Long Term Health Effects of Solar Flares, Sunspots, CME's and the Schumann Resonance

How Sunspots Shape Evolution and Guide Humanity

SCOTT RAUVERS

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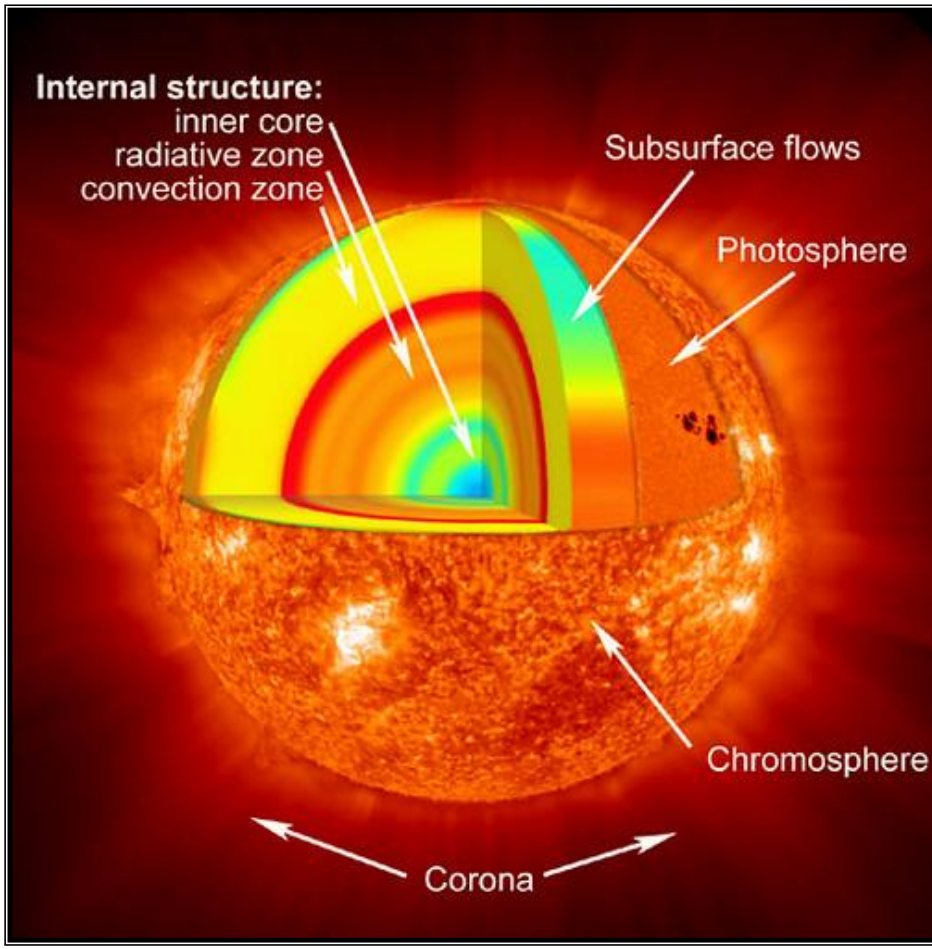
DEDICATION

This edition is dedicated to Theophrastus, who recorded the first known sunspot



Scott Rauvers, *Author*

Welcome to one of the most informative and up to date books showing how solar activity impacts the lives of millions of people. The purpose of this book is to show how the sun affects us physically and spiritually, and backing up our findings with the latest scientifically documented research studies.

This 2024 revised edition celebrated its 12 year anniversary in June 2024. The book was originally published under the name Solar Flares and their Effects upon Human Behavior and Health

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INTRODUCTION

A new science is emerging – one that is understanding how solar activity affects us. Pretty soon, doctors may be able to diagnose illnesses more accurately by considering space weather conditions. We all know how to protect ourselves from the sun's visible rays when we go to the beach, but what about the energies we can't see? How do we shield ourselves? This book is unique because it shares a method showing how solar activity directly impacts our bodies in real-time - a first. We can now track and predict these cycles as they happen. The sun will keep faithfully repeating these predictable cycles for about 5.4 billion more years. If you understand how each cycle works and its effects on life and weather, you'll have a golden key to understand how and what's happening. This key can help long-term plans succeed by anticipating changes in health, climate and more.

Today planet earth is in the middle of a knowledge boom that's shaking up major institutions. In the coming years, anyone will be able to learn almost anything faster than ever before in history. For students studying health and space science, learning the sun's cycles gives them an edge to level up their skills quickly. Recent studies have found some fascinating connections. It seems that abrupt changes in the sun's behavior and Earth's magnetic field can cause stress and inflammation in humans. This throws our internal balance off and weakens the immune system. As a result, people may experience higher blood pressure or issues with their nerves or

heart. The effects are even stronger for people living at higher latitudes and in the years leading up to solar maximum.

Each person has their own vulnerabilities, like existing medical conditions or life stresses. If a powerful solar flare hits during a time when someone is already feeling vulnerable, it seems the flare's energy can aggravate their particular weak spots, with the effects being felt up to 3 to 4 weeks after the initial flare has passed. Kids and developing babies may be especially at risk.

This book was the very first of its kind published in 2012 and unexpectedly became very popular! It has since been updated four times to keep up with all the new research coming out. Even a decade later, scientists are still making discoveries about how our sun impacts our health, technology and life on earth. By addressing this topic, the book has resonated particularly well with students of religion and those in medical fields by fulfilling an existing human need. This leads to the question - why have four major revisions been made when this book has been a success? To answer that, we must acknowledge that the Institute for Solar Studies in Santa Monica, California has intensively reviewed numerous recently published scientific papers on solar influences. Many of these studies have yielded important discoveries, with the best work only published in recent years due to new solar monitoring instruments. Revisions also serve to refine the book's overall message and significance over time as certain examples and phrasings naturally become dated as new discoveries are made. Hence, periodic updates create an edition tailored the audiences' evolving needs.

This fourth and final revision incorporates what is needed to comprehensively understand how solar influences affect our

day-to-day lives while maintaining accessibility for those who can benefit most - our students. The book has more than fulfilled my hope of providing a complete yet straightforward resource for students seeking to deeply understand how solar activity shapes life.

How to Use this Book

As a science and health writer, I fully understand that students exploring new topics benefit most from receiving information presented in an elegant yet straightforward manner. This allows students to thoughtfully expand on and contextualize the presented information according to their individual needs and interests. Singers require precise instruction on breathing techniques compared to a potter who may need no such guidance. However, the potter must have a detailed grasp of proper wrist positioning and form. Both singers and potters greatly benefit from a profound comprehension of how to correctly practice their craft to consistently achieve success.

Anyone can learn to analyze and apply the cyclical patterns of solar activity presented in this book to their benefit. All that is required is an open mind and willingness to consider the evidence. This workbook provides tools, techniques and practical exercises to develop skills not traditionally included in the modern curricula of most books about solar activity. All of us at the Solar Institute hope you will document what you learn, allowing this book to serve as an ongoing personal reference. I invite readers to apply the insights and forecasts provided in this book to successfully understand how solar cycles drive evolution and how they are guiding humanity and to learn how to intuitively channel the natural energy the sun and use it for healing and guidance.

Take your time reading - reflect carefully on the methods presented. If they resonate, you may wish to implement small, gradual changes rather than abrupt changes in your lifestyle. Our aim is for this book to become a lasting resource as you discover new findings and experiences that change your understanding of the cosmos along the way.

This edition begins with foundational concepts - the structure of sunspot cycles and their proven influence on human emotions and physical health. You will then learn to forecast future cycles and apply that knowledge across diverse fields in your lifestyle. This includes health maintenance, financial planning, immune system support, and more. Both 11-year and 11-day "solar mini cycles", which were discovered by Scott Rauvers of the Solar Institute, are covered, enabling long-and short-term planning. These repeated, predictable intervals will persist indefinitely in our Sun's lifecycle.

You will also learn about the sun's impact on the economy, environment, human psychology and physiology, and its role in organized religion. Over 200 cited scientific references are included to backup all scientific evidence presented throughout this revised edition.

The Solar Institute deserves worthy praise and recognition for being the first 12 years ago to pioneer a comprehensive understanding of the mini cycles and its foundations for future ongoing solar research and exploration.

Who am I and how did I make all these discoveries?

In 2012 I founded the Institute for Solar Studies in Santa Monica, CA. Years before I began the institute, I studied gerontology at Weber State University, focusing on the aging process and related topics. Shortly after completing my studies

in 1999, I founded my own business in Los Angeles, California where I noticed certain patterns in my energy levels and fatigue. Around this time, the National Oceanic and Atmospheric Administration (NOAA) began regularly publishing solar weather reports. During 2005 I became interested in exploring a potential connection between solar activity levels and fatigue, given the prevalence of technology in Silicon Valley where I lived at the time, I was able to make good observations in solar activity and physiology. To evaluate these relationships, I tracked dates where I experienced higher fatigue against NOAA solar activity data from the same periods. In 2012, I published my initial findings from this research in the book you are reading now. In the following years, the first peer-reviewed Western scientific studies started being published, confirming many of my original hypothesis between solar weather and human health. By 2024, the research has matured to such a point that New Scientist reported Solar storms may cause up to 5500 heart-related deaths in a given year, confirming that excessive solar activity can in fact impact human physiology and pathology.

