PAPER CHECK · PALAEOMAGNETISM

Excursions weaken the field faster than reversals do, but over millennia, not generations

A team at GFZ Potsdam measured how fast Earth's dipole weakened and recovered in four published field models. In the last reversal, the Matuyama–Brunhes, it weakened slowly, at 0.17 ×10²² A m² per thousand years over about 30,000 years, and recovered three times faster [1 §4.1]; in the Laschamp excursion it did the opposite, falling at 3.0–3.9 ×10²² A m² per thousand years and recovering slowly [1 §4.2][1 Table 1]. SO News said this shows that excursions "happen quickly" and that "almost that entire same amount of change" can fit "only two or three generations" [2 00:02:36–00:03:10]. At the paper's own rates the Laschamp decay took about 1,500–1,900 years, by our arithmetic, and nothing in its models resolves change over decades [1 p. 4].

By Fact-Checked Science · Published October 24, 2026

OUR ANALYSIS marks our own reasoning and calculations, and the verdicts are our assessment. Everything else comes from the numbered sources; for the paper [1], p. gives a page of the article as published (its own numbering, 1 to 15), § a section and Table or Fig. one of its tables or figures.

Excursions do fall faster than reversals, and still take a thousand years or more

OUR ASSESSMENT

0.17 vs 3.0–3.9
×10²² A m² per thousand years: how fast the dipole weakened in the Matuyama–Brunhes reversal and in the Laschamp excursion, in the paper's event-based fits [1 Table 1]

~30,000 years
the reversal's decay, from about 809,000 to 779,000 years ago [1 §4.1]; at the paper's rates the Laschamp decay took about 1,500–1,900 years, by our arithmetic [1 Table 1]

7 of 13
excursions in the paper that show its fast-fall, slow-rise pattern, by our count; five show the opposite and one splits between models [1 Table 1][1 Table 2]

THE CLAIMS

TRUE
Reversals happen slowly
The presenter: "Not only do full cron magnetic reversals of Earth's field take thousands of years, but they occur slowly." [2 00:02:36]
In the last reversal the dipole weakened "gradually" from about 6 to 0.3 ×10²² A m² between about 809,000 and 779,000 years ago, at 0.17 ×10²² A m² per thousand years [1 §4.1][1 Table 1]; earlier studies date the whole reversal to 29–30 thousand years, 799,000–770,000 years ago [1 p. 2][1 Table 2]. "Thousands" understates tens of thousands, and the recovery, at 0.53, was fast only beside the decay: about 0.7% of today's dipole per century, by our arithmetic. See section 2.

MISLEADING
Excursions happen quickly
The presenter: "However, the geomagnetic excursions like we're in now happen quickly." [2 00:02:42]
The paper does find fast decay and slow recovery in most of its excursions, 7 of 13 by our count, and in its event-based fits the Laschamp weakened 18–23 times faster than the reversal [1 Table 1][1 Table 2]. It calls excursions "short-lived" [1 Plain Language Summary], but that is quick for the geodynamo: a decay of about 1,500–1,900 years at its rates, by our arithmetic, whole excursions of one to a few thousand years, and models that resolve centuries at best [1 p. 4][3 Abstract]. See section 3.

UNSUPPORTED
80 to 90% as bad as a reversal
The presenter: "these excursions, which are only about 80 to 90% as bad as full reversals" [2 00:02:48]
No such figure or comparison appears in the paper. By the depth of the dipole's low, the Laschamp's 0.11–0.37 ×10²² A m² matched the reversal's 0.24–0.3, while Mono Lake's lows were 3.29–4.35, about half of today's field [1 Table 1][1 §4.1]. By the paper's index, one model's Laschamp peak is 83% of the reversal's and the other model's 29% [1 Table 1]. See section 4.

FALSE
Hits two or three generations
The presenter: "that's not the same as almost that entire same amount of change hitting only two or three generations" [2 00:02:57]
Two or three generations is 50–90 years. Falling as far as the reversal did, from about 6 to 0.3 ×10²² A m², in that time would take 63–114 ×10²² A m² per thousand years: 13–23 times the steepest rate in the paper, about 4.9, in its sliding-window analysis of the Laschamp (read by eye) [1 Fig. 6c]. At the paper's fitted rates the Laschamp decay took about 1,500–1,900 years, 50–75 generations [1 Table 1], and its fully reversed directions, the briefest well-measured phase of that excursion, lasted 250–450 years [19][20 p. 16] and [23 suppl.]. See section 3.

