Solar Cycles and Earth's Weakening Magnetic Field

The emerging Solar Cycle 24, combined with our planet's declining magnetic field, may have severe consequences for Earth in terms of climate, electricity grid systems and human behaviour.

by Alex Ansary

PO Box 12743
Portland, Oregon 97212, USA

Email:
alex_ansary@hotmail.com
Website:
http://alexansary.com

If you were thinking that the only things we have to be concerned about include wars, famines and economic crashes, think again. Recent scientific discoveries are indicating that this next solar flare cycle could be powerful enough to disrupt our planet's entire electric grid. In this report I document a number of changes taking place with the Earth's magnetic field, the Sun and our solar system while explaining some of the concerns that today's leading scientists have voiced. I also examine how humankind may be affected energetically.

Our Planet's Magnetic Field

The magnetosphere is a bubble of magnetism that surrounds the Earth and protects us from solar wind. Fortunately, our planet's magnetic field diverts most particles into a circular path around the Earth. Like weather patterns found on Earth, solar wind patterns can change rapidly.

Luckily, our planet's magnetosphere quickly responds to the threat and absorbs the impact, wiggling and jiggling in the process. Geophysicists call this reaction a geomagnetic storm, but because of how it disrupts the Earth's magnetic field it could also be called electromagnetic pollution. This is when we see the Aurora Borealis in our night skies.

But strange things are happening in both outer and inner space. The Earth's magnetic field has been weakening. This decrease actually began 2,000 years ago, but the rate of decrease suddenly became much more rapid 500 years ago. However, in the last 20 years or so, the magnetic field has become erratic.

Aeronautical maps of the world, which are used to allow aeroplanes to land using automatic pilot systems, have had to be revised globally in order for the autopilot systems to work.

Now, NASA's five THEMIS spacecraft have discovered a breach in the Earth's magnetic field that is 10 times larger than anything previously thought to exist. When this happens, solar wind can flow in through the opening to "load up" the magnetosphere for powerful geomagnetic storms. Exploring the mystery is a key goal of the THEMIS mission, launched in February 2007.

The big discovery came on 3 June 2007, when the five probes serendipitously flew through the breach just as it was opening. Onboard sensors recorded a torrent of solar wind particles streaming into the magnetosphere, signalling an event of unexpected size and importance.

But the breach itself is not the biggest surprise. Researchers are even more amazed and baffled at the unexpected way it forms, overturning long-held ideas of space physics.

"At first I didn't believe it," said THEMIS project scientist David Sibeck of the Goddard Space Flight Center. "This finding fundamentally alters our understanding of the solar wind–magnetosphere interaction."

"The opening was huge—four times wider than Earth itself," said Wenhui Li, a space physicist at the University of New Hampshire, who has been analysing the data. Li's colleague Jimmy Raeder, also of the University of New Hampshire, said: "10^{27} particles per second were flowing into the magnetosphere—that's a 1 followed by 27 zeros. This kind of influx is an order of magnitude greater than what we thought was possible."

Space physicists have long believed that holes in the Earth's magnetosphere open only in response to solar magnetic fields that point south. The great breach of June 2007, however, opened in response to a solar magnetic field that pointed north. To the layperson this may sound like a quibble, but to a space physicist it is almost seismic.

Unexpected Shield Drop

Regarding how our magnetic field is changing, what is understood today in the scientific community is that the solar wind presses against the Earth's magnetosphere almost directly above the equator, where our planet's magnetic field points north. Scientists previously believed that if a bundle of solar magnetism came along and pointed north, too, the two fields should reinforce one another, strengthening the Earth's magnetic defences and slamming the door shut on the solar wind.

The Earth's and the Sun's magnetic fields will be in sync at the peak of Solar Cycle 24, expected in 2012. This will cause an influx of solar particles.

In the language of space physics, a north-pointing solar magnetic field is called a "northern IMF" (interplanetary magnetic field) and it is synonymous with "shields up".

The big surprise is that when a northern IMF came along, the shields went down. This has completely overturned many scientists' understanding of things. As researchers investigated the tear in the magnetic field, they discovered that 20 times more solar wind passed into the Earth's protective shield when the magnetic fields were aligned.

