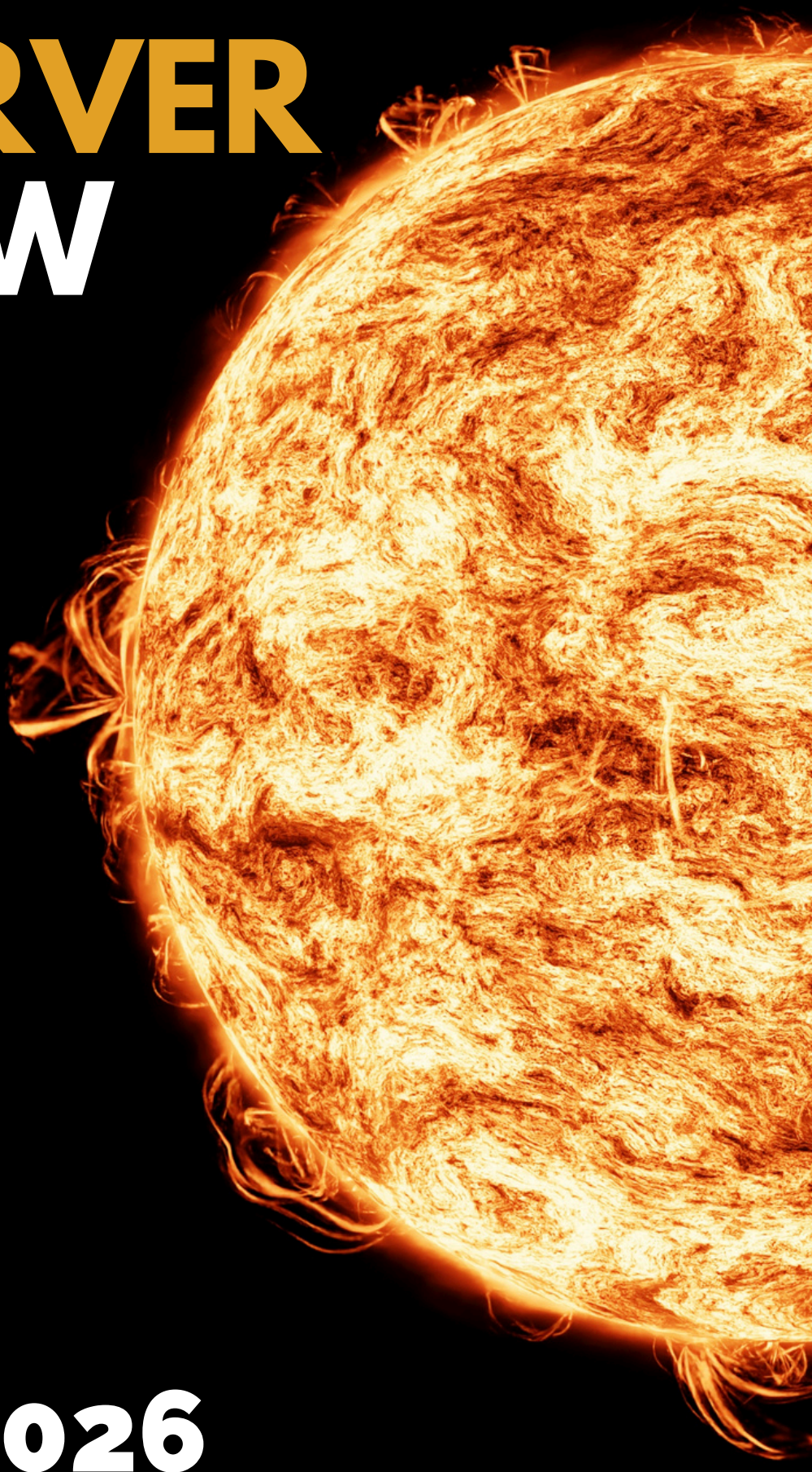
THE OBSERVER REVIEW



APRIL 2026

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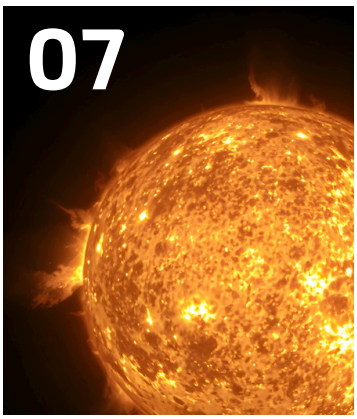
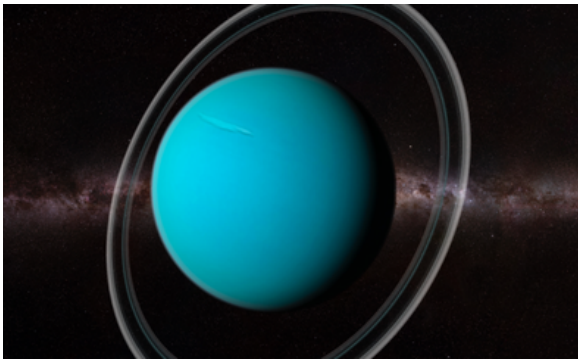
Comet MAPS (C/2026 A1) was a Kreutz comet that came into the inner solar system on the normal southern-entry line.



THE SUN, MAGNETISM AND EARTHQUAKES

As geomagnetic disturbances ripple through the Earth–ionosphere system, they induce electrical currents both in the atmosphere and within the ground.

FEATURED ARTICLES



A new study is diving deeper into the recently reported changes on Uranus, as part of the larger solar system shift ongoing now as we enter the galactic magnetic reversal zone of the central galactic current sheet.

AND MORE!

IS IT STILL SAFE TO FLY?

BY: BEN DAVIDSON

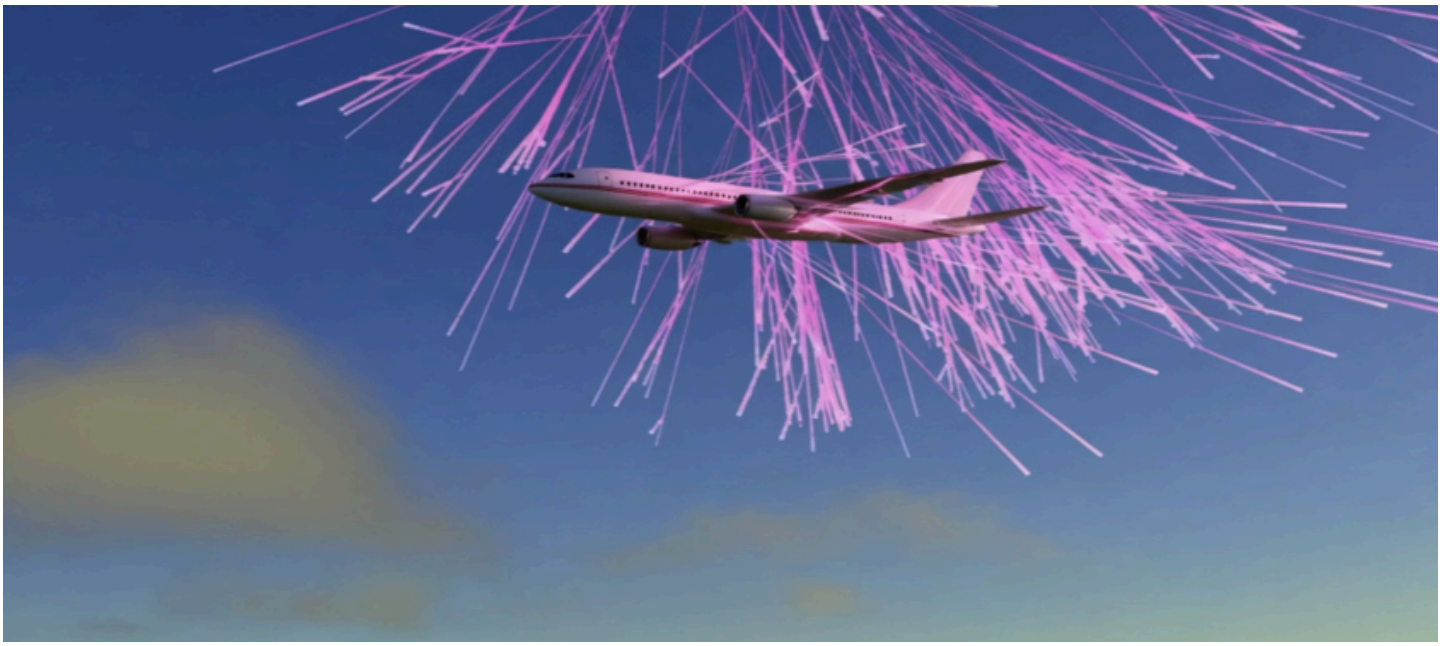
ARTICLE REFERENCED:
SYSTEMATIC RISE IN FLIGHT CANCELLATIONS DURING SPACE WEATHER EVENTS