UNSUPPORTED
Way worse for life on Earth
The presenter: "This is why these excursions ... are way worse for the life on Earth." [2 00:02:48]
The paper says nothing about life; the words life, biosphere, extinction, species, climate and radiation do not occur in it. A 1980 study found "no currently demonstrable relationship" between reversals and extinctions, and a 2010 review "no clear picture of a geomagnetic link" [21 Abstract][22 Abstract]. The one argued excursion case is contested [24][25], and its authors call the events "only temporally associated" [26]; no study compares excursions with reversals for life. Our review of the previous episode rates the premise False. See section 4.

TRUE
Excursions: fast fall, slow rise
The paper: "we observed an opposite behavior of fast dipole decay and slow recovery during most of the studied excursions" [1 Abstract]
Seven of the 13 excursions show the pattern, five the opposite and one splits between models, by our count [1 Table 1][1 Table 2]. It is best resolved for the Laschamp, in two models and three alternatives, and less firmly for the Norwegian–Greenland Sea event, in one model and with a sign that depends on the threshold [1 p. 10]; the authors call the sample too small for statistics [1 §3.1]. Their suggestion that excursions "may be governed by a mechanism distinct from that of reversals" is a hypothesis, not a result [1 Abstract]. See section 2.

1 · THE PAPER

Four field models, one reversal, thirteen excursions, and straight lines fitted to the dipole's fall and rise

Sunaina Shinu, Ahmed Nasser Mahgoub and Monika Korte of the GFZ Helmholtz Centre for Geosciences in Potsdam (Mahgoub has since moved to the University of Helsinki) asked whether the dipole weakens and recovers at different rates in excursions than in reversals, and whether that points to different mechanisms [1 p. 2]. The paper is a peer-reviewed research article in *Journal of Geophysical Research: Solid Earth*, received in November 2025 and accepted on October 2, 2026 [1 p. 1], published on October 21 and open access under CC BY 4.0 [1], and funded by the German Research Foundation [1 p. 15]. Its starting point is a known pattern: in reversals the dipole decays slowly and recovers fast, a "sawtooth" reported since 1993 and seen in two-million-year reconstructions, while "Recent global spherical harmonic field reconstructions that include the Laschamps excursion seem to indicate the opposite trend" [1 p. 2].

STEP 1
Take published models
Three global spherical-harmonic models built from sediment and lava records, two of them covering parts of the last 70,000 years and one the last reversal, plus PADM2M, a two-million-year curve of the axial dipole alone. Three of the four come from the authors' own group [1 §2.1].

STEP 2
Pick the events
The Matuyama–Brunhes reversal and 13 excursions: Mono Lake/Auckland, Laschamp, Norwegian–Greenland Sea, Post-Blake, Blake, Iceland Basin and Pringle Falls in the current chron; Kamikatsura, Santa Rosa, Intra-Jaramillo, Punaruu, Bjorn and Gilsa in the one before. Each was found "through visual inspection of the time series" near its published age [1 §2][1 §3.1].

STEP 3
Fit the rates
A straight line through the dipole moment's fall to its minimum and another through its rise gives a rate of decay and a rate of growth, in units of 10²² A m² per thousand years; the same is done for the paleosecular variation index, which combines direction and strength. A second pass cuts the series wherever the dipole crosses 6, 5, 4 or 3 ×10²² A m², and a third uses sliding windows [1 §3].

STEP 4
Measure the asymmetry
An index A = (|growth| − |decay|) ÷ (|growth| + |decay|): negative when the fall is faster than the rise. The authors call it "a descriptive measure ... rather than as a formal test of statistical significance" and put "Greater emphasis" on whether its sign is consistent across thresholds and models [1 §3.2].

The four models, as the paper describes them

MODEL	SPAN	BUILT FROM	EVENTS USED	TIME STEP AND RESOLUTION	MODEL AND PAPER
LSMOD.2	49,000–29,000 years ago	"12 globally distributed sediment time-series. ... All available volcanic data are also included"; three alternative models test the data choices [1 §2.1]	Laschamp; Mono Lake/Auckland "as two regional events at ~34 and ~31 ka" [1 §2.1]	Spline knots every 50 years; the resolution "is in the order of centuries" [1 p. 4]	[8]; [3]
GGFSS70	70,000–15,000 years ago	"a selection of only nine records, that are considered to have the highest data quality and best independent age models" [1 §2.1]	Norwegian–Greenland Sea, Laschamp, Mono Lake/Auckland [1 §2.1]	50 years; centuries [9]	[9]; [4]
GGFMB	900,000–700,000 years ago	"38 sediment records with mostly independent age control"; eight alternative models test the data choices [1 §2.1]	Laschamp; Mono Lake/Auckland	200 years; the resolution "probably lies in the order of 1,000 years" [1 p. 4]	[11]; [7]
PADM2M	The last 2 million years	A curve of the axial dipole moment only, "derived from a large compilation of volcanic and sediment paleomagnetic data, including 86 continuous records" [1 §2.1]	All 1.3 excursions and the reversal [1 Table 2]	Published every 1,000 years, "with an actual resolution in the order of 10,000 years" [1 p. 4]	[12]; [7]

"ka" is thousand years ago. For short-duration excursions in PADM2M the paper says its results "are better regarded as qualitative indications of the overall asymmetry rather than as well-resolved estimates of event-scale rates" [1 p. 8].

