Fact-Checked Science

EVIDENCE REVIEW · POLE SHIFTS

ECDO's rapid Earth flip runs against measurements of Earth's spin, shape and heat

ECDO, a hypothesis set out online by an author writing as The Ethical Skeptic, says Earth's mantle and crust periodically turn 104° within hours [1][2]. It draws on real observations, but Earth's measured inertia, the speed limit on polar wander and Earth's energy budget all run against it. We checked the infographic that sums it up.

By Fact-Checked Science · Published October 19, 2026

OUR ANALYSIS marks our own reasoning and calculations. The verdicts, the right-hand column of the table in section 3 and the tests in section 5 are also our assessment. Everything else comes from the numbered sources.

Real observations, but the mechanism runs against Earth's measured spin, shape and heat

OUR ASSESSMENT

0.33%
more inertia about today's spin axis than about the equator's axes, making it the stable one; published models of Earth's layers give the mantle and crust alone the same [3][4]

10^{11} ×
too fast: 104° in 6–8 hours, against at most 1–2° per million years for the pole to wander [5 p. 827]

11 ×
Earth's energy gain in 2013–2022, against all the heat flowing out of its interior [6][7]

ECDO'S CLAIMS

FALSE
"least dense, maximum inertia – in State 2 becomes the new polar axis"
ECDO, on the axis through two large structures deep in the mantle [8]
Measured from Earth's gravity field, the axis of greatest inertia is today's spin axis [3], and published models of Earth's layers give the mantle and crust alone the same [4]. Models put the deep-mantle structures' axis of least inertia near their centres, which keeps the spin axis about 90° away from them, as today's is, rather than on top of them [5 p. 828]. See section 2.

FALSE
"A six to eight hour Euler rotation"
ECDO's author, on the 104° turn of the mantle and crust [2]
Because Earth's equatorial bulge has to adjust as the axis moves, the pole can wander at most about 1–2° per million years [5 p. 827], some 10^{11} times slower. ECDO's articles give no torque or energy budget for a turn that would move the ground at up to 1,900 km/h. See section 2.

FALSE
"genesis of the majority of observed climate change"
ECDO's author, on heat released by the core [9]
Earth gains about 1 W/m^2 more energy than it radiates, about eleven times all the heat leaving its interior, 0.09 W/m^2, and the rise since the 2000s came from more absorbed sunlight [6][7]. ECDO's chain runs from core heat through the deep ocean to greenhouse gases, but it breaks at the first step: the deep ocean warms most where water sinks from the surface near Antarctica [10]. See section 4.

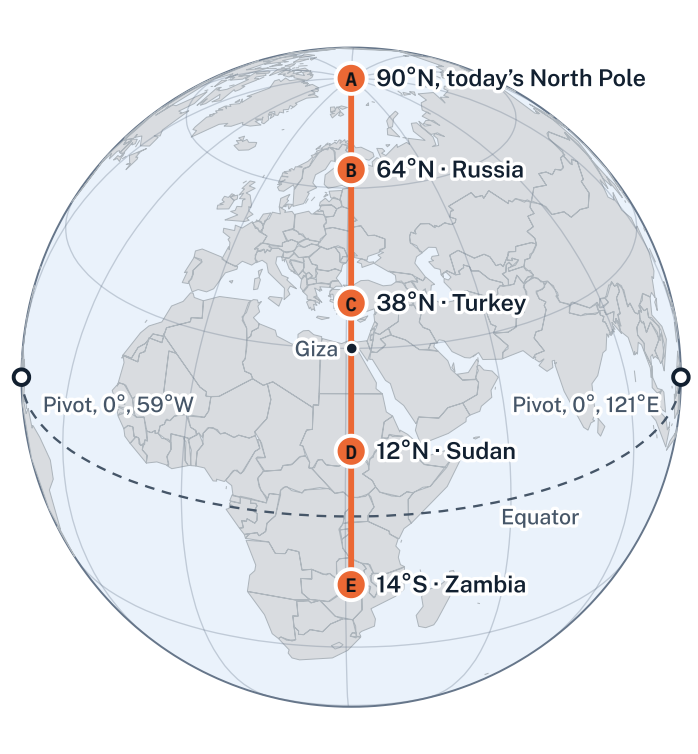
UNSUPPORTED
"our provision timeline date of 4400 BCE for the 'Flood of Noah'"
ECDO, on the date of the last flip [8]
The date comes from Biblical and Sumerian chronology and a 6,443-year cycle [11]. Its author matches it to single records, such as a fall in male-line (Y-chromosome) diversity dated to 3000–5000 BCE, which ECDO notes the female line doesn't share, not to records from around the world that share one date [8]. ECDO's community primer puts the most recent candidate at 2300–1600 BCE instead [11]. See section 1.

