EVIDENCE REVIEW · S0 NEWS, 22 OCTOBER 2026

S0 News, October 22, 2026: no excursion under way, and the Great Dying had another cause

On October 22, 2026, S0 News presented six papers under one premise: that “the excursion that we’re in now” is “less than 25 years away” from a pole shift, that excursions take out “a large chunk of life every time”, and that a new Permian paper confirms that magnetic reversals “were largely responsible for the great dying” [1 00:03:16–00:03:47]. Our six paper checks cover the papers themselves. This page checks the frame: what today’s field is doing [2 §3][3 §1.6 p. 20], what the record says about excursions and extinctions [13][14][15], what the May 2024 aurora shows beside the superstorms of 1859–1921 [27 §7][28], what killed the Permian [41], and the episode’s weather item [47].

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OUR ANALYSIS marks our own reasoning and calculations, and the verdicts are our assessment. Everything else comes from the numbered sources. For the episode [1], times are positions in the video; for papers, § gives a section, p. a page, and Abstract, Fig. and Table name the part we used; for the Storm Prediction Center’s products, times are UTC.

Real papers, a premise the record contradicts

OUR ASSESSMENT

29.8°
How far toward the equator the May 2024 aurora reached, in invariant latitude. The superstorms of 1859, 1872 and 1921 reached 24–27° under a stronger field [27 §7][28][29 Abstract].

9%
What the axial dipole has lost since 1840 [6]. Past excursions began when it had fallen by about half [8 §4.4][10], and Laschamp’s low was 2–5% of today’s [8 §4.2][9 §3].

~7 Myr
Our analysis: from the end of the Permian paper’s record, 258.75 million years ago, to the Great Dying, 251.94 million years ago [35 Abstract][36 Abstract]; from the record’s start, about 10.6 million years.

THE EPISODE’S CLAIMS

FALSE
An excursion is under way now
“Luckily, the excursion that we’re in now isn’t that bad” [1 00:03:38–00:03:41]
An excursion is a spell when the field weakens and its pole strays at least 40–45° from the geographic pole [11 §1][9 §1]. Today the axial dipole is about 9% weaker than in 1840 [6], the dipole axis is tilted 9.21° [3 §1.6 p. 20], and the north dip pole, within 4.2° of the geographic pole, is slowing [5][2 §3]. Past excursions began with the dipole near half strength [8 §4.4][10]; the field is “probably not reversing” [7]. See section 2.

FALSE
A pole shift within 25 years
“We’re less than 25 years away, by the way.” [1 00:03:45–00:03:47]
The date is the presenter’s own curve, “sometime in the 2040s” [54]. Halving the dipole by 2045 would take about 730 nT a year, 58 times the 12.6 nT a year forecast for 2025–30 [12][6 p. 2]; our review of the forecasts halves it no earlier than AD 2280 on any projection, and the geomagnetists who see a transition starting expect nothing for 500–1,000 years [10]. See section 2.

FALSE
Excursions take out much of life
“it still takes out a large chunk of life every time it happens” [1 00:03:41–00:03:45]
Reviews find “no currently demonstrable relationship” between extinctions and reversals [13 Abstract] and “no clear picture of a geomagnetic link” [14 Abstract]. The one argued case, Laschamp, is contested by two formal comments [16][17], and its authors call the events “only temporally associated” [18]; the Blake excursion passed “without apparent serious effects” [16], and the last reversal, 773,000 years ago, with no demonstrable extinction [25][13 Abstract]. See section 3.

FALSE
Needs a superflare at full field
“that’s not normal and should have required a superflare impact [if] Earth’s magnetic field was at full strength. But of course, it isn’t.” [1 00:02:54–00:03:00]
The May 2024 oval reached 29.8° invariant latitude in the south and 35.5° in the north, in step with a Dst of −412 nT, the sixth-largest storm since 1957 [27 §7][27 Abstract]. With a dipole 6–9% stronger, the storms of 1859, 1872 and 1921 drove the oval to 25.1°, 24.2° and 27.1° [28][29 Abstract], the 1872 one from “a complex active region of moderate area” [29 Abstract]. The merging is a storm response [30 Abstract]. The oval reached about as far in the great storms of 1958, 1959 and 1989, under a stronger dipole and with no recorded superflare [27 §9], and our aurora page finds that a 9% weaker dipole shifts the oval’s edge by a few degrees at most. See section 4.

MISREAD
Reversals drove the Great Dying
“the paper is confirming what we’ve seen suggested in several other studies. The magnetic reversals, the magnetic pole shifts were largely responsible for the great dying.” [1 00:03:16–00:03:24]
The paper’s record spans 262.5–258.75 million years ago; its authors tie the instability to the end-Guadalupian extinction, “though the causation remains unproven”, and say it “might have influenced” the crisis “together with other global forcing factor” [35 Abstract]. The Great Dying came 251.9 million years ago [36 Abstract], and its reviews assign it to the Siberian Traps with no role for the field [41 Abstract][38 Abstract]. See section 5.

TRUE
A rare Arizona tornado tonight
“a rare circumstance tonight where a late season tornado is possible in Arizona or New Mexico” [1 00:01:19–00:01:25]
Before the episode went up, the Storm Prediction Center’s 0600 UTC outlook put “a couple of tornadoes” among the main concerns for south-eastern Arizona, and watches 691 and 692 each listed “A tornado or two possible” [47][48]. October tornadoes have come in 15 of Arizona’s last 75 years (our count) [51]. None was reported: SPC’s preliminary log for the day, re-read on October 24, lists 19 hail and 7 wind reports and no tornado; a Tornado Watch, 693, followed at 1710 UTC [53][55]. Two EF1 tornadoes had struck Arizona the day before, on October 21 [56][57]. See section 6.

1 · THE EPISODE

Six papers, one premise

The episode of October 22, 2026, ran five and a half minutes and linked six items: three peer-reviewed articles, one of them paywalled, an AGU conference abstract and two conference papers [1]. Between them the presenter placed a premise he has made before: that an excursion is under way, that excursions kill, and that the Permian paper proves it [1 00:03:16–00:03:47].