The paper's key points The three bullet points on its first page, verbatim.

> *"Rates of dipole moment and paleo secular variation index change during geomagnetic excursions and the last reversal are studied"*
> Shinu et al. (2026) [1 Key Points]

> *"A recent global field reconstruction confirms a slow dipole decay and fast recovery during the Matuyama-Brunhes reversal"*
> Shinu et al. (2026) [1 Key Points]

> *"Many excursions exhibit faster dipole decay than recovery, potentially suggesting a different mechanism of these shorter events"*
> Shinu et al. (2026) [1 Key Points]

What the paper measures, and what it cannot see
Rates of change of the dipole moment, the strength of the planet-scale part of the field, over thousands of years. The two best models resolve "centuries", the reversal model about a thousand years and PADM2M about ten thousand [1 p. 4], so a change over decades is invisible to all of them. The paper says of its sample: "We acknowledge that the number of events we can study that way is small and do not allow for a statistical treatment" [1 §3.1]. The same results had been shown as a poster in October 2025 [28] and in an EGU abstract that also announces a test of the older Gauss–Matuyama reversal with a model "newly developing" [27].

2 · THE RESULT

A sawtooth one way in the reversal, the other way in most excursions

In the reversal model the dipole "decreased gradually from ~6 × 10²² Am² to a minimum value of 0.3 × 10²² Am² around 779 ka", starting about 809,000 years ago, and was back near 6 by about 766,000 years ago [1 §4.1]. The Laschamp in both high-resolution models shows "a strongly asymmetric behavior ... with rapid DM decay followed by slower recovery" [1 §4.2]. The chart draws every dipole-moment rate in the paper's Table 1.

How fast the dipole fell and rose in each event, in the paper's global models

0.17 → 0.53	3.01 → 0.90	18–23×	−0.35 to −0.26
the reversal's decay and recovery rates: the rise three times faster than the fall [1 Table 1]	the Laschamp's in LSMOD.2: 3.93 → 0.83 in GGFS70: the fall three to five times faster than the rise [1 Table 1]	how much faster the Laschamp's dipole fell than the reversal's in the event-based fits, by our arithmetic from Table 1; the paper's other analyses give about 5–15 times [1 Table 1][1 Fig. 8]	the Laschamp's asymmetry index across the alternative LSMOD models; 0.14 to 0.60 for the reversal across GGFMB and its eight alternatives [1 p. 10][1 p. 7]

Drawn from the numbers in Table 1 of [1] (CC BY 4.0), the paper's event-based regressions, not from any figure. Each row is one event in one model; "fast fall, slow rise" and "slow fall, fast rise" are the table's trend column. The models place the Mono Lake/Auckland excursion as two or more regional lows, so it has four rows [1 §4.2]. The paper's own summary picture is its Figure 8, a scatter of decay against growth rates for every segment of its threshold analysis; its values are in its Table 3 and Supporting Information, so we have not redrawn it.

OUR ANALYSIS

What "most" rests on
Counting the paper's own verdicts on its 13 excursions: seven show a clear fast fall and slow rise (Laschamp, Norwegian–Greenland Sea, Post-Blake, Pringle Falls, Santa Rosa, Bjorn and Gilsa), five show the opposite (Mono Lake, Blake, Iceland Basin, Intra-Jaramillo and Punaruu), and Kamikatsura splits, fast in GGFMB and slow in PADM2M [1 Table 1][1 Table 2], as the results section also notes [1 p. 11]. The paper itself says that "In the Brunhes chron, four out of seven excursions clearly display a fast decay, slow recovery pattern" and that the Blake and Iceland Basin asymmetry "is very small (~0.01) and relies only on the low-resolution PADM2M model" [1 p. 12][1 p. 10].