1 · THE CLAIM

A proposed 104° turn of the mantle and crust, and a return

ECDO, short for Exothermic Core–Mantle Decoupling–Dzhanibekov Oscillation, is set out in blog articles and a 2026 book by an author writing as The Ethical Skeptic [1]; we found no peer-reviewed paper on it. It says Earth "oscillates between two distinct rotational states", one held by its magnetic field and one by gyroscopic momentum [1].

The proposed path of the pole, on today's map



ECDO's path runs from 90°N to 14°S along the 31st meridian east, 104° in all [8]. A to E mark equal steps of 26°, as on the original infographic, and fall in the countries shown [12]. The turn would be about an axis through the two pivots on the equator. Our drawing; the original drew the path more than 20° too far east.

ECDO's proposed cycle

1. **State 1**
Today's configuration, with the North Pole at 90°N [8].

2. **The turn**
When the magnetic field weakens past "a specific threshold of reduced magnetic moment", the mantle and crust are said to decouple from the core and turn 104° along 31°E. Its speed varies by source: "six to eight" hours in one exhibit, "a violent 48 hours" in another, 6–24 hours in the community compilation [8][2][11].

3. **State 2**
ECDO describes the shift as "moving towards South Africa" [1]. On today's map, 14°S, 31°E is in eastern Zambia, and ECDO's stated range of 8–18°S runs from Tanzania to Zimbabwe [12]. It lasts 50–400 years in the current text, 10–50 in a 2024 copy [8][11].

4. **The return**
Back to State 1 after 50–400 years, implied along the same meridian [8]. ECDO never says how fast; its author suspects the return is slower [11].

The date, and who proposed it
The date of about 4400 BCE is the author's own "provision timeline date", matched to the Flood of Noah [8]; a chart by the author from November 2024 marks 4413 BCE [11]. ECDO "is solely the work of its author, The Ethical Skeptic" [1]. The infographic credited the date to a named person; we found no reliable source for that name, so this page credits the pseudonym.

A second stable state
With the core decoupled, the axis through the lighter structures deep in the mantle is said to become the spin axis [8].

A global flood
The oceans would carry on with their old motion and spill over the continents as the crust turned beneath them [8][11].

One process behind many signs
ECDO links "flood myths, ancient monuments, geophysical anomalies, and climate change" as expressions of a single process [1].

2 · THE MECHANISM

Earth already spins about its most stable axis

A spinning body is stable about its axis of greatest or least inertia: "a body will rotate stably about the axis with the largest or the smallest moment of inertia, but not about the intermediate axis" [13 §3.4.3]. The Dzhanibekov effect, the tumbling of a spun wing nut, happens about the intermediate one. That holds for a rigid body; a body that flexes and loses energy ends up spinning about its axis of greatest inertia [13 §3.4.4], and Earth's spin axis "follows the maximum moment of inertia axis of mantle convection" [5 p. 827].

