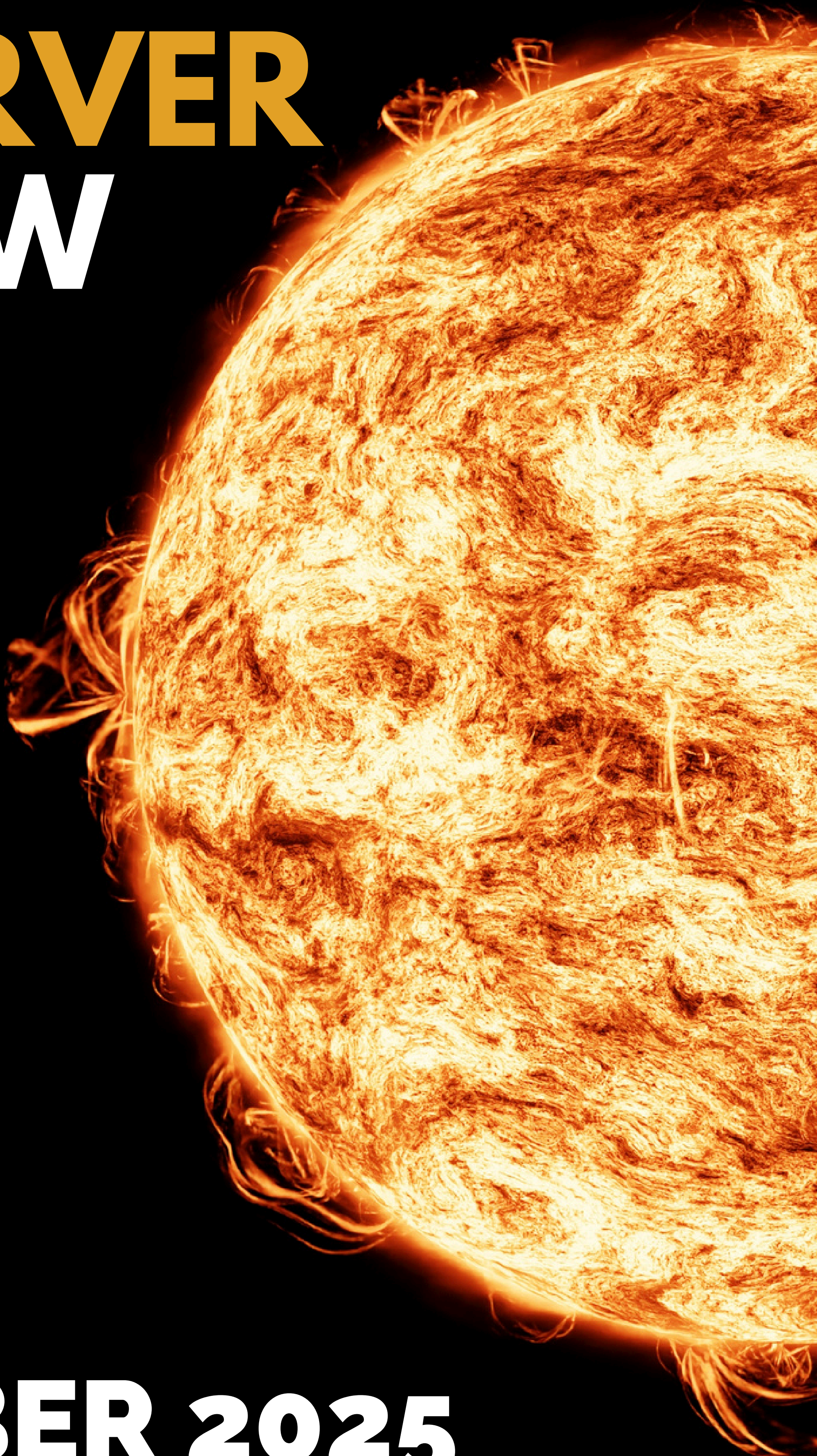
THE OBSERVER REVIEW

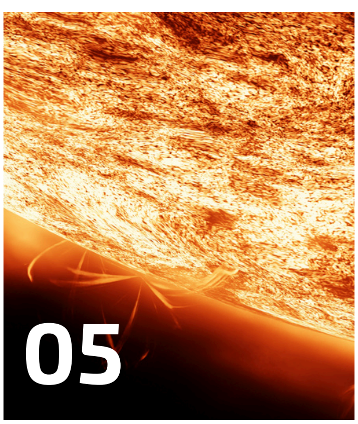


DECEMBER 2025

OBSERVER REVIEW

CONTENTS

DECEMBER



FEATURED ARTICLES

AND MANY MORE!

NOT RECORD WARM

ARTICLE REFERENCED:
COSMIC DUST REVEALS DYNAMIC SHIFTS IN CENTRAL ARCTIC SEA-ICE COVERAGE OVER THE PAST 30,000 YEARS

BY: BEN DAVIDSON

A new study is looking at sediment data of preserved paleoclimatology and confirming an important fact about the earth's atmosphere that often gets lost amidst mainstream climate propaganda.

The modern era is not record warm, not by a long shot, not in the last few thousand years with the Medieval and Roman warm periods, but for a stretch of several thousand years from early to middle Holocene.

The last glacial cycle ended ~12,000 years ago, with a rapid warming event and the Gothenburg geomagnetic excursion.

The time since then is known as the Holocene interglacial warm period, and the early to middle of it (about 5000-8000 years ago) was known as the Holocene climate optimum - when temperatures peaked considerably higher than they are now.

"Optimum" indeed means "optimal" and this description comes from the abundance during warmer periods, when plant and animal life tend to proliferate.

This is an accurate description, but odd, since it is coming from some of the same climatologists who suggest that a little bit of warming right now will be cataclysmic.

AT THE END OF THE DAY IT IS ANOTHER REMINDER THAT MOST PEOPLE ARE BEING FOCUSED IN THE WRONG DIRECTION, AND THAT FORCES OUTSIDE OF HUMAN CONTROL ARE WHAT ACTUALLY DOMINATE THE ATMOSPHERIC FORCING OF EARTH.

SOLAR GEC FORCING

ARTICLE REFERENCED:
GLOBAL ELECTRIC CIRCUIT RESPONSE TO THE MAY 2024 GEOSPACE SUPERSTORM FROM CHINA'S GAR STATION OBSERVATION

BY: BEN DAVIDSON

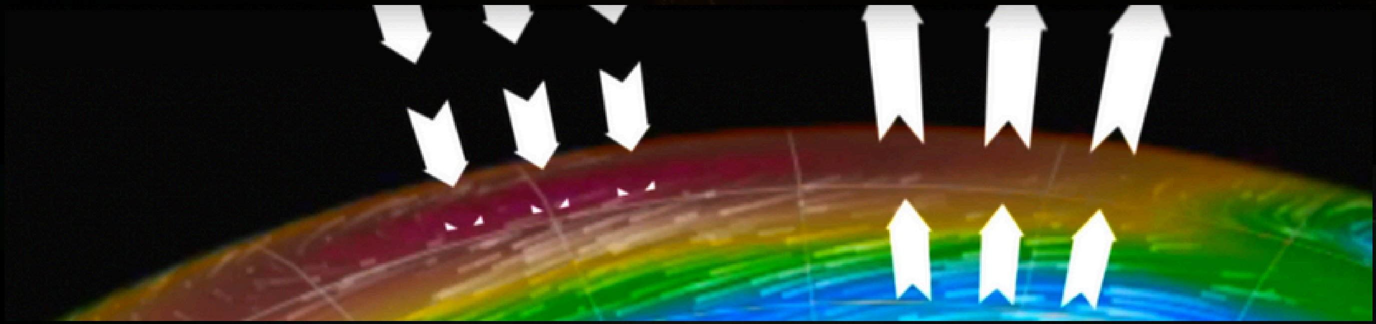
Two new studies are characterizing the impact of the May 2024 solar superstorm on the global electric circuit and atmospheric electricity. The primary goal was to determine the base ionization and the electric field strength resulting from the space weather impact.