Over the years, using the information in this book has more than validated my belief that understanding solar cycles, as interpreted by the Solar Institute, provides valuable insight for better comprehending our emotions, health, and the environment. Students of health who study these solar cycles and internalize the conveyed ideas tend to become stronger learners. When I originally wrote this book, I did not foresee this unexpected benefit which has since than brought me great delight and satisfaction. Religious arts educators have also found this unique resource tremendously helpful as they had previously struggled to appropriately disseminate the effects

of solar activity and its basic principles to their students.

Advancing Scientific Understanding

Sure my work was originally met with skepticism 12 years ago when I first started, which is common for any scientist publishing a new theory or presenting a new hypothesis, but many who purchased the original version of this book are now using it as a key reference for students studying this topic. Further, my research has validated the connections outlined in this book between health, solar activity, and even religious phenomena. I can now say that this book now rightfully holds its place in the scientific canon. All of us at the Solar Institute, thank you for your interest and wish you the best of success!

Scott Rauvers
Founder of the Solar Institute

Now let's see what exciting journey awaits us.....

Chapter 1
The Sun and early Culture

Early man observed comets, eclipses, meteorites and other cosmic phenomena. He related to these larger, more powerful elements as substitute deities. Before the time of Abraham, people worshipped the sun and the stars. Even today in modern times, June 21st marks the Summer Solstice and is celebrated by pagan festivities throughout the world.

It was more than 5,000 years ago at Stonehenge that the knowledge of these solar cycles was used by social leaders and elders for power and wealth. Stonehenge is aligned in such a way as to align with the sun on the horizon at the Summer and Winter solstices.

It was in Ancient Egypt that the early dynasties of rulers saw the construction of huge buildings and temples that aligned with the sun. For example in the great temple of Karnak on the Nile River there is a corridor that lights up with sunlight during sunrise on December 21. This light hits a shrine that is dedicated to a Sun God (*the Winter Solstice in the Northern Hemisphere*).

These Egyptian temples solidified the status of the Pharaoh, and hieroglyphs depict Pharaohs with the sun on his head. One such deity was known as the great Amon-Ra. Amon was also known as Amun and was considered the supreme creator. Ra, however, was a wise and old sun-god. When

combined they were known as Amon-Ra.

The Sun was recognized by the Inca (*known as the Inca Sun God Apupunchau*) who revered it for their stability and prosperity in their civilizations for thousands of years. They recognized that our sun had a spiritual component associated with it and they would build many temple entrances aligned with the rising or setting sun during the 2 equinoxes of the year. Machu Picchu in Peru is one example where at dawn each June 21st (*the winter solstice in the southern hemisphere*) rays of the sun shine through the temple's two windows like a laser beam, illuminating a ceremonial stone. At the winter solstice the Incan festival known as Inti Raymi (*Quechua for "sun festival"*) is celebrated. However at the Fall or Spring equinox at exactly 12 noon the Sun's shadow disappears. The ancient site of Teotihuacan located near Mexico has two great pyramids which are named after the sun and the moon. What an amazing calendar to know when to plant and harvest crops!

11,400 year old Karahan Tepe is an archaeological site in Şanlıurfa Province in Turkey. The site is close to Göbekli Tepe. It was deliberately buried hundreds, if not thousands of years ago for sun unknown reason. After it was excavated, a remarkable light effect was discovered that utilizes a porthole stone between the main enclosure and the Pillar Shrine. Precisely at ten minutes after sunrise each winter solstice, a beam of light coming through the stone's hole illuminates the head of a figure, eventually creating a 'halo' of light around the top of the head.

Chichen Itza was a sizable pre-Columbian city constructed by the Maya individuals of the Terminal Classic period. The archeological site is situated in Tinúm Municipality, Yucatán

State, Mexico. Due to the impressive architectural achievements, during the autumnal equinox when sunlight contacts the steps of Chichen Itza, the triangular shadows appear as if an enormous serpent is descending from the top of the pyramid. This entire phenomenon is known as 'The Snake of Sunlight'.

In England there are numerous archeological sites that show sun alignments. For example, 5,000 year old Newgrange (*pictured*) displays a shaft of bright sunlight that shines down a corridor into a chamber during the Winter Solstice, which is pretty amazing considering that it has been doing this for over 5,000 years!.

At 4,000 year old Stonehenge (*pictured below*) the iconic Stonehenge trilithons, including its signature great trilithon, are arranged within the monument's signature horseshoe formation of five central trilithons. Additionally, both the famed Heel Stone and the monument's embanked avenue are precisely aligned to sunset of the winter solstice and the opposing sunrise of the summer solstice. This demonstrates the sophisticated astronomical knowledge of the monument's Neolithic builders and their emphasis on marking the solar calendar through the monument's design and architecture. On Midwinter's Day, when it was originally constructed the sun would originally have set between the two uprights of the tallest trilithon (*two upright stones capped by a*

horizontal lintel). It would have dropped down over the altar stone, a sandstone block which was placed across the solstice axis. At the summer solstice, the Sun rose close to the Heel Stone, and the Sun's first rays shone into the centre of the monument between the horseshoe arrangement.

In Scotland, the structure known as Maeshowe, which was built around 2800 BC, and is situated on Mainland Orkney, faces the winter solstice sunrise. It is aligned so that the rear wall of its central chamber becomes illuminated with sunlight on the winter solstice. Some people speculate these historical sites were built as a type of calendar in order to know when it was time to plant and harvest crops.

From an observer on Earth, the sun appears to shift its rising position northwards each day after the winter solstice in the Northern Hemisphere on December 21st annually. The sun continues migrating north into spring, reaching its maximum northern extent directly over the Tropic of Cancer on the summer solstice in June. This date signifies the longest day of the year in the Northern Hemisphere. Thereafter, the sun begins moving south once more. Days grow shorter through summer and into fall, as defined by the autumnal equinox in September when the sun crosses the equator. In fall, the sun proceeds southward until reaching its southernmost rising position over the Tropic of Capricorn at the winter solstice. This marks both the beginning of winter and the moment when the sun reverses course to journey north again. After the winter solstice, the sun brings with it more heat and light and longer and warmer days, which the ancients no doubt worshipped, because sunlight is vital for crops and a more sustainable way of living. This is why today some people subconsciously name their newborn female babies after the months of the year

when the rays of sunlight are growing stronger (*after the winter solstice of December 21st*). These names include Jan, April, May and June.

What are the Solstices and Equinoxes?

The winter solstice is when the sun reverses its direction from a southerly heading and returns on a northerly journey until either June or December 21st, depending upon which hemisphere you live in. The two solstices occur in June (20 or 21) and December (21 or 22). These dates mark when the sun's path in the sky reaches its northernmost or southernmost point from the equator. A hemisphere's winter solstice represents the shortest day of the year, while its summer solstice is the longest. In the Northern Hemisphere, the June solstice signifies the beginning of summer, as this is when the North Pole tilts closest to the sun and the sun's rays are directly overhead at the Tropic of Cancer. The December solstice denotes the start of winter, as the South Pole tilts closest to the sun at this time and its rays are directly overhead at the Tropic of Capricorn. (The seasons are reversed in the Southern Hemisphere.) The equinoxes fall around March 21 and September 23 in both hemispheres. On these dates, the sun is precisely above the equator, resulting in equal periods of daylight and darkness. It is interesting to note that Easter in Australia is celebrated during the March equinox, which happens to be the season of fall in Australia. Easter originally began as a celebration of the goddess of fertility, Ishtar. Ishtar was commonly linked with eggs, which were viewed as a representation of new life and renewal. In antiquity, individuals would embellish eggs in recognition of Ishtar and present them as gifts to one another during the spring equinox, marking the start of the agricultural cycle.

In the Northern Hemisphere:

- Vernal equinox (approximately March 21): Equal daylight and darkness mark the beginning of spring.
- Summer solstice (June 20 or 21): The longest day of the year signifies the start of summer.
- Autumnal equinox (approximately September 23): Equal daylight and darkness mark the beginning of autumn.
- Winter solstice (December 21 or 22): The shortest day of the year denotes the start of winter.

With today's technology we are going to now explore the general cycles of solar activity. These cycles can be used for long term physical healing, financial prosperity and to know when the weather will be more erratic or calm. By learning how to forecast upcoming solar cycles, you can learn to more quickly adapt to sudden changes.

Further Reading

Egyptian Temple Orientation. Astronomical Alignments in the Temples of Egypt. David Furlong. May 2007.

Great Temple of Karnak on the Dec 21st Winter Solstice

Chapter Review:

- How did early cultures worship the sun and align their temples with solar events?