OUR ANALYSIS
The greatest inertia is about today's axis
From the IERS values of Earth's gravity field, its three principal moments of inertia are C > B > A: C exceeds A by 0.33%, and B exceeds A by only 0.002% [3]. Earth spins about C, and over the years its figure axis "should closely coincide with the observed position of the rotation pole" [3]. Published values for Earth's layers, from a model of its interior, give the mantle and crust on their own the same ordering [4], so even a shell freed from the core would spin most stably about today's axis. ECDO calls its flip a "mediated" Dzhanibekov rotation, in which the effect only "delineates the path of least resistance" [1], but we found no published quantitative model of that mediation.

OUR ANALYSIS
The deep-mantle structures keep the pole away from them
Two large provinces of slow seismic waves cover "around 30%" of the core–mantle boundary [14 p. 38]. Because they lie under highs of the geoid, models give them an inertia whose least axis runs near their centres, with the other two axes about 90° away [5 p. 828]. The axis of greatest inertia, which the pole follows, therefore tends to stay near a great circle halfway between the two [5 p. 828]. ECDO gives them the greatest axis instead [8]. Its own figure draws that axis through the proposed pole on purpose; in reality, its author notes, it "lies near the northeastern Somali Horn" [8]. Whether the structures are lighter or denser than the mantle around them "remains an active area of research" [14 p. 39]; the inertia argument doesn't depend on it.

HOW FAST THE POLE CAN WANDER
1–2° per Myr
at most, because the equatorial bulge, about 21 km high, needs to adjust as the axis moves [5 p. 827][3]

104° IN 6–8 HOURS
OUR ANALYSIS
≈ 10^{11} × faster
moving the ground at up to 1,400–1,900 km/h, a turn about as fast as Earth's own spin; even over 48 hours, about 240 km/h

TO SPIN ABOUT ANOTHER AXIS
OUR ANALYSIS
≈ 6.6×10^{26} J
for a rigid Earth to spin 104° away from its axis of greatest inertia, not counting the energy of the turn itself or friction. Our page on Earth's energy stores asks where such energy could come from.

OUR ANALYSIS
No torque budget
ECDO "postulates an open, field-mediated system, and not closed system" [8], and its author writes that the measurements needed to place the new pole in "a fully derivation-based model" are lacking [8]. A working model would have to show how the instability starts, which torques act and where the angular momentum goes.

OUR ANALYSIS
No threshold in numbers
The mantle and crust are said to decouple past "a specific threshold of reduced magnetic moment" [8], but no value is given, so the trigger can't be checked against the measured field (section 3).

3 · THE OBSERVATIONS

Real observations that don't close the chain

ECDO draws on things that are real. In our assessment, none of them, alone or together, shows the mantle and crust turning.

What is observed, and what it doesn't show

OBSERVATION	WHAT IS MEASURED	WHY IT DOESN'T CLOSE THE CHAIN
The Chandler wobble faded	It weakened from 2005 and was insignificant by 2015, while the annual wobble kept a nearly constant size [15]; a preprint finds it came back from about 2020 with its phase reversed [16].	Changes in the atmosphere and oceans can account for the fading [17], and a wobble's size doesn't measure how tightly the core grips the mantle.
The magnetic dipole is weakening	By about 5% per century since measurements began in 1840 [18]; from 1900 to 2025 the dipole moment fell 7.6% [19]. Earlier it is debated: two reconstructions found it nearly constant from 1590 to 1840 [18][20], while a 2011 reassessment, reviewed in [21], finds the decay "most likely extends back to ~1590 AD".	A weaker field doesn't move the geographic pole, and today's field isn't unusually weak: two 2006 studies found that "the intensity of the present dipole is higher than its average over the entire Brunhes chron", the past 780,000 years, as reviewed in [21].
Deep-mantle structures exist	Two large provinces of slow seismic waves at the base of the mantle, covering about 30% of the core–mantle boundary [14 p. 38].	In models they keep the spin axis about 90° away from them, where today's pole is (section 2).
The deep ocean is warming	By 21.6 TW between about 2,000 and 4,000 m and 12.9 TW below 4,000 m, with the strongest warming near where Antarctic Bottom Water forms, decreasing "with distance from Antarctica" [10].	That pattern follows cold water sinking from the surface near Antarctica, not heat rising from below (section 4).
Some monuments aren't aligned to today's north	True of many. ECDO counts 46 alignments to its State 2 pole among "N = 238 monuments", against about 10.6 expected by chance under its most cautious assumptions after excluding star and solstice alignments, and puts the odds at "1 in 4 × 10^{14}" [8].	OVERSTATED The sites and tolerances were chosen by the author, and the test hasn't been pre-registered or repeated independently, so the odds can't be taken at face value. ECDO also says the Giza pyramids' alignment to true north "bears a 1.5° tolerance error" [8], yet the Great Pyramid is 3.4 arcminutes off true north and Khafre's 6.0 [22 p. 1].