The planetary electricity took quite the jolt, with an initial fluctuation followed by a sustained addition to the circuit. Upon impact there was a brief 20v/m surge through the atmosphere followed by a drop of nearly double that amount. This fluctuation quickly stabilized into a sustained 130v/m addition to the global atmospheric electric circuit that lasted from May 12-14, 2025.

The next goal of the team is to eventually insert these data into at atmospheric electricity model that can accurately tell them how these impacts would affect the weather. This will hopefully be to a much greater degree than the more general data we have now.

For example, we already know that changes to the global electric circuit can impact clouds, precipitation, pressure cells, temperatures, storms, wind and lightning. However the differences between cells and characteristics at different latitudes, or how a high vs low cell would be impacted and to what degree- those specifics remain elusive for now. There are many studies that suggest that solar storms impact hurricanes, but how much, and is it particle-specific or larger in scale?

This is where the field of study should have gone in the 1990s when the global electric circuit was fully understood. Thirty years later we may be seeing the team who can actually cross the finish line.



SPACE WEATHER AND AGING

ARTICLE REFERENCED:
SPACE-EARTH CONNECTION: HOW SPACE WEATHER FLUCTUATIONS IMPACT EPIGENETIC AGING IN AN ELDERLY MEN COHORT FROM MASSACHUSETTS, USA

Aging is often seen as an internal process driven by genetics, lifestyle, and disease. But, new evidence indicates that space weather may subtly influence how fast our bodies age at the molecular level.

In a recent study of older adults, researchers found that short-term variations in space weather were associated with measurable changes in epigenetic aging, a biological marker that reflects how quickly cells and tissues are aging relative to chronological time.

The findings show that the same space environment known to affect astronauts may also leave detectable biological signatures in people living at ground level.

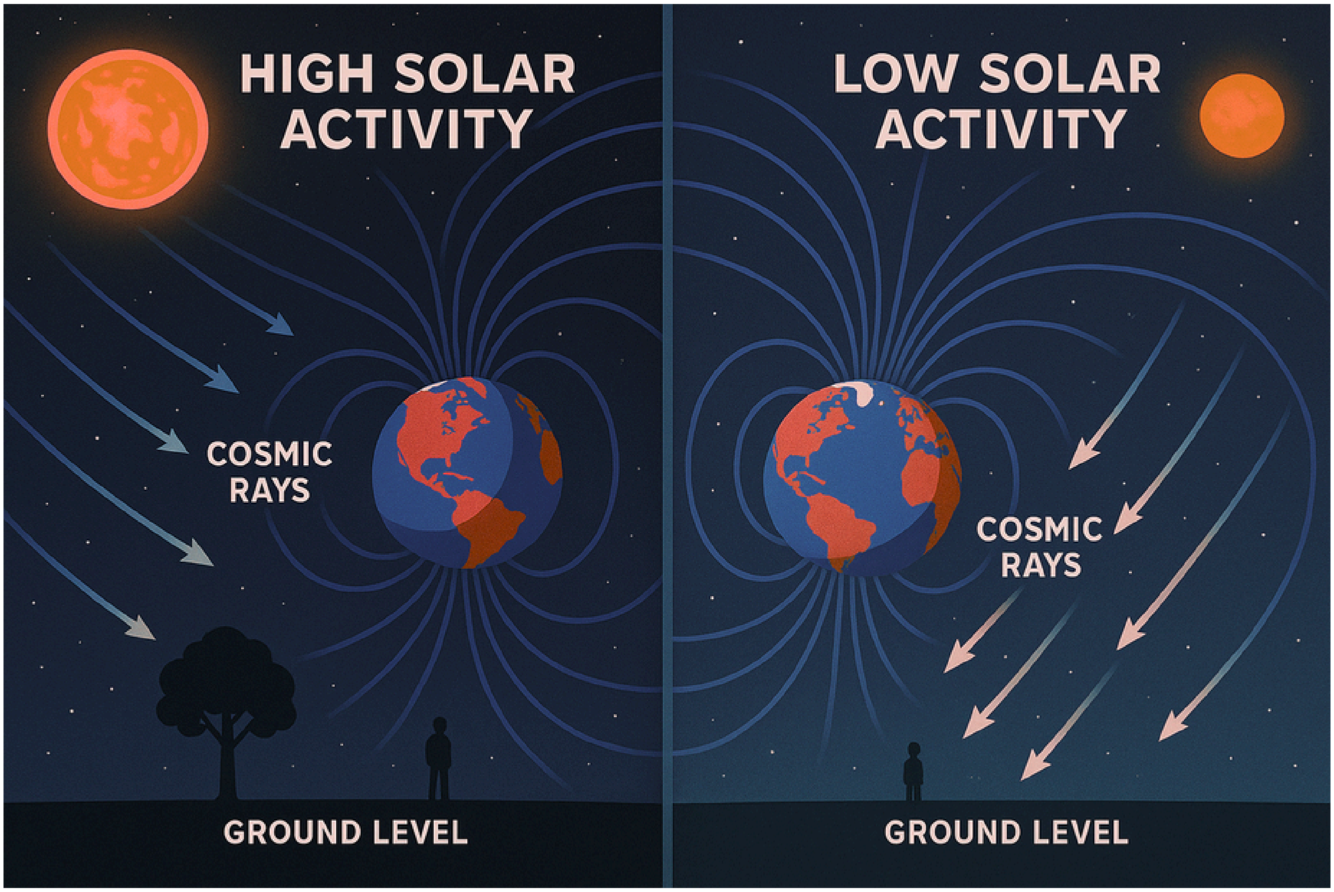
Epigenetic aging is assessed using DNA methylation, a chemical modification that regulates gene activity without changing the underlying DNA sequence. Patterns of methylation shift with age and environmental exposures, making them sensitive indicators of biological wear and tear.

Using data from the Normative Aging Study, a long-running cohort of older men in Massachusetts, researchers analyzed nearly 1,500 blood DNA methylation samples collected between 1999 and 2013.

This period spanned more than a full solar cycle, allowing investigators to capture natural variation in space weather over time.

THE STUDY FOCUSED ON FOUR ESTABLISHED EPIGENETIC CLOCKS. TWO CLOCKS REFLECT CELLULAR AGING, WHILE THE OTHERS INCORPORATE MARKERS OF PHYSIOLOGICAL DECLINE AND DISEASE RISK.

THE DIFFERENCE BETWEEN EPIGENETIC AGE AND CHRONOLOGICAL AGE, KNOWN AS EPIGENETIC AGE ACCELERATION, SERVES AS AN INDICATOR OF FASTER OR SLOWER BIOLOGICAL AGING.



Higher neutron counts and cosmic ray-induced ionization were linked to increases in epigenetic age acceleration, meaning that biological age advanced faster during periods of greater cosmic radiation. In contrast, higher sunspot numbers and stronger solar magnetic fields were associated with reductions in epigenetic age acceleration.