Of the seven, only the Laschamp and the Norwegian–Greenland Sea excursion come from models that resolve centuries; the other five rest on PADM2M, whose ten-thousand-year resolution is longer than the 3–8 thousand years the paper gives for four of them, with no duration for Post-Blake [1 p. 4][1 Table 2]. The Norwegian–Greenland Sea case is in one model and only, in its sign shifts with the threshold [1 p. 10]. The reversal side rests on one reversal, in GGFMB and its eight alternatives, built by the same group [9][16], and in PADM2M, which is not theirs [7]; the slow-fall, fast-rise sawtooth of reversals was known before, from sediment and seafloor records going back to 1993 [1 p. 2]. So the robust new finding is narrower than "most excursions": two well-resolved excursions, the Laschamp above all, fall faster than they recover, and the one well-resolved reversal does the reverse.

The 18–23 times also depends on how the curves are cut. It divides a straight line fitted over about 2,000 years by one fitted over 30,000. The paper's other analyses give smaller gaps. In its threshold segments the Laschamp decays at 3.06–3.20 in LSMOD.2 [1 Table 3], against no more than about 0.6 for any of the reversal's segments [1 Fig. 8e], about 5 times. In its sliding windows the Laschamp's steepest fall is about 3.5 in LSMOD.2 and 4.9 in GGFS70 [1 Fig. 5c] and [1 Fig. 6c], against about 0.34 in the reversal's decay phase [1 Fig. 3c], 10–15 times, though the reversal model's windows are ten thousand years long than one [1 §3.3]. Figure values here are read by eye from the paper's figures. On every measure the Laschamp fell several times faster than the reversal.

The reversal, in the group's earlier work
The GGFMB model paper found that the reversal "lasted 29 Kyr (from 799 to 770 ka) and had slower rate of dipole decay than recovery as well as lower dipole moment for several millennia before than after the reversal" [5 Abstract], with the dipole at its lowest, 0.1 ×10²² A m², about 780,000 years ago, then "a rapid, nearly linear increase to 6.5 × 10²² Am² at 767 ka" [5 p. 10]. Across GGFMB and its eight alternatives the reversal process "spanned around 21 to 32 ka", and "All models confirm a sawtooth pattern of slow dipole moment decay and fast recovery with a drop to values around or below 5 ZAm²", that is 0.5 ×10²² A m² [6 §3.4][6 §4]. A dating study of lavas, sediments and ice puts the whole process at "at least 22 ka and perhaps as long as 30 ka", with the final flip of polarity "terminating rapidly — in less than 4000 years" at 773,000 years ago [32 Discussion]. Overstated.

The excursions, in the models' own papers
In the LSMOD.2 suite the Laschamp's underlying process lasts "~5 ka (43–38 ka) and the surface field expression lasting ~2 ka (42–40 ka)" [3 Abstract]. The dipole falls below 0.4, and in three of the suite's four models below 0.2, ×10²² A m² (4 and 2 ZAm² in that paper's units), and "in all models spanning the 20 kyr interval, the DM does not recover to its pre-Laschamp strength after the excursion" [3 §4.2], the slow recovery this paper measures. Mono Lake is a different animal: its dipole stays "above 40 ZAm² in nearly all models", 4 ×10²² A m² [3 §4.2], in "two epochs of moderate dipole lows, around 34 and 31 ka" [3 §5], and the new paper calls it "a regional excursion associated with only a small decrease in dipole moment and multiple minima" [1 pp. 12–13], whose globally averaged index never passes 0.3, against 0.5 for an excursion [1 §4.2]. The Norwegian–Greenland Sea event, which the paper also calls regional, fell further, to 2.0 ×10²² A m² in GGFSS70 [1 p. 10][1 Table 1].

How the authors qualify it Their own limits, in their words.

> *"This may indicate that excursions are governed by a different mechanism than full polarity reversals, although the observation has some limitations."*
> Shinu et al. (2026) [1 §5]

> *"Exceptions from the opposite trend found for excursions compared to the MB reversal mostly occur in the PADM2M model which does not really have the resolution to characterize excursions, and for the excursions that appear quite different depending on how beginning and end are defined."*
> Shinu et al. (2026) [1 p. 12]

> *"It also has to be considered that the models have uncertainties, although they do not include formal uncertainty estimates."*
> Shinu et al. (2026) [1 p. 14]

3 · HOW FAST?

"Quickly" means about two thousand years

The episode set reversals that "take thousands of years" against excursions that "happen quickly", and made the contrast "500 generations of a species" against "only two or three generations" [2 00:02:36–00:03:10]. The paper does call excursions "short-lived" and says that in most of them "the field strength dropped quickly and recovered more slowly" [1 Plain Language Summary], and that "most excursions are clearly shorter than the duration of a full reversal process" [1 §6]. That is short and quick for the geodynamo: the paper's rates are in units of 10²² A m² per thousand years, and its models resolve centuries at best [1 p. 4].

