☑ Fact-Checked Science

EVIDENCE REVIEW · S0 NEWS, 19 NOVEMBER 2026

S0 News, November 19, 2026: the 40% field dip was the storm's own, and no leak has begun

On November 19, 2026, S0 News said "Earth's oxygen leak in this magnetic pole shift has begun" `[1 00:01:20–00:01:23]`, citing Arase data showing that "the Earth's magnetic field dropped 40%" in the May 2024 storm `[1 00:01:28–00:01:31]` and a new model in *The Astrophysical Journal* `[1 00:01:58–00:02:08]`. The dip was real, but it was the storm's own ring current pushing the field aside for some hours, about three Earth radii out `[3 Results, p. 5]`, and the paper ties it to a loss of radiation-belt electrons, not to the extra electrons of a fourth belt that formed in late May `[3 Discussion, p. 5]` `[7 p. 4]`. The new paper models ancient fields under fixed conditions `[4 Abstract, p. 1]` and says nothing about the field's weakening today or about a leak now; its present-day runs give rates far below what satellites measure `[4 §3 ¶5, p. 5]`. Today's field is nowhere near an excursion, and nothing measured shows a new oxygen leak.

By Fact-Checked Science · Published November 19, 2026

OUR ANALYSIS marks our own reasoning and calculations, including our five tests of the episode's space-weather report and our conversions of the field's dip, and the verdicts are our assessment: several restate or follow the site's other checks, as each says. Everything else comes from the numbered sources. For the episode [1], times are positions in the video; the sources note says what the other locators mean.

The storm of May 2024 dented the field unusually close to Earth and emptied part of a radiation belt; nothing the episode cites shows a leak or a pole shift begun

OUR ASSESSMENT

~40%
How far the field fell below the standard model of Earth's own field, about three Earth radii out, for some hours after the storm's peak: the storm's ring current pushing it aside `[3 Results, p. 5]`.

1.7%
Our analysis: how far the same storm lowered the field at the ground, its SYM-H of −518 nT `[3 Introduction, p. 1]` against an equatorial surface field of 31,100 nT `[4 §2, p. 3]`.

11–19 days
After the storm's peak, the fourth electron belt took shape: from about May 22 on its discoverers' dating `[7 p. 4]`, from May 30 in our count, not during the storm.

THE EPISODE'S CLAIMS

MISLEADING
Field dropped 40% in the storm
"the erase data is in showing how in the critical zone the Earth's magnetic field dropped 40% during the solar storm event." `[1 00:01:25–00:01:33]` Under the link "40% Field Loss During Oxygen Leak" `[1]`
The number is the paper's and it is right: the field Arase measured "decreased by ~40% compared with that calculated using the International Geomagnetic Reference Field … even close to the Earth" `[3 Results, p. 5]`, about three Earth radii out, for the hours of its passes after the storm's peak. The storm did it: the ring current's ions "had sufficiently high pressure to deform the background magnetic field" `[3 Results, p. 5]`. Earth's own field didn't weaken; the standard model of it is the baseline, and at the ground the storm lowered the field by under 2% (our analysis). Offered as an update on "Earth's oxygen leak in this magnetic pole shift", and labelled "Field Loss During Oxygen Leak", a true number leaves a false impression. See section 4.

MISREAD
Field drop made the 4th belt
"This also hints at the fourth ring that appeared during the storm as it is what drove those extra electrons like we reported just 3 days ago." `[1 00:01:33–00:01:40]`
The paper ties the dent to the opposite: electrons carried out to the magnetopause and lost, "a reduction (almost disappearance)" of the radiation belt's electrons above 1 MeV beyond 3.5 Earth radii `[3 Discussion, p. 5]`. The fourth belt the episode reported on November 16 took shape in late May, 11–19 days after the storm's peak `[7 p. 4]`, and its discoverers put it down to electrons injected deep into the belts `[7 p. 21]`, not to the dent. The extra multi-MeV electrons the storm made inside the belts' barrier are put down to chorus waves `[8 p. 1]`. See section 5.

MISREAD
Earth's oxygen started leaking
"The first update to this story that Earth's oxygen leak in this magnetic pole shift has begun" `[1 00:01:18–00:01:23]` "It has begun." `[1 00:02:11]` "Confirmation that the oxygen leak has begun with an electron leak to boot." `[1 00:02:31–00:02:33]`
The same claim and the same verdict as on November 13 and on our check of the oxygen-ion paper. That paper measured oxygen ions held around Earth in the ring current `[3 Abstract]` and, as our check found, gives no escape rate; the new paper models ancient fields under fixed conditions `[4 Abstract, p. 1]` and says nothing about the field's weakening today or about a leak now; its present-day runs give rates far below what satellites measure `[4 §3 ¶5, p. 5]`. Earth loses oxygen ions to space all the time, as it always has. And the electrons the storm removed were trapped particles of the radiation belts, lost in a storm as they often are, not Earth's air. See section 6.

FALSE
An excursion is under way now
"Earth's oxygen leak in this magnetic pole shift" `[1 00:01:20–00:01:23]` "After the 2014 paper, we said to watch for it. It has begun." `[1 00:02:08–00:02:11]`
Nothing measured is near one. In an excursion the field's pole strays more than about 45° from the geographic pole, with the dipole at about half today's strength. Today the dipole's axis is tilted 9.2°, and the dipole is about 9% weaker than in 1840 and about 40% stronger than its average over the last two million years, as our guide to the field sets out with its sources. The same claim is rated False on our reviews of November 13, November 9 and October 22. See section 6.

OVERSTATED
2014: an extinction trigger
"It was 12 years ago, 2014, when the pole shift oxygen leak extinction trigger hit the journals." `[1 00:00:57–00:01:03]`
The 2014 paper did appear in a peer-reviewed journal `[5]`. But it offered a hedged hypothesis, "a possible explanation" `[5 p. 97]`: oxygen lost during many reversals over millions of years, "a 'many-to-one' scenario rather the previously considered 'one-to-one'" `[5 p. 94]`, in a model that raised escape steeply "only if the magnetic field was extremely weak" `[5 p. 94]`, with the dipole set to zero `[5 p. 96]`. Even the 2026 paper that revisits the idea hedges it: such loss "could even trigger" a catastrophic oxygen decline, "potentially" linked to extinctions `[4 §1 ¶3, p. 2]`. Later models disagree. Some find the field's strength changes escape only two- to threefold (our review of November 13); the 2026 model the episode cites finds hundreds of times more escape at a tenth of today's dipole, though from a present-day rate far below what satellites measure (section 7). See section 3.

OVERSTATED
Confirms the pole-shift leak
"only for the Astrophysical Journal to come out and say that, yeah, that is exactly how it works. The magnetic pole shifts are how this happens." `[1 00:01:58–00:02:08]` "And this paper confirms why it works." `[1 00:02:14]` Under the link "Pole Shift Oxygen Leak Confirmed" `[1]`
The paper is one peer-reviewed model of ancient Earth, run "Under typical solar wind conditions" `[4 Abstract, p. 1]` that it holds fixed `[4 §2, p. 3]`, and its authors call the relative change, "rather than the absolute rate", its robust result `[4 §3 ¶5, p. 5]`. Its escape for today's field is "2 to 3 orders of magnitude lower than previous observational estimates" `[4 §3 ¶5, p. 5]`, so, taken at face value, even its rates with almost no field are below what Earth loses now; applied instead to the escape measured today, its rise would remove 0.07–0.17% of the air's oxygen in a 10,000-year collapse of the field (our check of the paper). Other models disagree, and it says nothing about the field's weakening today or about a leak now. The same verdict as on our check of the paper. See section 7.