THESE OPPOSING EFFECTS MIRROR THE KNOWN PHYSICS OF THE SOLAR CYCLE.

WHEN SOLAR ACTIVITY IS HIGH, EARTH'S MAGNETIC FIELD PROVIDES STRONGER SHIELDING AGAINST COSMIC RAYS.

WHEN SOLAR ACTIVITY IS LOW, COSMIC RADIATION AT GROUND LEVEL INCREASES. THE BIOLOGICAL FINDINGS TRACKED THIS NATURAL ANTICORRELATION.

Not all epigenetic clocks responded equally. Clocks reflecting cellular aging showed the strongest associations, while the mortality clock showed little sensitivity to short-term space weather variation.

In addition, it was revealed that cosmic radiation was linked to epigenetic changes in DNA damage response, p53 signaling, apoptosis, and inflammatory pathways. These are classic stress-response mechanisms activated by ionizing radiation and oxidative damage, and they closely resemble biological responses observed in astronauts exposed to higher radiation levels in space.

SPACE WEATHER DREAMS

ARTICLE REFERENCED:
TOWARD A NOVEL THEORY OF TRANSPERSONAL HELIOPSYCHOLOGY: EXPLORING THE INFLUENCE OF SPACE WEATHER ON SLEEP AND DREAM STATES

Dreams are among the most universal yet least understood human experiences. Every night, as the body slips into sleep and the brain enters altered electrical rhythms, consciousness detaches from waking sensory input and turns inward.

This research suggests that dreams may also be shaped by space weather.

The study lays the groundwork for heliopsychology: a framework for understanding how solar and geomagnetic activity may interact with consciousness, particularly during sleep, when the brain is most sensitive to electromagnetic perturbation. At its most basic level, sleep is an electromagnetic phenomenon.

BRAIN ACTIVITY IS ORGANIZED INTO OSCILLATORY PATTERNS: DELTA, THETA, ALPHA, AND BETA WAVES.

They each reflect synchronized electrical firing across neural networks. Rapid eye movement sleep, the phase most closely associated with vivid dreaming, is characterized by heightened neural activity, unstable autonomic regulation, and shifts in heart rate variability.

The brain and the heart generate measurable electromagnetic fields. These fields do not exist in isolation. The human body is embedded within Earth's geomagnetic field as we know.

SEVERAL STUDIES CITED IN THIS REFERENCED ARTICLE REPORT ASSOCIATIONS BETWEEN GEOMAGNETIC ACTIVITY AND CHANGES IN SLEEP DURATION, SLEEP FRAGMENTATION, DREAM RECALL, DREAM BIZARRENESS, AND EPISODES SUCH AS SLEEP PARALYSIS. WHILE THE EFFECTS ARE SUBTLE, THEY APPEAR CONSISTENTLY DURING PERIODS OF ELEVATED GEOMAGNETIC DISTURBANCE.

Dreaming consciousness differs fundamentally from waking consciousness.
Sensory gating is reduced, executive control is relaxed, and the brain becomes more internally driven. From an electrophysiological standpoint, the sleeping brain operates closer to times in which even small changes can produce outsized effects.

The brain may couple more strongly to the surrounding electromagnetic environment, allowing space weather to influence dream intensity, emotional tone, symbolism, and continuity.

This framework does not claim that solar activity causes specific dream content. Instead, space weather likely acts as a background modulator that alters the stability and coherence of the neural networks involved in dreaming.

SOLAR AND GEOMAGNETIC FLUCTUATIONS SHAPE THE CONDITIONS UNDER WHICH DREAMS UNFOLD, RATHER THAN TRIGGERING PARTICULAR IMAGES OR NARRATIVES.

One proposed mechanism involves biogenic magnetite, microscopic magnetic crystals found in the human brain and other tissues. These particles respond to external magnetic fields and support magnetoreception in other species.

You might ask what is magnetoreception?
It is the biological ability of an organism to detect Earth's magnetic field and use it for orientation

Their presence offers a plausible physical pathway through which geomagnetic variation could influence neural signaling.

A SECOND MECHANISM INVOLVES THE HUMAN BIOFIELD, THE COMPOSITE ELECTROMAGNETIC FIELD PRODUCED BY CARDIAC AND NEURAL ACTIVITY.

DURING SLEEP, AUTONOMIC REGULATION SHIFTS TOWARD PARASYMPATHETIC DOMINANCE, WHICH MAY INCREASE SENSITIVITY TO THESE EXTERNAL ELECTROMAGNETIC INFLUENCES.

Unlike meditation or other altered states, dreaming happens naturally, uncontrollable.
It occurs nightly in nearly all humans, and we are all affected by our sun.

MAGNETIC BIOLOGY OXIDATIVE STRESS

ARTICLE REFERENCED:
HUMAN RESPONSES TO MAGNETIC AND HYPOMAGNETIC FIELDS:
AVAILABLE EVIDENCE AND POTENTIAL RISKS FOR DEEP SPACE TRAVEL

Magnetic biology asks a simple question: if life evolved inside Earth's geomagnetic field, what happens when that background field changes or drops toward near-zero.

The cited article argues that the human body does not behave as if magnetic conditions are irrelevant. It also shows why oxidative stress sits near the center of the risk discussion, especially for long-duration spaceflight.

Earth's geomagnetic field averages about 50 microtesla at the surface. In interplanetary space, magnetic field strength typically falls into the nanotesla range, which is three to four orders of magnitude weaker than the field humans live in on Earth.

A HYPOMAGNETIC FIELD MEANS A SUBSTANTIAL REDUCTION OF THE GEOMAGNETIC FIELD, OFTEN BY A FACTOR OF 100 OR MORE. IN TERRESTRIAL LABS, RESEARCHERS CREATE THESE CONDITIONS BY ACTIVELY COMPENSATING EARTH'S FIELD INSIDE COIL SYSTEMS.

Oxidative stress provides a practical bridge between quantum-scale magnetic sensitivity and whole-body outcomes. Reactive oxygen species form through radical chemistry. Radical chemistry depends on electron spin states and reaction pathways, which weak magnetic fields can modulate under certain conditions. That makes oxidative stress markers and downstream redox signaling an obvious place to look when magnetic exposure changes.

Deep space missions layer multiple oxidative stress drivers on top of each other. The most immediate mission risk is not long-term disease. It is performance drift. The human studies reviewed suggest hypomagnetic exposure can degrade cognitive performance metrics in some settings.

IF HYPOMAGNETIC CONDITIONS ALSO INCREASE OXIDATIVE STRESS OR REDUCE SLEEP QUALITY, ASTRONAUTS COULD SEE COMPOUNDING IMPACTS: SLOWER REACTION TIMES, HIGHER ERROR RATES, AND REDUCED COGNITIVE FLEXIBILITY. THOSE ARE MISSION-CRITICAL RISKS EVEN IF THE BIOLOGICAL CHANGES REMAIN SUBTLE.

SPACE WEATHER AND SENESCENCE

ARTICLE REFERENCED:
SPACE RADIATION INDUCES DISTINCT SENESCENT PHENOTYPES: IMPLICATIONS FOR SPACE TRAVEL

A 2025 PAPER DIRECTLY TESTS A KEY DOWNSTREAM QUESTION: WHEN HUMAN CELLS EXPERIENCE SPACE-RELEVANT RADIATION, DO THEY ENTER CELLULAR SENESCENCE IN THE SAME WAY THEY DO AFTER MORE FAMILIAR TERRESTRIAL RADIATION EXPOSURES, SUCH AS GAMMA IRRADIATION.