In the episode’s words

Quoted from the automatically generated transcript. “superstorm” is its rendering of superstorm, and “of Earth’s magnetic field was at full strength” of “if Earth’s magnetic field was at full strength”.

> *“today we’re going to be looking at a rare weather watch expected to fly tonight. We’ve got global greening, pre- seismic signals, pole shift signals analyzed from the May 2024 solar storm, and a magnetic finish on the Great Dying.”*
>
> S0 News [1 00:00:17–00:00:30]

> *“During the May 2024 solar superstorm, the auroral oval expanded so far it merged briefly with the equatorial ionization anomaly … Needless to say, that’s not normal and should have required a superflare impact of Earth’s magnetic field was at full strength. But of course, it isn’t.”*
>
> S0 News [1 00:02:34–00:03:00]

> *“All the same stuff that happens with modern-day excursions happened back then, too. Major climate shift, super volcano upticks, and a period of psychotically high magnetic pole shift frequency during the Great Dying. Luckily, the excursion that we’re in now isn’t that bad, but it still takes out a large chunk of life every time it happens. We’re less than 25 years away, by the way.”*
>
> S0 News [1 00:03:24–00:03:47]

The six papers, and what the episode made of them

Geomagnetic instability in the Permian

WHAT IT IS
A peer-reviewed article in *National Science Review*, open access, by Zhang and colleagues: a 3.75-million-year magnetostratigraphic record from the Fengshan section in South China, 262.5–258.75 million years ago, with 29 magnetozones and “an unprecedented reversal frequency of 11 reversals/Myr” [35 Abstract].

WHAT THE AUTHORS CLAIM
That the instability is “temporally correlated with the end-Guadalupian extinction (~261 Ma), suggesting a potential deep-Earth force contributing to surface ecosystem collapse, though the causation remains unproven” [35 Abstract].

WHAT THE EPISODE SAID
“the paper is confirming what we’ve seen suggested in several other studies. The magnetic reversals, the magnetic pole shifts were largely responsible for the great dying” [1 00:03:16–00:03:24].

In our check of Zhang et al. (2026): “Reversals drove the Great Dying” Misread; “Reversal peak at the Great Dying” Partly true; “Confirms earlier studies” Overstated; “Just like modern excursions” Unsupported; “11 reversals per million years” True; “Reversals worsened the crisis” Unconfirmed.

Arctic greening in a climate-model ensemble

WHAT IT IS
A peer-reviewed article in *Environmental Research Letters*, open access, by Hueholt and colleagues, on how internal climate variability and forced warming shape Arctic growing degree days in a large model ensemble, and when the warming trend comes to dominate region by region.

WHAT THE EPISODE SAID
“the continuation of global greening … the observation that stands unquestioned, unchallenged is that the planet is producing more green plant matter, more oxygen thereafter, and overall more food” [1 00:01:30–00:01:51].

In our check of Hueholt et al. (2026): “A global-greening study” Misread; “Natural cycles vs human forcing” Partly true; “Greening is unquestioned” Partly true; “More oxygen thereafter” Misleading; “Overall more food” Overstated; “Forced warming already dominant” True.

Electromagnetic phenomena in the crust

WHAT IT IS
A conference paper in *E3S Web of Conferences* 745 (article 07003), from the YSS 2026 proceedings, on electromagnetic phenomena in the Earth’s crust and how they show up in space and time before earthquakes; conference proceedings, open access.

WHAT THE EPISODE SAID
“E3S web conference series delivering a banger on the ways the Earth snitches on itself before big quakes through changes in various geoysical parameters. I’m glad to see geomagnetic anomalies continue to receive attention on top of the much more well doumented atmospheric electricity signals” [1 00:01:57–00:02:15].

In our check of the paper: “Earth snitches before big quakes” Overstated; “Atmospheric signals documented” Overstated; “A working forecasting model” Misread; “Geomagnetic anomalies studied” True; “61% of anomalies preceded quakes” Unsupported; “Multi-parameter checks help” Unconfirmed.

Local geomagnetic anomalies and earthquakes

WHAT IT IS
A conference paper in *E3S Web of Conferences* 745 (article 01007), from the same proceedings, on local anomalous variations of the geomagnetic field around earthquakes; conference proceedings, open access.

WHAT THE EPISODE SAID
The same sentences as for its companion: “one and two of a triple on pre-earquake electromagnetic signals” [1 00:01:51–00:01:57].

In our check of the paper: “Earth snitches before big quakes” Misread; “Geomagnetic anomalies studied” True; “Atmospheric signals documented” Overstated; “No link to seismic energy” Partly true; “Real, repeatable anomalies” Unconfirmed; “Han et al. found only chance” Misread.

Short-term earthquake forecasting from TEC and the Sun

WHAT IT IS
A peer-reviewed article in the *Journal of Applied Geophysics* by Rodionov and Lyubushin, dated 2027, on short-term earthquake forecasting from global total-electron-content data, solar activity and machine learning. Closed access, behind a CAPTCHA: our check could read nothing of it beyond its title and record.

WHAT THE EPISODE SAID
“This team thinks that by combining those various ionospheric and related data with solar signals, they have put together a working earthquake forecasting model. We need more of this” [1 00:02:15–00:02:27].

In our check of Rodionov and Lyubushin (2027): “A working forecasting model” Unconfirmed; “Ionosphere and solar inputs” True; “Atmospheric signals documented” Overstated; “Short-term forecasts from TEC” Unverified.

The aurora and the equatorial anomaly, May 2024

WHAT IT IS
An abstract for the AGU Fall Meeting 2026 by Melendi and colleagues on the apparent merging of the equatorial ionization anomaly and the auroral oval over South America during the storm of 10–12 May 2024. A conference abstract, not peer reviewed, with no DOI.