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1 · THE EPISODE

Three minutes, two links, and graphics we haven't seen

S0 News of November 19 went up at 11:59 UTC; its transcript runs a little over three minutes [1]. It checked "quickly on the sun and space weather" and then updated "one of the biggest stories of the year less than a week after it first came out" `[1 00:00:17–00:00:24]`: the oxygen-ion story of November 13, with a press release and a new paper.

In the episode's words

Quoted from the automatic transcript as it stands, here and below. "The erase data" is almost certainly the Arase data, from the Japanese satellite whose measurements the release reports.

> *"We've got even more on the pole shift oxygen leak from Earth."*
>
> The opening `[1 00:00:24–00:00:28]`

> *"The first update to this story that Earth's oxygen leak in this magnetic pole shift has begun is that the erase data is in showing how in the critical zone the Earth's magnetic field dropped 40% during the solar storm event."*
>
> The top story `[1 00:01:18–00:01:33]`

> *"Confirmation that this is how the oxygen leak extinction events began. Confirmation that the oxygen leak has begun with an electron leak to boot."*
>
> On the new paper `[1 00:02:27–00:02:33]`

The two links, and where each is checked

THE DESCRIPTION'S LABEL	WHAT IT LINKS	WHERE IT IS CHECKED
"Pole Shift Oxygen Leak Confirmed"	Wang and nine colleagues (2026), *The Astrophysical Journal*, a model of oxygen escape from ancient Earth [4]	Our check of the paper; here, section 7
"40% Field Loss During Oxygen Leak"	Nagoya University's release of June 27, 2026 [2], on Kitamura and 19 colleagues (2026), *Science Advances* [3]	Our check of the paper; here, sections 4, 5 and 8

What we could see, and what we couldn't

We worked from the episode's automatic transcript, pasted by the site's owner, and didn't watch the video [1]. "Yanked both of those figures there together for you here" `[1 00:02:21–00:02:23]` points at pictures we haven't seen; that they were the new paper's curves of escape against the field's strength and tilt is our inference. "like we reported just 3 days ago" `[1 00:01:40]` means S0 News of November 16, whose one link, "4th Radiation Belt", is the Comment on four electron belts [6], which our check of the Comment covers.

Quoted, not rated

The episode adds "spend 3 days having mainstream bootlickers tell me I'm crazy" `[1 00:01:56–00:01:58]` and "This year's top science of 2026 list is going to be off the hook. That was just the last week." `[1 00:02:36–00:02:41]` It invites viewers to "a potluck and kids barter event at Observer Ranch on Sunday" `[1 00:02:41–00:02:45]` and says "the Observer Ranch store has almost everything 40% off for the holiday run" `[1 00:02:49–00:02:54]`. We didn't visit the ranch's or the store's pages, and don't rate the passages, nor the sign-off, "Eyes open, no fear. Be safe, everyone." `[1 00:03:08–00:03:12]`

2 · THE SUN AND SPACE WEATHER

A quiet day on the Sun and one brief minor storm, much as the episode said

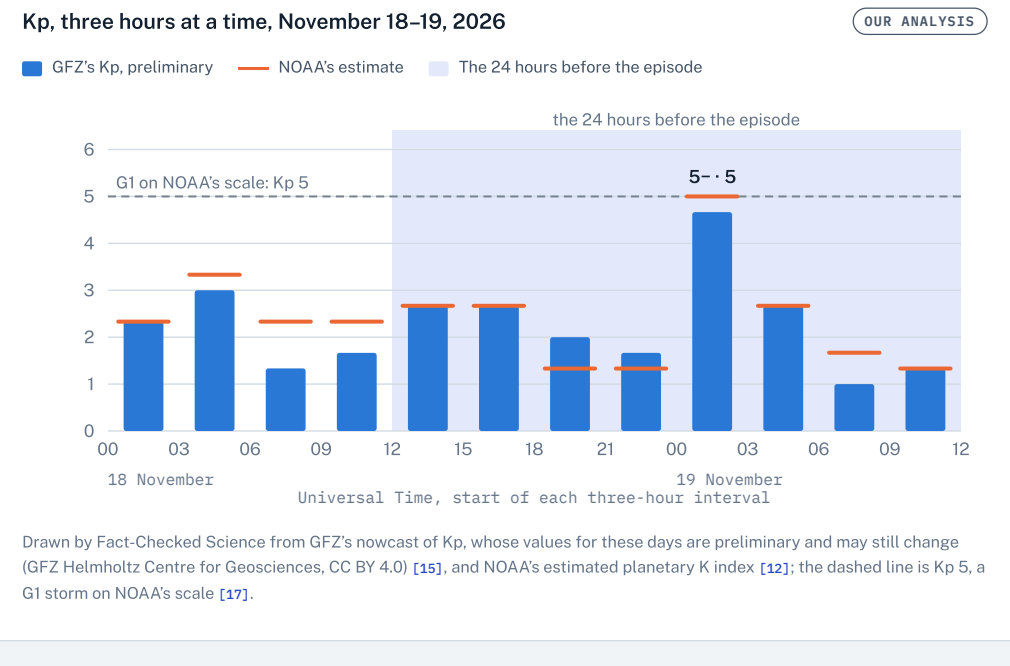
"As we start with our star where the last 24 hours were extremely quiet up there. The sun isn't doing much at all. Minor impulsive flare attempts, peripheral CME releases. Nothing aimed in Earth's direction. We did see a slight solar wind enhancement yesterday. The edge of a faster coronal hole. Not really much of an event, but we did see a brief geomagnetic storm condition crop up from it. Calm is expected today." `[1 00:00:28–00:00:51]`

Five tests, fixed before we ran them, and what the records show

THE EPISODE	THE RECORD, FOR THE 24 HOURS BEFORE THE EPISODE WENT UP	TEST
"Minor impulsive flare attempts" `[1 00:00:35]`	17 flares peaked, 15 of class C and 2 of class B; the largest, C4.9, came twice, from Region 4578 at 13:20 UTC on November 18 and from Region 4576 at 00:49 UTC on November 19 [13] `[10 Nov. 19, 1230 UTC]`. No M or X flare, and "No radio blackouts were observed over the past 24 hours" `[11 Nov. 19, 0030 UTC]`	Holds
"peripheral CME releases. Nothing aimed in Earth's direction." `[1 00:00:37–00:00:40]`	Two narrow ejections began, 30° and 32° wide, off the north and north-east limbs [16]. The westerly ones launched before the window, early on November 18, were "not currently considered a significant Earth-directed threat" `[10 Nov. 18, 1230 UTC]`; but see the caveat in the verdict box below	Holds, with the caveat below
"a slight solar wind enhancement yesterday. The edge of a faster coronal hole." `[1 00:00:40–00:00:45]`	"Solar wind parameters were weakly enhanced under CIR effects associated with a positive polarity CH HSS", a stream from a coronal hole `[10 Nov. 18, 1230 UTC]`. Hourly means 375–436 km/s on November 18 and up to 446 km/s on November 19; the field at most 9.5 nT [14]	Holds
"a brief geomagnetic storm condition crop up from it" `[1 00:00:49–00:00:51]`	Kp 5− in GFZ's preliminary index [15], 5 in NOAA's estimate, for 00–03 UTC on November 19, the only such interval; NOAA's alert: "Geomagnetic K-index of 5", "G1 - Minor" [12], the lowest storm level on its scale [17]	Holds
"Calm is expected today." `[1 00:00:51]`	"No G1 (Minor) or greater geomagnetic storms are expected", with Kp at most 2.67 forecast for November 19 `[11 Nov. 19, 0030 UTC]`	Holds