OUR ANALYSIS

The paper's rates in everyday units
Today's dipole moment is about 8 ×10²² A m², the value the paper uses to normalise its index [1 §2.3]; the LSMOD.2 models top out "in the range of 20th century values of ~80 ZAm²", which is the same number in other units [3 §4.2]. One unit per thousand years is therefore 0.1 ×10²² A m² per century, 1.25% of today's dipole. The reversal's decay, 0.17, is 0.2% per century and its "rapid" recovery, 0.53, is 0.7% per century. The Laschamp's decay, 3.01–3.93, is 3.8–4.9% per century, and its recovery, 0.83–0.90, about 1% per century [1 Table 1]. At those decay rates a fall from about 6 ×10²² A m² to the Laschamp's lows of 0.37 and 0.11 takes about 1,900 and 1,500 years, close to the 1,800 years over which the paper's fitted line runs in LSMOD.2 (read by eye) [1 Fig. 4a]; the reversal's fall from about 6 to 0.3 took the 30,000 years between 809 and 779 thousand years ago [1 §4.1].

EVENT AND MODEL	DECAY RATE	PER CENTURY, OF TODAY'S DIPOLE	TIME TO FALL FROM ~6 TO THE LOW
Matuyama–Brunhes reversal, GGFMB	0.17	0.2%	about 30,000 years (809 to 779 ka)
Laschamp, LSMOD.2	3.01	3.8%	about 1,900 years
Laschamp, GGFSS70	3.93	4.9%	about 1,500 years
Norwegian–Greenland Sea, GGFSS70	2.44	3.1%	about 1,600 years, to its low of 2.0

Rates in units of 10²² A m² per thousand years, from the paper's Table 1 [1 Table 1]; the per-century column divides the rate by ten and by 8 ×10²² A m²; the last column is the fall from the roughly 6 ×10²² A m² the models show before each event [1 §4.1], read by eye for the excursions [1 Fig. 4a] and [1 Fig. 6a], to the table's lowest value, at the fitted rate. The regression intervals the paper used are not tabulated, so these are indicative.

How long these things take, in years and in human generations OUR ANALYSIS

A logarithmic scale; each step to the right is ten times longer. "Two or three generations" and "500 generations" are the episode's words [2 00:02:57], converted at 25–30 years a generation (the bars show 25–30 years per generation; the lower axis uses 25). The Laschamp's fully reversed directions lasted about 250–450 years in Black Sea sediments, depending on the record [19][20 p. 16] and its age model [23 suppl.]; its main phase about 700 years in a dated cave record [18 p. 141]; its dipole decay about 1,500–1,900 years at the paper's rates (the table above); its surface expression about 2,000–5,000 years and its underlying process about 5,000 [2 Abstract], with the paper itself giving "approximately 2.8 kyr" [1 p. 2]. The reversal's decay ran from about 809,000 to 779,000 years ago [1 §4.1]. Excursions in general last from about 300 years to 10,000 [17 p. 2].

OUR ANALYSIS

What "two or three generations" would need
At 25–30 years a generation, 500 generations is 12,500–15,000 years and two or three generations is 50–90 years. The reversal's 30,000-year decay is 1,000–1,200 generations, so the presenter's first number is of the right order for a reversal. The second is not of the right order for anything in the paper. Falling as far as the reversal did, from about 6 to 0.3 ×10²² A m² [1 §4.1], within 50–90 years would take 63–114 ×10²² A m² per thousand years. The steepest rate anywhere in the paper is about 4.9, the Laschamp's fall in its sliding-window analysis of GGFSS70 (read by eye) [1 Fig. 6c]; threshold segments in that model reach about 4.6 (read by eye) [1 Fig. 8c], and the fastest fitted rate is 3.93 [1 Table 1]. The episode's version would need 13–23 times the steepest of these, 16–29 times the fastest fit and about 370–670 times the reversal's 0.17. The Laschamp decay itself took 50–75 generations; its fully reversed directions, the briefest well-measured phase of that excursion, lasted 250–450 years, 8–18 generations [19][20 p. 16] and [23 suppl.]. And the paper could not have seen a change over three generations if one had happened: its best models resolve "centuries" [1 p. 4].

The presenter's other premise, that an excursion brings "almost that entire same amount of change", holds for the Laschamp and fails for Mono Lake. The Laschamp's lowest dipole, 0.11–0.37 ×10²² A m², is as deep as the reversal's 0.24–0.3, which across GGFMB and its eight alternatives varies "between (10.07) and 0.65 × 10²² Am²" [1 Table 1][1 p. 7]; the Mono Lake lows, 3.29–4.35, are about half of today's field [1 Table 1].