THE ANSWER IS NO.

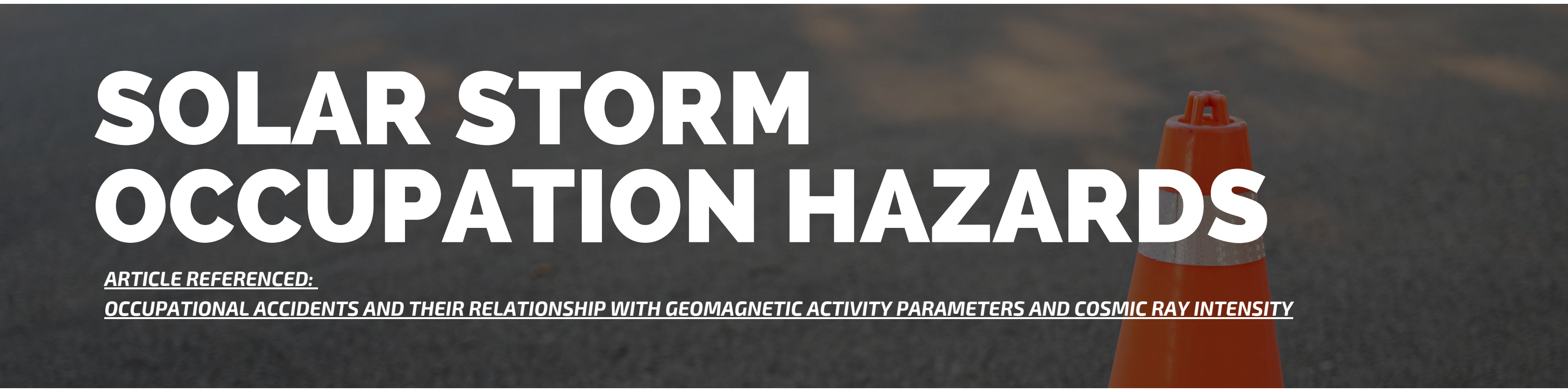
The difference starts with physics. High charge, high-energy ions deposit energy densely along their track through a cell, producing clustered DNA and macromolecular damage that is harder to repair than the more dispersed damage patterns typical of low linear energy transfer radiation like gamma rays. That matters because persistent DNA damage signaling is one of the most consistent routes into senescence.

The authors exposed two human fibroblast systems to components that model galactic cosmic radiation, including hydrogen ions and heavier ions like silicon and iron, and compared them to gamma irradiation. They used doses intended to bracket operationally relevant astronaut exposures, including a lower dose and a higher dose comparator.

THE CONCLUSION

Cells exposed to charged particles aged faster than those exposed to gamma radiation. Compared to gamma rays, charged particles caused cells to slow down their growth, take on the typical enlarged and flattened shape associated with aging cells, and show higher levels of a common marker used to identify cellular senescence.

In short, charged-particle radiation pushed cells into a more advanced aging-like state than gamma radiation did.



SOLAR STORM OCCUPATION HAZARDS

ARTICLE REFERENCED:
OCCUPATIONAL ACCIDENTS AND THEIR RELATIONSHIP WITH GEOMAGNETIC ACTIVITY PARAMETERS AND COSMIC RAY INTENSITY

Workplace safety has focused on familiar risk categories: human error, equipment failure, and environmental conditions such as heat, wind, or poor ergonomics. Now, lets add space weather into that list.

We visit a 2015 study that links geomagnetic activity and cosmic ray intensity to rates of workplace accidents across Latin America. The study reframes human error not as an isolated failure, but as a state that may be environmentally affected. Just as heat stress or fatigue can degrade attention, the research proposes that geomagnetic disturbances may alter human physiology in ways that increase accident proneness.

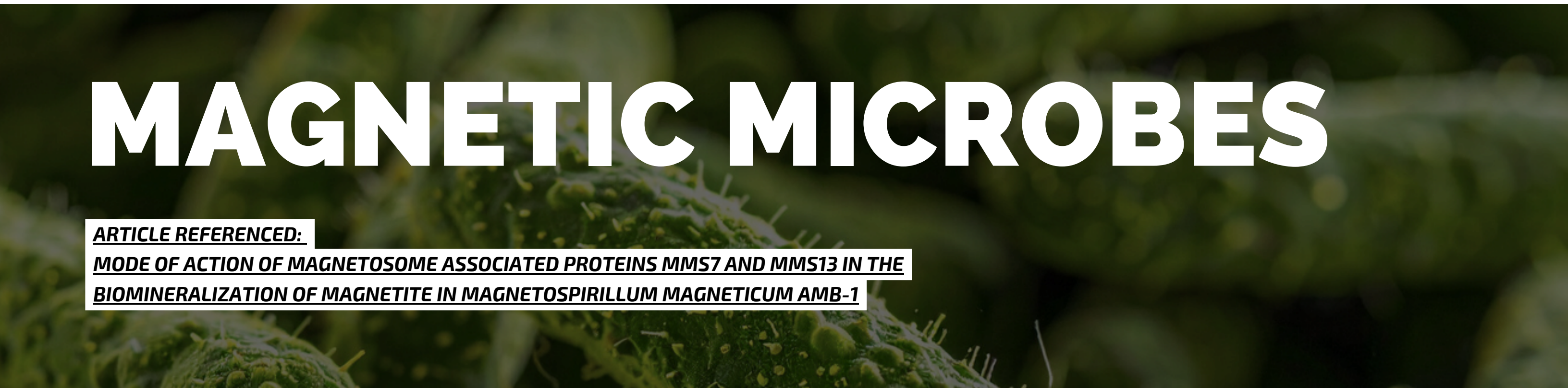
This as we know aligns with a broader body of research showing that geomagnetic storms affect cardiovascular regulation, brain electrical activity, reaction time, and autonomic balance.

The researchers conducted a large-scale statistical correlation analysis between workplace accident rates and space weather parameters, focusing primarily on: The Kp index and Cosmic Ray Intensity.

They analyzed accident data from multiple sectors and countries, including manufacturing, mining, electricity, oil and gas, construction, transportation, and agriculture across Ecuador, Chile, Uruguay, and Argentina.

Across nearly every sector examined, accident rates increased during periods of elevated geomagnetic activity and decreased when cosmic ray intensity was higher. This inverse relationship is expected, as cosmic ray intensity at Earth's surface typically drops during periods of heightened solar and geomagnetic activity due to heliospheric shielding.

Overall accident rates exhibited a strong positive correlation with the geomagnetic Kp index ($r \approx 0.94$), while showing a strong negative correlation with cosmic ray intensity ($r \approx -0.93$), suggesting that different components of the space environment exert opposing influences on human performance and risk. The mining and oil and gas sectors demonstrated some of the strongest associations, pointing to heightened sensitivity in physically demanding and high-stress occupations. Notably, when the Kp index reached 4 or higher, accident rates rose significantly compared with periods of quieter geomagnetic activity, underscoring a threshold effect in which moderate geomagnetic disturbances coincide with measurable increases in occupational accidents.