Our analysis, under rules written before the script ran on the flare list, the Kp files, the solar wind and the list of ejections; they say what we had already read. The script and its inputs are in section 11. NOAA's solar-wind data are real-time, not of science quality. The hourly means here count every hour with data; the script's output counts only hours with at least 30 good minutes, a rule set in the script, which leaves out two hours, both of about 436 km/s (22 UT on November 18 and 09 UT on November 19).

Kp, three hours at a time, November 18–19, 2026 OUR ANALYSIS



Drawn by Fact-Checked Science from GFZ's nowcast of Kp, whose values for these days are preliminary and may still change (GFZ Helmholtz Centre for Geosciences, CC BY 4.0) [15], and NOAA's estimated planetary K index [12]; the dashed line is Kp 5, a G1 storm on NOAA's scale [17].

OUR ANALYSIS TRUE

"Quiet Sun, brief minor storm": True

All five tests hold, so the report stands as a whole, with three caveats and one event that came after. "Extremely quiet" is generous: NOAA rated the day's activity "low" `[10 Nov. 19, 1230 UTC]`, the level of C-class flares, and the day before had two M-class flares, an M1.1 at 15:49 and an M1.7 at 21:39 UTC on November 17 [13]. "Calm" is a little generous too: NOAA's discussion expected "Largely unsettled conditions" `[10 Nov. 19, 0030 UTC]`, though its forecast gave no storm and Kp of at most 2.67 `[11 Nov. 19, 0030 UTC]`. Nothing launched in the window was called Earth-directed, but NOAA's modelling had the ejections of November 17–18 likely "to contribute to a potential glancing blow from the filament eruption that left the Sun on 14 Nov, arriving at the near-Earth environment mid-day on 22 Nov" `[10 Nov. 19, 0030 UTC]`, and a "narrow and faint" ejection seen from about 09:24 UTC on November 19 was still being modelled at 12:30 `[10 Nov. 19, 1230 UTC]`. And an hour and a half after the episode went up, the Sun produced an M2.4 flare, at 13:24 UTC [13]. We don't use Kyoto's Dst here: for these days it exists only as a real-time value, which the site doesn't publish.

3 · THE 2014 PAPER

A 2014 model offered oxygen escape in reversals as "a possible explanation" of extinctions over millions of years, not a trigger

"For the second time in a week, let's lay this foundation." `[1 00:00:51–00:00:57]` As on November 13, the 2014 paper that fits is Yong Wei and colleagues' study of oxygen escape during reversals of the field [5], here named by its year.

What Wei and colleagues proposed

That oxygen escaping to space during the many reversals of some geological periods could have lowered the air's oxygen and helped cause mass extinctions that unfolded over millions of years `[5 p. 94]`. They tested it with an escape model made for Mars and a reversing field built by "reducing the dipole term to zero" `[5 p. 96]`. In their model a reversal raised oxygen escape "by 3–4 orders only if the magnetic field was extremely weak" `[5 p. 94]`. Later models disagree. Some find the field's strength changes escape only two- to threefold (our review of November 13); the 2026 model the episode cites finds hundreds of times more escape at a tenth of today's dipole, though from a present-day rate far below what satellites measure (section 7).

In the authors' words

> *"We propose that accumulated oxygen escape during an interval of increased reversal rate could have led to the catastrophic drop of oxygen level, which is known to be a cause of mass extinction."*
>
> Wei et al. (2014) `[5 p. 94]`

> *"This suggests that our hypothesis could be a possible explanation of a correlation between geomagnetic reversals and mass extinction. Therefore, if this causal relation indeed exists, it should be a 'many-to-one' scenario rather the previously considered 'one-to-one'"*
>
> Wei et al. (2014) `[5 p. 94]`

> *"Thus our hypothesis is a possible explanation."*
>
> Wei et al. (2014) `[5 p. 97]`

OUR ANALYSIS OVERSTATED

"2014: an extinction trigger": Overstated

The claim has a basis: a peer-reviewed paper of 2014 proposed that oxygen escape in reversals could help explain extinctions `[5 p. 94]`. But the episode states as a finding what its authors offered as a hypothesis, "a possible explanation" `[5 p. 97]`, "if this causal relation indeed exists" `[5 p. 94]`. Even the 2026 paper that revisits the idea hedges it: such loss "could even trigger" a catastrophic oxygen decline, "potentially" linked to extinctions `[4 §1 ¶3, p. 2]`; and in Wei and colleagues' version it is the sum of escape over many reversals, "many-to-one" `[5 p. 94]`. Their surge needs a field with no dipole at all `[5 p. 96]`. The 2014 date and the journal are right.

"Super floods", already rated
"We discussed it and the potential for it to contribute to super floods." `[1 00:01:03–00:01:07]` The same idea is rated False as "Leaking oxygen makes floodwater" on our review of November 13: no known process there makes water from escaping oxygen, and all of it as rain would be a vanishing amount. Wei and colleagues say nothing about the escaping oxygen making water, or about floods [5]. We don't rate it again.

"10 years to the week"
"the May 2024 solar storm, which was 10 years to the week after that first paper came out" `[1 00:01:10–00:01:15]`. To the week, if the print issue counts: volume 394 is dated 15 May 2014 in the publisher's PDF [5], four or five days short of ten years before the storm of May 10–11, 2024; the paper had gone online six weeks earlier, on April 1, 2014 `[5 p. 94]`. Not rated.

"A hole in the top of the sky"
"poked a hole in the top of the sky" `[1 00:01:15–00:01:18]` is a figure of speech, and we don't rate it. The nearest things it could mean: the storm eroded the edge of Earth's magnetic field, a process its observers describe as "allowing solar wind penetration close to the Earth", and pushed it in to 4.96 Earth radii, "one of the innermost magnetopause crossings ever detected by magnetospheric spacecraft" `[9 Abstract]`, in a paper S0 News linked on November 8; or the oxygen-rich ring current, which the November 13 episode called a leak. Neither is a hole: an eroded magnetopause is the field's edge pushed in, and the ring current's ions were held near Earth by its field, as our check of the oxygen-ion paper sets out.

4 · THE 40%

Arase saw the field 40% below the standard model, near Earth, for hours: the storm's own ring current pushing it aside

"the erase data is in showing how in the critical zone the Earth's magnetic field dropped 40% during the solar storm event." `[1 00:01:25–00:01:33]` The number comes from the paper behind the release the episode links, and the paper says where, when and why.

