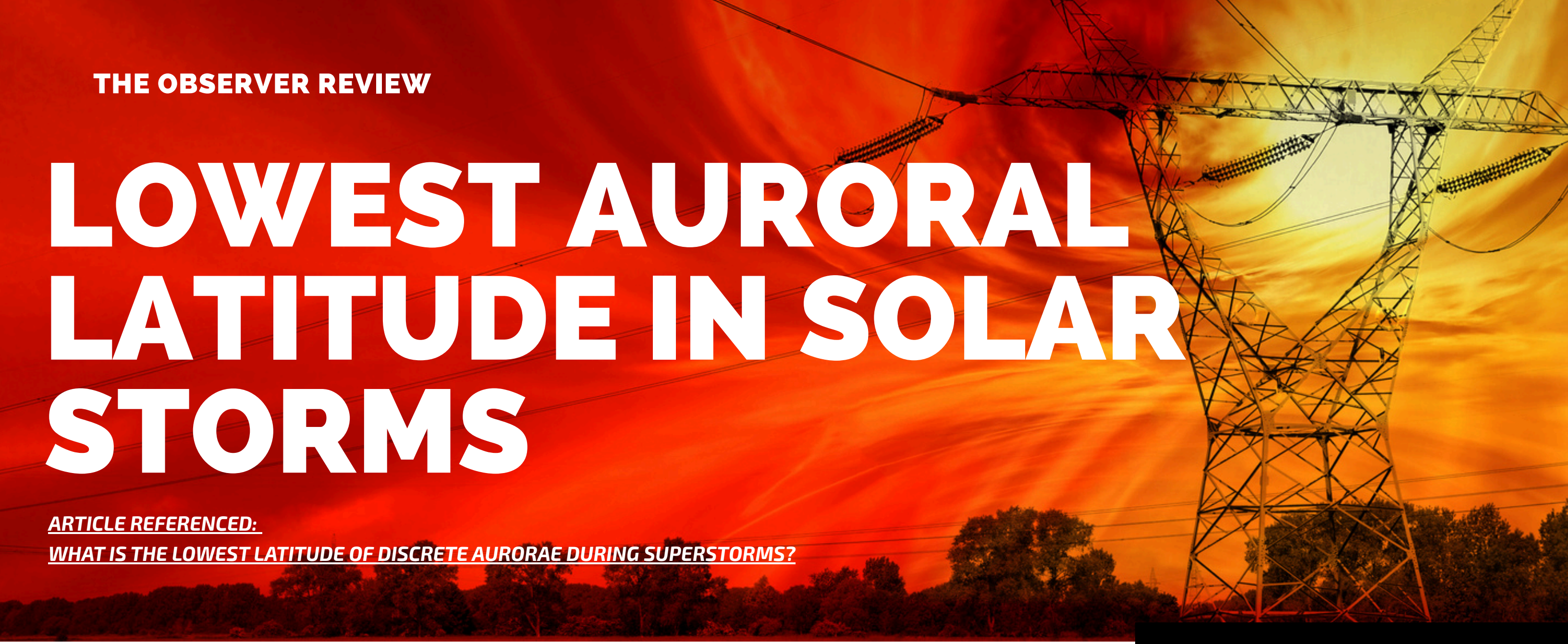
OBSERVER REVIEW

JULY 2025

CONTENTS
JULY

AND MORE!



LOWEST AURORAL LATITUDE IN SOLAR STORMS

ARTICLE REFERENCED:
WHAT IS THE LOWEST LATITUDE OF DISCRETE AURORAE DURING SUPERSTORMS?

The solar maximum of cycle 25 has been in play for approximately two years, and the big question among solar scientists is "will we get a second peak?" What does that mean? It means that most of us are wondering if this sunspot cycle will be a short-lived one, or if it will have a 2nd rise like over half of solar cycles do.

Right now, we are either in the beginning phase of the decline, or the famous "middle dip" between the peaks. The most recent available data, for May 2025, is the large drop in the monthly values (right before the pink predicted ranges begin in the image) and while we can definitively see the drop, there is absolutely no way to know what comes next.

What we DO know is that whether we get a 2nd peak in sunspot numbers over the next year or we begin to decline, we have more space weather coming to earth. Not only does it take several years to decline to sunspot minimum, but the "declining phase" often contains the geomagnetic maximum - when coronal holes increase their prevalence as sunspots are still present.

So, either we continue sunspot maximum or we get more coronal holes adding to the dwindling flaring/CME activity, but either way, this sunspot cycle isn't over yet.Aurorae, those shimmering lights in the sky, are caused by charged particles from the Sun colliding with Earth's atmosphere. Normally, they appear in high-latitude regions like Alaska or Norway. But during geomagnetic superstorms, that boundary expands, and the lights can be seen far closer to the equator.

The research team dug into more than 150 years of historical records: newspaper articles, observatory logs, and eyewitness accounts of aurorae seen directly overhead. They focused on discrete aurorae, the bright structured displays, streamers, curtains, and rays, that are visually striking and linked with intense geomagnetic activity.

From these records, they compiled the lowest latitudes where people reported seeing aurorae at the zenith, or directly overhead. This distinction matters. While aurorae near the horizon can be seen from afar, zenith aurorae mean the viewer is directly beneath the center of activity.

Using this data, the researchers developed a statistical model that links the lowest latitude of discrete aurorae to the strength of the magnetic storm. The stronger the storm, the farther the lights reach.
They found that a once-in-a-century superstorm, similar in strength to the famous 1859 Carrington Event, could cause overhead aurorae as far south as Mexico City. During the Carrington storm itself, aurorae were reportedly seen overhead in Puerto Rico, which lies at just under 30° geomagnetic latitude.

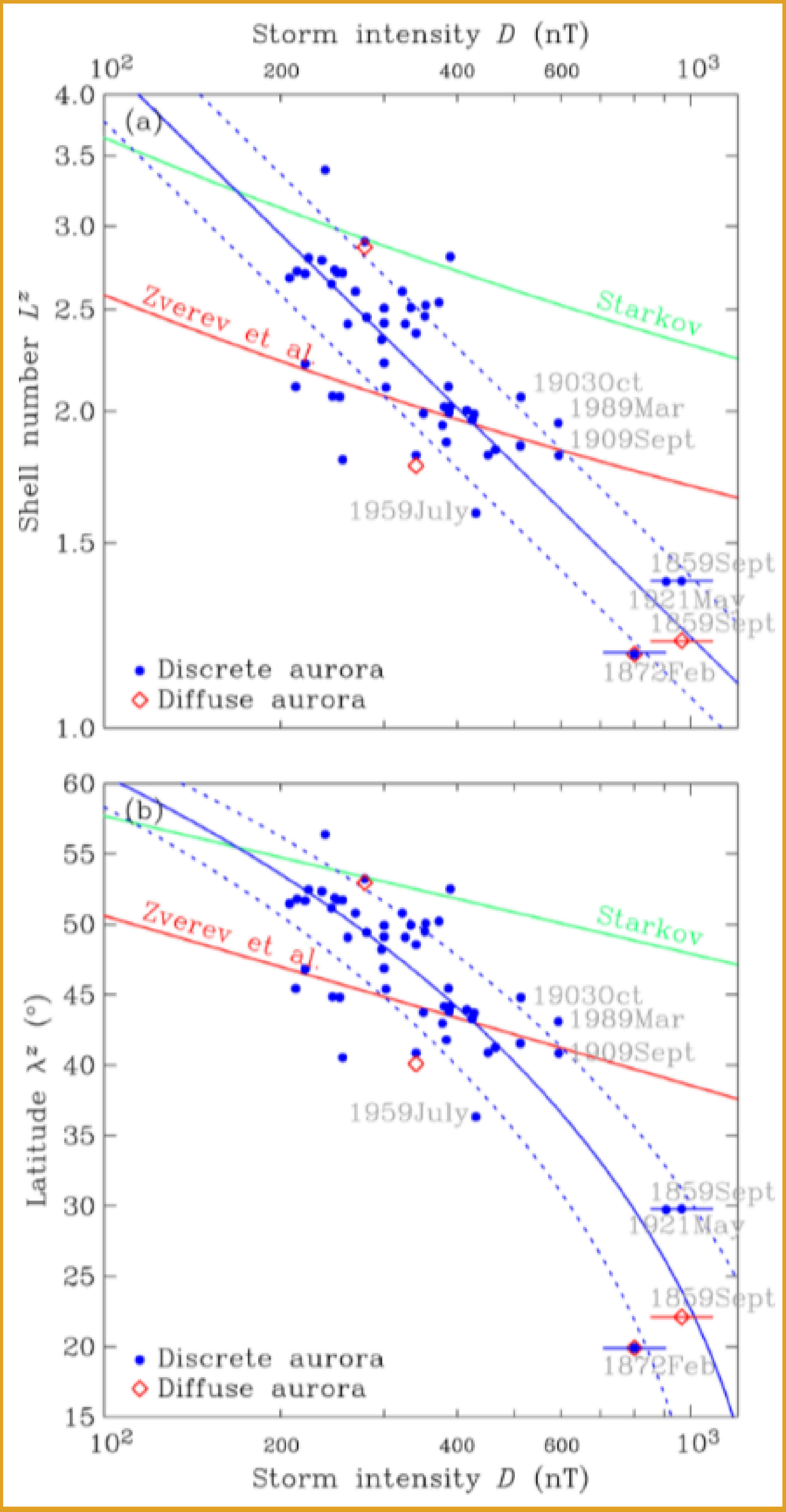
Even more remarkable: in 1872, aurorae were reported at zenith over Jacobabad, British India, at a geomagnetic latitude under 20°. That makes it one of the lowest-latitude discrete auroral sightings ever recorded.