MAGNETIC MICROBES

ARTICLE REFERENCED:
MODE OF ACTION OF MAGNETOSOME ASSOCIATED PROTEINS MMS7 AND MMS13 IN THE BIOMINERALIZATION OF MAGNETITE IN MAGNETOSPIRILLUM MAGNETICUM AMB-1

Life has learned to read Earth's magnetic field long before humans built instruments to measure it. Among the most striking examples are magnetotactic bacteria, microscopic organisms that manufacture their own magnetic particles and use them to navigate the planet's field lines. These organisms are described as magnetic microbes. New research into how they build their internal magnets is now revealing not only how life interacts with magnetism, but how those same mechanisms may be engineered for future use.

Magnetotactic bacteria biomineralize magnetite nanoparticles inside a specialized organelle called the magnetosome. These magnetosomes organize into chains, turning each cell into a self-propelled compass needle that aligns with Earth's magnetic field. This alignment helps the bacteria efficiently navigate chemical gradients in aquatic sediments.

At the core of this system is biomineralization: the controlled growth of magnetic crystals inside a living cell. Unlike inorganic magnetite, which forms irregularly in nature, magnetosome magnetite is highly uniform in size, shape, and magnetic properties. This precision is not accidental. It is governed by a suite of magnetosome-associated proteins that regulate nucleation, growth, and crystal morphology at the atomic scale.

Recent work focusing on Magnetospirillum magneticum AMB-1 has zeroed in on two of these proteins, Mms7 and Mms13. These proteins reside in the magnetosome membrane and play a direct role in shaping magnetite as it forms. Understanding their mode of action offers a rare window into how biological systems exert control over magnetic materials.

To probe this process, researchers combined artificial intelligence–based protein structure prediction with experimental measurements at the nanoscale. Structural modeling highlighted the importance of the C-terminal regions of both Mms7 and Mms13, particularly residues rich in negatively charged amino acids such as aspartic acid and glutamic acid. These residues are well suited for binding iron-rich mineral surfaces, suggesting a direct mineral–protein interaction during magnetite growth.

Magnetic microbes demonstrate that sensitivity to geomagnetic forces is not limited to large organisms or nervous systems. It is embedded at the cellular and molecular level, encoded in proteins that evolved to work within Earth's magnetic environment. Magnetosomes represent one of the clearest examples of life integrating planetary physics into its internal structure.

MAGNETIC INSECTS

ARTICLE REFERENCED:
FROM SKYLIGHT CUES TO MAGNETIC FIELDS: THE TOOLKIT OF INSECT LONG-DISTANCE NAVIGATION

Each year, insects with brains smaller than a grain of rice execute migrations that rival those of birds and mammals. Monarch butterflies traverse North America to reach the same mountain forests in central Mexico. Bogong moths cross hundreds of kilometers of Australia to converge on specific alpine caves. These journeys are not learned routes. They are completed by individuals making the trip for the first time.

At the core of this navigational feat is not a single compass, but a layered sensory toolkit that integrates skylight cues with the Earth's magnetic field.

Lepidopteran navigation relies on redundancy and cross-validation. Rather than depending on one cue, these insects integrate multiple environmental references to maintain orientation across changing conditions.

For diurnal migrants such as monarch butterflies, the sun acts as a primary directional reference. Monarchs use a time-compensated sun compass, meaning they correct for the sun's apparent movement across the sky using an internal circadian clock. This allows them to maintain a consistent migratory heading throughout the day.

Nocturnal migrants like bogong moths cannot rely on the sun. Instead, they use stars and patterns of polarized light in the night sky. Recent experiments have shown that bogong moths can maintain a fixed migratory direction using stellar cues alone, even when displaced to unfamiliar locations

Two leading mechanisms are under investigation. The first involves magnetite, microscopic crystals of iron oxide that can physically respond to magnetic fields. Magnetite-based sensing has been identified in a wide range of organisms and provides a direct, polarity-sensitive signal.
The second mechanism involves cryptochrome proteins, light-sensitive molecules found in the eyes and nervous systems of many animals, including insects. Cryptochromes can act as quantum sensors, where magnetic fields subtly alter electron spin states during photochemical reactions. This mechanism links magnetic sensing directly to light, explaining why magnetic orientation in some insects depends on wavelength and lighting conditions.

In monarch butterflies, cryptochromes are strongly implicated. Genetic and neurobiological studies show that these proteins are expressed in visual and central brain circuits involved in orientation. When cryptochrome function is disrupted, directional accuracy degrades.

LIZARD MAGNETORECEPTION

ARTICLE REFERENCED:
STATIC MAGNETIC FIELDS INFLUENCE MAGNETIC ALIGNMENT AND MOVEMENT PATTERNS OF FREE-RANGING LILFORD'S WALL LIZARDS

Under natural geomagnetic conditions, basking lizards consistently aligned their bodies along a north-northeast to south-southwest axis. This alignment was not explained by sun angle, wind, slope, or terrain features. It emerged as a preferred orientation pattern across individuals.

When researchers experimentally altered the magnetic environment by rotating magnetic north 90 degrees to the east using a static magnetic field, the lizards shifted accordingly. Their basking orientation rotated to an east-southeast to west-northwest axis, precisely matching the imposed magnetic rotation.

This phenomenon, known as spontaneous magnetic alignment, has been documented in mammals, birds, amphibians, and insects. Its presence in a free-ranging lizard species places reptiles more firmly within the broader framework of magnetically sensitive vertebrates.

Importantly, the response occurred without training, reward, or confinement. The lizards adjusted automatically, suggesting that magnetic alignment is a baseline behavioral feature rather than a learned strategy.

The study does not resolve how these lizards detect magnetic fields. Several mechanisms remain plausible, including magnetite-based sensing, light-dependent radical pair processes, or a hybrid of systems.

PRE-QUAKE GEOMAGNETIC

ARTICLE REFERENCED:
REMARKABLE VARIATIONS IN GEOMAGNETIC DISTURBANCES PRECEDING THE 2017 M 7.1 JIUZHAIGOU EARTHQUAKE

The 2017 Jiuzhaigou earthquake occurred along the eastern margin of the Tibetan Plateau, a tectonically complex region dominated by strike-slip faulting. Using second-sampling data from 47 geomagnetic stations within 1000 km of the epicenter, researchers applied a daily polarization correlation algorithm.

Rather than asking whether polarization increased at individual stations, the method asked a deeper question: how aligned were polarization changes across the region?
The answer revealed a striking pattern.

Approximately 143 days before the earthquake, more than twenty stations exhibited polarization anomalies.

WHAT FOLLOWED WAS NOT A SIMPLE TREND, BUT A THREE-STAGE EVOLUTION:

REGIONAL POLARIZATION CORRELATIONS INCREASED, SUGGESTING GROWING COHERENCE IN ELECTROMAGNETIC DISTURBANCES.

↓

CORRELATIONS THEN DECREASED, INDICATING FRAGMENTATION OR REDISTRIBUTION OF THE ELECTROMAGNETIC FIELD.

↓

CORRELATIONS ROSE AGAIN, FOLLOWED BY A SHARP INFLECTION POINT AT WHICH THE EARTHQUAKE OCCURRED.

Critically, the earthquake struck during a period of low regional polarization correlation, not at the peak of anomaly strength. This suggests that rupture may be triggered not when the electromagnetic system is most energized, but when it becomes unstable and reorganized.

PRE-EARTHQUAKE GEOMAGNETIC SIGNALS

ARTICLE REFERENCED:
CHARACTERISTICS OF GEOMAGNETIC ANOMALOUS EVOLUTION BEFORE AND AFTER TWO MAJOR EARTHQUAKES: A TAYLOR POLYNOMIAL MODEL ANALYSIS

By analyzing geomagnetic data preceding two major Chinese earthquakes, the 2013 Sichuan Lushan M7.0 event and the Gansu Minxian M6.6 event, researchers provide insight into how different geological settings cause electromagnetic behavior prior to rupture.