- What are some examples of ancient sites that are aligned with the sun and how do they demonstrate astronomical knowledge?

- What are the significance and cultural practices associated with the solstices and equinoxes?

- How can the cycles of solar activity be utilized for long-term benefits such as physical healing, financial prosperity, and weather forecasting?

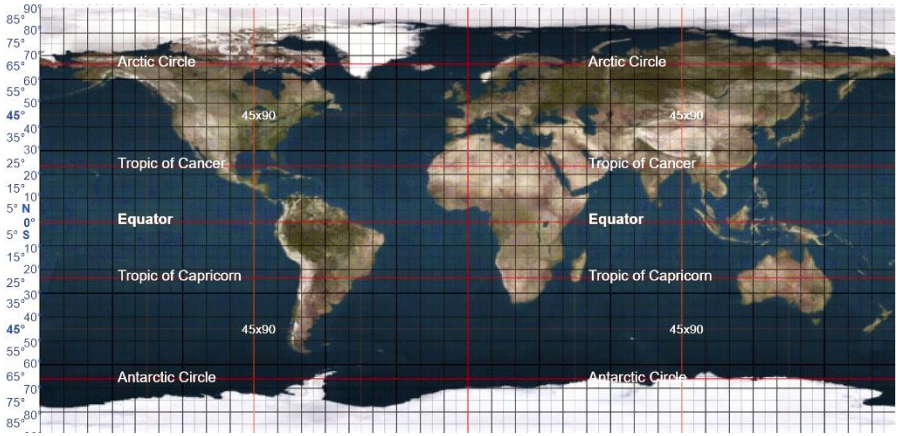
Chapter 2
An Introduction to Solar and Geomagnetic Activity

When the Sun is more active it can impact different people in different ways. First, some people may feel more confident and have stronger personalities during times of more active solar activity. For those who are sensitive to changes in solar weather, they could feel a bit off-balance or emotionally sensitive. It can also be a time when people who are spiritual may feel more connected to their higher self and received enhanced intuition as a beneficial side effect. Anyone who is already more emotional may experience stronger emotional surges during solar flares. And for those on a spiritual path, the solar activity could help them to deepen that connection. So in general, it seems the volatile solar energy can influence moods and open people up spiritually when the Sun is putting out more flares. Researchers Persigner and Krippner found that when the earth is calm and the space storms ebb, telepathy and clairvoyance increase and the ability to remote view improves [(1)]. If people who don't know about this enhanced intuition, it can create an overconfident ability in an individual who receives sudden "intuitive insights", replying on their intuition too much. Hence their overconfidence can cause them to make intuitive decisions when solar weather is more disruptive, resulting in poorer decision making. 11 years ago in an interview of Sadhguru, he stated that increases in human consciousness are often tied to solar flares. He stated if we have a plan to take advantage of this volatile time, if we have done the necessary inner work and have focus within, then

human awareness may rise much easier than during other epochs. It is during these times that the moment is a little more conducive. However he cautions that we have to remember that it still comes down to each individual. We are the ones who have to walk the path of self-transformation through practices like meditation. Flares might provide an opening, but we need to be the ones with enough courage to walk through it [2].

Because early cultures erected monuments in regards to the sun, could it be that certain religions are also influenced by solar activity? A scientific research study [3] [4] looked at activities from the years 1950 to 1999 that were conducted by the Jehovah's Witnesses religion. The study found that periods of solar activity that match human motivation provide evidence that geomagnetic activity may impact certain brain regions that govern motivation. What was interesting was that motivation was statistically significantly smaller at higher latitudes compared to lower latitudes. Geomagnetic storms disturb the lower ionosphere more intensely at higher latitudes and also significantly at middle latitudes. The effect occurs almost instantly at high latitudes, while it exhibits more of an after-effect at middle latitudes [5]. Studies confirm that geomagnetic disturbances have a greater effect on humans living at higher geomagnetic latitudes [6]. This is why the Aurora borealis are commonly seen after a major solar flare at the north and south poles because they exist at high latitudes. Later on in this book we go into depth about how the effects of geomagnetic activity on the human body vary according to latitude.

Where are the latitudes located on Earth?



There are three main latitudinal zones: low, middle and high latitudes. Low latitudes are located between the Equator (0 degrees N/S) and 30 degrees N/S. Middle latitudes extend from 30 degrees N/S to 60 degrees N/S. High latitudes reach from 60 degrees N/S to earth's poles (90 degrees N/S). The above image shows the latitudes of our planet.

Solar weather has 3 main factors that influence life on earth. They are

1 – The Solar Wind from the sun

2 – Sunspots and Solar Flares from the Sun

3 – Geomagnetic Storms

The Sun's Solar Wind

The solar wind is a stream of particles that is emitted from the sun at approximately one million miles per hour and propagates throughout the entire solar system. The solar wind speed has 2 main speeds. When solar wind speeds rise above

600 such as from a strong solar flare, it has been shown to negatively affect human physiology. However there is also a sweet spot in the sun's solar wind speed, which occurs just as the solar wind speed is starting to slow down into the 350 range, especially the period after exceptionally high solar activity. The most beneficial solar wind speeds for health and well-being are between 350 and 450 km/s. We always hear the negative effects of solar weather, but there are sweet spots that are good for health and well being. Later on in this book I will teach you how to find these sweet spots and how you can benefit from them.

What is the Difference between a Solar Flare and Coronal Mass Ejections?

Solar flares are among the most potent eruptions in the solar system, capable of releasing energy equivalent to a billion megatons of TNT within a few seconds. Caused by sudden releases of magnetic energy, flares can accelerate solar particles to velocities nearing the speed of light and heat solar material to tens of millions of degrees. Simply put, a Solar Flare is a brilliant flash of electromagnetic radiation that originates from the Sun's surface. Plasma located in the Sun's atmosphere is suddenly released during a solar flare. Once released, this plasma is accelerated to even greater speeds and energy levels. These bursts of electromagnetic radiation travel at the speed of light and reach Earth in just over eight minutes. The high-energy particles contained within solar flares are capable of penetrating Earth's atmosphere and ionizing the gasses located therein.

Coronal mass ejections are often associated with flares and sometimes occur shortly after the flare. Coronal mass ejections

exist as large expulsions of plasma that come from the Sun's corona, or its outer atmosphere. This plasma is ejected into space at velocities that are slower than solar flares but can still travel at hundreds of kilometers per second. Coronal mass ejections release billions of tons of plasma that can really damage Earth and other entities in the solar system if the ejection is directed towards those areas of space; especially earth. The clouds of electrified gas weigh billions of tons, reaching speeds from 12 to 1,250 miles per second. Depending on the orientation of the magnetic fields carried by the ejection, Earth-directed coronal mass ejections can cause magnetic storms by interacting with Earth's magnetic field, distorting its shape and accelerating electrically charged particles trapped within.

What is the most powerful solar flare ever recorded?

On April 2, 2001 at 4:51 p.m. EDT, the Solar and Heliospheric Observatory (SOHO) satellite observed the largest solar flare ever recorded by the sun. This flare was more powerful than the notable solar flare of March 6, 1989, which was linked to power grid disruptions in Canada. The recent explosion from an active region near the sun's northwest limb propelled a coronal mass ejection into space at an estimated speed of 7.2 million kilometers per hour. Fortunately, the flare was not directed at Earth. The flare and solar ejection also generated a storm of high-velocity particles, increasing the number of particles with ten million electron-volts of energy near Earth to 10,000 times the normal level. While posing no appreciable hazard to air travelers, astronauts or satellites, the NOAA rated this radiation storm at S2 to S3 on a scale of S5.

This solar flare however caused an R4 radio blackout on the sunlit side of Earth, rated second most severe on the R5 scale

used by NOAA to measure disruption to radio communications. X-ray and ultraviolet light from the flare altered the structure of Earth's electrically charged upper atmosphere (ionosphere), affecting radio frequencies that either pass through or are reflected by the ionosphere and traverse the globe.

The most recent powerful solar storm this year occurred on May 10, 2024 producing the strongest geomagnetic storm as well as the brightest display of the aurora borealis seen in over two decades. This allowed people in Florida as well as Australia to witness the Northern Lights, a rare event. See the back of this book for a list of the strongest solar flares ever recorded.