Northern IMF events don't actually trigger geomagnetic storms, Raeder noted, but they do set the stage for storms by loading the magnetosphere with plasma. A loaded magnetosphere is primed for auroras, power outages and other disturbances that can result when a CME (coronal mass ejection) hits. This means that the impact of solar flares is 20 times as strong when the magnetic fields are aligned.

The Earth's and the Sun's magnetic fields will be in sync at the peak of Solar Cycle 24, expected in 2012. This will cause an influx of solar particles. What the scientists didn't discuss is the impact on the human bioelectrical system.

Earth's Magnetic Field Changes Climate

The Earth's climate has been significantly affected by the planet's magnetic field, according to a Danish study published in January 2009 which could challenge the notion that human emissions are responsible for global warming.

"Our results show a strong correlation between the strength of the Earth's magnetic field and the amount of precipitation in the tropics," one of the two Danish geophysicists behind the study, Mads Faurschou Knudsen of the geology department at Aarhus University in Denmark, told *Videnskab* journal.

The results of the study (also published in the US scientific journal *Geology*) lend support to a controversial theory published a decade ago by Danish astrophysicist Henrik Svensmark, who claimed that the climate is highly influenced by galactic cosmic ray (GCR) particles penetrating the Earth's atmosphere.

Geomagnetic Field Reversal

Another recent study suggests that rapid changes in the churning movement of the Earth's liquid outer core are weakening the magnetic field in some regions of the planet's surface.

"What is so surprising is that rapid, almost sudden, changes take place in the Earth's magnetic field," said study co-author Nils Olsen, a geophysicist at the Danish National Space Center in Copenhagen.

The findings suggest similarly quick changes are simultaneously occurring in the liquid metal, 1,900 miles (3,000 kilometres) below the surface, Olsen said.

Fluctuations in the magnetic field have occurred in several far-flung regions of the Earth.

The changes "may suggest the possibility of an upcoming reversal of the geomagnetic field" said study co-author Mioara Mandea, a scientist at the German Research Centre for Geosciences in Potsdam.

Earth's magnetic field has reversed hundreds of times over the past billion years, and the process could take thousands of years to complete.

The decline in the magnetic field is also opening the Earth's upper atmosphere to intense charged-particle radiation, according to scientists.

Cosmic Rays Slam the Earth

An international team of researchers has discovered a puzzling surplus of high-energy electrons bombarding Earth from space. The source of these

cosmic rays is unknown, but it must be close to the solar system and could be made of dark matter. The results were reported in the 20 November 2008 issue of the journal N*ature*.

"This is a big discovery," said co-author John Wefel of Louisiana State University. "It's the first time we've seen a discrete source of accelerated cosmic rays standing out from the general galactic background."

To study the most powerful and interesting cosmic rays, Wefel and colleagues spent the last eight years flying a series of balloons through the stratosphere over Antarctica. Their NASA-funded cosmic ray detector found a significant surplus of high-energy electrons.

"The source of these exotic electrons must be relatively close to the solar system—no more than a kiloparsec away," said co-author Jim Adams of the NASA Marshall Space Flight Center.

Galactic cosmic rays are subatomic particles accelerated to almost light- speed by distant supernovae explosions and other violent events. They swarm through the Milky Way, forming a haze of high-energy particles that enter the solar system from all directions.

Cosmic rays consist mostly of protons and heavier atomic nuclei with a dash of electrons and photons spicing the mix. Why must the source be nearby? According to Adams: "High-energy electrons lose energy rapidly as they fly through the galaxy. They give up energy in two main ways: (1) when they collide with lower-energy photons, a process called inverse Compton scattering; and (2) when they radiate away some of their energy by spiraling through the galaxy's magnetic field."

High-energy electrons are therefore local, but the researchers cannot pinpoint the source in the sky.

The Sun's Magnetic Field

The Sun is a massive electromagnetic broadcaster which floods the planets of the solar system with heat, light, UV radiation and electrically charged particles. The Sun itself has a magnetic field, and that magnetic field creates an "egg" around the solar system that is known as the heliosphere. The heliosphere is shaped like a teardrop, with the long, thin end of the drop pointing away from the direction in which we're travelling.