What Arase measured

"The magnetic field intensity observed with the magnetic field experiment (MGF) … decreased by ~40% compared with that calculated using the International Geomagnetic Reference Field (IGRF) 14th model … even close to the Earth (L_M ~ 3 R_E, just outside of the peak of O^+ energy densities in Orbits 2 and 3)" `[3 Results, p. 5]`. L_M ~ 3 is the field line that crosses the magnetic equator three Earth radii from Earth's centre, about 12,700 km up (our conversion) `[19]`.

Why

The ring current, the band of charged particles that swells around Earth in a storm, was packed with oxygen ions from Earth's upper atmosphere, and its pressure exceeded the field's: the ions "had sufficiently high pressure to deform the background magnetic field even close to the Earth in the afternoon magnetic local time sector" `[3 Results, p. 5]`. The abstract puts it plainly: "the super-intense ring current penetrated close to the Earth, strongly deforming the local geomagnetic field" `[3 Abstract]`.

BELOW THE MODEL
~40%
of the standard model of Earth's internal field, IGRF-14, near three Earth radii `[3 Results, p. 5]`

WHEN
Hours
on Arase's passes from 02:36 to 04:09 UTC on May 11, just after the storm's peak, and from 10:54 to 13:40 UTC `[3 Results, p. 4]`

AT THE GROUND
OUR ANALYSIS
1.7%
SYM-H's −518 nT `[3 Introduction, p. 1]` against an equatorial surface field of 31,100 nT `[4 §2, p. 3]`

OUR ANALYSIS

Where, when and how much

In the paper's Figure 4, the ratio of the measured field to the model sits near 0.6 from about 2.6 to 3.5 Earth radii; only the later pass reaches 0.6 at 3.5, where the pass just after the peak is about 0.8, and the pass as the storm began is about 0.9 or more `[3 Fig. 4]`. That is our reading of the figure by eye, not a digitization. At the magnetic equator three Earth radii out, a dipole's field is about 1,150 nT, so 40% of it is some 460 nT, about the size of the storm's whole effect at the ground, where the field is 27 times stronger. Those figures use Wang and colleagues' reference for today's field, 31,100 nT at the equator `[4 §2, p. 3]`; today's dipole in IGRF-14, 7.69 × 10^{22} A m² by the series of our guide to the field, or about 29,700 nT at the equator (our conversion), gives about 1,100 and 440 nT, and 1.74% at the ground. The university's release puts the dip "at roughly 16,000 kilometers above Earth" `[2]`, three and a half Earth radii from Earth's centre: the outer end of the dip in the figure, on the later pass. No later pass is reported; a storm's ring current fades over days, and the dent with it.

OUR ANALYSIS MISLEADING

"Field dropped 40% in the storm": Misleading

Read word by word, the sentence is accurate: the field at the spacecraft fell about 40% during the storm `[3 Results, p. 5]`. But it comes as "the first update to this story that Earth's oxygen leak in this magnetic pole shift has begun" `[1 00:01:18–00:01:23]`, under the link "40% Field Loss During Oxygen Leak" `[1]`, and leaves out what the paper says about it. It was not Earth's own field that weakened: the standard model of that field, IGRF-14, is the baseline the dip was measured against `[3 Results, p. 5]`, and the dipole is about 9% weaker than in 1840 (our guide to the field). It was the storm's doing, not its cause; it lasted hours; and the paper says nothing of reversals, excursions or the field's decline (our check of the paper). "In the critical zone" isn't the paper's phrase: it says "even close to the Earth". On November 13 the episode blamed the storm's effects on a weak Earth field; our check of the paper rated that False as "A weak field, not a big punch", noting that "The one weakened field in the paper, about 40% below the standard model near Earth, was the ring current's own doing."

Our check of Kitamura et al. (2026)

WHAT IT IS

A peer-reviewed article in *Science Advances*, published June 26, 2026, open access under CC BY 4.0: the Arase satellite's measurements of the ring current's ions during the May 2024 storm [3]. The paper behind the release the episode links as "40% Field Loss During Oxygen Leak" [2].

WHAT THE EPISODE SAID

"the erase data is in showing how in the critical zone the Earth's magnetic field dropped 40% during the solar storm event." `[1 00:01:25–00:01:33]`

WHAT OUR CHECK FOUND

The measurements hold: near the peak, heavy ions from Earth carried over 85% of the ring current's energy, beyond the earlier storms measured, and solar-wind ions at most 15%. The paper credits the Sun's driving and the ionosphere's supply, and the field's dent to the ring current. It measures no escape; a generous bound on what the storm sent to space is 8,000 tonnes.

In Earth's oxygen ions dominated May 2024's ring current, a record; the air lost almost none: "An unprecedented Earth-ion share" True; "Solar wind ions under 15%" True; "Ionosphere supplied, Sun powered" True; "Earth's oxygen started leaking" Misread; "A weak field, not a big punch" False. The first three are the paper's own claims; the last two are the episode of November 13's.

5 · THE FOURTH BELT

The dent went with a loss of electrons, not a gain, and the fourth belt formed in late May, from electrons injected deep

"This also hints at the fourth ring that appeared during the storm as it is what drove those extra electrons like we reported just 3 days ago." `[1 00:01:33–00:01:40]` Three papers on the same storm's electrons say otherwise.

What the dent did to electrons

It flattened the field's fall-off with distance, so that energetic electrons "are efficiently transported to the magnetopause and are expected to be lost from the magnetosphere". "Consistent with this expectation, Arase did observe a reduction (almost disappearance) in the fluxes of the energetic electrons in the radiation belt (>1 MeV)" beyond 3.5 Earth radii `[3 Discussion, p. 5]`. The university's release is more cautious: "Whether the magnetic field deformation caused the electron loss warrants further investigation." `[2]`

When the four belts formed

The Comment the episode reported on November 16 describes "the four electron belts observed during June 2024", after the storm of May 11 `[6 p. 1]`. Its authors' 2026 paper dates them from "around 22 May" `[7 p. 4]`; our count of their data finds all three slots together from May 30, the slot that makes the fourth belt lasting to June 27. Not during the storm.

What made the extra electrons

The fourth belt's authors put it down to "the penetration of the fluxes at very low L" `[7 p. 21]`: electrons injected deeper than usual. The storm did make new multi-MeV electrons inside the belts' barrier: "chorus waves locally accelerated electrons to multi-MeV energies deep inside this barrier" `[8 p. 1]`, as our check of that paper sets out. None of the three ties extra electrons to the dent.

OUR ANALYSIS MISREAD

"Field drop made the 4th belt": Misread

The episode draws on the Arase paper for electrons that paper doesn't report, and reverses what it does: the dent went with electrons lost, beyond 3.5 Earth radii, during the storm `[3 Discussion, p. 5]`, and the paper's abstract says it led "to the loss of radiation belt electrons from the near-Earth region" `[3 Abstract]`. The fourth belt formed in the weeks after `[7 p. 4]`, and its own authors credit injection to low L `[7 p. 21]`; the storm's new multi-MeV electrons, inside three Earth radii, are credited to chorus waves `[8 p. 1]`. "Hints at" softens the link, but "it is what drove those extra electrons" states it, and nothing we found supports it. A False would be defensible too, on the timing alone; we rate the misreading of the paper the episode relies on.