QUANTIFYING THE IMPACTS OF THE MAY 2024 GEOMAGNETIC STORM ON TRANSATLANTIC AVIATION: REROUTING, DELAYS, AND ECONOMIC LOSSES

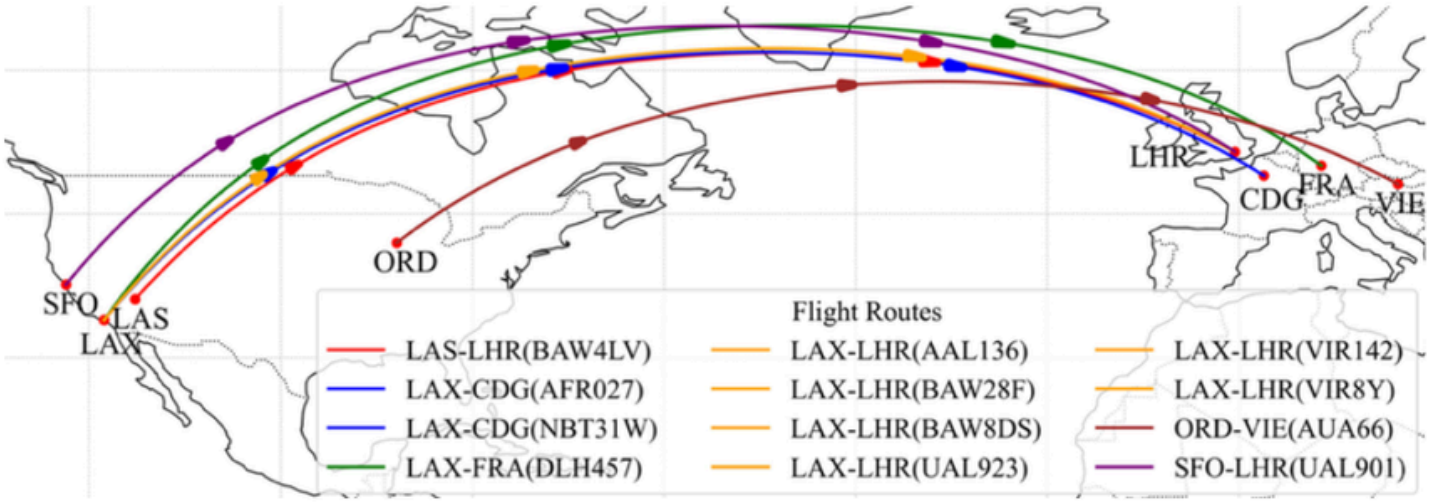
Powerful solar storms send out energy and particles that disturb Earth's magnetic field and upper atmosphere. Two new studies show that these events can cause real problems for airplanes. This is a topic we have covered for years, and have long said that one day the ongoing magnetic pole shift was going to make it unsafe to fly during solar storms, and then, unsafe to fly at all.

One paper looks at many years of flight data from China and finds more flight cancellations when space weather is active. Researchers studied about 5 million flight records from five busy airports in China between 2015 and 2019.

THEY COMPARED DAYS WITH SPACE WEATHER EVENTS—SUCH AS SOLAR FLARES, CORONAL MASS EJECTIONS, AND SOLAR PROTON EVENTS—TO QUIET DAYS WITH NO ACTIVITY.



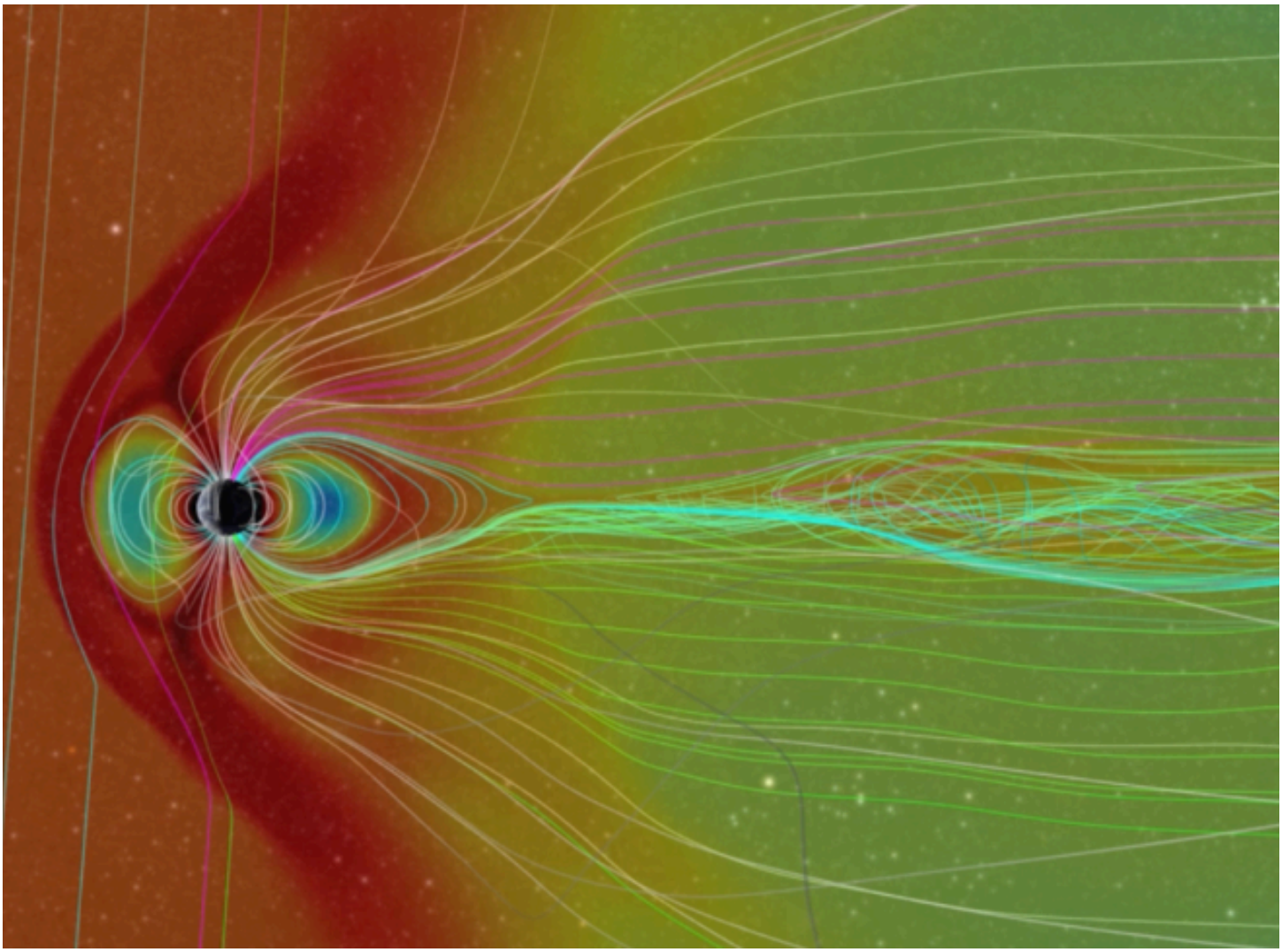
On average, flight cancellation rates jumped almost 97% higher during these space weather periods. The rate went from about 2.3% on normal days to 4.5% during storms. The scientists also noticed that stronger disturbances in Earth's magnetic field and ionosphere matched higher cancellation numbers in a nearly straight-line pattern. Even after checking for seasons and other factors, the increase stayed clear.