One of the study's most striking findings is that the two earthquakes exhibited opposite geomagnetic signatures.

Before the Lushan M7.0 earthquake, the epicentral region showed persistent positive geomagnetic anomalies. In contrast, the Minxian M6.6 earthquake zone was dominated by expanding negative anomalies prior to rupture.

These opposing signals are not contradictory. Instead, they reflect differences in the electrical and mechanical properties of the seismogenic medium. Positive anomalies appear to correspond to a phase of stable stress accumulation within relatively intact rock. Negative anomalies, by contrast, are associated with progressive fracture development. As microcracks expand and connectivity increases, the local electrical structure becomes more heterogeneous. This amplifies electromagnetic disturbances and manifests as declining magnetic intensity over a widening area.

Despite their opposite polarity, both earthquakes followed the same underlying evolutionary sequence. The geomagnetic anomalies progressed through three distinct stages.

The first stage involved pre-seismic accumulation, during which anomalies gradually intensified and expanded spatially. This phase corresponds to long-term tectonic stress buildup.

The second stage occurred during the earthquake itself and reflects co-seismic release. Magnetic anomalies changed abruptly as accumulated stress was rapidly discharged.
The third stage involved post-seismic adjustment, characterized by a gradual decay or reorganization of anomalies as the crust relaxed toward a new equilibrium state.

The timing of these phase transitions closely tracked regional tectonic stress evolution, reinforcing the interpretation that the geomagnetic field responds directly to mechanical changes in the lithosphere.

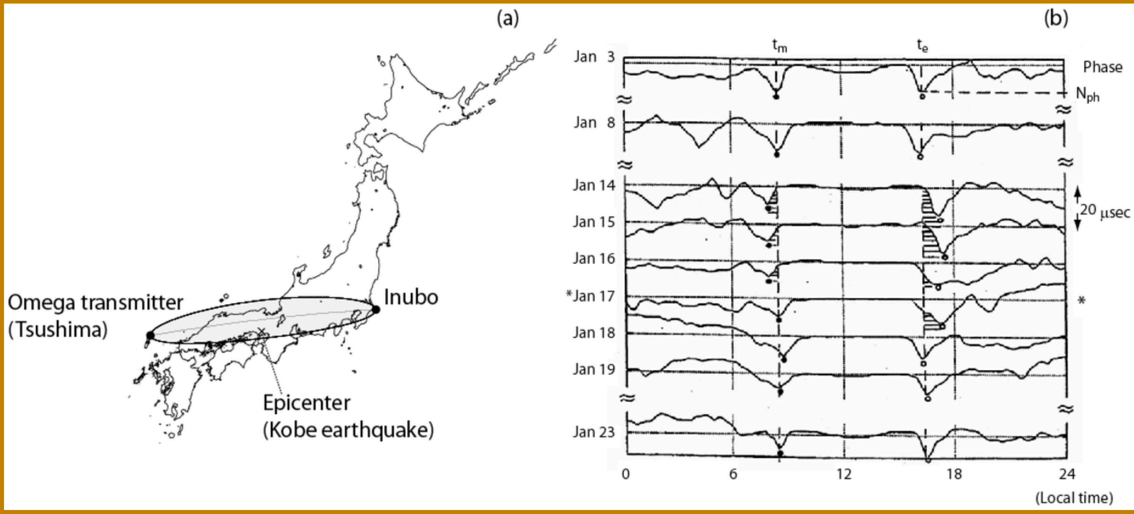
PRE-EARTHQUAKE FREQUENCIES

ARTICLE REFERENCED:
REVIEW OF SUBIONOSPHERIC VLF/LF RADIO SIGNALS FOR THE STUDY OF SEISMOGENIC LOWER-IONOSPHERIC PERTURBATIONS

Masashi Hayakawa's 2025 review makes a clear case for using subionospheric VLF/LF radio propagation as one of the most practical ways to observe earthquake-related changes in the lower ionosphere, specifically the D/E region around 70–90 km altitude. This layer is difficult to sample directly, so transmitter-based "radio sounding" becomes a high-leverage approach: earthquakes do not need to emit a clean electromagnetic signal themselves. Instead, they can perturb the ionosphere, and that perturbation shows up as measurable changes in existing VLF/LF signals.

VLF (3–30 kHz) and LF (30–300 kHz) signals propagate inside the Earth–ionosphere waveguide. Their amplitude and phase depend strongly on the reflection conditions at the lower ionosphere, meaning small changes in effective reflection height, electron density, collision frequency, or turbulence can measurably alter propagation.

A key "pre-earthquake frequency" result is that the received VLF/LF signal often shows enhanced power in fluctuation periods from roughly 10 minutes to a few hours, consistent with atmospheric gravity wave activity. The review frames AGWs as plausible carriers in lithosphere–atmosphere–ionosphere coupling because they propagate upward much faster



"Location of the VLF transmitter (Omega, Tsushima) and receiver (Inubo) (together with the EQ epicenter (as a cross)) and the first Fresnel zone (an ellipse); (b) sequential plot of diurnal variations in phase measurement at Inubo of Tsushima Omega transmission (f = 10.2 kHz) around the time of the Kobe EQ (on 17 January) with a star. A significant change is seen in the terminator times (as shaded area) just before the EQ. After [20]."

PRE-QUAKE GEOMAGNETIC

ARTICLE REFERENCED:
REMARKABLE VARIATIONS IN GEOMAGNETIC DISTURBANCES PRECEDING THE 2017 M 7.1 JIUZHAIGOU EARTHQUAKE

BY: BEN DAVIDSON

The 2017 Jiuzhaigou earthquake occurred along the eastern margin of the Tibetan Plateau, a tectonically complex region dominated by strike-slip faulting. Using second-sampling data from 47 geomagnetic stations within 1000 km of the epicenter, researchers applied a daily polarization correlation algorithm.

Rather than asking whether polarization increased at individual stations, the method asked a deeper question: how aligned were polarization changes across the region?
The answer revealed a striking pattern.

Approximately 143 days before the earthquake, more than twenty stations exhibited polarization anomalies.

WHAT FOLLOWED WAS NOT A SIMPLE TREND, BUT A THREE-STAGE EVOLUTION:

REGIONAL POLARIZATION CORRELATIONS INCREASED, SUGGESTING GROWING COHERENCE IN ELECTROMAGNETIC DISTURBANCES.

CORRELATIONS THEN DECREASED, INDICATING FRAGMENTATION OR REDISTRIBUTION OF THE ELECTROMAGNETIC FIELD.