Any changes that occur in or on the Sun will eventually affect every person alive. The solar activity during this last sunspot cycle was greater than anything ever seen before.

One study, authored by Dr Mike Lockwood and colleagues from Rutherford Appleton Laboratory in Chilton, UK, in 1999, investigated the Sun's activity over the previous 100 years. They reported that since 1901 the overall magnetic field of the Sun has become stronger by 230 per cent. Scientists do not understand what that means for us.

Some of the sunspot activity in this last cycle was greater than anything ever recorded before. But scientists claim that they don't understand what that means, either.

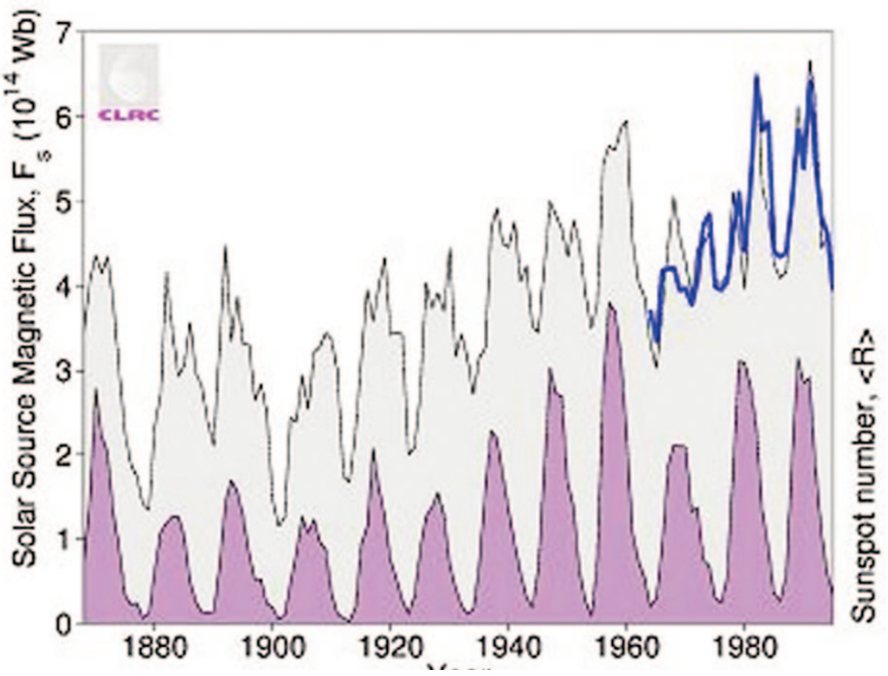
"Obviously, the Sun is Earth's lifeblood," said Richard Fisher, Director of the Heliophysics Division at NASA. "To mitigate possible public safety issues, it is vital that we better understand extreme space weather events caused by the Sun's activity."

Solar Cycle 24

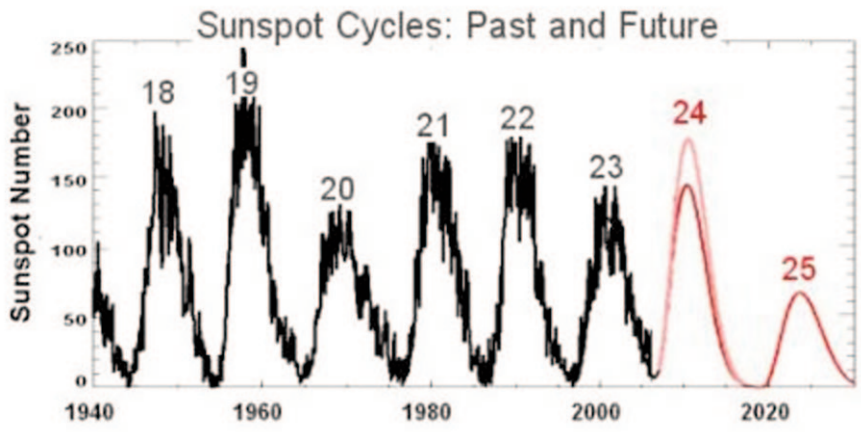
According to NASA, the Sun is beginning another 11-year cycle of activity.