The second study examines a big geomagnetic storm in May 2024 and measures how the extra radiation forced transatlantic flights to change their routes, leading to extra time, fuel, and costs. Scientists looked at 12 specific transatlantic flights between North America and Europe. To stay safe, many flights had to reroute away from high latitudes where the storm effects were strongest.

THIS CHANGE MADE THE AVERAGE FLIGHT DISTANCE 5.2% LONGER. IT ALSO INCREASED FUEL USE DURING THE CRUISE PORTION OF THE FLIGHT BY ABOUT 5.1% AND ADDED ROUGHLY 1.5% MORE TIME IN THE AIR. THESE SMALL PERCENTAGE CHANGES ADDED UP TO NOTICEABLE EXTRA COSTS FOR AIRLINES.

THE STORM DISTURBED THE IONOSPHERE, WHICH AFFECTED NAVIGATION SIGNALS AND FORCED AIR TRAFFIC CONTROLLERS TO CHOOSE SAFER BUT LESS DIRECT PATHS.



Together, they highlight how space weather touches everyday air travel in ways people often overlook. These are also clear signals of an increasing planetary vulnerability; similar solar storms did NOT produce similar issues or radiation levels in the past. At this point it IS unsafe to fly during Kp9 (G5) solar storms. It won't be long until things get worse.

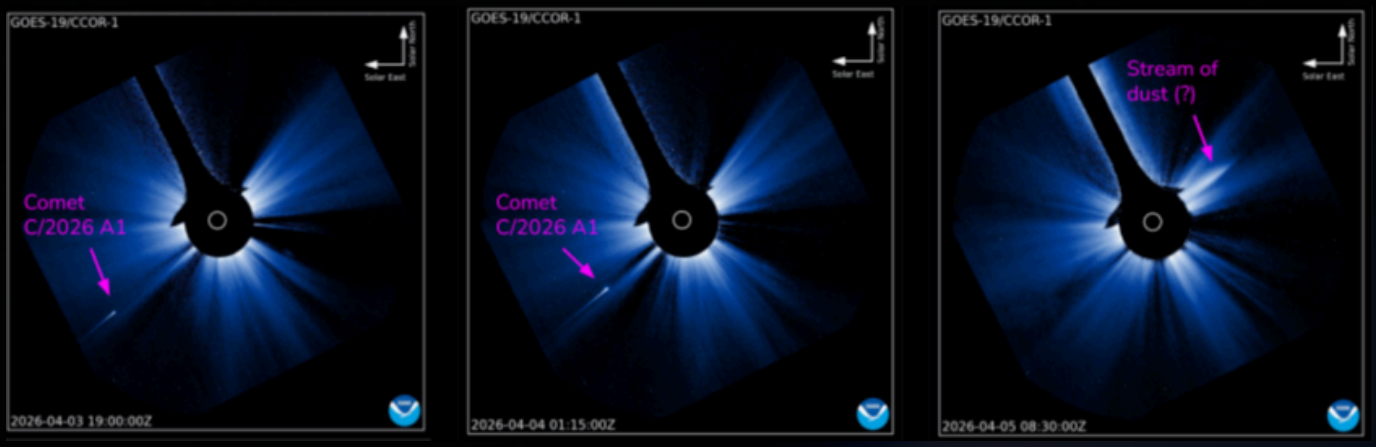
I cannot say exactly what it would take to make me move that advisory to a lower level- it took that paper for me to finally say that a similar storm is not something to mess around with. This is why it is critical that we keep monitoring the situation.

IT IS STILL SAFE TO FLY RIGHT NOW ALMOST ALL THE TIME.

LATER IN THIS ISSUE WE WILL SEE AN ARTICLE ON THIS EXACT CONCERN: THE ATMOSPHERIC RADIATION IMPACT DURING A MAGNETIC POLE SHIFT.

COMET MAPS: A FIRST-EVER COMET OBSERVATION

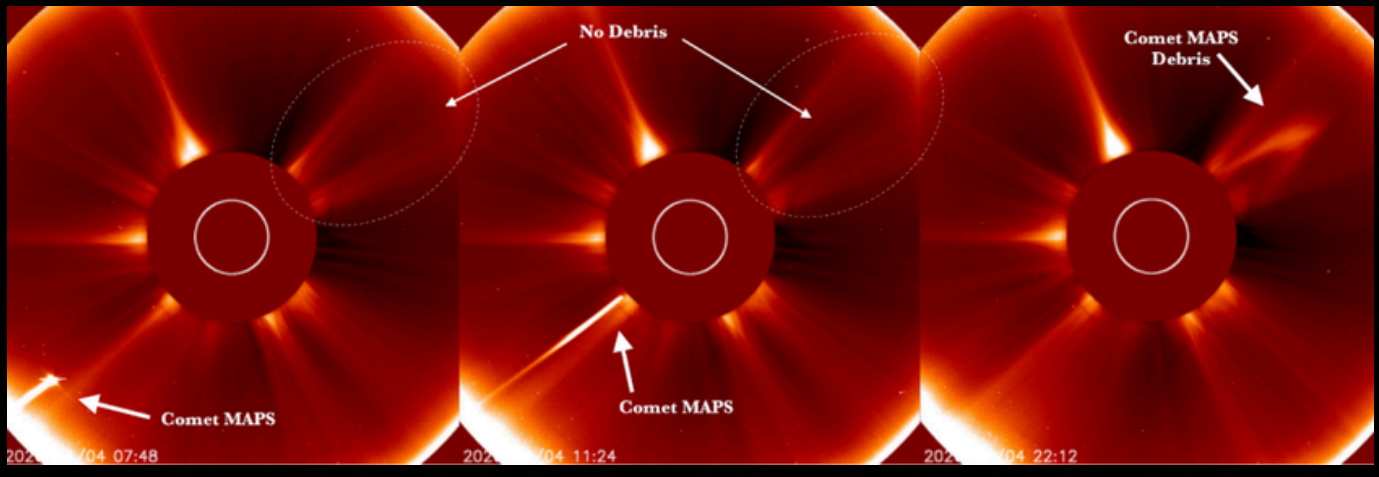
BY: BEN DAVIDSON



Comet MAPS (C/2026 A1) was a Kreutz comet that came into the inner solar system on the normal southern-entry line. It vaporized in the solar corona under extreme ultraviolet and solar wind particle radiation, atomizing into a vaporous stream that could be seen leaving the sun.