WHAT THE EPISODE SAID
“pole shift signals analyzed from the May 2024 solar storm” [1 00:00:23–00:00:27]; the merging “should have required a superflare impact” if the field were at full strength [1 00:02:54–00:03:00].

In our check of the abstract: “The oval merged with the EIA” Partly true; “Such a merging isn’t normal” Misleading; “Needs a superflare at full field” False; “A pole-shift signal in the storm” Misread; “EIA–oval merging, preliminary” Unconfirmed.

Two labels recur with different verdicts because the pages rate different papers against the same sentence. “Earth snitches before big quakes” is Overstated against the first E3S paper, whose numbers are illustrative, and Misread against the second, which reports a null result. “A working forecasting model” is Misread on the first E3S page, which has no such model (the presenter credits the E3S team with the third paper’s), and Unconfirmed on the TEC page, where the model itself is rated.

2 · THE EXCURSION WE ARE IN NOW

No measure of today’s field is anywhere near an excursion

An excursion is a spell when the field weakens sharply and its pole strays at least 40–45° from the geographic pole, short of a full reversal [11 §1][9 §1]; during a transition the field at the surface falls “to about 10% of its current value” [14 Abstract]. Here is where the three measures stand.

STRENGTH: LOST SINCE 1840
9%
The axial dipole’s decline over 175 years, from 1840 to about 2015, roughly 5% a century [6]. Past excursions began when the dipole had fallen to about half its usual strength [8 §4.4][10]; at Laschamp’s low it was 2–5% of today’s [8 §4.2][9 §3].

DIRECTION: THE DIPOLE’S TILT
9.21°
Between the dipole axis and the rotation axis in 2025, with the geomagnetic north pole at 80.85°N, 72.76°W [3 §1.6 p. 20]. The north dip pole lies within 4.2° of the geographic pole [5].

MOTION: THE NORTH DIP POLE
36 km/yr
Its speed from 2025 to 2026, down from a peak of 56 km a year in 2002 and forecast to slow to 31 in 2027 [4 p. 3][4 p. 12][2 §3]. None of the three 2025 reports describes a reversal, an excursion or a pole shift [2][3][4].

What geomagnetists expect

Brown and colleagues compared today’s field with the two best-recorded excursions and concluded that it is “probably not reversing” [7]. Laj and Kissel, who read the decline since 1590 as a possible first step toward a transition, “tentatively suggest that, whilst irreversible processes that will drive the geodynamo into a polarity change may have already started, a reversal or an excursion should not be expected before 500–1000 years” [10]. The same group’s lava-flow record notes that the field fell about 18 nT a year as Laschamp began, a rate “observed for the earth magnetic field since 1840”, which they call a possible sign of a coming excursion, not one in progress [21].

OUR ANALYSIS

“Less than 25 years away”

Twenty-five years from October 2026 is 2051; the presenter’s Disaster Cycle video put the pole shift “sometime in the 2040s” [54]. Our review of the forecasts extended the measured decline five ways; every projection halves the dipole, the level at which past excursions began, between AD 2280 and 3380, and halving it by 2045 would take about 730 nT a year, 58 times the 12.6 nT a year forecast for 2025–30 [12][6 p. 2]. The pole does move, which is the true part of the premise, and two days earlier we rated “a pole shift is under way” Misleading for that reason. “The excursion that we’re in now” has no true part: the field’s strength, tilt and pole speed all sit where ordinary secular variation puts them.

The dipole has lost 9%; an excursion begins near 50% and bottoms near 5%. Nothing measured puts one 25 years away.

3 · EXCURSIONS AND EXTINCTIONS

The record ties no extinction to an excursion, and one contested case to Laschamp

The idea that reversals or excursions kill has been suggested repeatedly and tested for decades [13 Abstract][14 Abstract]. Reviews find no demonstrable link [13][14], and the clearest overlap, around 42,000 years ago, is the subject of a 2021 paper and two formal rebuttals [15][16][17]. Our timeline review places the excursions, floods and extinctions on one axis.

In the researchers’ words

> *“Results indicate that no currently demonstrable relationship exists between faunal extinctions and geomagnetic reversals.”*
>
> Plotnick (1980) [13 Abstract]

> *“We conclude that no clear picture of a geomagnetic link, a causal relation between secular magnetic field variations and the evolution of life on our planet can be drawn.”*
>
> Glassmeier and Vogt (2010) [14 Abstract]

> *“Geological archives record multiple reversals of Earth’s magnetic poles, but the global impacts of these events, if any, remain unclear.”*
>
> Cooper et al. (2021), the paper that argues for a Laschamp link [15 Abstract]

The Laschamp hypothesis and its critics

Cooper and colleagues proposed that field minima about 42,000 years ago, “in combination with Grand Solar Minima”, drove climate shifts “that caused major environmental changes, extinction events, and transformations in the archaeological record” [15 Abstract]. A comment by ten researchers said the paper “failed to provide convincing explanatory mechanisms” and that its timing coincidence was “highly questionable” [16]; the anthropologist John Hawks wrote that it misrepresented the extinction and archaeological evidence [17]. The authors replied that the events “remain only temporally associated” [18]. Channell and Vigliotti argue separately that “the demise of Neanderthals at ~41 ka can now be closely tied to the intensity minimum associated with the Laschamp magnetic excursion”, through ultraviolet flux [19 Abstract]; Valet and Valladas “suggest that these conditions, added to some other factors, contributed to the demise of Neanderthal population” [20 Abstract]. New lava-flow intensities from the same region show the field recovering between Laschamp and Mono Lake; this, the authors write, “rules out the recent suggestion that a long intensity minimum (6000 years) between the two excursions would have resulted in the extinction of the Neandertal man-kind” [21].