4 · THE NUMBERS

The interior's heat is a small part of Earth's energy budget

ECDO's author proposes that heat released by the core may warm the deep ocean and drive most observed climate change [9]. Our analysis of the measured flows below leaves no room for it.

HEAT FROM THE INTERIOR
0.09 W/m^2
47 ± 2 TW spread over Earth's surface [7]

EARTH'S ENERGY IMBALANCE
≈ 1 W/m^2
1.0 ± 0.2 W/m^2 for 2013–2022, double the first decade of the century, with the rise from more absorbed sunlight [6]; it reached 1.8 W/m^2 in 2023 [23]

DEEP AND ABYSSAL WARMING
OUR ANALYSIS
108%
of all the heat flowing up through the ocean floor: 34.5 TW against 31.9 TW [10][7]

OUR ANALYSIS
A steady flow is not new heat
The heat rising through the sea floor has flowed for millions of years, and the ocean carries it away; it is part of the background, not a source of warming. To warm the deep ocean by 34.5 TW, that flow would have to rise by as much again, more than doubling, and ECDO points to no measurement of such a rise.

OUR ANALYSIS
What a 104° turn would mean on the map
Turning the globe so that 14°S, 31°E reached the North Pole would put today's North Pole at 14°S and Giza near 46°N, or 42–52°N across ECDO's range. About 70% of Earth's surface would change latitude by more than 30°, though a few places, such as Delhi, would end up at almost the same latitude. This is the hypothesis's geometry, not a reconstruction of anything that happened.

5 · WHAT WOULD TEST IT

What ECDO would have to show

ECDO's author has published a falsification statement. The hypothesis fails if observations show two things: that the mantle and crust keep "a stable, near-axisymmetric inertia tensor about Earth's current rotational axis", and that heat from the mantle is too small to have a measurable, sustained effect on the deep ocean [8]. Geodesy bears on the first: Earth's inertia is nearly symmetric about today's axis, and its figure axis tracks the pole [3][4]. The heat budget in section 4 bears on the second. The statement doesn't say how much asymmetry or heat would count.

TEST 1
An inertia and torque budget
Publish the outer shell's inertia tensor and the torques that would turn it. Published layer values already give the mantle and crust their greatest inertia about today's axis [4].

TEST 2
A threshold in numbers
Give the field strength at which the mantle and crust would decouple, so it can be compared with the measured field.

TEST 3
A turn that emerges from a model
ECDO says it "chose 104°" from a range of 8–18°S for the centre of the African deep-mantle structure, and relates it to 90° of rotation plus 14° of magnetic pole variation [8]. A model should produce the turn rather than impose it, with any outside torques quantified.

TEST 4
A pre-registered monument test
Fix the sites, tolerances and pole position in advance, and test them against other reasons for an orientation, such as terrain and local custom. ECDO's author has tested 238 monuments, choosing the sites and tolerances (section 3).

TEST 5
A dated global fingerprint
Show the same date worldwide in rock magnetism, in changes of sunlight with latitude and in flood deposits; ECDO cites single records [8].

What we didn't re-test
We didn't rebuild ECDO's 238-monument dataset, or assess ice cores, sediments and sea-level records for 4400 BCE ourselves.

Some sources only in summary
The fading of the Chandler wobble [15] and the pre-1840 field [21] were read through summaries; the wobble's return rests on a preprint [16].