Above we see the official NOAA graphic from their coronagraph on GOES, below is my own annotation of the SOHO C2 images. Both sequences show the comet entering the sun bottom left, and only a stream of dusty plasma leaving top right where there was clearly no debris before.

This was the first time a comet has ever broken apart upon entry to the sun and its remnant debris was visible leaving the coronagraph in the solar wind as atomized and plasmified matter. Later this month, a much more interesting Comet C/2025 R3 PANSTARRS will come into the inner solar system nearly on a direct line between the earth and sun; we are similarly concerned about what matter from its tail is added to the earth-destined solar wind.



THE SUN, MAGNETISM AND EARTHQUAKES

ARTICLE REFERENCED:

INTERACTION MECHANISM OF ELECTRIC CURRENT INDUCED BY SOLAR ACTIVITY AND EARTHQUAKE FAULTS

As geomagnetic disturbances ripple through the Earth–ionosphere system, they induce electrical currents both in the atmosphere and within the ground. These currents, known as telluric currents, flow through conductive regions of the crust, particularly in areas rich in fluids or mineralization. Fault zones, which often contain fractured rock filled with water and conductive materials, are especially susceptible to these effects. This creates a pathway through which solar activity can influence the physical conditions within the lithosphere.

One of the most compelling mechanisms linking geomagnetic activity to earthquakes is magnetostriction. This phenomenon occurs when certain minerals physically deform in response to changes in a magnetic field. In the Earth's crust, minerals such as magnetite, ilmenite, and pyrrhotite are both common and magnetically sensitive. When geomagnetic conditions fluctuate, especially during solar storms, the magnetic domains within these minerals realign, causing them to expand or contract at a microscopic level. While these deformations are small, they can become significant in fault zones that are already under extreme tectonic stress.
Observations cited in the study indicate that increases in solar proton flux and associated geomagnetic disturbances have been observed in proximity to several large-magnitude earthquakes (M6+).

In this context, earthquakes are not initiated by solar activity, but they may be triggered by it. A fault nearing its breaking point can be thought of as a system on the edge of instability. Even minor additional stresses, such as those introduced through magnetostrictive deformation, may be enough to accelerate fracturing and initiate slip. This process unfolds as a chain reaction: geomagnetic fluctuations lead to mineral deformation, which contributes to microfracturing, ultimately progressing into a full rupture that releases seismic energy.

Magnetostriction is only one part of a broader and more complex system of interactions. Other electromagnetic processes may act alongside it. Electrostriction, for example, causes materials to deform in response to electric fields, adding another layer of stress to rocks. The Lorentz force can act on charged particles within the crust, influencing their movement and potentially redistributing stress. At the same time, piezoelectric effects in minerals like quartz generate electrical charges under mechanical stress, creating feedback loops between deformation and electromagnetic activity. Fluid movement within rock pores further complicates the system, as shifts in pressure can weaken faults and promote fracturing. Together, these processes form a coupled network of interactions where magnetic, electrical, mechanical, and fluid dynamics all contribute to the evolution of stress within the Earth.

ARTICLE REVIEW: CLIMATE

ARTICLE REFERENCED:
MULTIVARIATE ANALYSIS, PHASE VERIFICATION, AND THE REJECTION OF MAN-MADE POSITIVE FEEDBACK GLOBAL WARMING THEORY

Using satellite-era data from 2000 onward, the author identifies strong statistical relationships between global sea surface temperature and two solar-linked variables: total solar irradiance (TSI) and absorbed shortwave radiation at the top of the atmosphere (ASW).

In contrast, carbon dioxide appears weak or even negligible in the model, and water vapor is treated not as a driver, but as a response to temperature changes.

The study looks at the growing body of research showing that solar activity can influence cloud formation, atmospheric circulation, and even regional climate variability through indirect pathways.

The study points to an important gap: the separation between climate science and space weather research is often artificial.

THIS STUDY, INTENTIONALLY OR NOT, SITS AT THAT INTERSECTION.

The abrupt warming observed in 2023–2024, which even mainstream researchers acknowledged as difficult to fully explain, is a case where these layers overlap.

Solar cycle intensification, geomagnetic disturbances, volcanic water vapor injection, and ocean variability all occurred within the same window. No single variable cleanly explains the signal.

It connects the Sun to Earth through magnetic and electrical coupling, not just energy flux. And it opens the reality that climate anomalies are not driven from the surface upward, but from the top of the atmosphere downward.

SOLAR FORCING OF OZONE

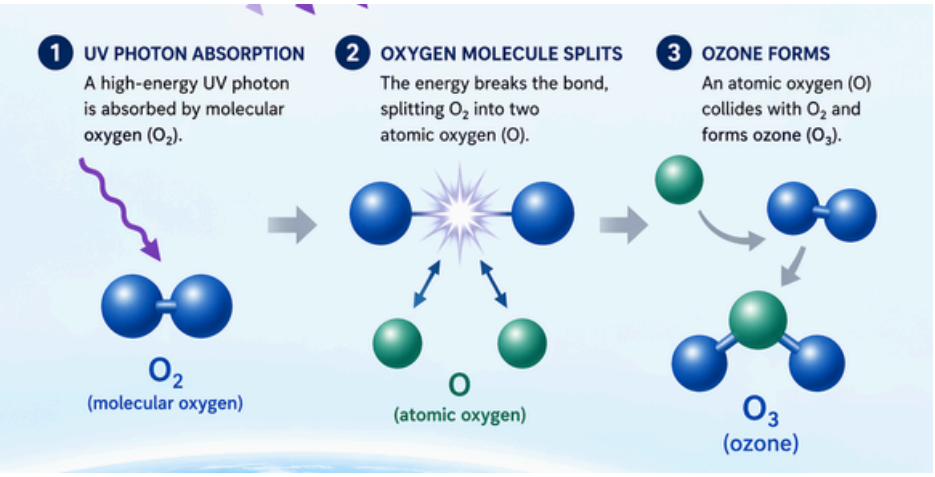
ARTICLE REFERENCED:
SOLAR-CYCLE INFLUENCE ON VERTICALLY RESOLVED OZONE: LATITUDE–ALTITUDE–SEASON PATTERNS FROM 44 YEARS OF GLOBAL STATION DATA

The ozone layer is often framed as a passive shield, protecting life on Earth from harmful ultraviolet radiation. In reality, it is an active, dynamic component of the Earth system, continuously produced, destroyed, and redistributed through a combination of photochemistry and atmospheric circulation. At the center of this system sits the Sun.

Solar forcing of the ozone layer operates through both direct radiative pathways and indirect particle-driven mechanisms, imprinting a clear ~11-year solar cycle signal into the vertical structure of the atmosphere.

The recent study "Solar-cycle influence on vertically resolved ozone: Latitude–altitude–season patterns from 44 years of global station data" provides one of the most resolved empirical frameworks to date, revealing how deeply solar variability is embedded in ozone behavior across space and time.

AT ITS MOST FUNDAMENTAL LEVEL, OZONE FORMATION IS CONTROLLED BY SOLAR ULTRAVIOLET (UV) RADIATION. WHEN HIGH-ENERGY UV PHOTONS STRIKE MOLECULAR OXYGEN (O_2), THEY SPLIT IT INTO ATOMIC OXYGEN, WHICH THEN RECOMBINES TO FORM OZONE (O_3). THIS IS THE CLASSIC CHAPMAN CYCLE.



At its most fundamental level, ozone formation is controlled by solar ultraviolet (UV) radiation. When high-energy UV photons strike molecular oxygen (O_2), they split it into atomic oxygen, which then recombines to form ozone (O_3). This is the classic Chapman cycle.