One of the more unexpected findings involves the 28 August 1859 storm, just days before the Carrington Event. Aurorae were seen directly overhead in Havana, Cuba, suggesting the storm's intensity rivaled that of the Carrington storm itself. Yet this earlier event has been largely overlooked in solar storm research.
The authors estimate the 28 August storm may have reached around -673 nT, placing it among the most intense storms on record. For comparison, the Carrington Event is estimated at -964 nT.

The model also offers a way to retroactively estimate storm strength from historical and even ancient auroral sightings. For example, during a massive storm in 1770, red aurorae were seen directly overhead in Kyoto, Japan. Based on the location, the researchers estimate this storm's intensity was comparable to the Carrington Event.

Even more provocatively, they apply the model to descriptions found in the Book of Ezekiel, specifically, his vision of "flashing fire surrounded by radiance." The geomagnetic latitude of Nippur, where Ezekiel lived around 600 BCE, suggests that if such aurorae were visible there, the responsible storm may have been around -870 nT—on par with modern superstorms.

The farther south these aurorae go, the wider the area exposed to geomagnetic risk.
The study finds that current models used by grid planners underestimate the geographic extent of exposure. This means infrastructure might be more vulnerable than previously assumed.



"ALSO SHOWN ARE DIFFUSE-AURORAL, STORM-INTENSITY DATA (RED DIAMONDS) FROM TABLE 1. THE 68% CONFIDENCE INTERVALS ON THE 1859 AND 1872 INTENSITIES AS LOVE ET AL. (2024) DEVELOPED. THE MODELS OF STARKOV (1993) (GREEN LINE) AND ZVEREV ET AL. (2009) (RED LINE)."

EVOLUTION, DISASTER AND THE POLE SHIFT

ARTICLE REFERENCED:
HTTPS://PUBS.GEOSCIENCEWORLD.ORG/GSA/GSABULLETIN/ARTICLE-ABSTRACT/77/2/197/6013/EVOLUTIONARY-PULSATIONS-AND-GEOMAGNETIC-POLARITY1?REDIRECTEDFROM=FULLTEXT
HTTPS://USAJOURNALS.ORG/INDEX.PHP/1/ARTICLE/VIEW/274/301
HTTPS://BONOI.ORG/INDEX.PHP/SI/ARTICLE/VIEW/1586/1072

The most famous of these pole shifts documented is the Laschamp event, around 42,000 years ago, when Earth's magnetic field dwindled to just 5% of its current strength.
When the magnetic field weakens, Earth's defense against cosmic radiation also falters as we know. Ionizing particles from space penetrate the atmosphere in greater numbers, increasing ground-level radiation exposure by up to twice the normal dose rate.

Sometimes, increased radiation alters DNA, occasionally in ways that confer adaptive advantages. These rare beneficial mutations, amplified by natural selection, can drive evolutionary innovation, especially during times of environmental instability.

Recent studies underscore this link between geomagnetic changes and biology. Ionizing radiation, when filtered less effectively by a weakened field, can damage DNA, induce double-strand breaks, and create reactive oxygen species that stress cellular processes. While such stress often leads to harm or death, it can also produce genetic variations that underlie evolutionary leaps.
For example, a 2025 study tracking geomagnetic polarity reversals over the last 540 million years revealed a striking temporal correlation between these reversals and periods of rapid evolutionary diversification. The implication: magnetic collapses might act as biological resets, episodes where nature briefly rolls the evolutionary dice more frequently.
During geomagnetic weakening, increased cosmic ray influx may alter cloud nucleation and stratospheric chemistry, especially ozone concentrations. This can lead to regional cooling or warming, shifts in precipitation, and broader climate volatility.

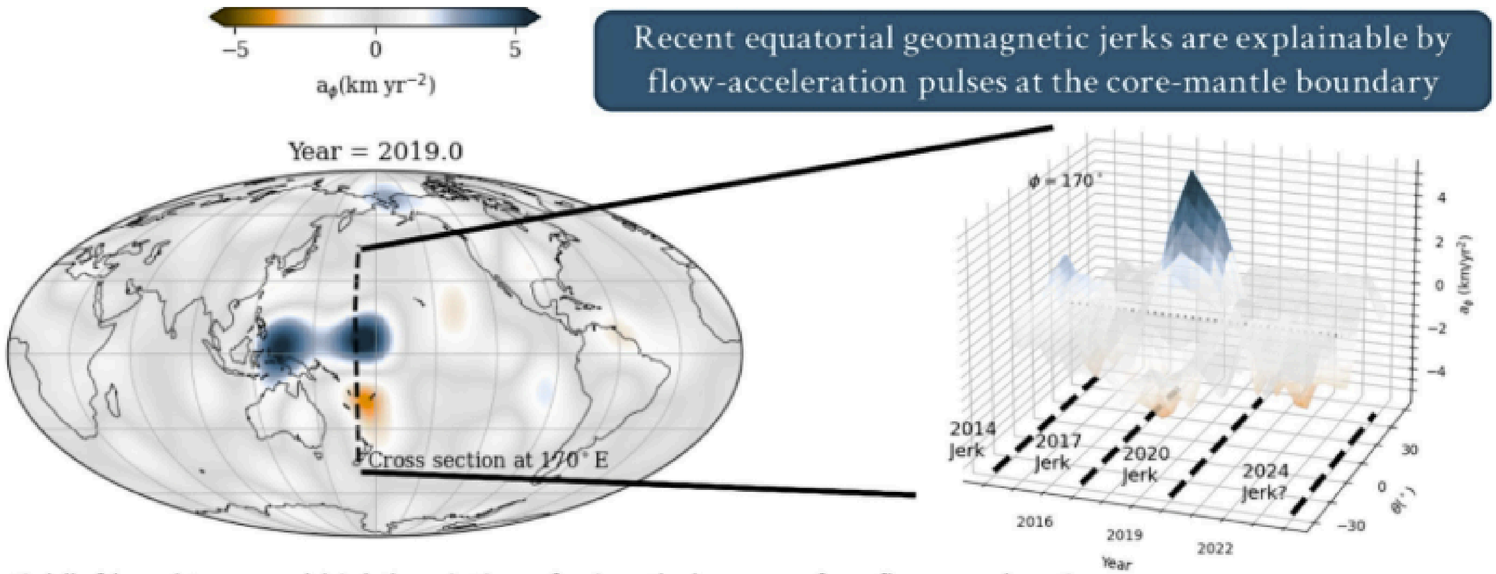
Magnetically sensitive proteins, such as cryptochromes in the retina and brain, are linked to circadian regulation. Changes in geomagnetic fields can desynchronize biological clocks, impacting sleep, mood, and behavior. Hospital admissions for anxiety and depression have been observed to spike during geomagnetic storms.

Today, the magnetic north pole is racing from Canada toward Siberia at nearly 40 kilometers per year—faster than at any point in recorded history.

THE LATEST GEOMAGNETIC JERK

BY: BEN DAVIDSON

ARTICLE REFERENCED:
MODELLING GEOMAGNETIC JERKS WITH CORE SURFACE FLOW DERIVED FROM SATELLITE GRADIENT TENSOR ELEMENTS OF SECULAR VARIATIO



Spatial (left) and temporal (right) variation of azimuthal core-surface flow acceleration

A recent study has identified the core pulse associated with the beginning of a geomagnetic jerk event that likely occurred late in 2024, centered in the Pacific. Geomagnetic jerks are routine events which happen every 3 to 4 years, but which have recently (last few decades) been associated with accelerations in the magnetic pole shift.