OUR ANALYSIS

The Laschamp's rate beside today's decline, with the context it needs
Converted the same way, the Laschamp's decay of 3.8–4.9% per century is the same order as today's: the axial dipole is about 9% weaker than in 1840, a loss of about 5% per century on average [14 p. 1][13]. That resemblance is real, and it is one reason some geomagnetists ask whether a transition has begun, though even they expect no reversal or excursion for 500 to 1,000 years [16]. Three things sit beside it. First, the paper's rate is a straight line fitted through 1,500–2,000 years of a model that resolves centuries; today's is a 185-year trend in direct measurements, and the two are not the same quantity [1 §3.1][1 p. 4]. Second, the same group's reconstruction found field states comparable to today's 49,000 and 46,000 years ago, each with a weak region like today's South Atlantic Anomaly, and neither turned into an excursion or a reversal, which the authors take to suggest that "Earth's magnetic field is probably not reversing" [13]. Third, the Laschamp decay ran from about 6 ×10²² A m² to near zero; today's dipole stands at about 7.6–8 [5 p. 10][1 §2.3], twice the 4 ×10²² A m² the paper calls "a reasonable threshold for defining transitional geomagnetic events", though not a universal one [1 p. 14]. Our page When is the next magnetic excursion due? runs the decline forward five ways: none halves the dipole, about where the Laschamp's directions began to change [16], before about AD 2280, and most not before AD 2600.

4 · NOT IN THE PAPER

Nothing on life, nothing on today's field, and no "80 to 90%"

The episode said the paper stated "as plainly as can be" that reversals are slow and excursions quick, concluded from that ("This is why") that excursions are "way worse for the life on Earth", and spoke of "the geomagnetic excursions like we're in now" [2 00:02:30–00:02:57]. The paper is a study of decay and growth rates in field models. It says nothing about life, nothing about the present field beyond the dipole value it normalises by, and makes no comparison of how harmful the two kinds of event are.

Life
The words life, biosphere, extinction, species, climate, radiation, ozone, cosmic, human and generation do not occur anywhere in the paper; its mechanism section is about advection and diffusion in the outer core [1 p. 14]. On the wider evidence, a 1980 study found "no currently demonstrable relationship exists between faunal extinctions and geomagnetic reversals" [21 Abstract] and a 2010 review "no clear picture of a geomagnetic link" [22 Abstract]. The one argued excursion case, a 2021 paper tying the Laschamp to extinctions and cultural change 42,000 years ago [23], drew two formal comments, one noting that the Blake excursion "occurred without apparent serious effects" [24], the other that it misrepresented the extinction and archaeological evidence [25]; the authors replied that the events "remain only temporally associated" [26]. No study we know of compares excursions with reversals for their effect on life. Our review of the previous episode rates "Excursions take out much of life" False, and our excursions timeline rates "Laschamp caused the 42,000-year extinctions" Overstated.

"80 to 90% as bad"
The figure appears nowhere in the paper, its two abstracts or the model papers we read in full, and nothing in them can be read as a ratio of harm; the only "90%" in them is unrelated, the GGFMB paper's early-Brunhes dipole at "almost 90% of the PDDM", the present-day dipole moment [5 p. 10]. What can be compared is how far the dipole fell: to 0.24–0.3 and 2 ZAm² in that paper's units), and "in all models spanning the 20 kyr interval, the DM does not recover to its pre-Laschamp strength after the excursion" [3 §4.2], the slow recovery this paper measures. Mono Lake is a different animal; its dipole stays "above 40 ZAm² in nearly all models", 4 ×10²² A m² [3 §4.2], in "two epochs of moderate dipole lows, around 34 and 31 ka" [3 §5], and the new paper calls it "a regional excursion associated with only a small decrease in dipole moment and multiple minima" [1 pp. 12–13], whose globally averaged index never passes 0.3, against 0.5 for an excursion [1 §4.2]. The Norwegian–Greenland Sea event, which the paper also calls regional, fell further, to 2.0 ×10²² A m² in GGFSS70 [1 p. 10][1 Table 1].

Today's field
The paper's only present-day number is the dipole moment it normalises by, "the present day dipole moment (8 × 10²² A m²)" [1 §2.3]. The definitions it uses for an excursion, both from earlier work, are a virtual pole "more than 45° from the geographic pole" and an index above 0.5 [1 p. 1], a threshold it also questions [1 §2.3]; it adds that a dipole below 4 ×10²² A m² "generally seems to be a reasonable threshold for defining transitional geomagnetic events", though one that "is not universally applicable" [1 p. 14]. Today the dipole axis is tilted 9.21° from the rotation axis [15 §1.6 p. 20], the axial dipole is about 9% weaker than in 1840 [14 p. 1] and about twice that 4 ×10²² A m², past excursions began with the dipole near half strength [16], and the field is "probably not reversing" [13]. The episode's premise that an excursion is under way now is rated False on our review of the previous episode and examined on When is the next magnetic excursion due?; the "disaster cycle" it invokes is checked on The Disaster Cycle and our excursions timeline.