During periods of high solar activity, UV output increases,especially in the 180–350 nm range, enhancing ozone production in the upper stratosphere.

THE STUDY CONFIRMS THIS MECHANISM WITH REMARKABLE CLARITY:

A 2.7–3.5% INCREASE IN OZONE IS OBSERVED AT 35–46 KM ALTITUDE DURING SOLAR MAXIMUM CONDITIONS

THIS REGION REPRESENTS THE PRIMARY PHOTOCHEMICAL RESPONSE ZONE, WHERE UV VARIABILITY DIRECTLY MODULATES OXYGEN PHOTOLYSIS RATES

This is the cleanest expression of solar forcing: more solar energy, more ozone production.

Solar forcing is also highly dependent on latitude and season. The strongest correlations between solar activity and ozone variability occur at mid-latitudes, where there is an optimal balance between photochemical production and atmospheric transport. In polar and winter conditions, the signal becomes amplified, with maximum ozone responses reaching up to 4.2 percent during boreal winter, driven by polar vortex isolation, reduced atmospheric mixing, and increased sensitivity to energetic particle precipitation . In contrast, summer conditions show a more fragmented response, including phase reversals above approximately 40 km where ozone can decrease during solar maximum.

This seasonal asymmetry reflects the role of large-scale atmospheric dynamics such as the Brewer–Dobson circulation, planetary wave activity, and the Quasi-Biennial Oscillation, all of which redistribute ozone vertically and latitudinally and modulate how solar signals are expressed.

Ozone is not only a protective layer but also a radiatively active gas that plays a key role in atmospheric temperature structure and circulation. As a result, solar-driven ozone variability can modify stratospheric heating rates, influence jet stream positioning, and contribute to top-down climate forcing.

THE SUN AND HUMAN HEALTH

ARTICLE REFERENCED:
(1) HTTPS://ASSETS.CUREUS.COM/UPLOADS/REVIEW_ARTICLE/PDF/432069/20260121-252567-310W1K.PDF
(2) HTTPS://LINK.SPRINGER.COM/ARTICLE/10.1007/S00484-026-03134-3
(3) HTTPS://WWW.RESEARCHGATE.NET/PROFILE/CHAVIS-SRICHAN/PUBLICATION/401706362_SOLAR_ACTIVITY_AND_STROKE_RISK_A_NONLINEAR_DYNAMICS_PERSPECTIVE_ON_ARRHYTHMOGENESIS_AND_CEREBROVASCULAR_EVENTS/LINKS/69AEFB5BCEB31F79AB253505/SOLAR-ACTIVITY-AND-STROKE-RISK-A-NONLINEAR-DYNAMICS-PERSPECTIVE-ON-ARRHYTHMOGENESIS-AND-CEREBROVASCULAR-EVENTS.PDF
(4) HTTPS://WWW.RESEARCHGATE.NET/PROFILE/CHAVIS-SRICHAN/PUBLICATION/402027707_SOLAR-GEOMAGNETIC_MODULATION_OF_CARDIOPATHY_AND_STROKE_RISK_A_40-YEAR_STATISTICAL_DYNAMICAL_AND_MACHINE-LEARNING_ANALYSIS/LINKS/69B57396A5BF176AB55007EB/SOLAR-GEOMAGNETIC-MODULATION-OF-CARDIOPATHY-AND-STROKE-RISK-A-40-YEAR-STATISTICAL-DYNAMICAL-AND-MACHINE-LEARNING-ANALYSIS.PDF

Every issue, we discuss a lot about how space weather is quietly shaping cardiovascular risk. Four recent studies offer a clearer picture of this emerging field, known as heliobiology.

AT THE POPULATION LEVEL, THE SIGNAL IS SURPRISINGLY CONSISTENT.

A large scoping review analyzing 36 studies found that most reported increases in cardiovascular events during periods of geomagnetic disturbance. These events include heart attacks, strokes, and cardiovascular mortality. In some cases, stroke risk increased by as much as 52 percent during severe geomagnetic storms.

These patterns are not isolated. A separate long-term analysis spanning 40 years found that cardiovascular risk fluctuates in step with the Sun's 11-year cycle. Risk tends to rise during periods of heightened geomagnetic activity, particularly in the years following solar minimum when solar storms become more frequent.

Short-term effects also appear. During major geomagnetic storms, cardiopathy risk can increase by 40 to 70 percent, while stroke risk rises more modestly but still significantly. These increases often occur within days of solar events, suggesting a delayed biological response rather than an immediate trigger.
What makes these findings notable is their consistency across different datasets, time periods, and geographic regions. Even after accounting for weather, air pollution, and seasonal trends, the association between space weather and cardiovascular events often persists.

ONE OF THE MOST COUNTERINTUITIVE FINDINGS IS THAT NOT ALL SOLAR CONDITIONS CARRY THE SAME RISK.

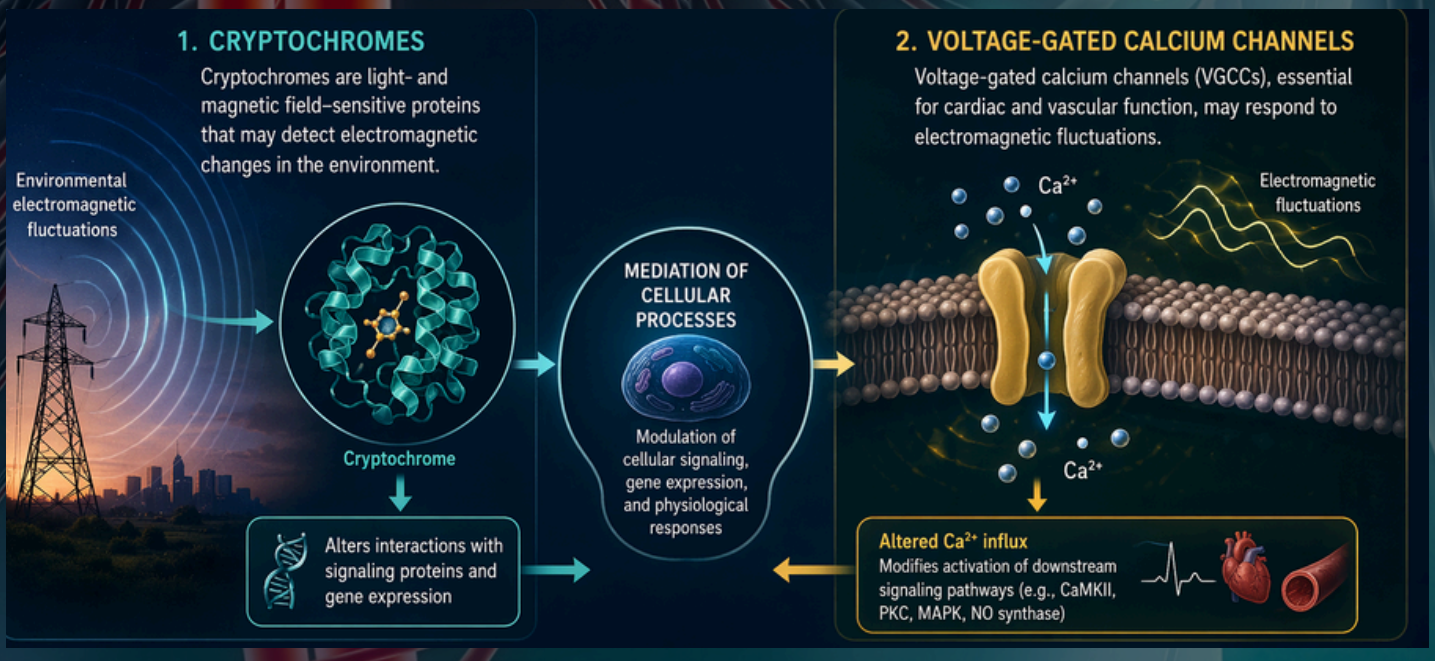
Periods of low solar activity, when the Sun's magnetic field weakens, allow more galactic cosmic rays to penetrate Earth's atmosphere. Several studies found that this combination, low geomagnetic activity and high cosmic ray exposure, is associated with increased rates of heart attacks and mortality.