THIS RECENT EVENT, LIKE THE 2017 PACIFIC PULSE, IS LOCALIZED AND MINOR, WHICH IS A GOOD THING FOR OUR CIVILIZATION. WITH THE ONGOING GEOMAGNETIC EXCURSION, EVERY JERK EVENT IS A CHANCE FOR THE "MAJOR AND FINAL" ACCELERATION, WHICH WOULD PUT US JUST MONTHS AWAY FROM THE MAJOR PROBLEMS OF THE POLE SHIFT.

Luckily, it hasn't happened yet, and so we look (eagerly and anxiously) towards the next jerk event, expected in 2027 or 2028. It is noteworthy that the major accelerations (like the last one in 2006) occurred as the sunspot cycle was entering the minimum phase, as will be the case in 2027 and 2028. Hopefully it is not "the big one", but we will be watching.

SEPTEMBER 2023 RARE BLUE AURORA

ARTICLE REFERENCED:
A RARE OBSERVATION FROM MID-LATITUDE OF A BLUE AURORA

On the night of September 24 to 25, 2023, something extraordinary unfolded in the skies over central France. A blue aurora, a phenomenon almost never seen outside of the far north, was observed and photographed from a latitude of just 48.3° North, near the town of Chartres. This rare display of color in the night sky left scientists both excited and puzzled.

Auroras are typically reserved for the high latitudes, where Earth's magnetic field funnels energetic particles from the solar wind into the upper atmosphere. These particles collide with gases in the atmosphere and cause them to glow.

Green and red are the most familiar auroral colors, associated with atomic oxygen at altitudes between 100 and 300 kilometers. Blue auroras, however, are linked to molecular nitrogen ions and usually occur at lower altitudes. They are rarely visible unless the observer is directly beneath them.

At approximately 23:00 UTC, a red aurora appeared low on the northern horizon. Three hours later, at 02:00 UTC, a distinctly blue light was observed and recorded on a partially unfiltered Canon 6D camera equipped with a fast lens.

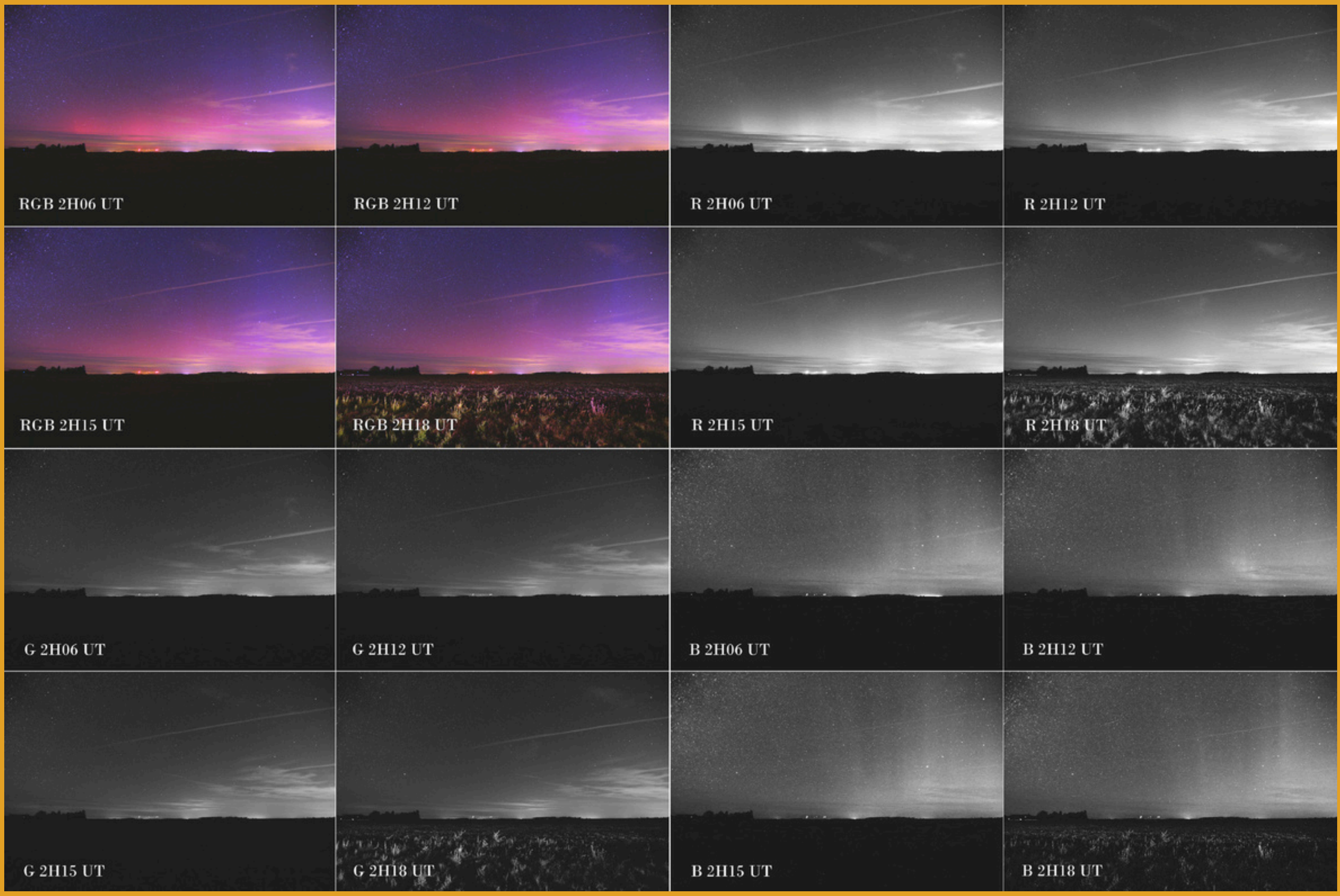
he camera captured a sequence of images showing vivid blue hues above the same northern horizon, with no green emission and only faint traces of red below.
This observation took place during a weak geomagnetic storm. The solar wind speed was moderate, around 460 kilometers per second, but the solar wind density was elevated, exceeding 30 particles per cubic centimeter. The disturbance storm time (Dst) index reached -64 nanoteslas, enough to bring auroras to middle latitudes.

Despite clear skies at the observation site, most of northern Europe was covered in clouds, limiting additional observations. The aurora's apparent location suggested it was happening far to the north, potentially over Scotland or the North Sea, but was high enough in altitude to be visible from France. Scientists first considered traditional auroral mechanisms.

The simplest explanation would be an electron aurora, where energetic electrons collide with atmospheric gases, exciting them to emit light. But that did not match the data. Electron precipitation should produce green and red light along with blue, yet the green emission line at 557.7 nanometers was completely absent.

A second hypothesis involved proton aurorae. These occur when high-energy protons from the solar wind collide with atmospheric hydrogen, producing Balmer series emissions such as H-beta at 486.1 nanometers (blue) and H-alpha at 656.3 nanometers (red). However, proton aurorae also produce green and red oxygen emissions, which were not seen in this event.

Next, researchers explored emissions from molecular nitrogen. Specific bands like the Vegard-Kaplan system can emit blue light under certain low-energy electron impacts. However, this mechanism should still result in visible green and red components. That was not the case here. The only plausible explanation left was resonant scattering of sunlight by molecular nitrogen ions at high altitudes. This process was first described in the 1930s and involves nitrogen ions at F-region altitudes (above 300 kilometers) re-emitting sunlight in the blue part of the spectrum. For this to occur, the ions must be lifted from the lower atmosphere to high altitudes where they can be illuminated by the Sun, even when the ground is in darkness. This condition was satisfied on September 25, the Sun was just below the horizon, but still able to light up the upper atmosphere. Satellite data and ionospheric models suggested the necessary ions were likely present, even if not directly measured. The blue light at 427.8 nanometers, associated with N_2^+ ions, matched the spectral signature expected from resonant scattering. The absence of green and red emissions could be explained by geometric factors, the lower-altitude green and red auroras may have simply been below the horizon or too faint to detect.



BLUE AND RED AURORA ON 25 SEPTEMBER 2023 AT 2 UT (4 LT),

RARE SOLAR STORM EFFECTS DURING THE MARCH 2023 SOLAR STORM

ARTICLE REFERENCED:
ON THE EXTRAORDINARY L-BAND SCINTILLATION EVENT OBSERVED IN THE AMERICAN SECTOR DURING THE 23–24 MARCH 2023 GEOMAGNETIC STORM

On March 23–24, 2023, during a solar storm that far-exceeded the earth-effects it should have produced, an extraordinary L-band scintillation event occurred in the American sector, observed from the magnetic equator to mid-latitudes, driven by equatorial plasma bubble (EPB)-like ionospheric depletions during a geomagnetic storm.