The control cases

The Blake excursion, two reversed intervals between 116,500 and 112,000 years ago [24], “occurred without apparent serious effects” on Neanderthals in Eurasia, *Homo sapiens* in Africa or the megafauna of Australia [16]. Channell and Vigliotti do place episodes of Australian megafaunal loss near Blake as well as Laschamp, within their ultraviolet hypothesis [19 Abstract]; the comment on the 2021 paper finds no such Blake effect [16], and the continent-wide extinction peak sits near 42,000 years ago, roughly 13,500 years after people arrived (our timeline review). The last full reversal, about 773,000 years ago [25], is followed by no mass extinction in the records the reviews examined [13 Abstract][14 Abstract]. Reviews list 12 to 17 excursions since that reversal [26]; the widely argued extinction link is Laschamp’s, with Blake paired to Australian losses in one review [19 Abstract]. The other hypotheses in the literature are offered as hypotheses: Wei and colleagues model oxygen escape during intervals of frequent reversals, “if this causal relation indeed exists” [22 Abstract], and a 2021 review holds that a weakened or vanished field “may result in considerable climatic changes and an increased frequency of mutations” [23 Abstract].

OUR ANALYSIS

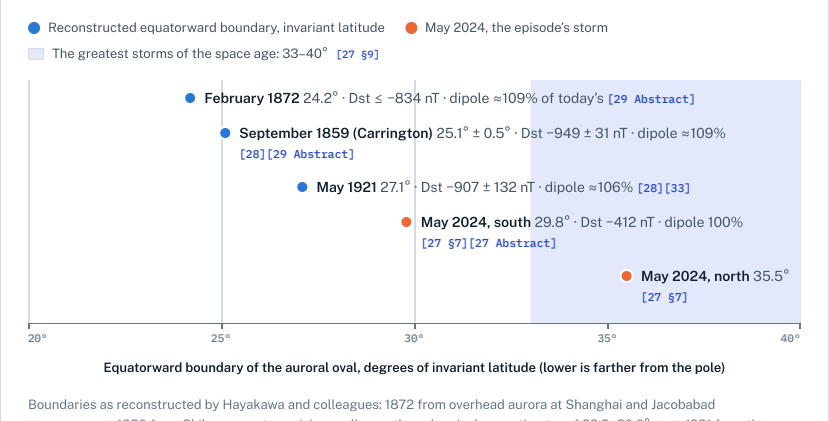
“Every time it happens” is the part the record contradicts. Of the dozen or more excursions since the last reversal, one, Laschamp, has a widely argued extinction link, contested by specialists in the extinctions it invokes, and one review also pairs Blake with Australian losses [19 Abstract]; the comment on the 2021 paper finds no Blake effect [16], and the reversal itself is followed by no demonstrable extinction [13 Abstract]. Our timeline review rated “Laschamp caused the 42,000-year extinctions” Overstated and “excursions line up with catastrophes” False; a claim that every excursion takes out “a large chunk of life” is False on the same evidence. The episode also says that “super volcano upticks” come with modern excursions; no source we found links Quaternary excursions to volcanism, and one of the comments notes that Greenland ice cores and marine records show no notable effect of Laschamp on global climate [16].

4 · THE MAY 2024 STORM

The aurora reached 29.8°; three superstorms under a stronger field reached 24–27°

The storm of 10–11 May 2024 peaked at a provisional Dst of −412 nT, “the sixth-largest storm since 1957”, from an active region whose free magnetic energy “surpassed 10^{33} erg” and which produced 12 X-class flares and at least four coronal mass ejections that combined on the way [27 Abstract]. Its aurora was reported worldwide; an online survey gathered 80 reports, naked-eye and camera, from which the equatorward boundary of the oval was reconstructed, the 29.8° boundary resting on a naked-eye report from Namibia and the 35.5° one on a report from Mexico [27 §7].

How far toward the equator the auroral oval reached, storm by storm



Boundaries as reconstructed by Hayakawa and colleagues: 1872 from overhead aurora at Shanghai and Jacobabad [29 Abstract]; 1859 from Chilean reports, revising earlier northern-hemisphere estimates of 28.5–30.8° [28]; 1921 from the aurora seen at Apia, Samoa [28][33]; 2024 from reports at Tivoli Astrofarm, Namibia, and Chirimoyos, Mexico [27 §7]. Dst for 1859 and 1921 as the 1872 paper tabulates them [29 Abstract]; Cliver and Dietrich’s working estimate for 1859 is −900 (+50, −150) nT, with the flare at soft X-ray class X45 (±5) [32]; 1921 from Love and colleagues [33]; 2024 provisional [27 Abstract][31]. The dipole strengths are our interpolation of the series on our review of the forecasts (109.8% of 2025 in 1840, 107.5% in 1900, 104.1% in 1950). The space-age band is the report’s own range for the greatest storms since 1957 [27 §9].

DST, 11 MAY 2024, 02 UT
−412 nT
“marking the sixth-largest storm since 1957” [27 Abstract]; −406 nT in Kyoto’s provisional index [31]. The 1859 and 1921 storms were about twice as deep [29 Abstract][33].

THE SOURCE REGION
12 X-class flares
From NOAA active region 13664 on May 8–15, after its free magnetic energy “surpassed 10^{33} erg on May 7”; the shock of May 10 compressed the magnetosphere to about 5.04 Earth radii [27 Abstract]. The ejections behind the storm’s main phase left the Sun after an X1.0 and an M9.8 flare on May 8, nothing in the sequence that reached Earth exceeded X5.8, and the largest flare, X8.7 on May 14, came after the storm [27 §2][27 §3].

WHAT MERGED WITH WHAT
450 m/s
How fast the southern crest of the equatorial ionization anomaly moved poleward while the aurora came down to the southern tips of Africa and South America: “there was no mid-latitude ionosphere in this region” [30 Abstract].