In contrast, more active solar conditions may provide a protective effect by strengthening the heliospheric magnetic shield, reducing the influx of high-energy particles. This suggests that human health may be influenced not just by solar storms, but by the balance between solar activity and cosmic radiation. In other words, both extremes, too much disturbance or too little shielding, may carry risk through different mechanisms. The critical question is how these distant solar processes translate into biological effects. A second study focusing on mechanisms outlines several pathways through which geomagnetic disturbances may interact with the human body.

One involves the autonomic nervous system, which regulates heart rate, blood pressure, and vascular tone. Geomagnetic storms have been associated with reduced heart rate variability, a marker of autonomic imbalance linked to increased cardiovascular risk.

Another pathway involves melatonin, a hormone that regulates circadian rhythms and has antioxidant and anti-inflammatory properties. Geomagnetic disturbances may suppress melatonin production, potentially increasing oxidative stress and vascular inflammation.

There is also emerging evidence that biological molecules such as cryptochromes, which are sensitive to magnetic fields, may act as mediators between environmental electromagnetic changes and cellular processes. Additionally, voltage-gated calcium channels, critical for cardiac and vascular function, may respond to electromagnetic fluctuations, altering cellular signaling.



A third study takes this concept further by modeling how geomagnetic disturbances could directly affect cardiac rhythm.

Using nonlinear dynamics, researchers propose that the heart operates near critical thresholds, where small perturbations can trigger large changes in behavior.

Under normal conditions, the heart maintains stable electrical rhythms. But when external electromagnetic fluctuations exceed a certain threshold, they may push the system into instability.

This transition can lead to arrhythmias, particularly atrial fibrillation, which is a major risk factor for stroke. The study shows that geomagnetic disturbances may induce weak electrical currents in the body.

While these currents are extremely small, they can be amplified through resonance and nonlinear effects, potentially reaching levels that disrupt cardiac stability in vulnerable individuals.

THIS PROVIDES A PLAUSIBLE CHAIN OF EVENTS:

SOLAR ACTIVITY

↓

GEOMAGNETIC DISTURBANCE

↓

CARDIAC RHYTHM DISRUPTION

↓

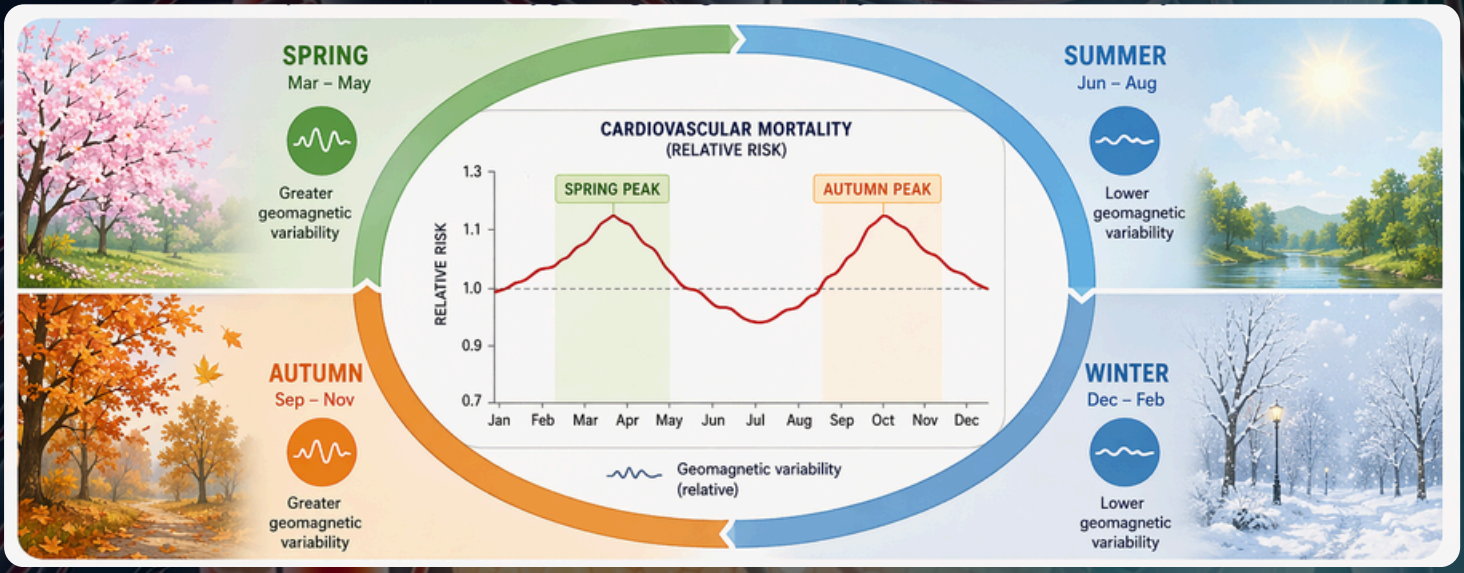
INCREASED STROKE RISK

Importantly, the effect is not uniform. Individuals with pre-existing cardiovascular conditions, hypertension, or prior stroke appear significantly more sensitive to these perturbations.

The fourth study highlights another key insight: timing matters.

Cardiovascular risk does not simply increase during isolated solar events. It appears to be amplified when multiple stressors overlap. For example, geomagnetic storms occurring alongside solar proton events or high-speed solar wind produce stronger effects than any single factor alone.

Seasonal patterns also emerge. Peaks in cardiovascular mortality often occur in spring and autumn, periods characterized by greater geomagnetic variability and environmental instability. When combined with weather changes, infections, or other stressors, these conditions may push vulnerable individuals past physiological thresholds.



Over longer timescales, the solar cycle itself modulates baseline risk, creating periods of heightened susceptibility that unfold over years rather than days. The Sun is not just a source of light and heat. It may also be a quiet, persistent force influencing the rhythms of human health.