Intense and long-lasting scintillations were recorded at Jicamarca (equator), Costa Rica (low latitudes), and Dallas (mid-latitudes), with severe impacts on GNSS signals. The event was linked to enhanced equatorial ionization anomalies and disturbance electric fields, as evidenced by TEC and ROTI maps, highlighting significant space weather effects.

The problem is that the space weather wasn't significant, wasn't severe. It was a moderate solar storm that had vastly outsized effects. This is due to the weaker magnetic field of our planet in the ongoing pole shift. We have covered this event, and others, from this exact perspective, but every new study that goes back and finds similarly unexpected impacts offers greater confidence in the conclusion.

VOLCANOS WITHOUT WARNING

ARTICLE REFERENCED:
AN ALASKAN VOLCANO COULD HELP SCIENTISTS UNDERSTAND WHY 'STEALTHY' VOLCANOES ERUPT WITHOUT WARNING

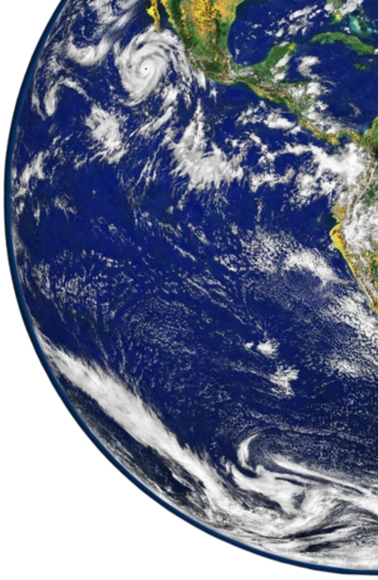
Some volcanoes erupt almost silently, giving little or no signal before exploding. These are known as stealthy volcanoes. A new study led by Dr. Yuyu Li from the University of Illinois, published in Frontiers in Earth Science, may finally explain how these surprise eruptions happen.

Mount Veniaminof is located on the Aleutian Arc in Alaska. Although it looks calm on the surface, it is one of the most active volcanoes in the state. Since 1993, it has erupted 13 times. Yet only two of those eruptions gave enough warning for scientists to notice in advance. In one case, a 2021 eruption went undetected for three full days.
"Veniaminof is a case study in how a volcano can appear quiet while still being primed to erupt," said Li.

To understand this behavior, researchers collected data from three summer seasons leading up to the 2018 eruption, which also happened with little warning. They created a detailed model that simulated different scenarios, adjusting variables like magma flow rate, chamber size, chamber shape, and depth. They then compared those simulations to real-world observations to identify the most likely internal structure and conditions.
The study revealed that stealthy eruptions are most likely when a small amount of magma flows into a small underground chamber. Under these conditions, there may be no noticeable ground movement or seismic activity. The eruption can appear to come out of nowhere.

If magma flows quickly into a large chamber, it may still cause an eruption, but there will likely be enough pressure to deform the ground or trigger earthquakes first. These would alert scientists that something is coming. A low flow into a small chamber, on the other hand, produces weaker signals and is more likely to go unnoticed.
The researchers also found that temperature plays a key role. If magma has been present over time, the surrounding rock becomes warm. Warm rock is more flexible, meaning it is less likely to crack or shift in ways that create detectable signals. This makes stealth eruptions even more likely.

Stealthy volcanoes are not unique to Alaska. Others like Merapi in Indonesia, Stromboli in Italy, and Popocatépetl in Mexico also show similar behavior.



SOLAR OZONE IMPACT, UNDERRATED

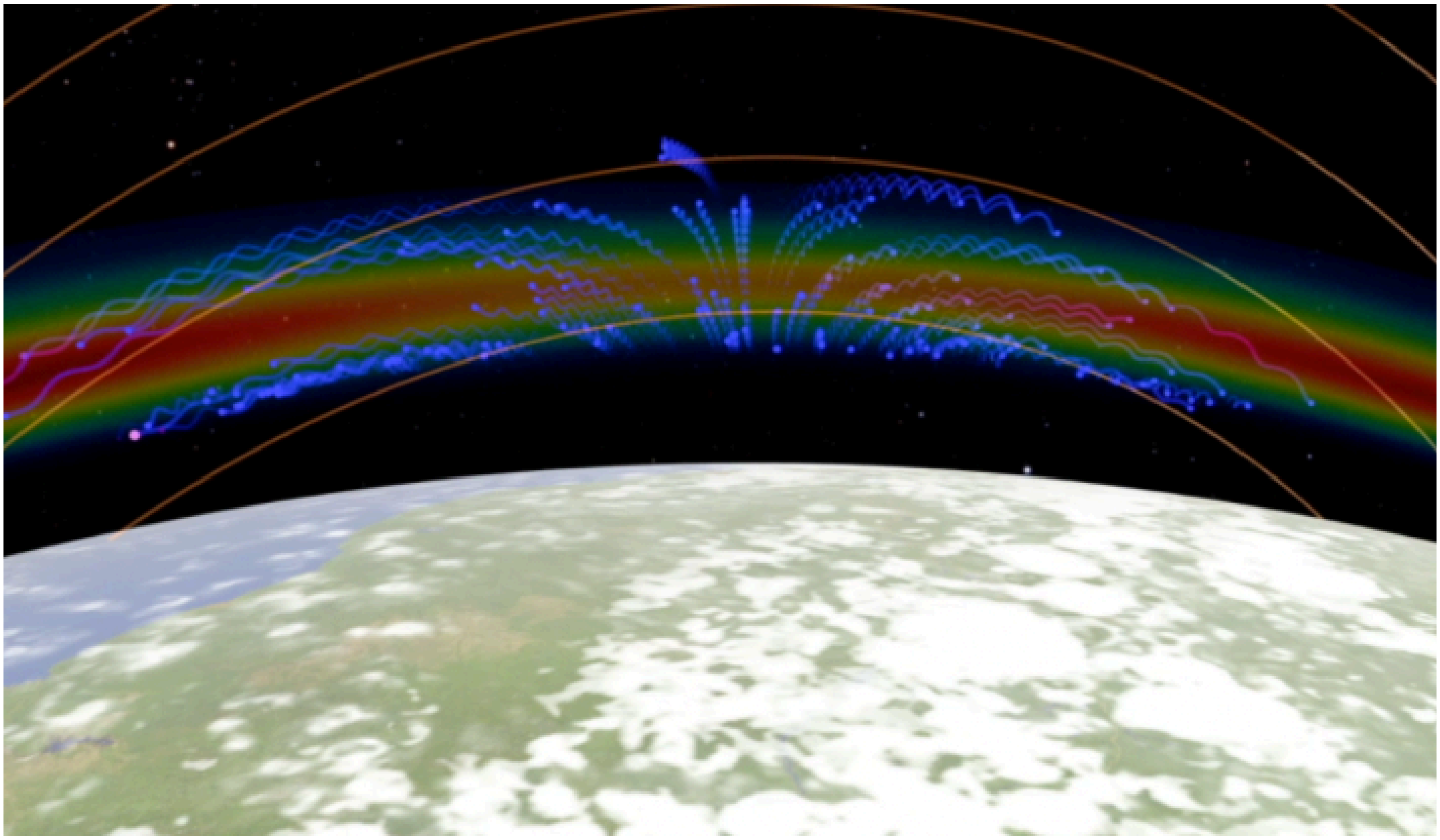
ARTICLE REFERENCED:
WACCM SIMULATION OF POLAR OZONE RESPONSE TO RELATIVISTIC ELECTRON PRECIPITATION

BY: BEN DAVIDSON

New study results: Relativistic electron precipitation (REP) significantly impacts atmospheric chemistry, enhancing (Nitrous Oxides) NOx by ~2.58 times at ~37 km and (hydroxyls) HOx by ~6.41 times at ~44 km, according to simulations using the Whole Atmosphere Community Climate Model. REP causes an additional ozone loss of ~16.2%–17.1% at ~30–35 km during winter. Unlike previously thought, REP's effects on stratospheric ozone persist beyond winter due to in situ NOx and HOx production.

These new findings indicate that the impact of energetic particles, which are largely driven by solar activity, have a vastly greater impact on ozone than was previously believed.

This finding tells us two things: First, the solar forcing of ozone, which is largely ignored by climate models, is actually even greater than we thought. Second, the ozone-destruction risk during the ongoing pole shift, which is what nearly every study identifies at the first major problem that comes with a pole shift, is an accurate crystal-ball vision of our future here on earth.



SOLAR FORCING OF COLD

ARTICLE REFERENCED:
ARE COLDER WINTERS IN EUROPE AT SUNSPOT MINIMA DUE TO ELECTRIC-CHARGE-INDUCED CHANGES IN AEROSOL SIZE DISTRIBUTIONS?