Our check of Pierrard et al. (2026)

WHAT IT IS

A Comment in *npj Space Exploration*, published November 16, 2026, under CC BY-NC-ND 4.0: four electron belts seen from the PROBA-V satellite after the storm of May 2024 [6]. The link of S0 News of November 16, "4th Radiation Belt".

WHAT THE EPISODE SAID

"This also hints at the fourth ring that appeared during the storm as it is what drove those extra electrons like we reported just 3 days ago." `[1 00:01:33–00:01:40]`

WHAT OUR CHECK FOUND

Four belts did form, in late May and June 2024, in the authors' own data; three-belt structures had been seen dozens of times before. Nothing in the Comment or its sources ties the belts to a failing field.

In Four electron belts did form after May 2024; three belts had been seen dozens of times: "Four belts after May 2024" True; "First-ever four electron belts" Overstated; "Three belts only once, in 2012" False; "Three belts after later storms" True; "None in the 2014–2015 storms" Misleading; "Likely hiss, maybe transmitters" Unsupported. All six are the Comment's claims; the episode of November 16 had no transcript, so it wasn't rated.

6 · "IT HAS BEGUN"

The same claims as on November 13, and the same verdicts: no leak has begun, and no excursion is under way

"The first update to this story that Earth's oxygen leak in this magnetic pole shift has begun" `[1 00:01:18–00:01:23]`; "After the 2014 paper, we said to watch for it. It has begun." `[1 00:02:08–00:02:11]`; "Confirmation that the oxygen leak has begun with an electron leak to boot." `[1 00:02:31–00:02:33]`

OUR ANALYSIS MISREAD

"Earth's oxygen started leaking": Misread

The sources the episode leans on don't report a leak that has begun. The oxygen-ion paper measured ions lifted from the upper atmosphere and held around Earth by its field, "an unprecedented dominance of heavy ions originating from the Earth" in the ring current `[3 Abstract]`, and gives no escape rate (our check of the paper); the university's release speaks of ions that "escape into the magnetosphere" `[2]`, where the field holds them, not into space. The new paper models fields of the deep past under fixed conditions `[4 Abstract, p. 1]` and says nothing about the field's weakening today or about a leak now. Earth loses about 0.5–2 kg of its atmosphere a second to space, and has lost gas to space throughout its history, and a generous bound on what the May 2024 storm sent to space is 8,000 tonnes, eight seconds of the air's measured oxygen decline, as our check of the oxygen-ion paper and our review of November 13 set out. "An electron leak to boot" adds the storm's loss of trapped radiation-belt electrons `[3 Discussion, p. 5]`. Such losses come with strong storms: super storms, the same paper notes, are typically accompanied by "the disappearance and reformation of the electron radiation belt" `[3 Introduction, p. 1]`. The electrons are the magnetosphere's, not the air's.

OUR ANALYSIS FALSE

"An excursion is under way now": False

Here "this magnetic pole shift" and "It has begun" presuppose a reversal or an excursion of the field under way now. In an excursion the field's pole strays more than about 45° from the geographic pole, with the dipole at about half today's strength. Today the dipole's axis is tilted 9.2°, down from 11.4° in 1900, and the dipole is about 40% stronger than its average over the last two million years. It is weakening, slowly: about 9% weaker than in 1840, about 5% a century; our guide to the field gives the sources. The same claim is rated False on our reviews of November 13, November 9 and October 22 and in our guide. Nothing has changed since.

Our review of S0 News of November 13

WHAT IT IS

Our evidence review of the episode whose top story this one updates, built on the same oxygen-ion paper [3] and the 2014 paper [5].

WHAT OUR REVIEW FOUND

The storm filled near-Earth space with Earth's own oxygen ions, as big storms do; what escapes is far too little to change the air or make a flood, and no pole shift is under way.

In S0 News, November 13, 2026: Earth's oxygen leak is old and tiny, and can't make a flood: "Earth's oxygen started leaking" Misread; "An excursion is under way now" False; "Oxygen loss surges in reversals" Overstated; "Leaking oxygen makes floodwater" False; "New paper explains mechanisms" Misread; "All predictions have come due" False.

7 · THE NEW PAPER

A careful model of ancient fields, under fixed conditions, with an escape rate for today hundreds to thousands of times below what satellites measure

"only for the Astrophysical Journal to come out and say that, yeah, that is exactly how it works. The magnetic pole shifts are how this happens." `[1 00:01:58–00:02:08]` "And this paper confirms why it works." `[1 00:02:14]` Our check of the paper reads it in full; here, in brief.

What the paper did

Ming Wang and nine colleagues ran a global model of the plasma around Earth, tracing hydrogen and oxygen ions, "Under typical solar wind conditions" `[4 Abstract, p. 1]`, held fixed while they varied the strength and tilt of a dipole field `[4 §2, p. 3]`. As the field weakens, escape rises steeply, and "below 10^{-2}, it approaches saturation at ~10^{25}–10^{26} s^{-1}, limited by the ionospheric source"; tilt gives "secondary modulation"; in a reversal, "the collapse of the dipole moment — rather than the dipole tilt — drives heavy-ion escape upward by 1 to 2 orders of magnitude" `[4 Abstract, p. 1]`.

How strong, in the authors' words

For today's field the model gives "an O^+ escape flux of ~5.76 × 10^{21} s^{-1} … which is 2 to 3 orders of magnitude lower than previous observational estimates" `[4 §3 ¶5, p. 5]`, and the authors "emphasize that the relative variation of O^+ escape with geomagnetic dipole strength, and tilt, rather than the absolute rate, constitutes the robust result of this study" `[4 §3 ¶5, p. 5]`. They discuss why, among other things how escape is defined and where it is counted.

OUR ANALYSIS OVERSTATED

"Confirms the pole-shift leak": Overstated

The claim has a basis: a peer-reviewed model finds that a much weaker field lets far more oxygen escape `[4 Abstract, p. 1]`. But it is one model, of fields the Earth had long ago, under fixed solar wind, and its authors call only the relative change robust `[4 §3 ¶5, p. 5]`. Its escape for today's field, about 0.15 g a second, is hundreds to thousands of times below every measured rate, so, taken at face value, even its plateau with almost no field is below what Earth loses now, and the peak of its reversal path is about 60 times below today's measured mean, on our check of the paper. Applied instead to the escape measured today, as its authors' emphasis on the relative change would suggest, its rise would still remove only 0.07–0.17% of the air's oxygen in a 10,000-year collapse of the field, at most about 66 years of today's measured decline (our check of the paper). That check also sets it beside other models that find the field matters far less. It says nothing about the field's weakening today or about a leak now; its present-day runs give rates far below what satellites measure, and today's field is nowhere near an excursion (section 6). "Exactly how it works" and "confirms" claim much more than that.