What the storm’s own analysts say drives the reach

“This storm significantly extended the auroral oval equatorward, as expected from the empirical correlation between the extension of the equatorward boundary of the auroral oval and the intensity of the associated geomagnetic storm” [27 §7]. Historical boundaries “have extended down to 33–40° ILAT during the greatest geomagnetic storms of the space age … and 24–25° during extreme historical storms” [27 §9]. For the three superstorms, the boundaries “agree with existing comparisons related to the intensity of their magnetic disturbances” [28]. The 1872 storm “apparently originated from a complex active region of moderate area (≈ 500 μsh)” [29 Abstract]. None of these papers, nor the GOLD paper on the merging [30], mentions the strength of Earth’s field as a factor.

OUR ANALYSIS

A 9% weaker dipole does not turn a great storm into a superflare

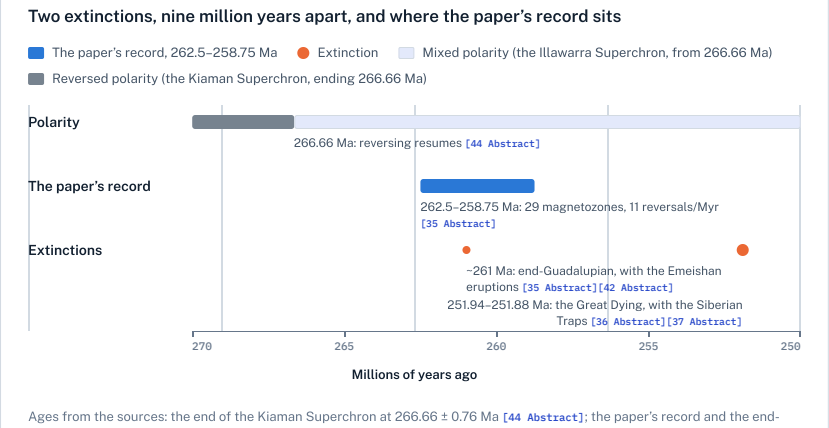
The episode’s test is backwards. If a weak field were what let the oval reach 29.8°, the storms under a stronger field should have stopped short of it; instead, with the dipole 6–9% stronger, they reached 24–27°, and one of them came from a moderate active region. The reach tracks the storm, as its analysts say, and the record makes the point before any arithmetic: the oval reached about as far as in May 2024 during the great storms of February 1958 and July 1959, which the report calls comparable [27 §9], and in March 1989 (our aurora page), all under a stronger dipole and with no recorded superflare; by the earlier northern-hemisphere reconstruction of 30.8°, so did the Carrington storm [28]; only 1872 (24.2°) and 1921 (27.1°) reached farther [29 Abstract]. Our aurora page adds the arithmetic: “a 9% weaker dipole shifts the oval’s edge by a few degrees at most: 1.6° at a storm-time edge of 30° by Siscoe and Chen’s polar-cap scaling (cos Λ ∝ $M^{-1/6}$), and anything from nothing to about 5° across the three exponents Glassmeier et al. list; 0.4–2° at a quiet-time edge of 55–65°.” The storm’s own main phase followed flares no larger than X1.0 [27 §3]. On the Carrington flare itself we claim nothing: estimates of its energy reach a few times 10^{33} erg, which by one definition already counts as a superflare [34 p. 11]; 1872 and 1921 carry the argument. “Pole shift signals analyzed from the May 2024 solar storm” relabels an ionospheric abstract: the AGU authors analysed the merging of two ionospheric structures, and the merging has an ordinary storm-time explanation [30 Abstract]. We rate the superflare claim False and the relabelling, on the aurora page, Misread.

5 · THE GREAT DYING

The paper’s reversals end seven million years before the Great Dying, which the Siberian Traps explain

The end-Permian extinction, the “Great Dying”, was “the most severe loss of marine and terrestrial biota in the last 542 My”; it ran from 251.941 ± 0.037 to 251.880 ± 0.031 million years ago, “an interval of 60 ± 48 ka” [36 Abstract], and removed more than 90% of marine and 75% of terrestrial species [37 Abstract]. The episode is right that it was the worst ever and more than 250 million years ago [1 00:03:04–00:03:14]. What it gets wrong is which extinction the paper is about, and what the paper claims.

Two extinctions, nine million years apart, and where the paper’s record sits



Ages from the sources: the end of the Kiaman Superchron at 266.66 ± 0.76 Ma [44 Abstract]; the paper’s record and the end-Guadalupian extinction, ~261 Ma [35 Abstract]; the Emeishan province, 260 million years old [42 Abstract]; the end-Permian extinction, 251.941 ± 0.037 to 251.880 ± 0.031 Ma [36 Abstract]. The gap from the record’s end to the Great Dying is about 6.8 million years, from its start about 10.6 million, and from the reversal peak around 260 Ma, which our check of the paper counts from, about eight million; the two extinctions are about nine million years apart (our arithmetic).

What killed the Permian, in the reviews’ words

“At the Permian–Triassic boundary (252 million years ago), a series of environmental crises triggered by the Siberian Traps eruptions caused the extinction of 81–94% of marine species and 70% of terrestrial vertebrate families” [41 Summary], through “global warming, anoxia and ocean acidification” at sea and “increased seasonality, ozone depletion and acid rain” on land; “the ultimate reasons for the exceptional severity … remain debated” [41 Abstract]. Dated magmatism confirms Siberian Traps volcanism “before, during, and after” the extinction [37 Abstract]; the trigger is placed at the “initial emplacement pulse of laterally extensive sills”, which cooked volatile-rich sediments, “likely liberating the massive greenhouse gas volumes needed to drive extinction” [38 Abstract]. “A massive release of thermogenic carbon dioxide and/or methane may have caused the catastrophic extinction” [39 Abstract]; ocean warming and oxygen loss “can account for more than half the magnitude of the ‘Great Dying’” [40 Abstract]. Magnetostratigraphy across the boundary points the same way, “making this igneous activity the most likely cause of the end-Permian mass extinctions” [43 Abstract]. None of these gives the geomagnetic field a role.