Although the Sun's brightness changes very little from year to year, other solar signals such as cosmic rays vary significantly. During solar minimum, when the number of sunspots is lowest, more cosmic rays enter Earth's atmosphere. These rays ionize air molecules, creating electric charges and increasing the electrical conductivity of the atmosphere. This in turn increases the flow of downward electric current from the ionosphere to the Earth's surface, known as JZ. This electric current flows globally, and where it passes through clouds, it generates tiny electric charges called space charge. These charges change the behavior of cloud droplets and the way aerosols combine, which influences cloud thickness, rainfall, and storm dynamics.

In stratiform clouds common in winter, electric forces reduce the rate at which tiny particles are removed by falling droplets. This keeps more small droplets suspended in the air. These droplets are then carried higher into the atmosphere, where they freeze. When water freezes, it releases latent heat, which strengthens the storm system. The stronger the storm, the more likely it is to cause atmospheric blocking. Blocking happens when a high-pressure system stalls, diverting warm ocean air away from Europe and allowing cold Arctic or Siberian air to dominate the region. This leads to longer and colder winters, especially in Northern and Central Europe.
The study pulls together more than a century of data and observations, showing that:
Central England and Northern Europe have repeatedly experienced colder winters during solar minimum, dating back to the 1600s.

Winter storm tracks shift northward during solar minimum, in sync with changes in the Sun's activity.

Satellite data show that cloud cover increases and cloud droplets become smaller when more cosmic rays are present.

Sudden reductions in cosmic rays, known as Forbush decreases, are followed by weaker storms and lower storm vorticity.

Solar proton events, which increase JZ, are followed by stronger cyclones in polar regions.
These observations all point to a consistent pattern. Increased JZ during solar minimum alters cloud properties and boosts storm intensity, leading to more frequent and persistent atmospheric blocking.

The study focuses on a process called electro-anti-scavenging. In this process, small aerosol particles become electrically charged and are less likely to be captured by cloud droplets. This keeps more small particles in the cloud, leading to smaller droplet sizes and delayed precipitation. As these clouds are lifted into the upper atmosphere and freeze, they release more heat, strengthening storm systems. This same mechanism explains why blocking becomes more common during solar minimum.

SOLAR FORCING OF CYCLONES

ARTICLE REFERENCED:
THE SOLAR INFLUENCED CYCLONE GENESIS MODELLING: NORTH INDIAN OCEAN REGION

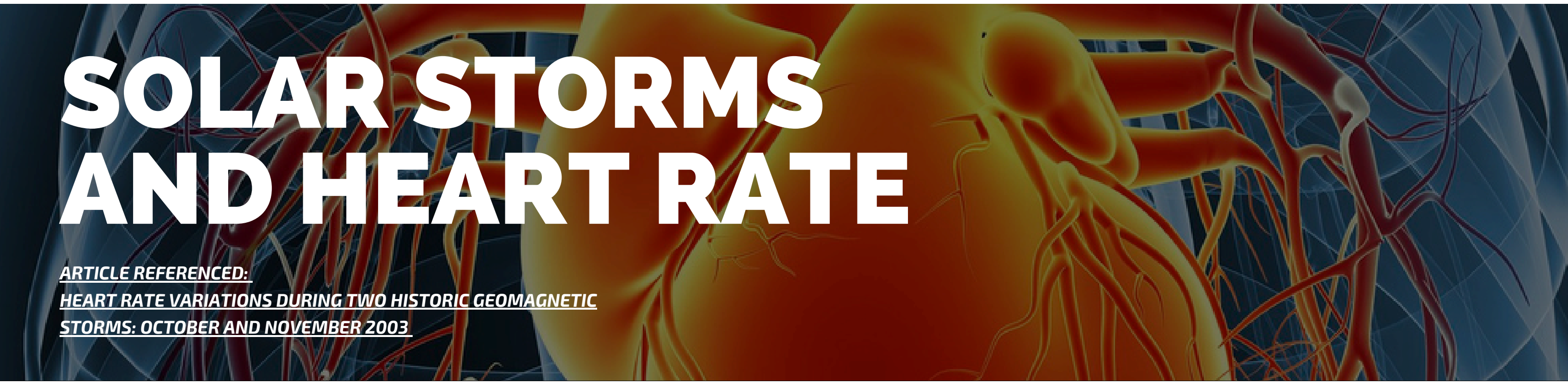
Tropical cyclones in the North Indian Ocean, especially near Pakistan and Oman, are some of the most destructive weather events on Earth. They form quickly, grow rapidly, and often leave little time for evacuation. But a new study points to an unusual warning signal, activity from the Sun.

RESEARCHERS ANALYZED HOW SOLAR PARTICLE EMISSIONS, SUCH AS BURSTS OF PROTONS AND ELECTRONS, COULD BE LINKED TO CYCLONE FORMATION IN THIS REGION. USING ADVANCED MACHINE LEARNING TECHNIQUES, INCLUDING ADAPTIVE NEURAL-FUZZY INFERENCE SYSTEMS (ANFIS), BAYESIAN REGULARIZED NEURAL NETWORKS (BRNN), AND RANDOM FOREST MODELS, THE TEAM TRAINED ALGORITHMS TO DETECT PATTERNS BETWEEN SOLAR DATA AND CYCLONE GENESIS.

Their key finding is that solar proton fluence, especially high-energy protons in the P100MeV range, appears to be a significant trigger for cyclone development, particularly when this solar activity occurred one day prior. In terms of modeling performance, the ANFIS system consistently outperformed the others, accurately identifying tropical cyclone onset when provided with solar particle inputs like P1MeV, P10MeV, P100MeV, and E0.6MeV.

The study also used principal component analysis to select the most relevant solar variables, ensuring that only the strongest predictors were included in the model. While no model is perfect, the researchers found that their best systems could detect up to 33 percent of cyclone events, a promising result, especially considering the complexity of cyclone formation.

SENSITIVITY TESTS CONFIRMED THAT SOLAR INPUTS, ESPECIALLY P100MEV AT A ONE-DAY LAG, HAD A MEANINGFUL INFLUENCE ON STORM GENESIS. THIS OPENS THE DOOR TO INCORPORATING SPACE WEATHER INTO REGIONAL EARLY WARNING SYSTEMS, GIVING COMMUNITIES ALONG THE COASTS OF SOUTH ASIA MORE TIME TO PREPARE.



SOLAR STORMS AND HEART RATE

ARTICLE REFERENCED:
HEART RATE VARIATIONS DURING TWO HISTORIC GEOMAGNETIC STORMS: OCTOBER AND NOVEMBER 2003

A new study from researchers in Italy explores more about cosmic ray fluctuations that have a measurable effect on human heart rate.
The research, which examined over 2,000 heart rate records from volunteers at Rome's Polyclinico Tor Vergata, focused on two intense solar events in October and November 2003, often referred to as the "Great Halloween Solar Storms."

This study found that heart rate increased significantly during and around geomagnetic storms and Forbush decreases (sudden drops in cosmic ray intensity). Using advanced statistical methods, the researchers showed that heart rate was not only affected during the peak of the storm but also two days before and after the event. suggesting our bodies begin to respond to solar-driven changes in Earth's magnetic field even before the storm hits.
The research analyzed data from April 2003 to May 2004, a time of heightened solar activity. Volunteers ranged in age from 5 to 96, and heart rate was monitored through Holter electrocardiograms—a device that tracks heart rhythms continuously over 24 hours.
The scientists used geomagnetic indices (Dst and Ap) and cosmic ray data from the Rome Cosmic Ray Station to categorize levels of space weather activity. They then compared these levels to changes in daily average heart rate, using a method called ANOVA (Analysis of Variance) and a time-based approach known as "superimposed epoch analysis."

THEIR FINDINGS?

Geomagnetic storms increased heart rate in the days just before and after the event.
The strongest storms, measured using the Dst index, were linked with the highest heart rates.
Forbush decreases, or sudden dips in cosmic rays, were also associated with increased heart rate.

Interestingly, some increases in cosmic rays (rather than decreases) were also linked to elevated heart rates, showing the body may respond to any sudden change in space weather, not just the extremes. The biggest physiological shifts happened not during the peak of the storm, but in the days leading up to and following it.

This aligns with previous studies that found notable patterns between geomagnetic activity and human health. Blood pressure tends to rise about two days before major solar storms, suggesting a possible anticipatory response in the body. Additionally, the risk of heart attacks and strokes increases within three days of heightened geomagnetic activity. Women may be especially sensitive to these changes, often showing stronger cardiovascular responses compared to men.