Two more sentences, rated on our check of the paper

"It's both the weakness of the field and the tilt angle that contributes to the oxygen loss." `[1 00:02:17–00:02:21]` rated Partly true there, as "Both a weak field and the tilt". In the model the field's strength dominates and tilt is secondary, and at a tenth of today's dipole more tilt meant less escape. "Confirmation that this is how the oxygen leak extinction events began." `[1 00:02:27–00:02:29]` rated Misread, as "Shows how extinctions began": the paper mentions extinction once, in a hedged sentence of its own in the introduction, after describing Wei and colleagues' proposal `[4 §1 ¶3, p. 2]`, and computes no oxygen budget. See our check of the paper; we don't rate them again.

"Snuck into publication undetected"

"this one snuck into publication undetected" `[1 00:01:46–00:01:56]`. The paper was published on November 16, 2026, three days before the episode, after its acceptance on October 16 `[4]`; its simulation data were archived on October 8 `[20]`. It was simply new. Not rated.

Our check of Wang et al. (2026)

WHAT IT IS

A peer-reviewed article in *The Astrophysical Journal*, published November 16, 2026, open access under CC BY 4.0: a multifluid model of oxygen-ion escape from ancient Earth under fixed solar wind, as the dipole's strength and tilt change [4]. The episode's link "Pole Shift Oxygen Leak Confirmed" [1].

WHAT THE EPISODE SAID

"only for the Astrophysical Journal to come out and say that, yeah, that is exactly how it works. The magnetic pole shifts are how this happens." `[1 00:01:58–00:02:08]`

WHAT OUR CHECK FOUND

A careful model: as the field weakens its escape rises steeply, and tilt matters less. But its rate for today's field is hundreds to thousands of times below what satellites measure, so, taken at face value, even its rates with almost no field are below what Earth loses now, and its rise would remove 0.07–0.17% of the air's oxygen in a 10,000-year collapse of the field; it says nothing about the field's weakening today or about a leak now.

In our check of the paper: "In this model a weak field lets out far more oxygen, yet only a sliver of the air's": "Weak dipole, more escape model" True; "Far below measured escape today" True; "Reversals as windows of loss" Partly true; "Confirms the pole-shift link" Overstated; "Both a weak field and the tilt" Partly true; "Shows how extinctions began" Misread. The first three are the paper's own claims; the last three are the episode's.

8 · THE UNIVERSITY'S RELEASE

The release reports the paper fairly, with three loose phrases

The episode's link "40% Field Loss During Oxygen Leak" is Nagoya University's release of June 27, 2026, the day after the paper [2] [3]. It says nothing of oxygen leaving Earth, the field's decline or a fourth belt. Here is what it says beside the paper; these are the release's words, not a finding about the authors' data, which our check of the paper confirms.

What the university's release says

THE RELEASE SAYS [2]	THE PAPER SAYS	OUR READING
"approximately 85% of ions were oxygen from Earth's own ionosphere", quoting the lead author	"overwhelmingly dominated (>85%) by terrestrial-origin heavy ions (O^+, O^{2+}, and molecular ions) in energy density" near the peak `[3 Discussion, p. 6]`; about 90% and 70% on the two passes `[3 Results, p. 4]`	A share of the ring current's energy, not of its ions by number, which the paper doesn't give; and of all Earth's heavy ions, molecular ones included, not oxygen alone
"the first simultaneous observation of ring current ions and solar wind during a storm this large"	"As the first opportunity to our knowledge to provide observational evidence on this issue" `[3 Introduction, p. 2]`, with the solar wind measured almost throughout `[3 Results, p. 2]`	Holds
"No geomagnetic storm this powerful had ever been measured in the Earth's ring current region"	"In situ observations of the ring current during magnetic storms of this magnitude are an unexplored frontier" `[3 Introduction, p. 1]`	Holds
"the first direct measurements of ring current composition from a super geomagnetic storm"	Two earlier storms below −250 nT were measured with the ions told apart, in February 1986 and March 1991 `[3 Introduction, pp. 1–2]`	True only of a storm this large
"−518 nanotesla, the second-largest value recorded since 1981"	The same `[3 Introduction, p. 1]`	Holds
"The last comparable geomagnetic storm was the November 2004 superstorm"	Not in the paper	Holds on Kyoto's final Dst: November 8, 2004, at −374 nT, was the last storm below −250 nT before May 2024 `[18]`
"a 40% decrease in magnetic field intensity at roughly 16,000 kilometers above Earth"	"~40% … even close to the Earth (L_M ~ 3 R_E)" `[3 Results, p. 5]`	Roughly: three Earth radii out is about 12,700 km up, and 16,000 km is the outer end of the dip in the paper's Figure 4, on the later pass (section 4)
"much closer to Earth than similar large decreases previously documented"	Deformations were known "far from the Earth", where the field is weak; near Earth "it is difficult to significantly deform the magnetic field" `[3 Results, p. 5]`	A fair paraphrase
"Whether the magnetic field deformation caused the electron loss warrants further investigation."	The abstract: "driving unusual outward transport of electrons, which led to the loss"; the text: "Consistent with this expectation" `[3 Abstract]` `[3 Discussion, p. 5]`	More cautious than the abstract, in line with the text

The release also says Arase crossed the ring current "just after the storm began, and again near its peak"; the paper adds a third pass, eight hours later `[3 Results, p. 4]`.

9 · WHAT IT GETS RIGHT, AND WHAT TO WATCH

Real measurements, read as a pole shift they don't show

The episode's numbers are often right; its frame is not.

OUR ANALYSIS

What the episode gets right

The Sun was quiet and a brief minor storm did crop up from a weak coronal-hole stream (section 2). The field near Earth did fall about 40% below the model in the May 2024 storm `[3 Results, p. 5]`, and the storm did remove electrons from the radiation belt `[3 Discussion, p. 5]`. A fourth belt did form afterwards `[6 p. 1]`, and a 2014 paper did propose oxygen escape in reversals as a cause of extinctions `[5 p. 94]`. The new paper does find escape rising steeply as a field weakens `[4 Abstract, p. 1]`. What the evidence doesn't support is the step from these to a leak that has begun, a pole shift under way, or a paper that confirms either.

What would change these verdicts

01
A measurement of oxygen escaping to space faster than before with today's field, as distinct from storms; or field models showing the dipole's axis or strength moving toward an excursion.

02
A study tying the ring current's dent in the field to the fourth belt's electrons, or showing the belt formed during the storm itself.

03
The video's own graphics: if they showed something the transcript doesn't carry, a verdict that rests on what was shown could change.

10 · LIMITS

What this check could and couldn't settle

A transcript, not the video

We quote the automatic transcript and haven't seen the graphics; where the episode points at a picture, we can't tell what was shown [1].

Real-time space-weather data

The solar-wind records and GFZ's Kp for these days are real-time or preliminary and may be revised [14] [15]; the forecasts and alerts are as issued [10] [11] [12].

A figure read by eye

Where the dip ran along Arase's path is our reading of the paper's Figure 4, not a digitization `[3 Fig. 4]`; we chart no Arase data, as the mission's rules ask (see our check of the paper).

Other pages' numbers

The oxygen budget, the belts' dates and the new paper's rates against measured escape are those of our checks of the papers, which show their work.

11 · HOW WE WORKED IT OUT

Rules first, one script for the space weather, and arithmetic for the dip

The space-weather tests are the only analysis with an outcome to decide; we wrote their rules down first. The dip's conversions are arithmetic from published numbers.