What the paper says, and about which extinction

The Fengshan record “yields extreme geomagnetic instability, characterized by 29 magnetozones and an unprecedented reversal frequency of 11 reversals/Myr – one of the highest records in Earth’s history. These features are temporally correlated with the end-Guadalupian extinction (~261 Ma), suggesting a potential deep-Earth force contributing to surface ecosystem collapse, though the causation remains unproven. This implies that, together with other global forcing factor, geomagnetic instability might have influenced late Permian climatic and biotic upheavals” [35 Abstract]. The end-Guadalupian extinction is a separate, earlier event, recorded with the Emeishan eruptions in south-west China, where “the temporal coincidence of these two phenomena supports the idea of a cause-and-effect relationship” [42 Abstract]. Across the Permian–Triassic boundary itself, the polarity record shows “a distinctive short duration reversed-normal-reversed polarity pattern” in the uppermost Changhsingian beneath a normal chron [43 Abstract], within a “mixed-polarity interval through the later Lopingian” [44 Abstract]; neither timescale describes the Great Dying as a time of exceptional reversal frequency. The paper itself notes, as background, “a phase of heightened reversal frequency and weakened field intensity during the latest Permian that coincided with Siberian LIP volcanism and the end-Permian mass extinction” [35 l. 69–71], but its own compilation gives about 5 reversals per million years at the boundary, the average rate of the last 25 million years, against 11 at its peak around 260 Ma, eight million years earlier [35 l. 145–149][35 Fig. 3a].

OUR ANALYSIS

Why Misread, and what the “several other studies” are

The episode attributes to the paper a confirmation the paper disclaims. Its authors say “potential”, “unproven” and “might have influenced … together with other global forcing factor”, and they correlate their reversals with the end-Guadalupian event, not the Great Dying; the record ends about seven million years before the extinction the episode names. That is Misread on our scale: a real source, with its claim and its subject changed. The episode’s separate sentence about “a period of psychotically high magnetic pole shift frequency during the Great Dying” describes a real reversal peak in the wrong epoch, eight million years early; our check of the paper rates it Partly true under “Reversal peak at the Great Dying”. The “several other studies” exist, and they are hypotheses about the superchron’s end and the earlier crisis, not confirmations about the Great Dying. Courtillot and Olson link the end of each superchron to a deep mantle plume that produces flood basalts and “massive faunal depletions” 10–20 million years later, the field change being a symptom of the plume [45]. Isozaki goes further and gives a weakened field a role, for the end-Guadalupian event: a superplume “makes the geodynamo’s dipole of the outer core unstable, and lowers the geomagnetic intensity”, more cosmic rays reach the atmosphere, and “the more clouds develop to increase the albedo, thus enhancing cooling of the Earth’s surface” [46]. A modelling paper proposes oxygen escape during reversal-rich intervals, modelled for a later extinction, “if this causal relation indeed exists” [22 Abstract]. Our check of the paper rates its own claims; this page rates the frame.

6 · THE WEATHER ITEM

The tornado risk was in the forecast; “almost certain” hail was not

The episode opened with “a rare weather watch expected to fly tonight” [1 00:00:17–00:00:20] and said that “a late season tornado is possible in Arizona or New Mexico. They say significant hail is almost certain for some in the areas of yellow” [1 00:01:19–00:01:30]. It went up at 11:55 UTC, 04:55 in Arizona. Here is what the Storm Prediction Center had said by then, and what it said after.

In the Storm Prediction Center’s words

Times are UTC; Arizona is seven hours behind.

> *“THERE IS A SLIGHT RISK OF SEVERE THUNDERSTORMS FROM CENTRAL AND EASTERN ARIZONA INTO WESTERN NEW MEXICO … Large hail (perhaps to around 2 inches) and a couple of tornadoes will be the main concern, focused where the largest buoyancy and strongest low-level shear will overlap in southeastern AZ.”*
>
> Day 1 Convective Outlook, 0600 UTC [47]

> *“Severe Thunderstorm Watch for portions of Northern and Central Arizona … Effective this Thursday morning from 200 AM until 1000 AM MST. Primary threats include… Scattered large hail and isolated very large hail events to 2 inches in diameter possible … A tornado or two possible”*
>
> Severe Thunderstorm Watch 691, issued 0900 UTC [48]

> *“The stronger low-level shear/hodograph curvature and somewhat richer low-level moisture are focused near the Mogollon Rim in central AZ with some eastward expansion expected into this afternoon, where a couple of tornadoes will be possible … A new watch is likely into western NM by 17z”*
>
> Mesoscale Discussion 2397, 1607 UTC [49]

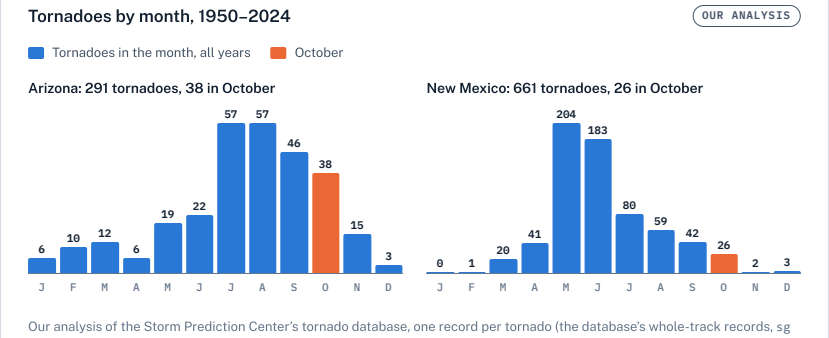
TORNADO PROBABILITY, 0600 UTC OUTLOOK
5%
The chance of a tornado within 25 miles of any point in an 18,608-square-mile area around Show Low and Safford, Arizona; kept at 5% over a larger area at 1300 UTC, when the outlook spoke of “a few tornadoes … mainly over east-central AZ this afternoon” [47][50].