PRE-QUAKE ANOMALIES

ARTICLE REFERENCED:
HTTPS://WWW.SCIRP.ORG/PDF/OJER_2740321.PDF
HTTPS://PAPERS.SSRN.COM/SOL3/PAPERS.CFM?ABSTRACT_ID=5277466
HTTPS://AGUPUBS.ONLINELIBRARY.WILEY.COM/DOI/10.1029/2025EA004320

This article compares four key scientific studies that showcase why solar activity, particularly X-class solar flares, geomagnetic storms, and associated space weather disturbances, play a measurable role in triggering earthquakes, as we know.

The first study provided a comprehensive analysis of how solar cycles and seasonal variations correlate with deep and ultra-deep earthquakes, especially in subduction zones. They showcase that X-class solar flares and seasonal changes, which modulate solar wind speed and magnetospheric compression, alter pressure on the Earth's surface. Their findings suggest a nuanced relationship: while shallow quakes are more prone to non-natural or anthropogenic noise, deeper tremors (≥70 km) display patterns tied to solar maxima, with enhanced seismicity during geomagnetically active periods such as 2000, 2014, and 2024.

The next study of the 2007 Pisco, Peru earthquake introduces a diagnostic technique based on magnetic vector deflection: the Forward Intersection of Magnetic Disturbance Vectors. This method estimated the likely seismogenic zone days ahead of the mainshock based on ultra-low frequency (ULF) magnetic emissions and directional magnetic anomalies, consistent with the PSRC hypothesis. Key takeaways from this research include that there are two distinct pre-quake phases: microcrack-induced ULF emissions weeks prior, and (2) surface-reaching PSRC currents producing vector deflections on the day of the quake, and diurnal variation pattern ratios as a stable signal.

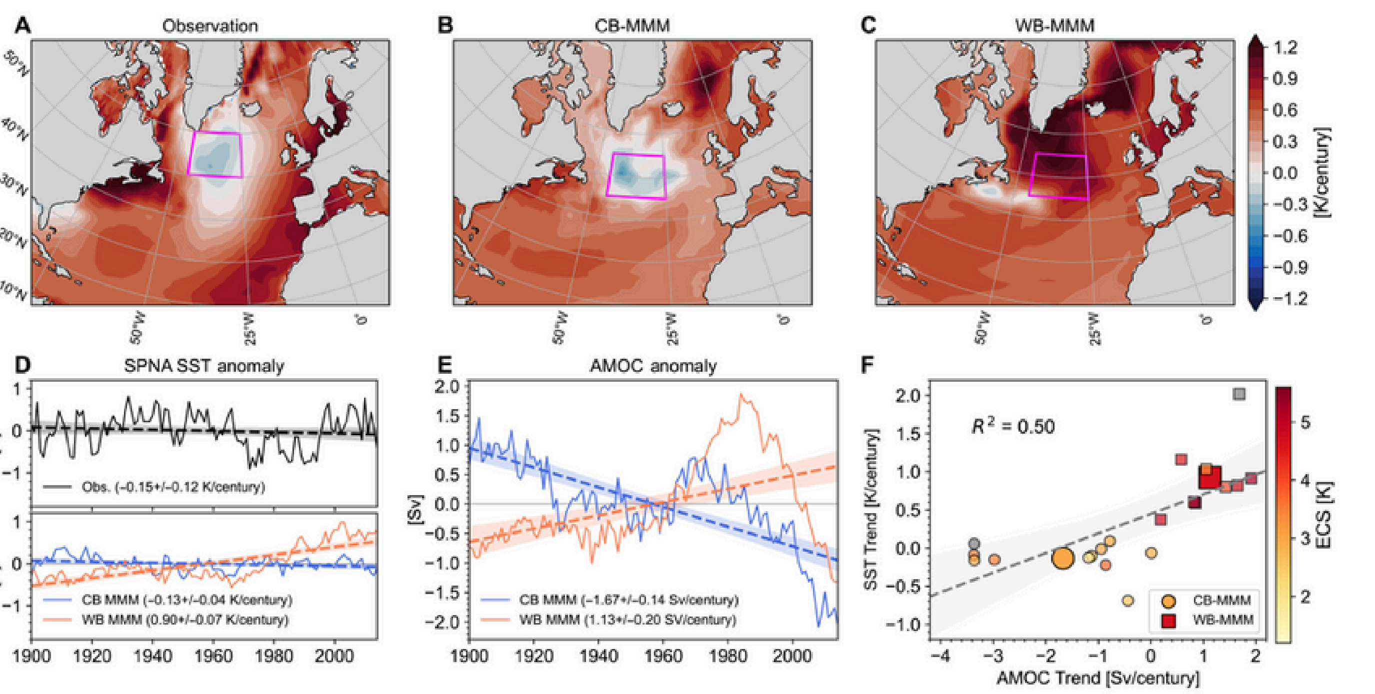
Building on the previous findings, this final comparative study explores the mathematical and physical models linking tectonic stress to the sequence of observed anomalies. It quantifies both the total charge from the interplanetary magnetic field (IMF) and the surface charge density from the atmospheric electric field, revealing a positive linear correlation between the two.

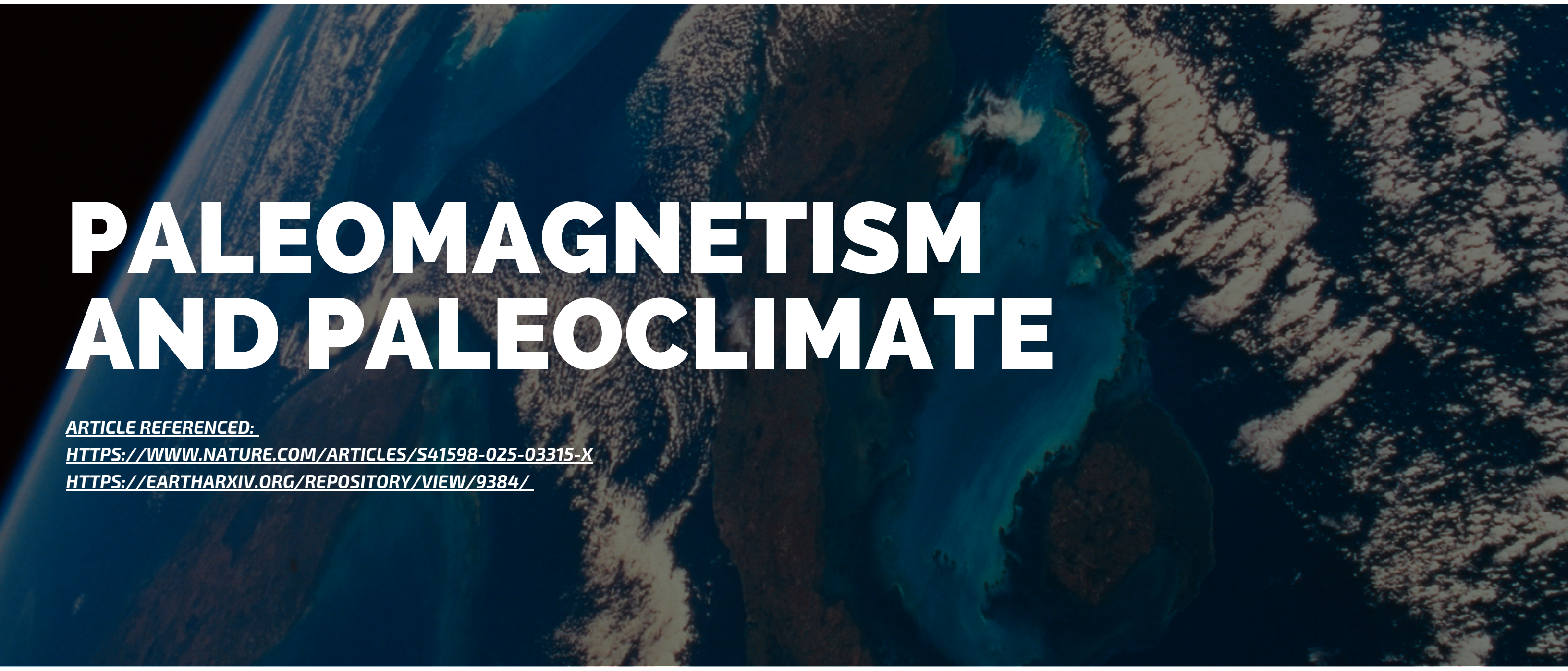
The study also provides geological evidence, noting that the affected seismogenic zones are composed primarily of granitic and andesitic rocks—lithologies known to activate positive hole (p-hole) charge carriers under stress. The timing of the anomalies supports theoretical predictions: PSRC generation and IMF variations occur 3 to 100 minutes before AEF anomalies, which in turn precede total electron content disruptions by 1 to 12 hours. This temporal structure is critical for distinguishing tectonic signals from background noise due to meteorological conditions or solar activity, particularly when factors such as the Kp index and cloud cover are excluded.