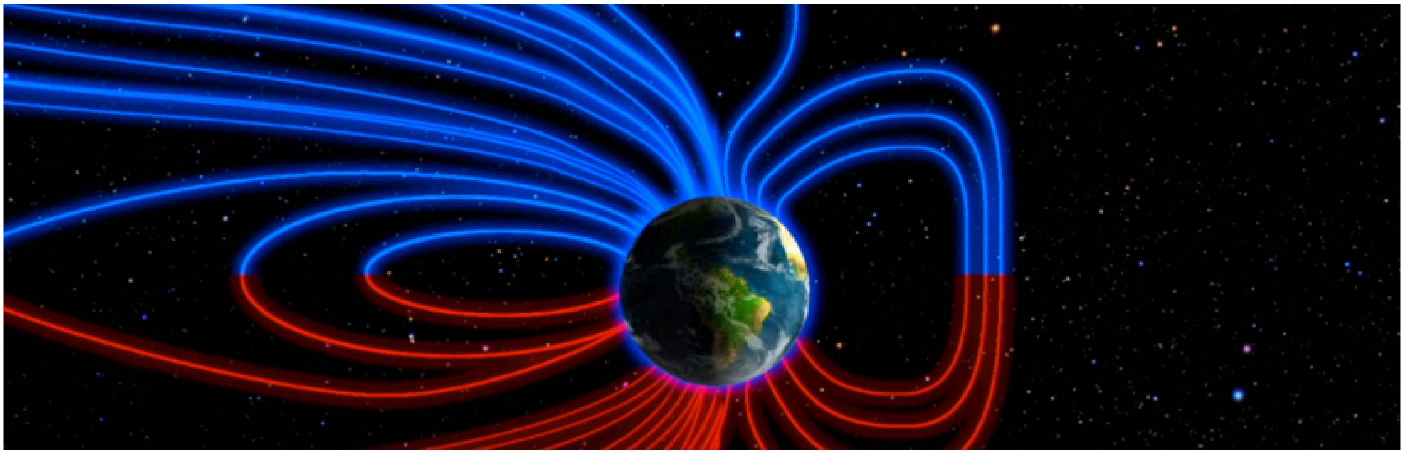
CORRELATIONS ROSE AGAIN, FOLLOWED BY A SHARP INFLECTION POINT AT WHICH THE EARTHQUAKE OCCURRED.

Critically, the earthquake struck during a period of low regional polarization correlation, not at the peak of anomaly strength. This suggests that rupture may be triggered not when the electromagnetic system is most energized, but when it becomes unstable and reorganized.

THE SUN, PEAS AND POTATOES

ARTICLE REFERENCED:
YIELD DYNAMICS IN PERMANENT CROPS OF PEAS AND POTATOES IN LONG-TERM FIELD EXPERIMENTS ON CHERNOZEMS OF THE KURSK REGION

BY: BEN DAVIDSON



New research into the interplay between geomagnetic field (GMF) variations and agricultural productivity reveals strong environmental influences on global crop yields. A comprehensive study utilizing data from 1985 to 2015 demonstrates that increases in GMF intensity are positively associated with enhanced yields for major staple crops. Specifically, a 1 mG rise correlates with a 1% increase in wheat and maize production, and a more pronounced 1.8% boost for rice, based on grid-cell analyses encompassing thousands of observations worldwide.

The mechanisms involve processes where the GMF influences plant physiology through magneto-sensitive proteins like cryptochromes, which mediate processes such as gene expression, photosynthesis, and metabolic rates.

Laboratory evidence supports this, showing that even modest field strengths (0.25–1 mG) can alter growth in model plants like Arabidopsis thaliana, while stronger artificial fields accelerate germination and biomass accumulation. Notably, soybeans exhibit no significant response, highlighting crop-specific sensitivities that may stem from differences in radical pair mechanisms or environmental adaptations.

Extending beyond yields, the economic ramifications of GMF dynamics are significant, with data from 1960 to 2020 linking a 1 mG increase to a 0.5% uplift in per capita agricultural value added and a 0.7% rise in overall GDP. Given that wheat, maize, rice, and soy constitute over one-third of global agricultural output and two-thirds of human caloric intake, these shifts could meaningfully impact food security and rural economies.

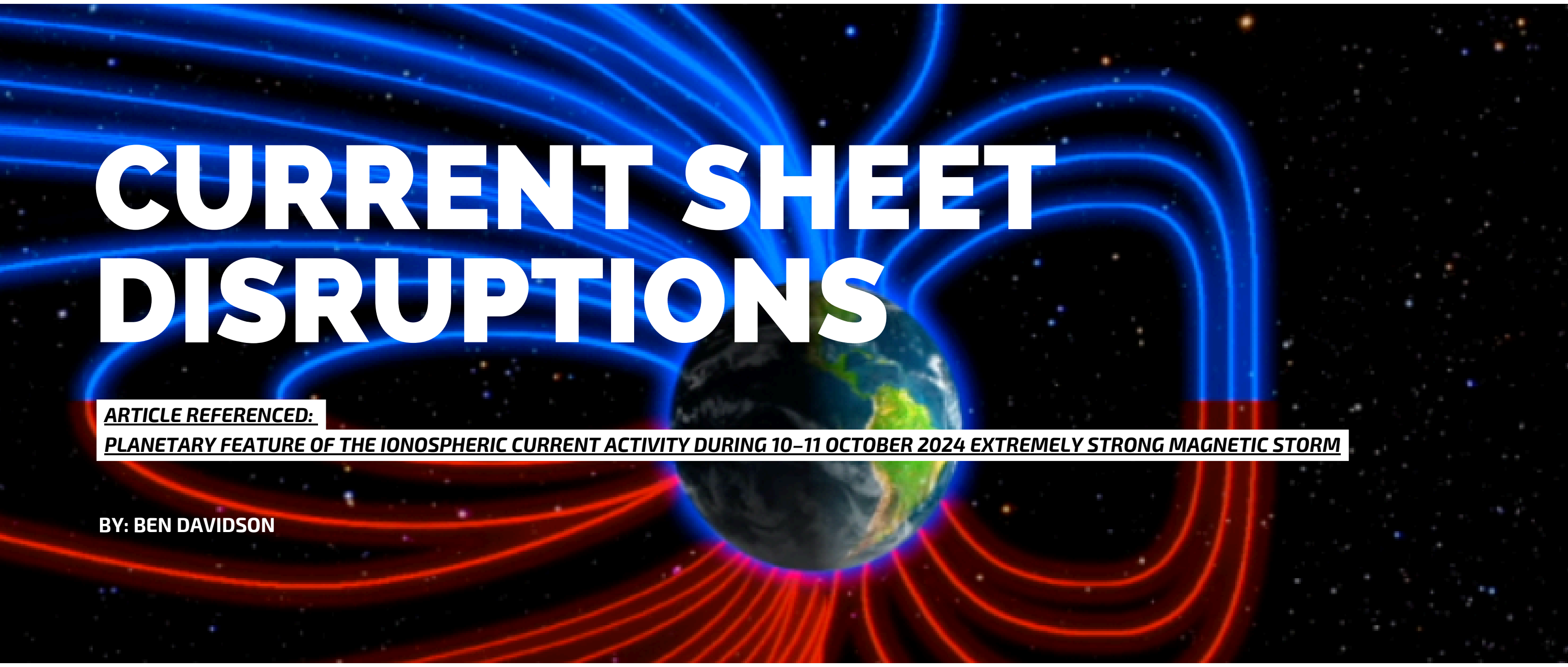
Complementing geomagnetic insights, investigations into solar activity's role in crop performance highlight parallel cosmic influences on localized agriculture, particularly in long-term field trials on chernozems. Over 44 years in Russia's Kursk Region, pea and potato yields displayed a marked downward trajectory, aligning with a concurrent decline in solar activity metrics, such as sunspot cycles.

This correlation persisted across experimental variants, including unfertilized controls and those amended with nutrients, though fertilizers offered partial mitigation for potatoes but proved ineffective for peas, suggesting inherent varietal vulnerabilities to reduced solar irradiance.