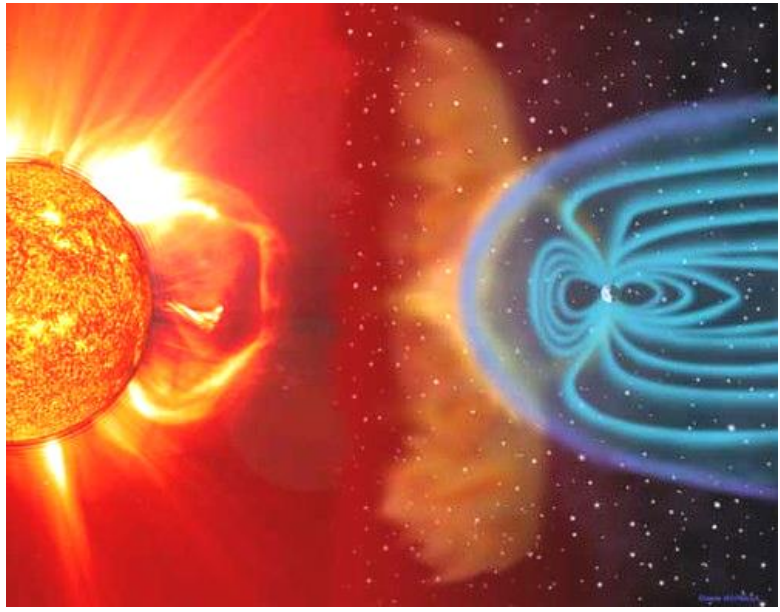
What Year had The Most Sunspots?

Since recordkeeping began, Solar Cycle 19 was the most active solar cycle on record as measured by sunspot counts at solar maximum. The cycle lasted from April 1954 to October 1964. The peak number of sunspots observed during this period was 285, setting the record in March 1958. Solar Cycle 19 had the highest sunspot counts ever witnessed during solar maximum, making it the most active solar cycle to date based on this metric.

Where did the Sunspot Cycle come from?

In 1848 the famed Swiss astronomer Rudolf Wolf designed a unique algorithm for making counts of sunspots which allows comparisons between data from different observers across the centuries throughout time. The sunspot cycle consists of an approximately 11 year cycle that goes from low numbers of sunspots to high numbers of sunspots. The sunspot count that was obtained using Wolf's formula, is now known as the Wolf

sunspot number. It is still in use today. Wolf used the data from previous astronomers to re-construct sunspot numbers as far back as the years 1755-1766. He named this first Sunspot Cycle, Sunspot Cycle 1. Since that time period, subsequent cycles have been numbered consecutively from that point in time. Hence, today we are in solar cycle #24 or 24 eleven year cycles of solar activity from the year 1755 A.D. A complete solar cycle starts at the bottom than reaches its maximum than hits the bottom again. So the sun has done this 24 times since approximately 1755 A.D. It is at the peaks of these 11 year cycles that we get massive solar flares and powerful geomagnetic storms.



Sunspot Minimum and Maximum

By now you are probably wondering what a sunspot minimum and maximum is. A sunspot minimum is when sunspot levels are at their lowest throughout a sunspot cycle. The grand solar minimum is the period of the least amount of solar activity in the sun's 11 year solar cycle. It is also commonly called Sunspot Minimum. Sunspot Maximum is exactly the opposite; a time that sunspot activity reaches a peak. The most recent sunspot maximum cycle is Solar Cycle 25, with its peak occurring in July of 2025.

How Earth Protects Itself against Solar Flares

During a solar flare, electrically charged plasma is ejected from the sun and sends out billions of tons of solar particles towards Earth at a speed in excess of more than 1 million miles an hour. When this happens a series of consecutive shock waves form, creating a series of sonic booms invisible to the naked eye. As they enter earth's upper atmosphere, it causes earth's atmosphere to heat up to temperatures of 750 degrees Fahrenheit. Next a chemical reaction takes place from the energy in the resulting shockwaves that forms the chemical nitric oxide, acting as a type of radiator coolant in earth's atmosphere helping to shrink it and cool it down. If it was not for earth producing the nitric oxide during solar events, earth's surface would be scorched as the ozone layer would be stripped away.

Where do Geomagnetic Storms come From?

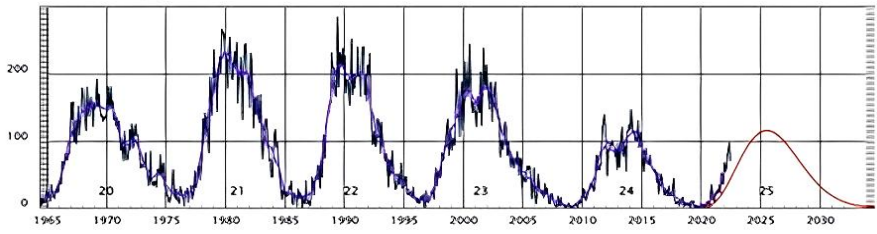
A geomagnetic storm comes from earth's magnetic field becoming bombarded by higher solar protons and electrons which are being emitted from our sun by solar flares. These

protons and electrons impact earth's magnetic field, creating stronger than average magnetic currents. 2mev electrons are just starting to be used as a forecasting tool for future geomagnetic activity (D. Mourenas et al. June (2019).

The 3 Main Cycles of a major Geomagnetic Disturbance

Geomagnetic storms consists of 3 main phases: the initial, the main and the recovery phases. The initial phase is when geomagnetic activity has been paused or quiet for some time and then all of a sudden there is a sudden increase. This is known as sudden commencement (ssc). Geomagnetic storms that do not exhibit sudden commencement phases are known as storms of gradual commencement (sgc).

You may sometimes see or hear the term "KP" when you read or study geomagnetic storm activity. The K-index term was formally introduced by Julius Bartels in the year 1938. The 'K' comes from the German term 'Kennziffer', meaning 'characteristic digit' and is short for Planetarische Kennziffer meaning "Planetary Index". It is a measure of geomagnetic activity currently taking place in Earth's atmosphere. Every 3 hours the data is summarized from 13 geomagnetic observatories located at between 44 degrees and 60 degrees northern / southern geomagnetic latitude and displayed as green, red or yellow bars on the NOAA website. The KP index is measured on a scale of 0 to 9, where zero denotes very minimal activity, with nine denoting extremely high



geomagnetic activity. Significant fluctuations in geomagnetic activity are referred to as geomagnetic disturbances (GMD), which are due to increases in solar activity. Pictured below are some recent 11 year cycles of solar activity.

What does the future hold regarding Geomagnetic Activity Levels?

NASA forecasts extremely low levels of geomagnetic activity in the coming years [(7)]. Low phases of geomagnetic activity are more common during solar minimums and we are entering a new Grand Solar Minimum that will last until 2070.

As solar activity continues to decline, there may be an increase in the effects attributed to climate change. Future levels of UVR are expected to increase owing to climate change and variation in atmospheric ozone [(8)], with variations in solar activity playing a major role in how climate change plays itself out in the future [(9)]. One example is the increased wind speeds earth has been experiencing over the years.

Why Earth's Wind is Speeding Up

Within the past decade, global average wind speeds have risen from approximately 7 miles per hour to around 7.4 miles per hour [(10)]. For the typical wind turbine, this represents around a 17% growth in potential wind energy generation. The small observed increase in average wind speed can translate to significantly more power harnessed from this renewable resource. As wind energy technologies continue advancing alongside changes in climate patterns, further opportunities of this clean energy sector will become more common [(10)].

Also during periods of higher cosmic ray activity (*which occurs more often towards Sunspot minimum*) rain is more likely to form and as cosmic rays increase, temperatures rise

[11]. This is because cosmic rays assist in the creation of more clouds [12]. Because solar activity is going into a major decline until 2070, expect climate change to increase the precipitation in certain regions on the earth. During the previous solar minimum between cycle 23 and 24 cosmic ray intensity increased by 19% [13].

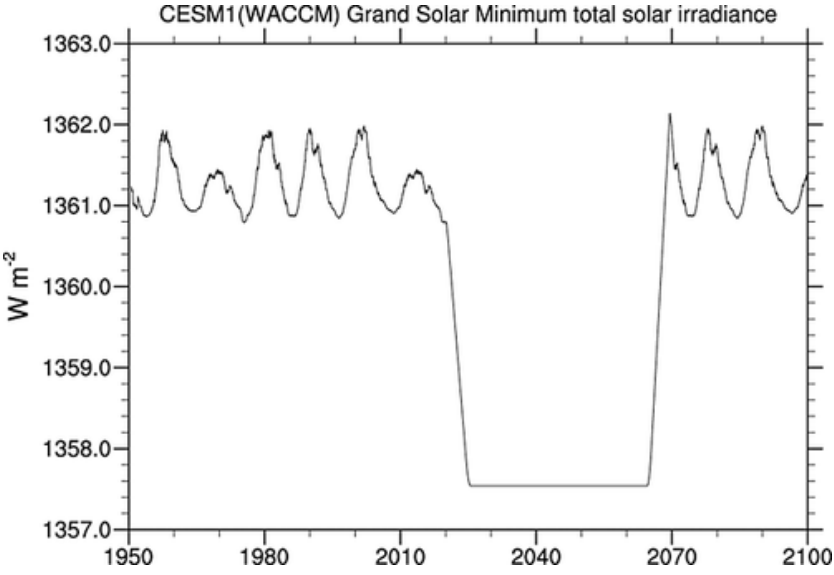


Image courtesy of: Could a future "Grand Solar Minimum" like the Maunder Minimum stop global warming? Gerald A. Meehl et al. March 2013.