STEP 1
Rules first
We wrote the window, the five tests and what would count as holding into a rules file, logged its checksum, and listed what we had already read, before the script ran.

STEP 2
Fetch and run
We fetched NOAA's, GFZ's and SIDC's files under a plain client name and ran the tests on them [10]–[16].

STEP 3
Extracts
Because those files roll over, the page hosts extracts of what we used; its script reproduces every number of the registered run from them.

STEP 4
Conversions
A second small script turns L into height [19] and the 40% into nanotesla in a dipole of 31,100 nT `[4 §2, p. 3]`.

Code and numbers

- PY **space_weather.py** The five tests, with commands to fetch the original files and to rebuild the extracts from them; standard library only · 21 KB
- CSV **goes18-flares-2026-11-12-19.csv** · **kp-2026-11-17-19.csv** GOES-18's flare list for November 12–19, and Kp from GFZ (CC BY 4.0) and NOAA for November 17–19 · 7 KB and 1 KB
- CSV **solar-wind-hourly-2026-11-17-19.csv** · **cactus-cmes-2026-11-14-19.csv** Our hourly means of NOAA's real-time solar wind, and CACTus's list of ejections · 6 KB and 2 KB
- CSV **swpc-alerts-2026-11-18-19.csv** · **swpc-3day-2026-11-19-0030.json** NOAA's alerts of November 18–19, their key lines, and its 3-day forecast of 00:30 UTC on November 19 · 1 KB each
- TXT **space_weather.txt** The script's output, tests T1–T5 · 4 KB
- PY **field_numbers.py** · **field_numbers.txt** The dip's conversions and their output; standard library only · 1 KB each
- TXT **RULES_sun.txt** · **RULES_field.txt** The rules, as written before the runs, with what we had already read · 4 KB and 1 KB
- TXT **HASHES.txt** SHA-256 of the rules, the inputs, the scripts and the outputs, in the order they were made · 5 KB

Run it

It needs only Python 3.9 or later. In a folder with the script and the extracts, `python3 -I space_weather.py run` prints the five tests from the extracts. `python3 -I space_weather.py fetch inputs` downloads the original files into `inputs` and says whether each matches our copy, and `python3 -I space_weather.py extract inputs out` rebuilds the extracts from them; NOAA's seven-day lists, alerts and real-time files and GFZ's nowcast roll over or are revised, so later copies differ from ours. `python3 -I field_numbers.py` `field_numbers.txt` writes the conversions.

Related checks

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

Sources

Bracketed numbers refer to this list. For the episode [1], times are positions in the video (hours:minutes:seconds), from the first to the last line of its automatic transcript that holds the words quoted, rounded down to the second; a bare [1] is the episode as a whole or its description. For Kitamura et al. [3], Abstract, Introduction, Results and Discussion name its sections, followed by a page of its typeset PDF, as on our review of November 13, and Fig. gives a figure. For Wang et al. [4], § and ¶ count the paper's sections and paragraphs as IOP's article page and its PDF show them, and p. gives a page of its PDF. For the other papers, p. gives a page as printed and Abstract the abstract. For NOAA's products [10]–[13], the locator names the issue by its date and time. A bare number is the source as a whole, as for the university's release [2], which has no page numbers. Times are UTC. We read the sources on November 19, 2026, except those marked as read for earlier pages. Links checked November 19, 2026.

