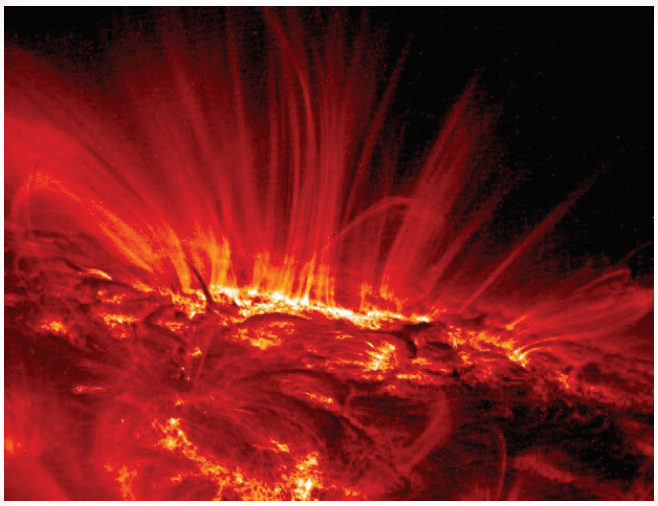
THE
ATMOSPHERIC RESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

Our Sun Has Spots

By Mark D. Schneider

Is there actually weather above our earth's troposphere that concerns us? Yes. In fact, the US Department of Commerce National Oceanic and Atmospheric Administration (NOAA) has a separate division called the Space Weather Prediction Center (SWPC) that monitors the weather in space. Space weather focuses on our sun and its' cycles of solar activity. Back in April of 2007, the SWPC made a prediction that the next active sunspot or solar cycle would begin in March of this year. Their prediction was on the mark, Solar Cycle 24 began in January and is forecast to peak in October of 2011.



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Solar cycles are characterized by increased sunspot activity and generally have an 11-year lifespan. This 11-year sunspot cycle is referred to as the Schwabe cycle, named after Heinrich Schwabe, who made the astronomical discovery in 1843. Sunspots are dark regions of the sun that are actually cooler than the surrounding surface. They are usually found in pairs with opposing magnetic fields. These magnetic fields cause giant blasts of plasma, called solar flares, to travel through the solar system, sending waves of x-rays and geomagnetic storms toward the earth.

A positive effect of these geomagnetic storms is an increase in Aurora Borealis light shows. If you haven't seen the northern lights for a while, you're not alone. The end of Solar Cycle 23 and a minimum of sunspot activity likely took place late last year. Now that a new 11-year sunspot cycle has started, there should be more frequent opportunities to see the northern lights in our state over the next few years.

The negative impacts of increased geomagnetic storms include disruption to power grids, military and aviation communications, Global Positioning System signals, cell phones, and even ATM transactions. Historical disruptions to humans by the sun include interruptions in electrical telegraph service in 1859 and a 1989 power grid failure that brought a blackout to six million Canadians.

There might be a correlation between sunspots and climate. During the mid 1600s to early 1700s the sun went through a period of sunspot minima and decreased activity called The Maunder Minimum. This period coincides with the "Little Ice Age" and may be an indication that it's possible to forecast long-term temperature trends over several decades or centuries by looking at the sun's irradiance patterns.

You may have heard about 22-year climate cycles (two 11-year sunspot cycles) in which wet periods and droughts were experienced in the Midwestern U.S. The years 1918, 1936, and 1955 were periods of maximum solar forcing, but minimum precipitation over parts of the U.S. Corn Belt region. There is some correlation between sunspots and droughts, but much more research is needed before anything definite can be said.

Over the next few years, don't be surprised if your GPS has trouble receiving satellite signals or your cell phone service experiences interruptions. It's all part of the sun's solar cycle and proof that our technological advances are still susceptible to the ultimate force in our solar system.

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