The Sun flips its magnetic poles every 11 years. Considering that the Sun is to blame for some unfavourable climate changes on the Earth, the coming decade could spell more trouble for our planet. The years ahead could be intense.

Jimmy Raeder explained: "We're entering Solar Cycle 24. For reasons not fully understood, CMEs in even-numbered solar cycles (like 24) tend to hit Earth with a leading edge that is magnetized north. Such a CME should open a breach and load the magnetosphere with plasma just before the storm gets underway. It's the perfect sequence for a really big event."



Solar-source magnetic flux and sunspot numbers



Sunspot numbers and cycles

Every 10–11 years, the number of sunspots found on our closest star rises from zero (as it was in 2008) to a high of over four hundred. While the sunspots themselves don't affect Earth, the solar flares and other disturbances emanating from our Sun during increased sunspot activity result in an increased number of particles (electrons and protons) and harmful light radiation (ultraviolet rays and X-rays), known as solar wind. If it weren't for the Earth's protective magnetic field and atmosphere, this bombardment of particles would burn us to a crisp.

Sunspot Cycle 24, expected to peak around 2012, could be one of the strongest in centuries. It will be 30–50 per cent stronger than the last one and begin as much as a year late, according to a breakthrough forecast using a computer model of solar dynamics developed by scientists at the US National Center for Atmospheric Research (NCAR). Predicting the Sun's cycles accurately, years in advance, will help societies plan for active bouts of solar storms, which can slow satellite orbits, disrupt communications and bring down power systems.

The scientists have confidence in the forecast because, in a series of test runs, the newly developed model simulated the strength of the past eight solar cycles with more than 98 per cent accuracy. The forecasts are generated in part by tracking the subsurface movements of the sunspot remnants of the previous two solar cycles.

Solar Cycle 25

The Great Conveyor Belt is a massive circulating current of fire (hot plasma) within the Sun. It has two branches, north and south, each taking about 40 years to perform one complete circuit. Researchers believe the turning of the belt controls the sunspot cycle, and that's why the slowdown is important.

"Normally, the conveyor belt moves about one metre per second—walking pace," said NASA solar physicist David Hathaway. "That's how it has been since the late 19th century."

In recent years, however, the belt has decelerated to 0.75 m/s in the north and 0.35 m/s in the south.

"We've never seen speeds so low," Hathaway added.

According to theory and observation, the speed of the belt foretells the intensity of sunspot activity approximately 20 years into the future. A slow belt means lower solar activity; a fast belt means stronger activity.

"The slowdown we see now means that Solar Cycle 25, peaking around the year 2022, could be one of the weakest in centuries," said Hathaway.

NASA is now sounding an alarm because the North American continent is so close to the north magnetic pole and is the most vulnerable to solar activity.

Solar Activity's Impact on Earth

The first instruments to measure solar flare activity made their appearance 440 years ago. They showed that our nearest star treats the Earth to more than just solar eclipses. Sunspots, solar flares, faculae and other phenomena affect everything on the Earth from atmospheric events to human behaviour. These phenomena are known collectively as solar activity. This activity, expressing itself through bursts of solar radiation, magnetic storms or fiery flares, can vary in intensity from very low to very strong. It is the storms that pose the greatest danger to civilisation.

On 28 August 1859, polar lights glowed and shimmered all over the American continent as darkness fell. Many people thought their city was aflame. The instruments used to record this magnetic fluctuation across the world went off their scales. Telegraph systems malfunctioned, hit by a massive surge in voltage. It was perhaps the worst solar storm in the past 200 years. Its results for humankind were small because civilisation had not yet entered a high-tech phase of development. But with the advent of modern power grids and satellites, much more is at risk. Had something similar happened in our nuclear space age, destruction would have been catastrophic.

According to scientific data, storms of such size occur about once in five centuries. But events with half the intensity happen every 50 years. The last one took place on 13 November 1960 and disturbed the Earth's geomagnetic fields, upsetting the operation of radio stations.

Now, our dependence on radio-electronic devices is so immense that increased solar activity could disable life-support systems all over the world, and not only on the surface. Poor space weather makes all orbital systems malfunction. A heavy solar storm can cause disruption to space-based navigation systems.