"Rapid pole shifts"
The episode's title is "Rapid Pole Shifts Confirmed" [2]. The paper is about field strength, and it reads its own result the other way: the asymmetry is weaker in the index that includes direction, "suggesting that it is caused by the (axial) dipole evolution and not a characteristic of directional field changes. This might also support previous findings that directional field changes seem to play no or a minor role in driving excursions and reversals" [1 p. 14]. It confirms nothing about pole movement, rapid or otherwise; the title is rated on our review of the episode.

5 · THE EPISODE

What the episode said, page by page

S0 News of October 23, 2026 made the paper its "top story" at 00:02:30, under the link label "Rapid Excursions" [2]. The transcript's "cron" is *chron*, a long interval of one polarity.

The episode's statements beside the paper

THE EPISODE SAID	THE PAPER, AND THE RECORD	OUR VERDICT
"Not only do full cron magnetic reversals of Earth's field take thousands of years, but they occur slowly." [2 00:02:36]	The last reversal's decay ran about 30,000 years at 0.17 ×10²² A m² per thousand years, its recovery three times faster [1 §4.1][1 Table 1]; earlier studies date the reversal to 29–30 thousand years [1 Table 2]. Slow in every phase on a human scale; "thousands" understates it.	**True**
"However, the geomagnetic excursions like we're in now happen quickly." [2 00:02:42]	Fast decay and slow recovery in 7 of 13 excursions, the Laschamp 18–23 times faster than the reversal in the event-based fits [1 Table 1][1 p. 12]; a decay of about 1,500–1,900 years, whole events of one to a few thousand years, models resolving centuries [1 p. 4][3 Abstract]. Nothing on the present field.	**Misleading**
"these excursions, which are only about 80 to 90% as bad as full reversals" [2 00:02:48]	No such figure or comparison. By the dipole's low the Laschamp matched the reversal and Mono Lake halved the field; by the index one model's Laschamp reaches 83% of the reversal's peak, the other 29% [1 Table 1].	**Unsupported**
"almost that entire same amount of change hitting only two or three generations" [2 00:02:57]	50–90 years would need 13–23 times the steepest rate in the paper [1 Fig. 4c]; at its fitted rates the Laschamp decay took 50–75 generations [1 Table 1], and its reversed directions lasted 250–450 years [19][20 p. 16] and [23 suppl.].	**False**
"This is why these excursions ... are way worse for the life on Earth." [2 00:02:48]	Nothing on life in the paper; no study compares the two kinds of event for life; a 1980 study and a 2010 review found no demonstrable link between reversals and extinctions [21 Abstract][22 Abstract].	**Unsupported**
"What we're in now is the disaster cycle for the biosphere, the life on Earth." [2 00:03:10]	Not in the paper. Rated on our review of the episode and on The Disaster Cycle.	**See those pages**

Quotations from the episode are from its automatically generated transcript, with the time at which each begins [2]. The same sentences carry the same labels on our review of the episode.

6 · READ WITH CARE

A careful paper on a small sample, with its limits stated

The measurements are of models, not of rocks, and the authors say so throughout. The limits below are our reading; the first four the paper states itself.

Few events, no statistics
"the number of events we can study that way is small and do not allow for a statistical treatment"; the asymmetry index gives no significance threshold [1 §3.1][1 §3.2].

Resolution
Centuries in the two best models, about a thousand years in the reversal model, about ten thousand in PADM2M, whose excursion rates are "qualitative indications" [1 p. 4][1 p. 8].

Where an event begins and ends
"defining the start and end of an event is not straightforward"; for Mono Lake and the Norwegian–Greenland Sea event the segments, and sometimes the sign, change with the threshold [1 p. 14][1 §4.2], as the LSMOD.2 table shows [1 Table 3].

Models without error bars
"the models have uncertainties, although they do not include formal uncertainty estimates" [1 p. 14]; the robustness checks swap data sets rather than propagate errors [1 §2.1].

One group's models, one reversal
Three of the four models [3][4] and [5], and both robustness suites [3] and [6], are by the authors' group, and the reversal half of the comparison is a single event. The sawtooth of reversals is older and independent [1 p. 2]; the excursion half is the new claim and rests on two well-resolved events.