1. SpaceWeatherNews (S0) (November 19, 2026). Magnetic Pole Shift Sky-Sign Confirmation | S0 News Nov.19.2026. YouTube video, https://www.youtube.com/watch?v=-gf8P-YjrmQ, published 11:59:19 UTC, with the two links of its description as the site's collector recorded them on November 19, 2026. Quoted from the automatic transcript pasted by the site's owner; times are positions in the video. We did not see the video's graphics.
2. Nagoya University (June 27, 2026). Earth's ionosphere supplied vast majority of ring current ions during May 2024 super geomagnetic storm, study finds. Press release, dated 2026/06/27 on its page; the episode's link "40% Field Loss During Oxygen Leak". Read in full on November 19, 2026. No licence is stated, so it is quoted briefly and not hosted.
3. Kitamura, N., Yamamoto, K., Yokota, S., and 17 others (2026). Extreme dominance of Earth-origin heavy ions in the intense ring current near the Earth during the May 2024 super geomagnetic storm. *Science Advances* 12(26), eaee1069, published June 26, 2026. CC BY 4.0, by its own statement. Peer reviewed. Read in full, in Europe PMC's text (PMC13308607) with its figures, and in its typeset PDF, which the site's owner supplied on November 13, 2026, for the page numbers; checked in full on our check of the paper.
4. Wang, M., Li, J., Xie, L., Lu, J., Wei, G., Du, K., Yuan, Y., Zhao, K., Ding, L., and Li, L. (2026). A Numerical Investigation of Oxygen Ion Escape from Ancient Earth: Influences of Magnetic Dipole Moment and Dipole Tilt Angle. *The Astrophysical Journal* 1012(1), 79. Received August 25, accepted October 16 after revision, published online November 16, 2026, in the issue of November 20. CC BY 4.0. Peer reviewed. Read on the publisher's article page, which carries the full text, and checked in its typeset PDF, which the site's owner supplied; the two have the same sections and paragraphs. The episode's link "Pole Shift Oxygen Leak Confirmed", checked in full on our check of the paper.
5. Wei, Y., Pu, Z., Zong, Q., Wan, W., Ren, Z., Fraenz, M., Dubinin, E., Tian, F., Shi, Q., Fu, S., and Hong, M. (2014). Oxygen escape from the Earth during geomagnetic reversals: Implications to mass extinction. *Earth and Planetary Science Letters* 394, 94–98. Received November 19, 2013, accepted March 10, 2014, "Available online 1 April 2014"; the print issue, volume 394, is dated 15 May 2014 in the publisher's PDF, its cover date (Crossref's record gives the month only). CC BY 3.0. Peer reviewed. Read in full, from a copy the site's owner downloaded because ScienceDirect refuses our client, as for our review of November 13. p. gives a page as printed.
6. Pierrard, V., Winant, A., Botek, E., Benck, S., and Borisov, S. (2026). Exceptional observation of multiple electron radiation belts after the 11 May 2024 geomagnetic storm. *npj Space Exploration* 2, 43, a Comment, published November 16, 2026. CC BY-NC-ND 4.0: quoted only. As read in full for our check of the Comment; the link of S0 News of November 16, 2026, "4th Radiation Belt".
7. Pierrard, V., and Winant, A. (2026). Atmospheric Loss of Energetic Electrons and Protons from the Radiation Belts After the Exceptional Injection of the 11 May 2024 Superstorm Leading to Four Electron Belts. *Atmosphere* 17(3), 324. CC BY 4.0. As read in full for our check of the Comment, from a copy the site's owner supplied. p. gives a page as printed.
8. Miyoshi, Y., Kurita, S., Shinbori, A., and 17 others (2026). Local Acceleration of Multi-MeV Electrons Inside Earth's Impenetrable Barrier During the May 2024 Superstorm. *Geophysical Research Letters* 53(20), e2026GL125879. CC BY 4.0. Peer reviewed. As read in full for our check of the paper; its key points are on p. 1.
9. Yamamoto, K., Miyoshi, Y., Kitamura, N., and 16 others (2026). Intense magnetopause erosion at Earth during the May 2024 solar storm. *Geophysical Research Letters* 53, e2026GL125027. CC BY 4.0. Abstract only, as deposited with Crossref and read for our review of November 13. S0 News linked it on November 8, 2026.
10. NOAA Space Weather Prediction Center (November 18–19, 2026). Forecast Discussion, the issues of November 18 (1230 UTC) and November 19 (0030 UTC, the last before the episode, and 1230 UTC, after it), from the Center's archive (ftp.swpc.noaa.gov, pub/forecasts/discussion/). Read November 19, 2026. A work of the US government.
11. NOAA Space Weather Prediction Center (November 19, 2026). 3-Day Forecast, the issues of 0030 and 1230 UTC, from the Center's archive (pub/forecasts/three_day/). Read November 19, 2026. A work of the US government.
12. NOAA Space Weather Prediction Center. Alerts, watches and warnings (alerts.json) and the estimated planetary K index (noaa-planetary-k-index.json), copies of November 19, 2026, 16:36 UTC; the files roll over, so the lines we used are hosted in section 11. A work of the US government.
13. NOAA Space Weather Prediction Center. GOES-18 X-ray flare list, last 7 days (November 12, 20:12, to November 19, 13:59 UTC), copy of November 19, 2026, 16:36 UTC, hosted in section 11; and the Edited Events for November 18 and 19 (pub/indices/events/), for the flares' regions. A work of the US government.
14. NOAA Space Weather Prediction Center. Real-time solar wind: the one-minute ACE lists of plasma (SWEPAM) and field (MAG) for November 17–19, from the Center's archive (pub/lists/ace/), and the RTSW files of the last 24 hours (json/rtsw/), read November 19, 2026, 16:37 UTC. Real-time data, not of science quality; NASA's OMNI record doesn't yet cover these days. Our hourly means are hosted in section 11. A work of the US government.
15. Matzka, J., Bronkalla, O., Tornow, K., Elger, K., and Stolle, C. (2021). Geomagnetic Kp index. GFZ Data Services. CC BY 4.0: the nowcast file Kp_ap_nowcast.txt of the GFZ Helmholtz Centre for Geosciences, copy of November 19, 2026, 16:36 UTC, whose values for November 17–19 are preliminary. Our extract is hosted in section 11.
16. Solar Influences Data Analysis Center (SIDC), Royal Observatory of Belgium. CACTus: CMEs detected in SOHO/LASCO C2 and C3 images, the list issued November 19, 2026, 13:54 UTC. Our extract is hosted in section 11.
17. NOAA Space Weather Prediction Center. NOAA Space Weather Scales, read November 19, 2026: a G1 (minor) geomagnetic storm is Kp 5. A work of the US government.
18. Nose, M., Iyemori, T., Sugiura, M., Kamei, T., Matsuoka, A., Imajo, S., and Kotani, T. (2015). Geomagnetic Dst index [data set]. World Data Center for Geomagnetism, Kyoto. Final hourly values to December 2020 and provisional ones to September 2026, as read for our check of the Comment on November 16, 2026, under the WDC's data usage rules: scientific use, no commercial use, with acknowledgement of the WDC and of the observatories that supply the data. No real-time value is used.
19. NASA Space Science Data Coordinated Archive. Earth Fact Sheet, for Earth's mean radius, 6,371.0 km, as read for our review of November 13. A work of the US government.
20. Wang, M. (2026). Simulation data for: A Numerical Investigation of Oxygen Ion Escape from Ancient Earth: Influences of Magnetic Dipole Moment and Dipole Tilt Angle. Science Data Bank, CC BY 4.0. Record only: DataCite's record, read November 19, 2026, gives it as issued on October 8, 2026.

METHOD

How this was checked

On November 19, 2026, we checked every statement, number and quotation on this page against its source: S0 News of November 19, through the automatic transcript pasted by the site's owner, quoted verbatim with its timestamps, and its description's two links [1]; the university's release, read in full [2]; the full text of the oxygen-ion paper behind it, with its figures [3]; the new paper on oxygen escape, on its publisher's page and in its PDF [4]; the 2014 paper, read in full [5]; three papers on the storm's electrons, as read for our earlier checks [6] [7] [8]; and, for the episode's space-weather report, three of NOAA's forecast discussions, two 3-day forecasts, its alerts, flare list, event lists and real-time solar wind, GFZ's Kp and CACTus's list of coronal mass ejections [10]–[16]. In all, 20 sources. The new paper, the oxygen-ion paper, the electron belts and the November 13 episode are checked on their own pages, and their verdicts appear here on cards.

The verdicts and the items tagged "Our analysis" are our own assessment, built on the cited sources: our five tests of the space-weather report and our conversions of the field's dip. Several verdicts restate or follow the site's other checks, and say so: "Earth's oxygen started leaking", from our check of the oxygen-ion paper and our review of November 13; "An excursion is under way now", from our guide to the field and earlier reviews; "Confirms the pole-shift leak", from our check of the new paper, which also rates two more of the episode's sentences, reported here with a link; and the reading of the fourth belt and the inner-belt electrons, from our checks of those papers.

What was re-run: the five space-weather tests, from rules written before the script ran on the flare list, the Kp files, the solar wind and the CME list, which say what we had already read; the page's script reproduces them from the extracts it hosts. The conversions of the field's dip are arithmetic from published numbers. What couldn't be checked: the episode's graphics, which we didn't see; and Kyoto's Dst for November 18–19, which exists only as a real-time value, which the site doesn't publish. Our reading of the oxygen-ion paper's Figure 4 is by eye, not digitized.

After the page was built, a fresh reviewer who hadn't seen the drafting re-checked it against its sources: it re-found every quotation and locator, and recomputed the page's numbers in separate code, the space-weather tests, the conversions of the field's dip and the dates. Its findings were applied. Among them: the peak of the new paper's reversal path is now given as about 60 times below today's measured mean; the later models' disagreement about the field's role is stated both ways, since the new model finds a far larger relative effect; the 2014 paper's print issue is dated from the publisher's own PDF, which bears out "to the week"; the new paper is said to say nothing about the field's weakening today, rather than nothing about today; and the November 13 episode is no longer credited with reading the dent as a weak field.

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.
MISLEADING	Contains something true but leaves a false impression, usually by leaving out key context.
OVERSTATED	Has some basis but claims much more than the evidence supports.
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

Nov 19, 2026 — Published on factchecked.science after a full check against the sources. Built from S0 News of November 19, 2026, through its automatic transcript; the university's release and the oxygen-ion paper behind it, read in full; the new paper on oxygen escape; the 2014 paper; NOAA's, GFZ's and SIDC's records of the Sun and space weather for November 17–19; and our checks of the new paper, the oxygen-ion paper, the electron belts and the episode of November 13. The verdicts are harmonized with those pages: each sentence the pages share has the same label and verdict.

Fact-Checked Science is independent. It isn't affiliated with the channels, presenters or authors whose claims it checks.

Last updated Nov 19, 2026