NASA is now sounding an alarm because the North American continent is so close to the north magnetic pole and is the most vulnerable to solar activity. A study by the Metatech Corporation revealed that an impact similar to that of 1859 would incapacitate the entire electricity grid in North America. Even the relatively weak magnetic storm of 1989, provoked by solar activity, caused an accident at a Canadian hydro-electric power plant that left six million people in the United States and Canada without electric power for nine hours.

A study by the US National Academy of Sciences also outlines grim possibilities on Earth for a worst-case-scenario solar storm. Modern power grids are so interconnected that a big space storm—the type expected to occur about once a century—could cause a cascade of failures that would sweep across the United States, cutting power to 130 million people or more in this country alone, the new report concludes. Such widespread power outages, though expected to be a rare possibility, would affect other vital systems.

"Impacts would be felt on interdependent infrastructures with, for example, potable water distribution affected within several hours; perishable foods and medications in about 12–24 hours; and immediate or eventual loss of heating/air conditioning, sewage disposal, phone service, transportation, fuel resupply and so on," the report states.

Outages could take months to fix, banks might close, and trade with other countries might halt.

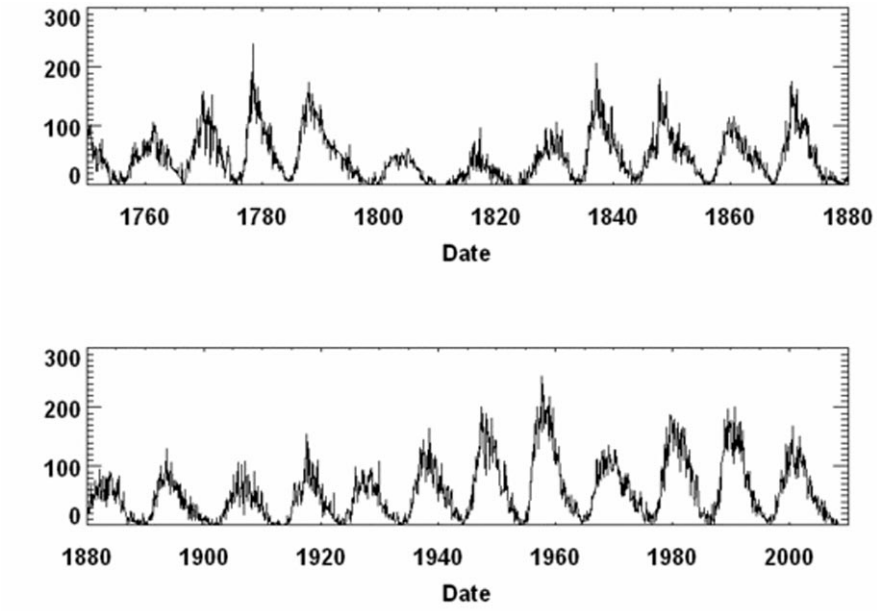
"Emergency services would be strained, and command and control might be lost," according to the researchers, led by Daniel Baker, director of the Laboratory for Atmospheric and Space Physics at the University of Colorado in Boulder.

Solar Cycles and Human Behaviour

Could cycles of war and peace be tied to cycles of the Sun? Some researchers claim that geomagnetic storms affect brain waves and hormone levels, causing a number of different reactions, predominately in males. While a few women may also experience changes during these storms, they generally seem less affected by the Sun's behaviour. Reacting to changing hormone levels, some men may become increasingly irritable and aggressive, while others may instead become more creative.

An increase in solar activity is found to increase psychotic episodes in individuals who already suffer from unstable psychological states. While we might relate such behaviour to a full moon, in 1963 Dr Robert Becker and his colleague, Dr Howard Friedman, demonstrated that solar changes also lead to a noticeable increase in psychotic activity. Yet these reactions are not simply isolated to a few particularly sensitive or unlucky individuals.

Evidence indicates that wars and international conflicts most often break out when sunspots are rapidly forming or rapidly decaying, as these are times when there are more intense geomagnetic storms. In addition, this increase in solar activity correlates to periods of more accidents and illness as well as an increase in crimes and murders. The entire biosphere is affected by this electromagnetic pollution, and human behaviour seems to react accordingly.