Cyclical yield oscillations, spanning roughly seven years, mirrored regional weather patterns rather than direct solar forcing, as revealed through statistical analyses of conjugate samples that differentiated dynamic trends from static averages. Such an approach proved superior for capturing temporal nuances, revealing significant divergences in long-term productivity between treatments—most starkly for potatoes, where fertilized plots sustained higher baselines despite overarching declines.

For peas, the uniform downturn across variants pointed to broader abiotic stressors, reinforcing the hypothesis that diminishing solar output exacerbates soil and climatic limitations on these permanent crops.

The sun’s role in agriculture is confirmed, as well as the impact of the ongoing geomagnetic excursion (magnetic pole shift), which should create difficulties in food production in the years ahead.

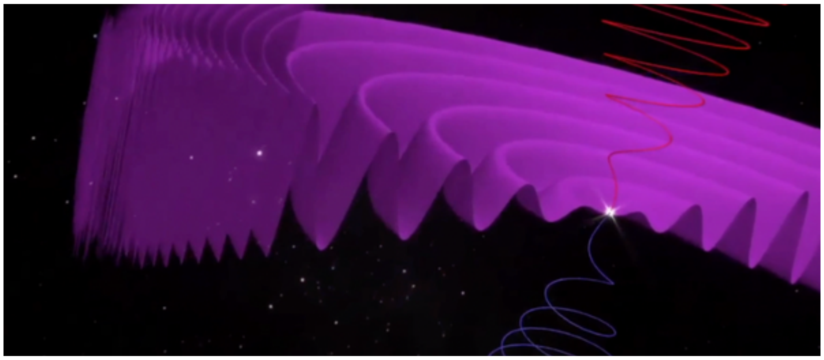


CURRENT SHEET DISRUPTIONS

ARTICLE REFERENCED:
PLANETARY FEATURE OF THE IONOSPHERIC CURRENT ACTIVITY DURING 10–11 OCTOBER 2024 EXTREMELY STRONG MAGNETIC STORM

BY: BEN DAVIDSON

A new study on the October 2024 solar storm described an incredible impact of the interplanetary magnetic field on the energetic dynamics of the geomagnetic disturbance. This was one of the solar storms that out-performed expectations, a trend we have attributed to earth's weakening magnetic field.



This new analysis demonstrates how sharp turns of the solar wind magnetic field disrupt the earth's magnetic field like a twisting tug of war, allowing more solar wind energy than usual to enter the system. This is why changes in the solar wind magnetic field can cause significant auroras and geomagnetic storms by themselves, even without a CME or a coronal hole.

Most significantly, the onset of the flipped solar wind field began flipping the ionospheric electric currents. These are the critical interactive pathways for solar wind energy to enter the global electric circuit and impact the atmosphere and crust below. The reversal of these currents and overall disruption of the magnetic field can temporarily turn the entire system around, electromagnetically.

This is precisely what is happening to our solar system as we are impacted by the galactic current sheet. More energy is coming in both in the charged and neutral categories, the system's electromagnetism is reversing as the prime foundational change throughout the spheres of the system. Just as the sun's current sheet can cause magnetic storms and electric current reversals at earth, the galactic version can do it to the entire solar system.

GEODESY BREAKING DOWN

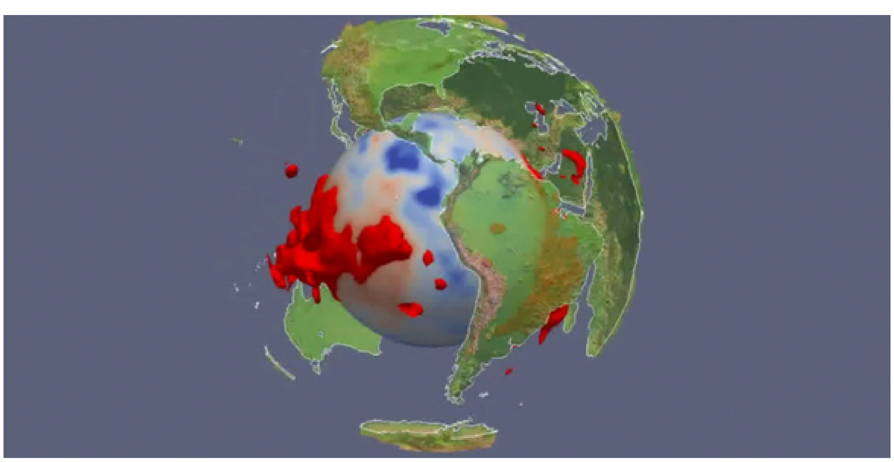
ARTICLE REFERENCED:
HILBERT-HUANG TRANSFORM ANALYSIS OF INTRADECADALVARIATIONS IN THE LENGTH OF EARTH'S DAYS

The majority of the examination of the earth disaster cycle is focused on changes to earth's magnetic field, ionosphere and atmosphere. Other focus often falls to the sun, galactic physics, or the other planets. However we have seen rotation-speed changes, where the earth is now spinning faster than ever recorded before, and the chandler wobble began exhibiting anomalous behavior.

A new study hints that the rotational instabilities are more extensive than anyone realized. In addition to the fact that the earth is speeding up its rotation, there are very well-known cycles of the length-of-day (rotation speed) that have begun to disappear or have already disappeared entirely.

The physical dynamics of the solid earth are known as geodesy - rather than looking at smaller scale dynamics like seismic, volcanic or sedimentary dynamics on the surface, this is the large-scale total rotation, tilt, wobble, and precession of the planet. These global aspects have always been expected to change during the disaster cycle but the easier mechanism for this action is the micronova trigger. However that is yet to occur, and we are already seeing the geodesic changes at small scale. Perhaps they will be kicked-into-high-gear when the micronova occurs, or maybe the crustal and planetary shifts occur via a different process entirely.

The bottom line is that one of the most challenging aspects of the disaster cycle to wrap a human brian around is the geodesic changes - rotation, tilt, wobble - and those changes have already begun. No more belief required.



Are You Ready for What's Coming?

BEN DAVIDSON

LIVE WINTER TOUR 2025

~~Omaha, NE~~
~~december 29, 2025~~

~~San Diego, CA~~
~~December 13, 2025~~

Orlando, FL
January 10, 2026

Dallas, TX
February 21, 2026

Las Vegas, NV
March 7, 2026

EVENT CAPACITY: **80**

TICKET
$200

CLICK FOR TICKETS

CLICK FOR TICKETS

CLICK FOR TICKETS

OBSERVER RANCH

Campground for Today, Education for Tomorrow

INTRODUCING THE OBSERVER RANCH MEMBERSHIP!

Year-Round Access

Enjoy year-round access, exclusive discounts, and special perks—while supporting community education, outdoor exploration, and our mission to inspire lifelong learning.

Your Membership Includes:

- Access to Observer Ranch during open hours
- Use of the Learning Center & Library
- FREE admission to member-only events
- Discounts on select special events
- and store promotions
- Two complimentary nights in one of our Planet RVs

CLICK FOR MORE INFORMATION

THANK YOU!

WE HOPE YOU ENJOYED OUR DECEMBER ISSUE!
WE APPRECIATE YOUR QUEST AND LOVE FOR KNOWLEDGE ABOUT SPACE AND OUR GREATER COSMOS.

HAVE A TOPIC/DISCUSSION YOU WANT FEATURED?

Email observerreview@observerranch.com with a topic that you'd love to see an article written on!