AMOC CONTROLS CLIMATE

ARTICLE REFERENCED:
SUBPOLAR NORTH ATLANTIC COOLING REINFORCED BY COLDER, DRIER ATMOSPHERE WITH A WEAKENING ATLANTIC MERIDIONAL OVERTURNING CIRCULATION

Imagine a vast conveyor belt running through the Atlantic Ocean. Warm water flows northward near the surface, releasing heat into the air. Then, cooled, saltier water sinks and flows back southward deep below the surface. This flow of heat and water is known as the Atlantic Meridional Overturning Circulation, or AMOC. It's one of Earth's climate engines, regulating temperatures, driving weather patterns, and helping move carbon and nutrients around the globe. But this conveyor belt is weakening. The study, led by Yifei Fan and colleagues, dug deep into historical climate simulations from state-of-the-art global models. It found that the AMOC's slowdown affects the ocean surface in two distinct ways, both of which contribute equally to the mysterious cold blob. As the Atlantic Meridional Overturning Circulation (AMOC) weakens, it delivers less warm water to the North Atlantic, causing sea surface temperatures in the region to drop. This oceanic cooling is further intensified by atmospheric changes above. A slower AMOC leads to cooler and drier air over the subpolar North Atlantic, which means the ocean receives less heat in return from the atmosphere. This creates a feedback loop, less ocean heat release leads to a cooler atmosphere, which in turn reduces the ocean's heat gain, amplifying the regional cooling trend. Understanding AMOC's dual influence is crucial. The North Atlantic cold blob doesn't just affect local temperatures, it shifts jet streams, alters rainfall in the tropics, and influences storm patterns in Europe and North America. The AMOC's role as both ocean current and atmospheric influencer makes it a central pivot point in our climate system.





PALEOMAGNETISM AND PALEOCLIMATE

ARTICLE REFERENCED:
HTTPS://WWW.NATURE.COM/ARTICLES/S41598-025-03315-X
HTTPS://EARTHARXIV.ORG/REPOSITORY/VIEW/9384/

Two new studies are confirming the impact of geomagnetic field intensity on climate. One modeled the atmospheric and oceanic systems mathematically based on energetic particle interactions with the ozone and atmospheric circulations.

The other looked back into the glacial period which lasted from 100,000 years ago until about 12,000 years ago, highlighting the simultaneously occurring geomagnetic excursions and rapid shifts in climate.

Every study that looks at these rapid magnetic pole shifts finds the same climatological shifts, often coinciding with “Heinrich Events”, which are some of the most drastic and rapid shifts in global climate in the paleoclimate record.

This not only offers a fairly dramatic look at what is going to happen to earth in the years ahead as we dive deeper into the ongoing geomagnetic excursion happening now, but it offers insight into global warming of the last century.

The lower magnetic field strength has already begun to allow for slightly lower ozone levels (it’s not chlorofluorocarbons) which is allowing more UV light to reach the lower atmosphere and heat the planet.

Furthermore, increased particle flux from space weather tighten-up the jet streams, pulling them towards the polar region, which not only allows tropical heat to spread more-easily, but allows intrusion of that heat into the polar regions themselves.

For those of you who have studied this topic, you know that rapid heating during the magnetic pole shift is followed immediately afterwards by a cooling pattern. This is due not-only to the reversal of the ozone and jet stream patterns, but the melted-ice of the polar region having chilled the oceans, which then chills the atmosphere. This is the Heinrich Event pattern: rapid warming, followed by rapid cooling.

MAGNETIC POLE SHIFT AND OXYGEN

ARTICLE REFERENCED:
HTTPS://WWW.SCIENCE.ORG/DOI/FULL/10.1126/SCIADV.ADU8826
HTTPS://WWW.SCIENCEDIRECT.COM/SCIENCE/ARTICLE/PII/S0012821X14001629

In a 2025 study led by Weijia Kuang and colleagues, scientists analyzed the relationship between atmospheric oxygen levels and the strength of Earth's geomagnetic dipole field over the past 540 million years. Using two independently derived data sets—paleomagnetic records (specifically the virtual geomagnetic axial dipole moment, or VGADM) and geochemical proxies for atmospheric O_2—the researchers discovered a striking correlation. Both oxygen levels and geomagnetic field strength followed a similar pattern: a steady long-term rise punctuated by a dramatic surge between 330 and 220 million years ago.

Crucially, this correlation held even when the data were detrended and filtered to isolate long-term signals. Statistical tests showed that the synchronization between geomagnetic strength and oxygen concentration was unlikely to be due to chance.

During stable periods, Earth's magnetic field deflects most of these particles, minimizing atmospheric loss. However, during geomagnetic reversals, when the magnetic poles switch and the field weakens drastically, this protective shield collapses. Earth begins to behave more like Mars, experiencing direct atmospheric erosion by the solar wind.

A 2014 study by Yong Wei and colleagues simulated these reversal events. They found that when the magnetic field drops to 10% of its normal strength, oxygen ion escape rates spike by three to four orders of magnitude. In just a few million years, enough oxygen can be lost to trigger mass extinctions.

Their model, using parameters from the Triassic–Jurassic extinction (~200 million years ago), showed that heightened reversal frequency during that time directly caused a drop in atmospheric oxygen from 23% to 14%, a decline large enough to suffocate vast ecosystems. This is not speculation; the geological and biological records perfectly align.

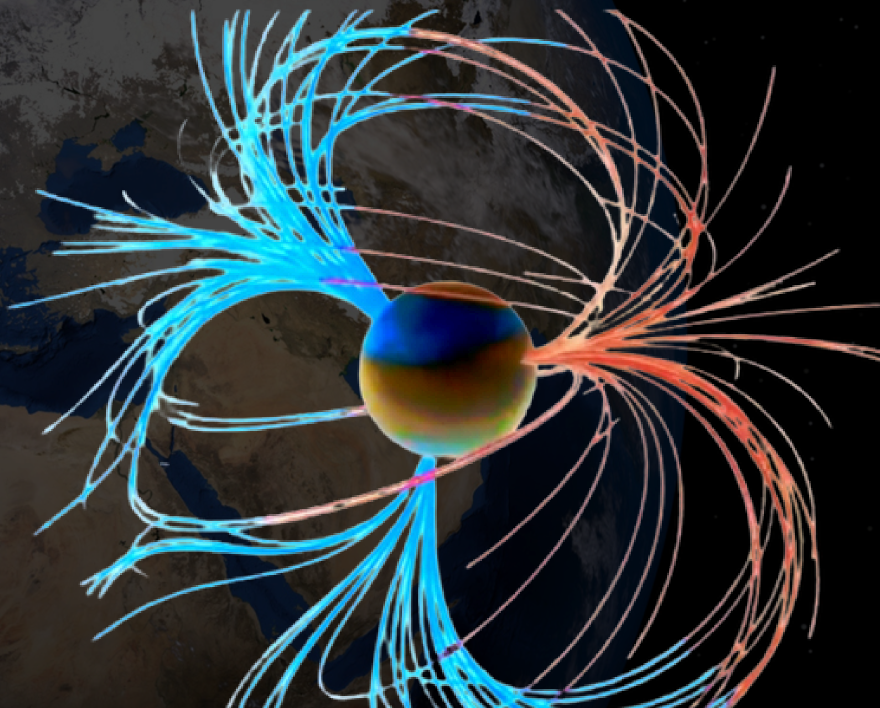
The Kuang study found that the largest spike in both magnetic intensity and O_2 occurred during the formation of Pangea and the onset of the Kiaman Reversed Superchron—a time of intense tectonic activity and stable magnetic polarity.
These findings suggest that large-scale tectonic processes and inner core solidification influence both the magnetic field and the surface redox balance. Supercontinent cycles drive heat flow variations at the core-mantle boundary, which in turn regulate the geodynamo and modulate atmospheric oxygen via weathering, degassing, and carbon burial.
This means Earth's interior and surface systems are directly coupled. Oxygen, life, climate, and geomagnetism are all part of one planetary system driven by the churning heart of Earth itself.

THE LAST DISASTER

ARTICLE REFERENCED:
HTTPS://WWW.SCIENCEDIRECT.COM/SCIENCE/ARTICLE/PII/S0031920125001062
HTTPS://AGUPUBS.ONLINELIBRARY.WILEY.COM/DOI/10.1029/2024PA004998

Two new papers are revealing more about the last cyclical disaster event about 6000 years ago - although one of them is using a flawed isotope dating method which puts the event a bit younger, closer to 5000 years ago.