Sunspot cycles from 1760

Not all geomagnetic storms are disruptive. But over time, these extremes in solar activity may also affect periods of Earthly conflict. The data on cycles of war and peace extend back at least 2,500 years.

As early as 1915, some scientists were beginning to recognise connections between solar activity and human behaviour. This work began with Russian scientist

Alexander Chizhevsky, who observed a correlation between mass changes in human behaviour and sunspot cycles.

In the 1930s, Professor Raymond Wheeler, an historian at the University of Kansas, took this observation one step further. His research afforded numerical rankings to the severity of individual battles correlating to solar cycles. His data was statistically analysed by Edward Dewey, who validated the existence of these war cycles. Yet he was unable to make a definite connection with sunspot cycles because the data at that time was insufficient. In the 1980s, with a more detailed analysis of Wheeler's data, the connection became clear.

Upon close examination of the data, it appears that we are beginning to discover a pattern emerging where wars are most likely to start at key points of the sunspot cycle. These are when geomagnetic activity is changing most rapidly on the upsurge of solar activity or on the downward part of the cycle when sunspots are rapidly diminishing. In addition, we can see how this adversely affects physiological mechanisms such as brain rhythms and hormonal levels.

In other words, wars could be a kind of mass psychosis. When we see the connection to physical mechanisms (such as electromagnetic pollution), this gives us some predictive insight into when increased aggressions are likely to start. Calculations indicate that we're due to see another rise in intense solar activity in less than two years' time, around 22 September 2010. NASA predicts that this activity will peak in 2012.

Jupiter's energetic charge has risen so high that there is actually a visible tube of ionising radiation that's formed between the surface of Jupiter and its moon Io.

Solar System Changes

The atmospheres of five of the planets and the Earth's moon are changing. The Earth's atmosphere in the upper levels is forming HO gas that didn't exist in the quantity that it does now. Scientists from the Russian Academy of Sciences say it's not related to global warming, CFCs or fluorocarbon emissions. They claim that the atmospheres of Jupiter, Uranus and Neptune are also are changing.

The Martian atmosphere is getting sizeably thicker. In 1997, the *Mars Observer* probe lost one of its mirrors, causing it to crash. This happened because the atmosphere was about twice as dense as NASA had calculated.

The brightness and magnetic fields of the planets are also changing. Venus is showing marked increases in its overall brightness. Jupiter's energetic charge has risen so high that there is actually a visible tube of ionising radiation that's formed between the surface of Jupiter and its moon Io. You can see the luminous energy tube in photographs that have been taken recently. Uranus and Neptune also are becoming brighter.

The magnetic fields of Jupiter, Uranus, and Neptune are changing. Jupiter's magnetic field has more than doubled and Neptune's magnetic field is increasing. The Russians say that all three of these planets are becoming brighter and their atmospheric qualities are changing, but they do not explain what this means.

The Russians also report that Uranus and Neptune appear to have had recent pole shifts. When the *Voyager* II space probe flew past Uranus and Neptune, the apparent north and south magnetic poles were sizeably offset from where the rotational pole was in earlier recordings. In one case it was 50 degrees off, and in the other case the difference was around 40 degrees.

This new information about the changes in our solar system comes at an interesting time for our planet. It's possible that, for some time, celestial events have been playing their part in shaping our way of life on the planet, and that these changes we are now seeing with our Sun, the solar system and the Earth's magnetic field may be the very things that transform our world as we know it into something new.

Only time will tell, but it appears that the future may already be here... ∞

About the Author:

Alex Ansary is an independent journalist from Portland, Oregon, USA, who has been questioning the nature of reality since his early youth. His daily radio show *Outside the Box* (http://www.oraclebroadcasting.com) gives voice to those who are normally censored or attacked in the mainstream media. The program aims to connect the dots behind world events and to provide hope during these troubled times. Alex participates in the global battle for freedom via cable television, Internet radio and the web. He can be contacted by mail at PO Box 12743, Portland, Oregon 97212, USA, by email at alex_ansary@hotmail.com and via his website http://alexansary.com.

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