The New Grand Solar Minimum Explained

A reduction in the solar magnetic field will cause a decrease in solar irradiance of approximately 0.22% for three solar cycles (25-27) during the first modern Grand Minimum (2020-2053). This decrease in solar irradiance can lead to a drop in terrestrial temperature of up to 1.0°C from current

temperatures during the next three sunspot solar cycles (25-27) of the first Grand Minimum. The largest temperature drops will likely occur during the local minima between sunspot cycles 25-26 and cycles 26-27 when solar activity levels are at their lowest. Therefore, temperatures in the Northern Hemisphere could be reduced by up to 1.0°C from current levels, which have risen 1.4°C since the Maunder Minimum. This would result in average temperatures falling below current levels to only 0.4°C higher than those measured in 1710. Then, after the conclusion of the First Modern Grand Solar Minimum, solar activity in cycle 28 will be restored to normal levels during a relatively short but newly emerging powerful Grand Solar Cycle expected to take place between 2063 and 2370.

Further Reading

Diminishing Solar Activity May Bring New Ice Age By 2030. Lomonosov Moscow State University Press Release. July 2015. Astronomy Now.

The Effects of Solar Activity on Local Weather

When sunspot activity has been quiet for some time than suddenly rises to above average levels, it can magnify weather extremes. This is why as solar activity begins to become more quiet in the coming decades, we are likely to see extreme changes in weather we have never witnessed before in our lifetimes. It is my hypothesis that the particles generated by our sun that negatively impact health not only directly impact the body, but also the weather. I have noticed during the past 12 years that when solar activity is rising and it does so during what I have termed a "condition red", sudden major changes in weather will take place. These changes are erratic, sudden and

of greater scope than mild changes. This may be causing a synergistic effect. There are numerous scientific research studies confirming the effect of weather upon not just the human body, but the immune system as well. If you suddenly experience abrupt weather changes, check the solar weather and you will most likely see solar flare activity taking place. This is also a time to be more cautious because sudden changes in weather have been linked to a higher incidence of falling injuries.

Geomagnetic Activity and its effects on the Vulnerable

Zaitseva and Pudovkin (1995) examined annual sunspot numbers and the deviation of earth's geomagnetic field within a 30-year mortality and birth rate record from the years 1867 to 1897 in Russia. The study found the rate of mortality rose significantly (r=0.78) and the birth rate dropped significantly (r=-0.67) when changes in earth's geomagnetic field occurred.

High correlations were found between trauma deaths and sudden diseases according to high and extremely low geomagnetic activity levels for miners that worked at high latitudes in the Spitsbergen mines, Shumilov et al. (1998). This confirms my earlier findings that people living at the northern latitudes are more susceptible to the effects of geomagnetic activity and are more prone to the first sudden increases in geomagnetic activity.

Geomagnetic Storms and their Effects at Middle Latitudes

Professor E. Stoupel in Azerbaijan studied the effects of space weather in two groups of acute cardiac events. These were sudden cardiac death (SCD) and acute myocardial infarction (AMI) morbidity and mortality. These studies were carried out in mid-latitudes, (Stoupel et al. 2006; Stoupelet al. 2007a;

Stoupel et al. 2007b). The study involved the years 2003 to 2005 examining Emergency Aid Stations in Grand Baku Area. The study revealed a rise in both acute myocardial infarction and sudden cardiac death during days of extremely high and extremely low levels of geomagnetic activity. Rare geomagnetic storms that occurred in the middle latitudes were the most life threatening. The events occurred when geomagnetic activity was at its lowest, and when there were above average levels of cosmic rays. At sea level, there are less cosmic rays due to more cosmic rays being absorbed by earth's atmosphere.

Equinoxes Magnify the Effects of Geomagnetic Activity

A study published in September/October 2001 titled: Biotropic effects of geomagnetic storms and their seasonal variations, which was conducted by V.P. Kuleshova and colleagues, found that the effects of higher than average geomagnetic storms were stronger at the equinoxes. The effects from the geomagnetic storms affected both the mental and the cardiovascular portions of the body.

What is the biggest geomagnetic storm ever recorded?

The largest geomagnetic storm ever recorded is known as the "Carrington Event" and was named after Richard Carrington, who saw it from his observatory in England. The event took place on August 28, 1859 to September 2, 1859 (solar cycle 10) which allowed for auroras to be seen at lower latitudes on our planet such as far south as the Caribbean and Hawaii and Central Mexico and even at lower latitudes very close to the equator, such as in Colombia. The energy of this flare was so powerful it took just 17 hours for the energetic particles to

reach earth instead of the usual 3 to 4 days. Ice cores drilled from earth's Arctic Circle, which contained nitrates in the cores, showed the event was the biggest geomagnetic storm in the last 500 years.

This geomagnetic storm did not however come from the largest recorded solar flare in earth's history. Tree rings show that two massive solar storms five times more powerful than the Carrington event have occurred in the past. Evidence for this came when scientists examined the rings of the oldest living trees in the world, the Bristlecone Pine Tree located in California [(14)] with a possible solar flare super storm having taken place on earth approximately 14,300 years ago. Ice cores can also be used to look at solar weather on earth in the past. It may be that massive solar storms happen every 12,000 to 14,000 years or so. This is because there is usually a bunch of extra solar activity in the hundreds of years leading up to one of these big storm cycles. Scientists think we might be due for another period of increased solar eruptions pretty soon, maybe kicking off around 2070 or so. The sun has been pretty quiet for a long time now, a few hundred years in fact, so it seems like we're overdue to start ramping up to another big one of these Grand Solar Maximums. We'll have to keep an eye on our sun over the coming decades to see if things start heating up like the researchers suspect!

Solar Activity has Lingering Effects

The effects upon the human body after a geomagnetic storm can linger for days, and even up to a week afterwards and the effects are felt on the body up to 24 hours before the geomagnetic storm occurs. For example blood pressure will rise a day before a geomagnetic storm and up to two days thereafter [(15)]. Above average solar wind speeds also create

similar lingering effects in older women. A study found that when solar wind speeds were in the 600 km/s range, older women experienced higher blood pressure and that the subsequent geomagnetic storm caused their blood pressure levels to remain elevated up to 2 days thereafter [16]. These effects were more pronounced at higher latitudes.

Your Dog can sense changes in Earth's Geomagnetic Field

Dogs have been shown to be sensitive to small changes in earth's magnetic field [17]. Could this be why some dogs know when their owners are returning home? A research study involving 200 tests showed a dog named Jaytee anticipated the owner's return by waiting at the window 55 percent of the time. In the control studies when the owner was not returning back home, Jaytee did not wait at the window [18].

Solar Weather's Effects on Latitude

Geomagnetic effects become compounded at higher magnetic latitudes [19]. Between 10 and 15% of the population living at higher latitudes is sensitive to auroral disturbances with the remainder of the population having a higher adaptive ability to sudden changes in geomagnetic activity [19]. Indigenous cultures residing in the circumpolar regions of earth have over time developed mechanisms that cope with above average geomagnetic disturbances.

What is interesting is grapes use this effect to create better tasting wine. The stronger effects of geomagnetic activity at high latitude have forced grapes to adapt, and in doing so create grapes with more robust flavor. The impact of latitude was more significant than altitude in influencing the sensory characteristics of Malbec wines produced across various

regions in Argentina. Vineyards situated between 31 and 33 degrees latitude tended to yield wines with the most desirable attributes, including floral, sweet, cooked fruit and raisin flavors. In contrast, regions located outside this latitude band were more likely to produce wines exhibiting sour and bitter tastes along with a pronounced herbal aroma. The findings suggest latitude plays a key role in determining the quality and style of Malbec grapes grown and the resulting wines made within different parts of Argentina [(21)]. I also state in my book Lifespan Extension and longevity secrets through Alchemy, SIRT1 & SOX9 genes and the Maillard reaction, that grapes produce the anti-aging substance Resveratrol when grown at higher latitudes.

Another study found that people living at 30 degree latitudes experience what's known as "*light vortexes*" which causes viruses to mutate due to an amplification type effect [(22)]. The latitude of 30 degree latitudes has also been shown to be more susceptible to virus mutation [(23)]. Geomagnetic storms, including times of quiet geomagnetic activity that occur in the middle latitudes have been found to be the most life threatening [(24)]. At lower latitudes the temperature has more of an effect on the body. Sudden changes in humidity and temperature affect the human body more intensely. This greatly reduces the body's resiliency to recover from exercise [(25)].

Solar Activity Influences Radioactive Decay

Jere H. Jenkins et al. (Sept 2012) found that the rate of decay for a radioactive isotope called chlorine 36 changed each year. It decayed the fastest in January and February (winter). It decayed the slowest in July and August. They measured this

over a period from July 2005 to June 2011 (summer). This decay rate may be because earth rotates closest to the sun during July.