Small inconsistencies
The Laschamp "lasted approximately 2.8 kyr" in the introduction and 1.5 kyr in Table 1 [1 p. 2][1 Table 1]; the reversal's decay begins "at approximately 809 ka" in the results and the event is dated "~-799–770 ka" in the introduction [1 §4.1][1 p. 2]; its minimum is 0.3 ×10²² A m² in the text and 0.24 in the table [1 §4.1][1 Table 1], and 0.1 in the GGFMB paper [5 p. 10]; its index peaks at 7.32 in the table but at about 9 and 11 in the figures [1 Fig. 2b][1 Fig. 3b]; and the reversal model's sliding-window rates are said to range mostly from −2 to −4 ×10²² A m² per thousand years [1 p. 7], while its figure spans about ±0.6 [1 Fig. 3c]. Figure values are read by eye.

What would change these verdicts

01 For the paper's claim: the same asymmetry in a second reversal, which the authors are testing with a Gauss–Matuyama model [27], and in independent reconstructions of the Laschamp from other groups' data.

02 For "two or three generations": a dated record in which a global excursion's dipole collapse completes within a few human generations. The briefest well-measured phase of the Laschamp, its fully reversed directions, lasted 250–450 years [19][20 p. 16] and [23 suppl.].

03 For "worse for life": a study that compares biological records across excursions and reversals and finds an effect scaled to speed. None exists; a 1980 study and a 2010 review found no demonstrable link between reversals and extinctions [21 Abstract][22 Abstract].

Related checks
FALSE Every 6,000 years? 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

Sources

Bracketed numbers refer to this list. For the paper [1], p. gives a page of the article as published (its own numbering, 1 to 15), pp. a span of pages, § a section, Table a table and Fig. a figure or panel; values we read off a figure are marked "read by eye". Abstract, Key Points and Plain Language Summary name those parts of its first page. For the episode [2], times are positions in the video (hours:minutes:seconds). For the other sources, § and p. name a section or page of the cited work, Discussion its discussion section, suppl. its supplementary material and Abstract its abstract; where only an abstract was read, the entry says so. Links checked October 24, 2026.

1 Shinu, S., Mahgoub, A. N., and Korte, M. (2026). Rates of Geomagnetic Field Change During Excursions and Reversals. *Journal of Geophysical Research: Solid Earth* 131(10), e2025JB033422. Received November 20, 2025, accepted October 2, 2026, published October 21, 2026. Open access, CC BY 4.0. We read the publisher's version of record (15 pages, with Tables 1–3 and Figs. 1–8), from GFZ Potsdam's repository GFZpublic and from a copy of Wiley's PDF supplied by the site's owner; the two files are identical. Its Supporting Information (Figures S1–S21, Tables S1–S5) is only on the publisher's site, which showed a bot check to our tools, and was not read.

2 Korte, M., Brown, M. C., Panovska, S., and Wardinski, I. (2019). Robust characteristics of the Laschamp and Mono Lake geomagnetic excursions: results from global field models. *Frontiers in Earth Science* 7, 86. CC BY 4.0. The LSMOD.2 model paper; we read the full text. It gives dipole moments in ZAm²: 10 ZAm² is 1 ×10²² A m².

3 Mahgoub, A. N., Korte, M., and Panovska, S. (2023). Global geomagnetic field evolution from 900 to 700 ka including the Matuyama-Brunhes reversal. *Journal of Geophysical Research: Solid Earth* 128(6), e2023JB026593. CC BY 4.0. The GGFMB model paper; we read the full text (by the city in Bremen's Archimer repository); p. gives a page of the article.

4 Ziegler, L. B., Constable, C. G., Johnson, C. L., and Tauxe, L. (2011). PADM2M: a penalized maximum likelihood model of the 0–2 Ma palaeomagnetic axial dipole moment. *Geophysical Journal International* 184(3), 1069–1089. The PADM2M model paper. We read the abstract.

5 Panovska, S., Korte, M., Liu, J., and Nowaczyk, N. (2021). GGFSS70: a global time-dependent model of the geomagnetic field over the 15–70 ka period. EarthRef Digital Archive, ERDA 2472 (dataset).

6 Panovska, S., Korte, M., Nilsson, A., Wardinski, I., and Gunnarson, S. (2018). Earth's magnetic field is probably not reversing. *Proceedings of the National Academy of Sciences* 115(20), 5111–5116. We read the abstract; cited as on our pages When is the next magnetic excursion due? and When Earth's magnetic field falters.

7 Channell, J. E. T., Hodell, D. A., and Lehman, B. (2020). The Brunhes geomagnetic polarity transition, 850 ka to 780 ka: PADM2M, sediment magnetism, and marine oxygen isotope records from Ocean