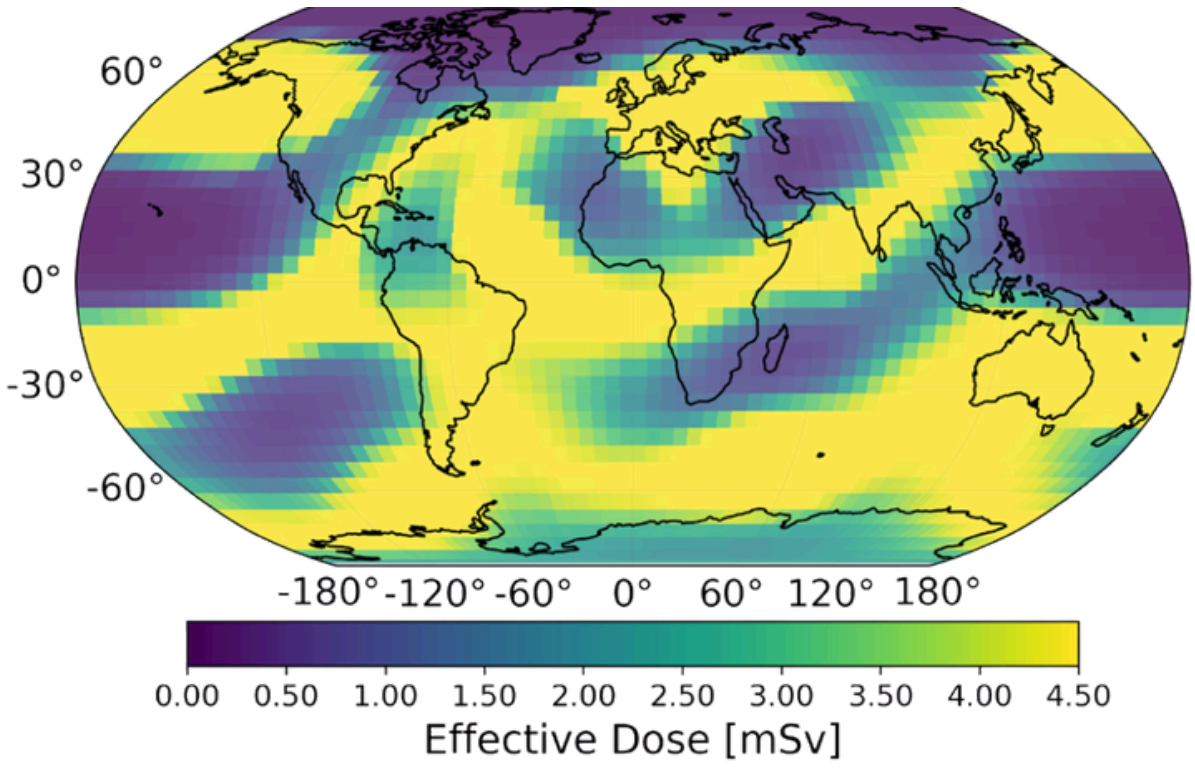
COSMIC RAY SURGE COMING DURING EXCURSION

BY: BEN DAVIDSON

ARTICLE REFERENCED:
REDUCED GEOMAGNETIC SHIELDING DURING THE LASCHAMPS EXCURSION AND ITS IMPACT ON COSMIC-RAY-INDUCED ATMOSPHERIC RADIATION

A new paper is dropping excellent tidbits, confirming long-understood principles, and joining the sounding of alarm about the ongoing changes to earth's magnetic field. The study looked at what it would be like for flights during a major magnetic pole shift, and what the overall atmospheric radiation impact would be.

The overall principle that a magnetic pole shift dramatically increases the levels of atmospheric radiation due to the weakening of the magnetic protection surrounding our planet has been confirmed and quantified to understand that modern air travel would become extremely dangerous during this event.



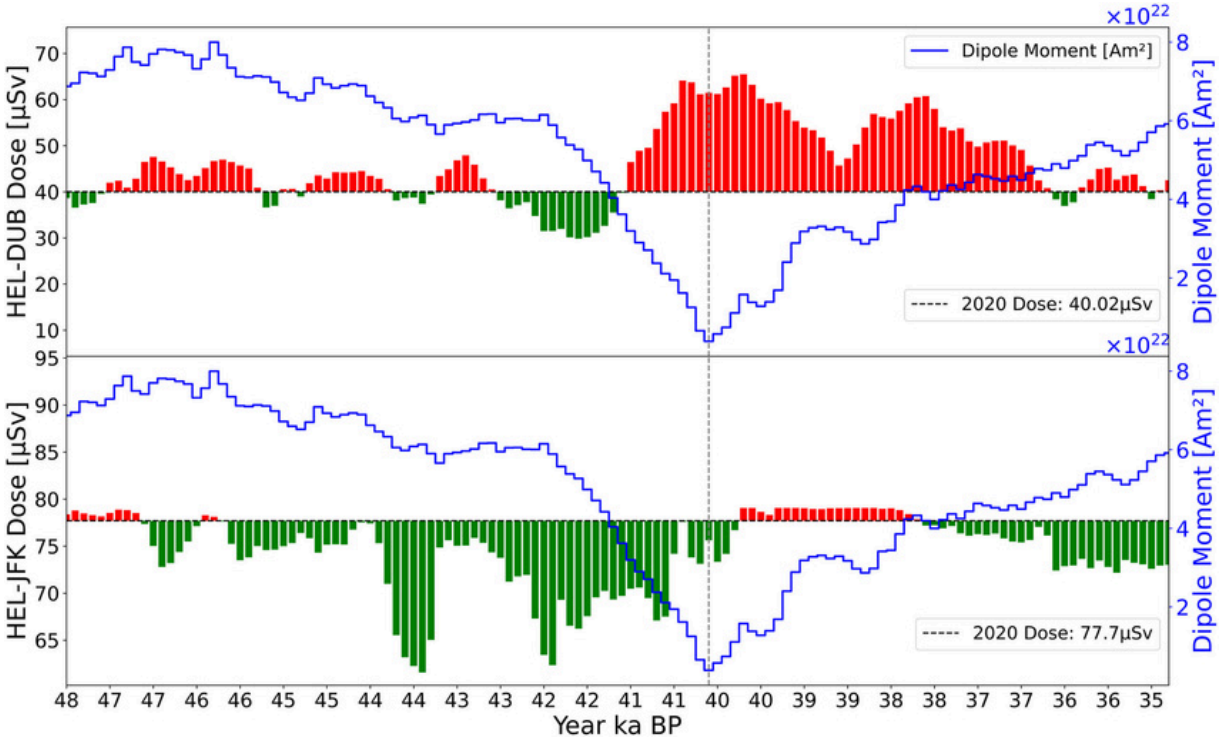
Their main “terrifying” graphic, pictured above, shows in yellow where there could be dangerous radiation in one of their model runs during a normal proton event during a magnetic pole shift.

FURTHER, IF THE PROTON EVENT WAS FROM A SUPERFLARE, AND WAS AN EXTREME VERSION, PEOPLE ON GROUND IN THE YELLOW AREAS WOULD EVEN BE AT SERIOUS RISK.

This radiation is the same sort that dramatically impacts the clouds and lightning, and indirectly impacts pressure cells, temperatures, and storm conditions through the global electric circuit.

THIS IS THE SAME RADIATION THAT INTEGRATES INTO VERTICAL FIELDS AND ENTERS THE CRUST. THIS IS THE SAME RADIATION THAT CAUSES DOZENS OF KNOWN PHYSIOLOGICAL AND PSYCHOLOGICAL CONDITIONS. THIS IS THE SAME RADIATION THAT CAUSES CIRCUIT TROUBLE AND BIT FLIPS IN COMPUTERS.

This radiation is already on the rise, and there’s now another voice saying it's going to be a problem.



Comparison of total effective dose over the two flight paths throughout the Laschamps excursion, at 100-year intervals, and 2020 epoch at 40 kft due to GCRs. Red indicates an increase in the total dose over the 2020 flight, and green indicates a decrease. The blue line indicates the Earth's dipole moment. The gray dashed vertical line highlights the deepest phase of the Laschamps excursion at 40950 BP, corresponding with the minimum value of the dipole moment. Top: Helsinki to Dubai flight. Bottom: Helsinki to New York flight.

NASA PROBE CAME DOWN WAY TOO EARLY

BY: BEN DAVIDSON

ARTICLE REFERENCED:
NASA'S VAN ALLEN PROBE A RE-ENTERED ATMOSPHERE

The Van Allen probes (A and B) are twin spacecraft NASA launched in 2012 to better-understand the upper high radiation belts of the earth. The mission lasted longer than intended, providing unprecedented details and science data, and when it ended in 2019, it was calculated that the Van Allen A would re-enter and burn up in 2034.