On December 13, 2006, a solar flare provided an important clue when it emitted particles and radiation towards Earth. A Purdue University nuclear engineer, Jere Jenkins, was measuring the decay rate of manganese-54, a short-lived isotope used for medical diagnostics. He noticed the decay rate dropped slightly during the solar flare, with the decrease starting approximately a day and a half before the event. Jenkins and his colleague Fischbach hypothesized that solar neutrinos were likely responsible for this change in the decay rate. Solar neutrinos are very light particles that travel near the speed of light through matter, interacting very little. Upon further examination of past decay data from Brookhaven National Laboratory, the researchers found a recurring pattern of 33 days. This was somewhat surprising as most solar observations show a pattern of approximately 28 days, which matches the rotation rate of the sun's surface. It is my hypothesis that distant supernova explosions may also impact the decay rate of radioactive particles. Certain isotopes could potentially exhibit higher sensitivity to influences from supernova explosions. Further studies in the future will validate or dismiss this hypothesis.

Now let’s explore how Solar Weather affects the physiology of the body.

Chapter Review:

- How do solar and geomagnetic activity affect human moods and spirituality?

- What are the main factors of solar weather that influence life on Earth?

- What are the potential effects of the New Grand Solar Minimum and the decrease in solar activity on climate change and wind speeds?

- How does solar activity influence radioactive decay and what patterns have been observed in decay rates?

Chapter 3
Effects of Solar Weather on Health

Epileptic Seizures and Geomagnetic Activity

One of the groups most sensitive to geomagnetic activity are epileptics. The effects leading up to an epileptic seizure are accumulative. Persinger and Bureau (1995) looked at the amount of time to initiate an epileptic seizure according to the amount of geomagnetic activity. They found it occurred in a dose response manner according to the amount of geomagnetic activity [(26) (27)].

Geomagnetic Activity and Poltergeists

A research study published in April 1986 titled: Geophysical variables and behavior: XXXIII. Onsets of historical and contemporary poltergeist episodes occurred with sudden increases in geomagnetic activity, that was published by L Gearhart and M A Persinger saw that in early data that poltergeist incidents often started around the same time as a sudden big increase in geomagnetic activity. To check this observation, the scientists looked closely at reports of incidents where the exact starting date of a geomagnetic storm matched poltergeist activity. Statistical analysis clearly showed that geomagnetic activity was much higher on the day the incidents started or on the following day. This pattern was the same for older cases and more recent ones too. It was also similar for incidents in North America and Europe. The results were very unlikely to be just chance - they suggest these strange episodes may be some kind of natural occurrence connected to things that happen on the earth and the resulting phenomenon has a tendency to manifest through

certain people.

Solar Weather and Cancer

As sunspot activity starts to wind down after solar maximum, headed towards a sunspot minimum, we may start seeing a rise in cases of cancer as published studies are now just starting to confirm this link [28].

Riabykh and Bodrova (1992) found significant correlations between sunspot numbers and the rates of benign breast cancer for mid to late aged women. Dimitrov (1993) discovered a connection between malignant melanoma in Czechoslovakia and solar 7.5 and 11 year solar cycles. Dimitrov (1999) also discovered that there existed a pattern showing the solar cycle was related to Malignant Melanoma and Non-Hodgkin's Lymphoma in adult U.S. Populations. Dimitrov (1999a) correlated childhood Non-Hodgkin's Lymphoma in the U.S. with solar cycles, $p<0.05$. The study also found that there existed a relationship between male leukemia cases and female breast cancer cases in Thailand, corresponding with annual sunspot numbers.

In a study published in September 1940 researchers found that there existed an increase in Influenza, Cancer and Neoplastic Diseases during the period when sunspot activity was winding down and headed towards sunspot minimum. A more recent study published in June 2006 [29] also reached the same conclusions stating that sunspot activity may be used as a predictor for large scale influenza outbreaks. One of the more recent studies published in September 2016 [30] concluded that influenza pandemics occur within 1 to 2 years of a sunspot maximum. However the date of the first reported COVID-19 patient which was November 2019, was

approximately 4 years after solar maximum of Sunspot Cycle 24, at the very beginning of Sunspot Cycle 25.

So we can clearly see that solar activity affects our health, most notably our immune system. We could further say that solar activity may be affecting our perception of our environment, perhaps creating more confidence, which creates a stronger economy. There are many scientific studies showing that the mind can affect the immune system and exercises such as Yoga and Meditation have been scientifically proven to affect the immune system and we shall go into techniques of how to combat excessive solar weather a little later on in this book. Now let's take a look at how solar activity affects our white blood cells, a vital component of our immune system.

Sunspots and their effect upon White Blood Cells

A study published in September 2014 [31] discovered that a quarter of your genes (5,136 out of 22,822 genes) have a seasonal variation. Some genes become more active in the summer, and others more active in winter. The biggest changes were observed in white blood cells and adipose tissue, which affect the immune system. A six month shift existed between European and Australian patterns, due to the opposition of seasons. The variation of genetic activity also varied by latitude. Gambia peaked during June and October (*the rainy season and October is the equinox*). Gambia is noted for its high infectious disease burden, showing that white blood cells come alive to fight infection during the rainy season which lasts from June to mid-October. White blood cells were not the only substrate showing a seasonal peak, peaks were also observed in summer and winter and genetic

changes were also observed in adipose tissue. Adipose tissue is composed of adipocytes, whose primary function is to store energy in the form of fat.

Studies now prove that there are 3 main groups of the population that are at risk for above solar weather activity –

1 - The Elderly, especially those living at high to mid latitudes.

2 - Those deemed solar sensitive. Possibly individuals born during solar maximum.

3 - Those with pre-existing medication conditions, especially those who have conditions that are adversely impacted by solar weather such as stroke and heart disease.

People over 70 years show a stronger tendency to suffer from conditions of Ischaemic Heart Disease when geomagnetic activity is at below average levels [33]. Some people are more resistant to the effects of extreme solar weather than others. People who are under extreme stress or suffering from specific medical conditions are most at risk. This occurs because as solar activity suddenly increases, a shock wave from the huge ejection of particles from our sun propagates throughout our solar system. This shock wave contains within it specific frequencies that may cause some people to feel uneasy and uncomfortable. For example, grey whales, which are mammals like us, appear to be sensitive to these frequencies. Grey whales are 4.3 times more likely to unexpectedly beach themselves when a solar outburst is hitting the Earth (Jesse

Granger et al. (2020). It may be that increased solar activity creates lots of radio frequency noise which overwhelms the whales and they try to escape these frequencies by leaving the water.

While there are no studies yet confirming this it is my hypothesis that disturbances in the Schumann resonance (*7.83, 14.3, 20.8, 27.3, and 33.8 Hz*) that occur during above average solar activity may play a role in the whales beaching themselves. This is because the frequencies between 30 and 100 Hz (Gamma) is the same frequencies whales use to communicate [33]. This frequency also overlaps with wind and vessel noise [33].

Solar Activity and the Heart

214,908 ambulance calls were examined for ($p = 0.95$) a rise in the frequency of acute myocardial infarction (AMI) in men during a year of low solar activity (LSA) [34]. The study also looked at women during a year with high solar activity (HSA). A correlation existed showing an enhanced number of deaths including sudden death, cardiogenic shock, clinical death and pulmonary edema during higher solar activity. Emergency calls peaked between the hours of 9.00 a.m. and 12.00 p.m., with the lowest number of calls occurring between 3.00 a.m. and 6.00 a.m. Acute myocardial infarction became elevated during December in years solar activity was at its lowest and also during May when solar activity was higher with peaks on Mondays during years of higher solar activity and during Thursdays during years of solar activity [34].

During Mondays heart attacks occur more often due to the sudden increase in ELF waves caused by cell phones and other electronic equipment that goes online every Monday morning.

Research already shows that cell phone use causes a reduction in melatonin levels in the body. A study that was published in May 2014 [35] concluded that increased duration of mobile phone was associated with depression. This is why people feel horrible going to work on Mondays. By Tuesday their physiological systems have adjusted, much like the body adjusts after a high period of solar activity.

A study published in August of 1995 [36] concluded that serotonin plays a major role in the pathogenesis of the cardiac plaque formation observed in carcinoid patients. Therefore could the electromagnetic radiation from cell phones be disturbing the body's serotonin levels? A study published in 2015 [37] found that just 45 minutes of exposure to electromagnetic radiation caused an increase in serotonin (5-HT), which may lead to retarded learning and memory deficits. Could this be one of the reasons the worldwide population is experiencing a dramatic drop in IQ levels?

Changes in space weather may also affect our heart rhythms. Researchers looked at a group of people in Saudi Arabia and found some interesting connections. Not only was their heart rate variability linked to changes in solar wind intensity, but also cosmic ray levels, radio flux from the sun, and Schumann resonance power [38]. All of these space weather factors seemed to increase parasympathetic nervous system activity.