That study, which notices the Noah event (or Tianchi event) in sediment from Sweden, detects severe and rapid geomagnetic changes during the period, and it is the first ever documentation of this disaster event (magnetically) outside of the Asian continent.

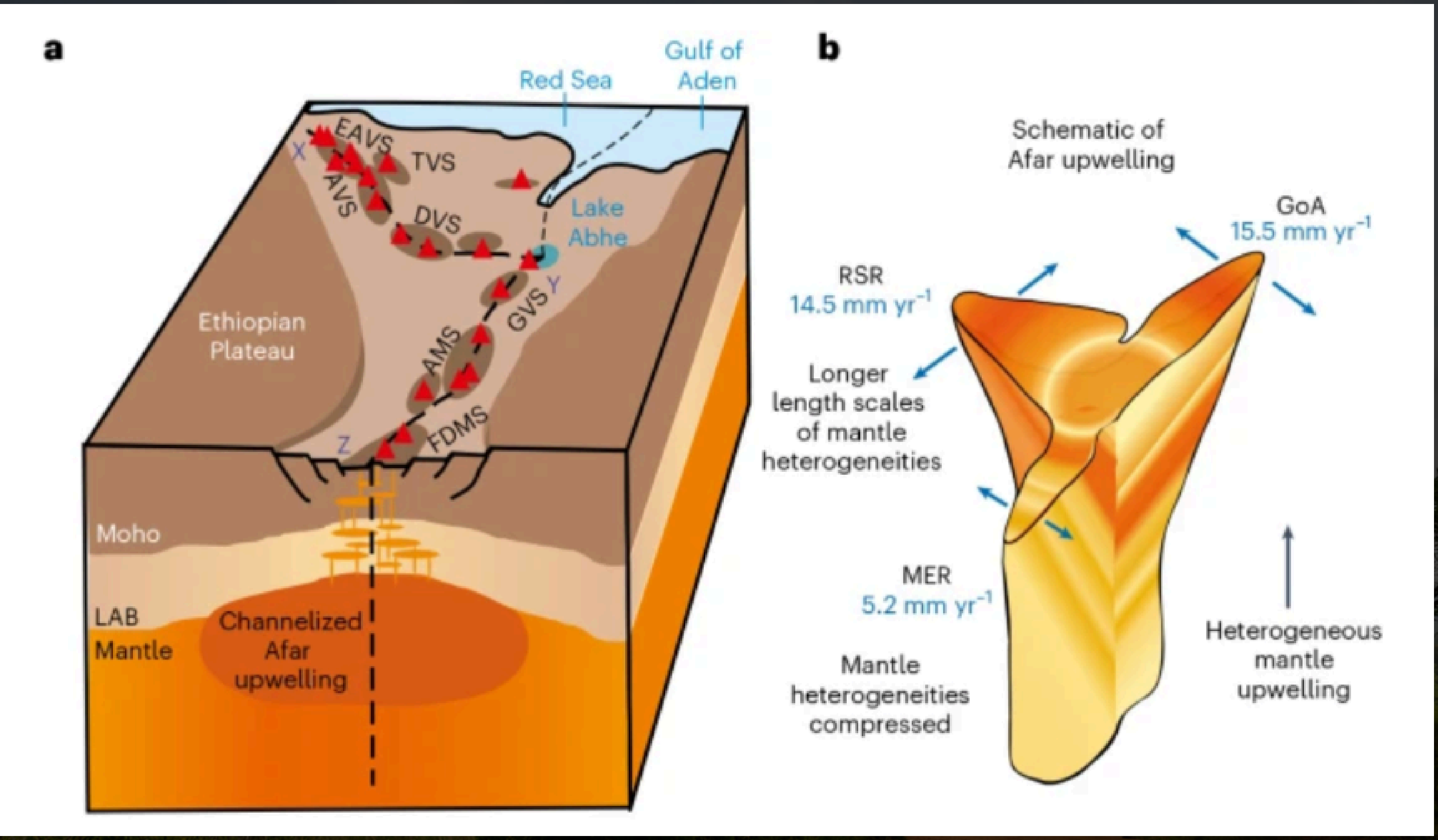


The other study demonstrates that a severe ocean current change occurred in the polar region 6000 years ago, and this is where most of the outside-of-Asia evidence of the last disaster can be found. While most of the paleomagnetic data has been reported from China, Russia and Korea, the climatological impacts were global, including massive floods in the Middle East, a tropical hydroclimate and green-Sahara event, and now, with this new study, polar changes as well.

The reason that the most-recent cyclical magnetic pole shift took so long to identify as an official “excursion” is that the climatological impacts were missing from the record as well. Now that they have been found, and the magnetic changes have been repeatedly documented, more studies like this are being commissioned; one should expect much more on the magnetic and climate changes from ~6000 years ago to be reported in the coming years.

AFRICA DISASTER LOOMS

ARTICLE REFERENCED:
MANTLE UPWELLING AT AFAR TRIPLE JUNCTION SHAPED BY OVERRIDING PLATE DYNAMICS



One of the big questions, and one that cannot be fully answered, is which areas of the crust will rise, fall, twist, heave, sink or break during the polar shift associated with this round of the earth disaster cycle. A few regions on earth appear more vulnerable than others to one particular type of disruption, like the center of the United States, expected to sink a bit due to isostatic readjustment.

Another such area is the East African Rift. A new study is fortifying what many already suspect, that the major fault running next to the Ethiopian plateau, which is already cracking and spreading, will have a major heave and break event, with magmatic intrusion and eruption.

The new study identifies the rising (upwelling) magma beneath the region that has already begun to split the eastern portion of the continent. It also identifies how it is pushing outward, not just upward, creating the cracking of the crust we can already see. During the major pole shift aspect of the disaster, expect this area to be completely devastated.

ARE GALACTIC IONS IMPACTING THE INNER SOLAR SYSTEM?

ARTICLE REFERENCED:
FIRST MMS OBSERVATIONS OF WAVES POSSIBLY GENERATED BY PUIS NEAR EARTH

The approach of the galactic current sheet, which is the cause of the cyclical disaster in our solar system via a galactic magnetic reversal, is already causing magnetic changes on all the spheres (planets and sun, and one moon), and has begun delivering extra dust, energetic neutral atoms, and interstellar ions.

While the dust and neutral particles are seen increasing throughout the system, the ions have only been detected by the Voyager spacecraft and the New Horizons satellite… until now. New data from the NASA MMS mission has discovered the interstellar (galactic) ions at earth's orbit.

This is not unexpected, but it is in fact a concerning sign that the worst of the disaster cycle is coming in the years ahead. These ions are the closest layer of mass to the actual magnetic reversal point within the sheet. While the exact thickness of that layer, and speed of the sheet movement are not known, the arrival of these ions at earth likely means we are 12-20 years away from the exact magnetic null that triggers the pole shift, micronova, and next age of earth.

RETREAT PLANNED BY BEN DAVIDSON

THE EXPERIENCE AT OBSERVER RANCH
OCTOBER 17-19TH, 2025
PENROSE, COLORADO

The Experience Colorado Oct 17-19th 2025

You've got your preps, your food stockpile, and the perfect location in a safe zone.

theexperiencecolorado.com /

OBSERVER RANCH

Campground for Today, Education for Tomorrow

CAMP, LEARN AND PLAY WITH US!

Learning Center & Library

Our campground has a Learning Center with classes and workshops, and the Little Spark Library holds 350+ books with resoures on space, nature, homesteading, self-sufficiency and more!

Campfire under the Stars

Use our telescopes to enjoy the night sky! With beautiful mountain views, and attractions like hot springs, hiking, fishing, Jeep tours, skydiving, whitewater rafting...the list of adventures will be one to remember! During the day, assemble and launch a model rocket from our friends at Estes Rockets!

Spacious RV Sites

Our sites have plenty of room to spread out, each with a campfire ring, POLYWOOD adironack and table set for your enjoyment.

CONTACT US

719-203-2436

www.ObserverRanch.com

THE BRIEF DIGEST

We're excited to share something new from one of The Observer Review's co-contributors.

The Brief Digest — a new weekly journal that breaks down the latest studies in health, science, and lifestyle into clear, accessible insights.

Each month will feature reports released every week.

The goal? To help you understand the research behind the headlines and decide what matters most to your life — no prescriptions, no agendas, just trustworthy interpretation.

If you're someone who likes to stay informed but doesn't always have time to decode academic language or scroll through endless summaries, The Brief Digest was made for you.

We invite you to follow along and explore this new way of learning.

THANK YOU!

WE HOPE YOU ENJOYED OUR JULY 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!