It re-entered and burned up on March 11, 2026.

This is not a small error. The official press release suggests that solar maximum was a bit stronger than expected here from 2023 to 2026, which gave an extra bit of puff-up effect to the upper atmosphere, which caused extra drag. But enough extra drag to go from a 15 year projection to a 7 year actual lifespan? That should not have happened.

This is very precise science, and the current sunspot cycle is not so much drastically larger than forecasts that it would account for this much extra puff and drag. The better explanation is the weakening of earth's magnetic field, allowing more energy from space to hit that upper atmosphere. If the sunspot number had broken the record this cycle, or we had taken several X10 solar flares I might say otherwise; that did not happen.

Sign after sign, month after month, coming faster and faster, presenting with greater and greater extremes. Drop those breadcrumbs to your loved ones now, subtly, because when the earth and sun call them back it will not be subtle.

URANUS IS FALLING

BY: BEN DAVIDSON

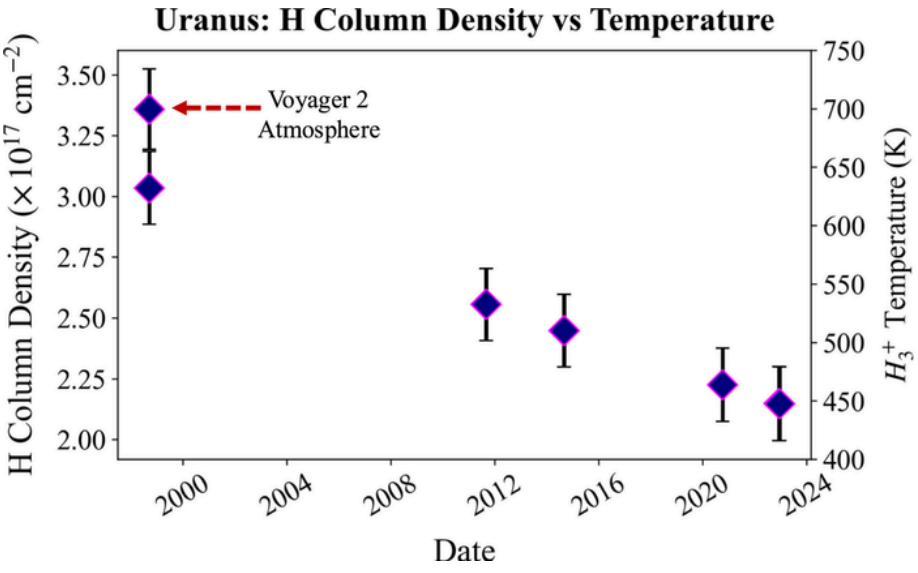
ARTICLE REFERENCED:
STEADY COLLAPSE OF URANUS' EXOSPHERE AFTER 1998 TO THE PRESENT DECADE

A new study is diving deeper into the recently reported changes on Uranus, as part of the larger solar system shift ongoing now as we enter the galactic magnetic reversal zone of the central galactic current sheet. In previous years we had reports of record storms and aurorae on

Uranus, last year we learned that its magnetic poles are actually shifting too (just like earth), and earlier this year we learned that a mysterious thermospheric temperature drop was unfolding - something that is only mysterious if you don't consider that the solar system is reversing magnetism.

This month we are hearing that this temperature drop extends further up into the exospheric zone. This completely destroys the only other hypothesis for the changes on the teal marble because the internally-driven mechanisms have no way to touch the exosphere, far out above the spherical atmosphere.

This can only happen if extra solar wind is stripping that matter away and reducing density - which would only be noticeable at a rapid rate, which could only rapidly onset like this if the planet is losing its magnetic field. Earth is losing its field as its magnetic poles shift... why would Uranus be any different?



"H column densities inferred from the model with variable temperature (red circles in Figure 2). The point marked as the "Voyager 2 Atmosphere" is the column density of H at Uranus in 1998 for Voyager 2 observation conditions."

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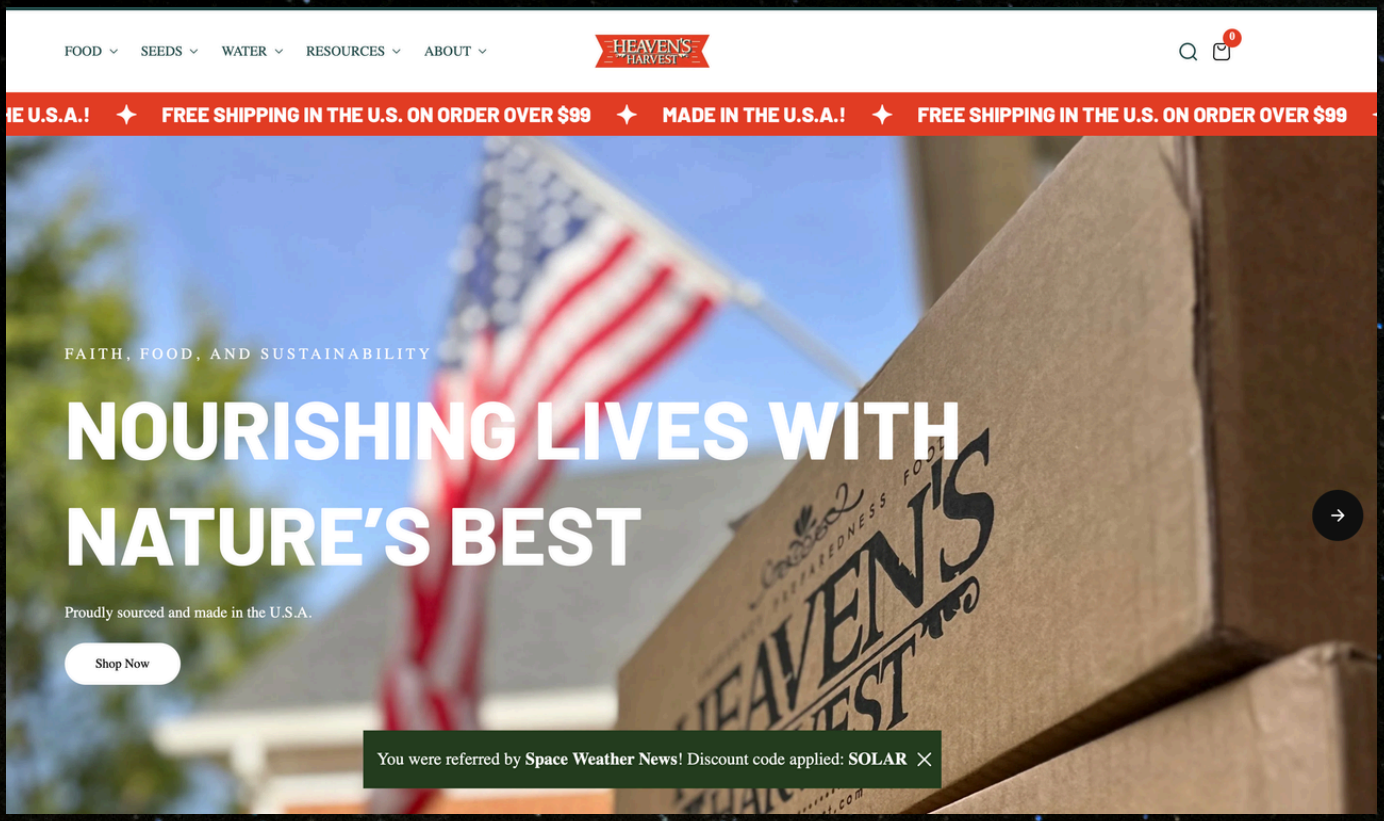

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