Now parasympathetic activity is important because that part of your autonomic nervous system regulates things like heart rate variability, breathing, and metabolism. A lower HRV (*heart rate variability*) has actually been tied to a higher risk of first-time heart issues and lower HRV levels are used to predict sudden cardiac death, which accounts for about a quarter of all

deaths seen in cardiology [38].

Further research has found that sudden cardiac deaths from coronary atherosclerosis but not acute heart attacks actually happened more often on days with the lowest geomagnetic readings compared to days when geomagnetic activity was at higher levels. The difference was statistically significant [39] and if geomagnetic activity is too high, the heart becomes more susceptible to a heart attack [40]. It is the period in-between these two periods, the "*sweet spot*", that the heart is at its very best.

Neurological effects of Low and Quiet Geomagnetic Activity

Shumilov et al. observed a high incidence of unexpected deaths, cardiovascular diseases, and psychotic disorders in a high-latitude mining community during periods of exceptionally low geomagnetic activity. Their findings suggested a correlation between reduced geomagnetic field strength and negative health outcomes. In a 1989 study, Usenko et al. examined the relationship between solar activity cycles and cardiovascular function in pilots. They found statistically significant increases in systolic blood pressure and heart rate among study participants during years of maximum solar activity compared to years marked by minimum solar activity. These results provide early evidence linking fluctuations in space weather parameters to human physiology [41]. Conesa (1995, 1997) found a connection between quiet geomagnetic activity and vivid dreaming [42]. A significant correlation was found between periods of localized geomagnetic activity and the occurrence rate of isolated sleep paralysis. Specifically, times of relatively low geomagnetic

activity were notably associated with a higher incidence of isolated sleep paralysis episodes [42]. Tunyi and Tesarova (1991) found that work injuries that were fatal, sports injuries, alcoholism and suicide, occur more often during periods of low solar activity and also that the Schuman Resonance played a role in suicides. The study also found that found that suicides in people 70 and greater occurred more often during periods of lower solar activity [43]. C. Gordon and Michael Berk of Deakin University discovered that suicide was associated with geomagnetic activity levels and that the correlation was found to be statistically significant for both men and women [44].

During times of above average solar activity, the heart is the most vulnerable organ of the body. It is now a fact that solar activity affects the heart. When astronauts and people on the ground simultaneously had their heart activity measured when a geomagnetic storm was taking place, they exhibited significant increases in their heart rate as well as a decrease in their heart rhythm variability (HRV) [45].

What happens to the Heart during Geomagnetic Storms

Chernouss et al. (2001) found that the reason two groups of people that were affected by above average geomagnetic activity (*those that had adapted and those that were sensitive*) was due to their sympathetic responses, with some individuals having a higher adaptive ability to changes in their localized geophysical environment [46]. As stated earlier, Chernouss et al. (2001) suggested indigenous cultures residing in the circumpolar region have over time developed mechanisms to cope with magnetic disturbances [46]. This is in comparison to people who have recently moved to the region. These new settlers had not enough time for their biological systems to

fully adapt to the above average geomagnetic variations in that region. Studies by Chernouss et al. (2001) looked at people who respond sympathetically with magnetic disturbances, and compared it to people who respond parasympathetically. These 2 groups were called SP and PP. The stress response of SP people increased with increasing geomagnetic activity while, the stress index of the PP group decreased a small amount as geomagnetic activity increased. Hence SP individuals have adapted to stress, whereas PP people had not [(46)]. Cornelissen et al (2002) states mortality from geomagnetic disturbances in Minnesota, USA, which is located at a northern latitude of 43 degrees, was 5% during periods the sunspot activity was at maximum. This corresponds to approximately 220 deaths yearly in a population of approximately 5 million people.

The Effect of Geomagnetic Storms on Productivity

Because higher than average geomagnetic storms have been scientifically shown to impact our mental and emotional health, and our state of mind represents how productive we can be, higher than average geomagnetic activity must also be affecting our productivity. Let's take a look at the data and see what it says.

In a June 2013 study researchers O.B. Novik and F.A. Smirnov discovered that persons performing tasks using a computer during a moderate geomagnetic storm and up to 24 thereafter showed a decrease in their theta rhythm brainwaves by a factor of two or more; at times reaching zero [(47)]. Theta is one of the prime brainwave frequencies for learning and creativity. So we can see that creativity is affected almost in real time and up to approximately 1 day after a major

geomagnetic storm. In another separate study conducted in 2005 [48] researchers concluded that during severe geomagnetic storms, the volunteers tested also showed a reduction of theta brain wave rhythms. And in a 2014 study the researchers concluded that alternations in brainwaves lasted up until about 48 hours after the geomagnetic storm had passed [49].

Very Low Geomagnetic Activity and its Effects on Health

Low periods of geomagnetic activity are more common during solar minimums [50]. Very low or non-existent levels of geomagnetic activity have been shown to significantly impact the number of cases of some acute cardiac events (*acute myocardial infarction morbidity, sudden cardiac death and mortality*) [34]. Other studies show a rise in both sudden death from cardiac arrest (Heart Attack). This is the most common cause of cardiac arrest. This is also commonly called coronary artery disease and is responsible for the high number of emergency room admissions.

Summary

There exists a sweet spot of geomagnetic activity that is beneficial for the health of the body.

Sunspots Affect Lifespan at Time of Birth

A January 2015 study [51] found that people born during periods of solar maximum lived shorter lives, compared to people born during solar minimums. This means the most recent generation of people born during solar maximum (2000), those today called "millennials", should keep an extra eye on their health, as this research proves this group is less

adaptable to solar extremes. Hence climate change may affect this group more than any other group. It also means that those born during solar cycle 24 (December 2008) will be better adapted to future climate change.

Effect of Sunspots on Birth Weight and Height

A research study [52] examined 1,171 infants born during solar sunspot maximum #21 (September 1st, 1979 to January 31st 1980) and the period of sunspot minimum (#22) (September 1st to December 31st 1986). The study showed that infants born during sunspot maximums, weighed more and grew taller. During solar minimums, the males were more likely to be born with a lower birth weight compared to females. This is due to the fact that studies have shown that there is a greater secretion of hormones when there are more sunspots and elevated geomagnetic activity and that it may be these hormones that are allowing the body to rapidly adapt to geomagnetic stresses [53]. Another study that was published in April 1995, found that babies born during sunspot maximum exhibited chromosomal abnormalities [54] and a Norway study found that the lifespans of people born during solar maximum were 5.2 years shorter compared to people born during solar minimum [55].

Strokes

Stroke admissions show a highly significant correlation when geomagnetic activity is higher in males of 65 years or less [56].

Sunspots and Hip Fractures

Now let's take a look at sunspot activity and the health of our bones. There exists a confirmed and remarkable pattern

between sunspot cycles and the prevalence of hip fractures occurring in the elderly. A study concluded that the 11-year cyclic variation of ultraviolet radiation is the cause of hip fractures or that solar activity is negatively influencing the nervous postural regulation leading to a occurrence of accidental falls [57].

Sunspots Affect the Human Cervix

In a more resent study published in March 2011, the study concluded that around the peak of sunspot maximum, there were increased cases of diseases of the cervix [58].

What is the Cervix?

The Cervix is the narrow neck like passage forming the lower end of the uterus.

The Solar Healing Clinics of Dr. Auguste Rollier

The most notable effect from sunlight we gain is the natural increase of Vitamin D in our bodies. Dr. Auguste Rollier used light to heal thousands of patients with tuberculosis. He coined the name heliotherapeutic therapy. His clinic was situated at a high elevation in clear mountain air [59].

The secret to his success was in the combined effects of ultraviolet exposure and its ability to induce the production of nitric oxide and vitamin D in the human body. Nitric oxide functions not only as a vasodilator and messenger within the cardiovascular system, but also plays a role in innate immunity. Vitamin D contributes importantly to immune system functions, as multiple peer-reviewed studies have found an

association between higher vitamin D levels and greater resistance to tuberculosis infection. Together, the increase in these critical molecules helps bolster both cardiovascular health and core immune defenses through natural exposure to sunlight on the skin's surface [59].

Sliced Mushrooms and Vitamin D

When fresh button mushrooms are deliberately exposed to sunlight between midday hours for 15-120 minutes, they produce significant amounts of vitamin D2, usually exceeding 10 micrograms per 100 grams of fresh weight. This level approaches the daily recommended intake of vitamin D in many countries. However, the amount of vitamin D2 produced depends on factors such as the time of day, season, latitude, weather conditions, and length of exposure. Since sliced mushrooms have a higher surface area to volume ratio, where more ergosterol is exposed, mushrooms sliced and exposed to sunlight generate more vitamin D2 than whole mushrooms receiving equivalent ultraviolet radiation exposure [60].

