rotation discovered what is known as the Butterflydiagrams. This pattern was developed by plotting the sunspots from the Sun's poles towards its equator during what is considered presently to be the 11-year solar cycle. His collaborative work with Mausumi Dikpati intends to produce a unified theory of the solar cycle and elaborate on his 'active longitudes' work where magnetic fields are strong and sunspots recur over time.

Other work concludes that during peak sunspot solar cycles a great bundle of plasma escapes from the Sun. This coronal mass ejection.

(CME) accelerates through the corona quickly. If it is pointed at the Earth, the CME will irradiate everything in its path, disrupt radio signals, interrupt circuitries in satellites, knock out power grids on Earth and generally create a beautiful disruptive high-altitude auroras.

Most experts in the Solar-Earth and Space Weather field agree with HAO, Boulder's scientists finding in 2004 that more work needs to be done to show a direct correlation between historical data of the various epic low sunspots or high sunspot periods and Earth's Little Ice Age or Medieval Maximum. It could be a combination of a cold snap and warming trend on Earth in combination with the dormant or active sunspot activity. Research is on going.

BBC's Confusion Over Low Sunspot Period and Global Dimming:

A period of low activity in sunspots on the Sun's surface is not the same as the theory of Global Dimming or the dimming of the Sun. The English Scientist Gerry Stanhill discovered while working in Israel a marked decrease in the amount of sunlight reaching the Earth's surface. In the USA, a 10-percent decrease, the former Soviet Union, nearly 30-percent and globally a decrease in sunlight reaching Earth. The mainstream opinion on the cause of Global Dimming is the increased presence in the atmosphere of particulate matter and aerosols from burning fossil fuels and other human activity. In the Global Dimming scenario, the polluted matter acts like a mirror reflecting back into the space the Sun's rays. The effect on Earth is drought, crop damage and potentially harm to human health.

In Conclusion:

Strong evidence points to a connection between weather on Earth and activity on the Sun. The Hinode (Solar-B) satellite was launched in 2006 from Japan carrying three different telescopes on board and was placed

on a heliosynchronous orbit that allows it to track the solar disc and perform detailed observations. Tracking the sunspot cycles began in the early 1700s with what is called Cycle 1. According to the latest from Hinode (Solar-B) log, the current "Cycle 24 is Beginning Slowly". They reference Cycle 23 which peaked in 2001 and while shorter in duration than most, showed some of the largest Sun flares ever recorded. Some are predicting Cycle 24 is going to be a Hot Tamale (at its peak) when it kicks into gear sometime in 2009 or 2010.

For More Info:

Hinode Solar-B; solarb.msfc.nasa.gov/

Predicting the Strength of [solar cycle](#) 24 using a flux transport;
192.211.16.13/z/zita/articles/Dik06GRLMar.pdf

HAO, Boulder Colorado; www.hao.ucar.edu

BBC Article; news.bbc.co.uk/2/hi/science/nature/8008473.stm

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