HAIL, IN THE SAME PRODUCTS
15% · CIG1
A 15% chance of severe hail within 25 miles, the yellow area [50], with a hatched area at the first of two hail intensity levels, CIG1: since March 3, 2026, SPC’s intensity areas are “conditional, meaning if a tornado/wind gust/hail report occurs, the expected strength/intensity/size will be represented” [58]; the outlook’s words were “perhaps to around 2 inches” and “isolated 2+ inches possible” [47], the watches’ “isolated very large hail events to 2 inches in diameter possible” [48].

OCTOBER TORNADOES IN ARIZONA, 1950–2024
OUR ANALYSIS
38 in 75 years
In 15 of those years, on 24 days; 10 of the 38 came on one day in 2010. New Mexico: 26, in 17 years [51].

Tornadoes by month, 1950–2024

OUR ANALYSIS



Our analysis of the Storm Prediction Center’s tornado database, one record per tornado (the database’s whole-track records, sg = 1), counted by the state the record names [51]; each panel is scaled to its own busiest month. NWS Albuquerque counts about 9 New Mexico tornadoes a year over the 30 years to 2024, “most … across the eastern plains”, with “rare tornado occurrences across western New Mexico” [52].

OUR ANALYSIS

Rare, possible, and not “almost certain”

“Rare” and “late season” hold: October brings a tornado to Arizona in about one year in five and to New Mexico in about one year in four or five, and the risk area lay in western New Mexico, where tornadoes are rarer still [51][52]. The pattern had already produced two: NWS Flagstaff’s damage survey of October 24 rated EF1 tornadoes near Walker in Yavapai County at 7:32 AM MST on October 21 (105 mph, 8.0 miles) and through Heber-Overgaard in Navajo County at 6:59 PM MST that evening (110 mph, 9.3 miles, one person injured), both before the episode went up [56][57]. “Possible” was the forecasters’ own word, in the outlook and in both watches [47][48], so we rate the tornado claim True. The hail sentence is the presenter’s: the Storm Prediction Center gave a 15% chance of severe hail within 25 miles of a point [50], with a first-level hail intensity area, which says how big hail would be if it fell, not how likely it was [58], and wrote “perhaps to around 2 inches” [47]; “almost certain for some” is Overstated. As for the “rare weather watch expected to fly tonight”, two severe thunderstorm watches were already in force when the episode went up, from 0900 and 1055 UTC [48], and the midday discussion expected another for western New Mexico [49]; a tornado watch would be the rarer product, and none had been issued by 16:40 UTC [48][53]; Tornado Watch 693 followed at 1710 UTC [55].

What happened, so far

By 16:40 UTC on October 22, SPC’s storm reports for the day listed no tornado and one hail report, 1.00 inch at Linden, Navajo County, Arizona, at 1220 UTC [53]. Read again on October 23 and 24, the preliminary reports for the whole convective day (1200 UTC on October 22 to 1159 UTC on October 23) list no tornado: 26 reports by October 24, 19 of hail, to 3 inches near Page Springs in Yavapai County and near Rio Rico in Santa Cruz County, and 7 of wind, to 73 mph near Safford in Arizona and 74 mph in Nye County, Nevada; 24 of the 26 were in Arizona or New Mexico, and the last, a 59 mph gust south of Bingham, New Mexico, came at 0435 UTC on October 23 [53]. After this page’s last read on October 22, SPC also issued Tornado Watch 693 at 1710 UTC for northern and eastern Arizona and western New Mexico, in force until 0300 UTC, naming “A couple tornadoes possible” [55]. The tornado the forecast called possible did not come. Our verdict rates the forecast the presenter relayed, not the outcome.

Code and numbers

PY **tornado_months.py**
Counts tornadoes by month and October tornado years and days for any states in the SPC database, one record per tornado · 2 KB [51]

Run it

Needs only Python 3. Download `1950-2024_actual_tornadoes.csv` from the Storm Prediction Center [51] and run `python3 -I -X utf8 tornado_months.py 1950-2024_actual_tornadoes.csv AZ NM`; it prints the monthly counts, the October years and days, and the ratings, for the states you name.

7 · LIMITS

Where this check could be wrong

The Permian paper, read for its own page

Its publisher’s page sits behind a bot check we did not bypass; the full text was read for our check of the paper, which found the reversal peak around 260 Ma and about 5 reversals per million years at the Permian–Triassic boundary [35]. Here we quote its abstract and that check’s findings.

Reviews read in abstract

The two reviews of reversals and extinctions, the Laschamp papers other than the EGU abstract, and the end-Permian reviews were read in abstract; the quotations are from those abstracts [13][14][19][20][41]. Two papers on the superchron–plume hypothesis are known from their abstracts, read for our check of the Permian paper [45][46].

Interpolated dipole strengths

The 106–109% figures for 1859, 1872 and 1921 are straight-line interpolations between the dated values on our review of the forecasts, not field-model values; the 6–9% range is robust, the decimals are not [6].

The storm outcome

SPC’s products were read up to 16:40 UTC on October 22; the afternoon and evening outlooks, any later watch and the day’s final storm reports were not yet issued [47][48][53].

What would change these verdicts

01 A measured dipole decline many times 16 nT a year, sustained over decades, or a global field model putting the dipole near half today’s strength within a few centuries.

02 A dated extinction signal at the Blake excursion, beyond the review’s correlation, or at the reversal of 773,000 years ago; or a resolution of the Laschamp debate in favour of the 2021 paper.

03 A published mechanism by which a 9% weaker dipole moves the auroral boundary by far more than the few degrees the scalings allow, or a geochronology placing an exceptional burst of reversals at 251.9 million years ago.

The tornado verdict rates the forecast; a tornado on October 22 would confirm it, and none would not overturn it.