The Vitamin D Discoveries of Leonard Findlay

During the time rickets was prevalent in industrialized cities in the United States and Europe, numerous intervention studies were initiated to determine a causal relationship. In 1908, Findlay, a prominent Scottish physician, was convinced that rickets was caused by a lack of activity rather than a lack of sun exposure. To prove his point, he conducted an intervention study where he placed rodents in a glass enclosure to prevent movement and exposed them to sunlight [61]. He observed that they developed rickets. However, he did not realize that the lead-containing glass absorbed all vitamin D-producing solar

radiation. As a result, his conclusion was incorrect. Separately, Koch infected puppies with a Bacillus bacterium and concluded that rickets was caused by an infectious disease. Concurrently, children exposed to radiation from a mercury arc lamp or sunlight were reported to be cured of their rickets. Therefore, 100 years after the first association study suggested sunlight deprivation was the cause of rickets, it was finally accepted that exposure to sunlight was a "*definite and dependable cure for rickets*."

Does Sunscreen Block Vitamin D Production?

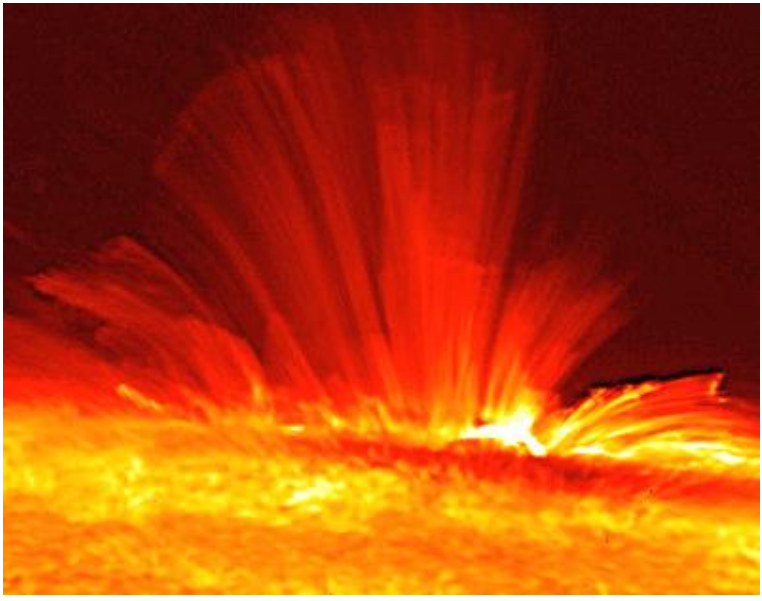
While aging decreases the skin's ability to produce vitamin D due to a reduction in robust tissue, the skin still maintains a significant potential for vitamin D synthesis even in older individuals. Exposure to 15-30 minutes of sunlight three times per week has been shown to sufficiently raise blood vitamin D concentrations in elderly populations. The application of sunscreen greatly diminishes vitamin D production in the skin, contrary to statements made by the Institute of Medicine. A study of farmers in Pennsylvania and Illinois with histories of skin cancer who regularly used daily sunscreen while outdoors performing their farming duties were found to have significant rates of vitamin D deficiency at the conclusion of each summer. When applied as directed, sunscreen containing a sun protection factor (SPF) of 30 or higher was been shown to decrease vitamin D synthesis by over 95% [(61)].

And in closing out this chapter, operating room nurses who worked long hours and received minimal sunlight, were shown to be at risk for higher incidences of mental illness [(62)] and that it accompanied with chronic diseases. In Summary, we now have published scientific studies proving solar activity

affects 3 main factors of our civilization.

- Creativity and Learning
- Lifespan
- White Blood Cells

Is it any wonder the world's longest civilizations such as the Egyptian and the Inca worshipped our sun? Now let us look at solar weather stress and methods we can use to cope.



Chapter Review:

- How does solar weather impact the occurrence of epileptic seizures?

- What is the relationship between solar weather and the incidence of cancer, including specific types such as breast cancer and melanoma?

- In what ways does solar activity affect the cardiovascular system, and what are the potential health implications?

- What evidence exists to support the impact of solar weather on factors such as lifespan, birth weight, height, strokes, bone health, and cervical diseases?

Chapter 4
Solar Weather Stress

The stresses that take place in our environment during the first 2 to 3 years of our lives have an enormous impact on our long-term wellbeing and lifespan [(63)], with heavy stress reducing life expectancy by 2.8 years [(64)]. As covered earlier, studies confirm that people born during Solar Maximum, which is a time solar activity is more active than usual, have shorter lifespans [(65)]. As of 2024, we are in Solar Cycle 25, with an expected peak in 2025, rounding out the latest Solar Maximum.....Get this book now to read the rest

Recent Powerful X-ray Solar Flares

RANK	DATE	CLASS
1	04/11/2003	X28+
2	02/04/2001	X20.0
2	16/08/1989	X20.0
3	28/10/2003	X17.2
4	07/09/2005	X17
5	06/03/1989	X15.0
5	11/07/1978	X15.0
6	15/04/2001	X14.4
7	24/04/1984	X13.0
7	19/10/1989	X13.0
8	15/12/1982	X12.9
9	06/06/1982	X12.0
9	01/06/1991	X12.0
9	04/06/1991	X12.0
9	06/06/1991	X12.0
9	11/06/1991	X12.0
9	15/06/1991	X12.0
10	17/12/1982	X10.1
10	20/05/1984	X10.1
11	29/10/2003	X10
11	25/01/1991	X10.0
11	09/06/1991	X10.0
12	09/07/1982	X 9.8
12	29/09/1989	X 9.8
13	22/03/1991	X 9.4
13	06/11/1997	X 9.4
14	24/05/1990	X 9.3
14	**06/09/2017**	**X 9.3**
15	05/12/2006	X 9.0
15	06/11/1980	X 9.0
15	02/11/1992	X 9.0

Quiet Sunspot Activity	Quiet or Geomagnetic Activity	Above Average or unexpected increase in Sunspot Activity	Above Average or unexpected increase in Geomagnetic activity
people aged 70 years are more prone to suicide (1)	pregnancy induced hypertensio n (2)	Daytime - sudden death, cardiogenic shock, clinical death and pulmonary edema	myocardial infarction (8) Impaired Reproductive Ability (11)
increase in stroke/isc hemic heart disease deaths (5)	Unexpected death from cardiac arrhythmia, paroxymal atrial fibrillation and stroke (3)	More Earthquakes (14) (15) (16) (17)	Reduced Melatonin (18)
myocardia l infarction (9)	Ischaemic Heart Disease. People over seventy (4)	Antioxidant Depletion (25)	Increased Cortisone (19)
Longer Lifespan (solar minimum) (12)	sports injuries, fatal work injuries and alcoholism (30)	Impaired Lung Functioning (26)	epileptic seizures (20)
Less Earthquak es (13) (14) (15) (16) (17)	Sleep paralysis (30)	Influenza or Pandemics (28)	Mental Instability (21)
Increase in Cancer (27)	increased electrical instability in the heart (42)	Beached Whales (33)	psychiatric unit admissions increase (22) (23)

Higher Rainfall (29)		chromosomal abnormalities (sunspot maximum) (38)	lower birth rate, higher infant mortality at birth (24)
Higher anxiety levels in pilots (31)		Shorter Lifespan (solar minimum) (12)	Increased depression in males during the second week following KP storms (25)
Breast Cancer (43)		Air and Soil is more drier than usual (39)	Increased Blood Pressure (32)
		Intensified Air Pollution (40)	Microcirculation blood flow affected (34)
		Hip Fractures (solar maximum) (41)	Sudden Infant Death (35) (36)
		malignant melanoma (solar maximum) (44)	decreased nocturnal melatonin production (37)

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Space Weather Forecasting Links

NOAA and some space weather websites give you an option to sign up for when solar flares occur. As this activity occurs, they will send you an email when they take place. You can also look at recent solar flares by visiting the link below: https://www.swpc.noaa.gov/products/notifications-timeline

Real Time Geomagnetic Activity

https://services.swpc.noaa.gov/text/daily-geomagnetic-indices.txt

https://en.ilmatieteenlaitos.fi/auroras-and-space-weather?station=OUJ

https://aurorawatch.lancs.ac.uk

https://www.swpc.noaa.gov

Schumann Resonance

http://sosrff.tsu.ru/?page_id=554

Schumann Resonance Forecast

http://sosrff.tsu.ru/?page_id=502

Magnetometer

https://flux.phys.uit.no/Last24/Last24_jck1a.gif

https://www.swpc.noaa.gov/products/goes-magnetometer

https://aurorawatch.lancs.ac.uk

Magnometer archived data
https://www.gi.alaska.edu/monitors/magnetometer/archive

Current Sunspot Activity
http://services.swpc.noaa.gov/text/daily-solar-indices.txt

Solar Wind Speed
https://services.swpc.noaa.gov/text/ace-swepam.txt

Solar Wind Speed Forecast
https://www.swpc.noaa.gov/products/wsa-enlil-solar-wind-prediction

Solar Weather Forecasts
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2mev levels
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Cosmic Rays
https://cosmicrays.oulu.fi

Real Time polar cap magnetic activity Index
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