Related checks

FALSE Every 6,000 years? The Disaster Cycle, Fact-Checked
FALSE More auroras from less solar input? The Disaster Cycle, Fact-Checked
UNSUPPORTED A magnetic pole flip in the 2040s? The Disaster Cycle, Fact-Checked
FALSE Ringless trees and frozen mammoths The Disaster Cycle, Fact-Checked
FALSE 55% of the field gone? The Disaster Cycle, Fact-Checked

Sources

Bracketed numbers refer to this list. For the episode [1], times are positions in the video (hours:minutes:seconds). For the papers, § gives a section, p. a page, and Abstract, Fig. and Table name the part of a work we used; for the reports [3] and [4], p. gives a page of the PDF; for [35], l. gives a line of the manuscript PDF, as on our check of that paper; Summary names the one-sentence summary that [41] carries above its abstract. For the Storm Prediction Center’s products, times are UTC. For [27], Abstract quotations follow the published abstract and § gives a section of the accepted version. Links checked October 22, 2026.

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METHOD

How this was checked

On October 22, 2026, we checked every statement, number and quotation on this page against its source: the episode’s automatically generated transcript, quoted verbatim with its timestamps [1]; the IGRF-14 paper, the World Magnetic Model 2025 report and the December 2025 State of the Geomagnetic Field for today’s field [2][3][4], reusing the numbers of our reviews of the field’s decline and of the October 20 episode; fourteen sources on reversals, excursions and extinctions, read in abstract except the EGU abstract, read in full, with the Laschamp debate taken from our timeline review’s sources [13]–[26]; three reconstructions of auroral boundaries by Hayakawa and colleagues, two read in full [27][28][29], with the GOLD paper’s abstract [30]; the abstracts of the Permian paper and of nine papers and reviews on the end-Permian and end-Guadalupian extinctions and the Permian polarity timescale [35]–[44], with the Permian paper’s full text and two earlier hypotheses as read for our check of that paper [45][46]; and the Storm Prediction Center’s outlooks, watches, mesoscale discussions, definitions and storm reports for October 22, read on the day [47]–[53]. DOIs were resolved through Crossref; about 120 items in all. The six papers themselves are checked on their own pages; nothing here re-rates them.

The verdicts and the items tagged “Our analysis” are our own assessment, built on the cited sources: the arithmetic of the 25-year countdown; the dipole’s strength in 1859, 1872 and 1921, interpolated from the series on our review of the forecasts; the reading of the auroral boundaries against the storms’ Dst; the gap between the Permian paper’s interval and the end-Permian extinction; and the count of October tornadoes in Arizona and New Mexico from the Storm Prediction Center’s database, made with the script hosted in section 6.

Re-run here: the tornado count, from the database as downloaded (checked by its SHA-256). Not read in full here: the Permian paper, whose publisher’s page sits behind a bot check we did not bypass, and whose abstract we quote, with its full text as read for our check of it; the AGU abstract on the May 2024 merging, which the aurora page covers; the reviews of reversals and extinctions and of the end-Permian extinction, read in abstract; and two papers on the superchron–plume hypothesis, known from their abstracts as read for our check of the Permian paper. Whether a tornado occurred in Arizona or New Mexico on October 22 was not known when this page was published; it is to be checked against SPC’s storm reports on October 23 and recorded in the change log.

This page was researched and written with Claude, an AI assistant made by Anthropic, and then re-checked against its sources in a separate verification pass.

The verdicts on this page

FALSE	The evidence contradicts the claim.
MISREAD	Cites a real source but gets wrong what it says.
TRUE	The evidence supports the claim.

All ten verdicts, and how we check

CORRECTIONS

Corrections and changes

If we get something wrong, we fix it and record the change below with the date. If a correction changes a verdict, the log says what the old verdict was.

Change log

Oct 26, 2026 — Corrected: the 9% decline of the axial dipole that Finlay and colleagues report is over 175 years, from 1840 to about 2015, not “about 185 years”; the 9% and the rate of roughly 5% a century are unchanged.

Oct 25, 2026 — Two Arizona tornadoes of October 21 added. NWS Flagstaff’s damage survey of October 24 rated EF1 tornadoes near Walker in Yavapai County on the morning of October 21 and through Heber-Overgaard in Navajo County that evening, one person injured, both before the episode went up; the verdict card and section 6 now say so (sources 56 and 57). The hail stat and section 6 now describe the outlook’s hatched area by SPC’s definition since March 3, 2026, a conditional intensity level for hail, instead of the retired “10% or higher probability for significant severe events” (source 58), and section 6 notes Tornado Watch 693. The verdicts are unchanged.

Oct 24, 2026 — Storm reports updated. SPC’s preliminary log for October 22, re-read on October 24, has grown to 19 hail and 7 wind reports, still with no tornado in Arizona or New Mexico; the last report of the convective day was a 59 mph gust in Socorro County, New Mexico, at 0435 UTC on October 23. A Tornado Watch (693) that SPC issued at 1710 UTC on October 22, after this page’s last read that day, is now recorded in section 6 and the verdict card (source 55). The verdict is unchanged.

Oct 23, 2026 — Tornado outcome added. SPC’s preliminary storm reports for the convective day of October 22 (to 1159 UTC on October 23) list no tornado in Arizona or New Mexico: 16 hail reports, to 3 inches, and 4 wind reports, to 73 mph, the last at 2356 UTC. The verdict on “A rare Arizona tornado tonight” is unchanged, because it rates the forecast the presenter relayed, which was the Storm Prediction Center’s own, not the outcome; the verdict card, section 6 and source 53 now carry the outcome.

Oct 22, 2026 — Published on factchecked.science after a full check against the sources. Built from the episode’s transcript, the IGRF-14 paper and the 2025 geomagnetic reports, the site’s existing reviews of excursions and today’s field, reviews and primary papers on reversals and extinctions, Hayakawa and colleagues’ reconstructions of the 1859, 1872, 1921 and 2024 auroral boundaries, reviews and geochronology of the end-Permian and end-Guadalupian extinctions, and the Storm Prediction Center’s products of October 22, 2026, read up to 16:40 UTC. Whether a tornado occurred in Arizona or New Mexico that day will be added here from SPC’s storm reports after October 23.

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