OUR ANALYSIS
Bottom line: ECDO links real observations, but its central premise runs against Earth's measured inertia.
The wobble, the weakening field, the deep-mantle structures, the warming deep ocean and the monuments that don't point north are all real. But Earth already spins about its most stable axis, the deep structures keep the spin axis away from them, the pole can wander only a degree or two in a million years, and the interior's heat is a small part of Earth's energy budget. The hypothesis has to explain all of that, and pass tests like these, to stand.

Related checks

FALSE Einstein and the 90° flip — The Disaster Cycle, Fact-Checked
UNVERIFIED Major White and Project Nanook — The Disaster Cycle, Fact-Checked
TRUE The Chandler wobble "disappeared" — The Disaster Cycle, Fact-Checked

Sources

Bracketed numbers refer to this list; p. gives a page of the article or preprint and § a section of the lecture notes. Values without a reference are our calculations from the cited inputs. Links checked October 19, 2026.

1 The Ethical Skeptic (pseudonym). Master Exothermic Core-Mantle Decoupling – Dzhanibekov Oscillation (ECDO) Theory. Blog page, May 23, 2024, as modified August 3, 2026; read October 19, 2026.

2 The Ethical Skeptic (pseudonym). Hidden in Plain Sight. Blog article, December 18, 2023, as modified July 3, 2026; read October 19, 2026.

3 Petit, G., and Luzum, B. (eds.) (2010). IERS Conventions (2010), IERS Technical Note 36, updated chapters 1 and 6: Earth's gravity field and rotation, from which its moments of inertia follow.

4 Guo, Z., and Shen, W. (2020). Formulation of a triaxial three-layered Earth rotation: theory and rotational normal mode solutions. *Journal of Geophysical Research: Solid Earth* 125(3), e2019JB018571. CC BY 4.0. We read the preprint, arXiv:1901.10066, whose Table 1 gives the moments of inertia of Earth's layers; the publisher's site didn't load for us.

5 Steinberger, B., Seidel, M.-L., and Torsvik, T. H. (2017). Limited true polar wander as evidence that Earth's nonhydrostatic shape is persistently triaxial. *Geophysical Research Letters* 44(2), 827–834. We read the published version in the GFZ repository.

6 Loeb, N. G., et al. (2024). Observational assessment of changes in Earth's energy imbalance since 2000. *Surveys in Geophysics* 45(6), 1757–1783. CC BY 4.0.

7 Davies, J. H., and Davies, D. R. (2010). Earth's surface heat flux. *Solid Earth* 1(1), 5–24. CC BY 3.0.

8 The Ethical Skeptic (pseudonym). Exothermic Core-Mantle Decoupling – Dzhanibekov Oscillation (ECDO) Hypothesis. Blog article, May 12, 2024, as modified October 8, 2026; read October 19, 2026.

9 The Ethical Skeptic (pseudonym). The Climate Change Alternative We Ignore (to Our Peril). Blog article, February 16, 2020, as modified August 29, 2026; read October 19, 2026.

10 Johnson, G. C., and Purkey, S. G. (2024). Refined estimates of global ocean deep and abyssal decadal warming trends. *Geophysical Research Letters* 51(18), e2024GL111229. CC BY-NC-ND 4.0. We read the copy in the NSF Public Access Repository.

11 sovrynn/ecdo. Community compilation of ECDO material on GitHub, commit 4a73760 (June 30, 2026), including the *ECDO Data-Driven Primer* and contributors' notes; it carries no licence.

12 Natural Earth. 1:50m admin-0 countries, public domain; used for the map and for placing points in countries.

13 Tong, D. Classical Dynamics, chapter 3, "The motion of rigid bodies". University of Cambridge lecture notes.

14 Garnero, E., and Richardson, C. (2024). The mysterious, massive structures in Earth's deep mantle. *Physics Today* 77(12), 36–43.

15 Yamaguchi, R., and Furuya, M. (2024). Can we explain the post-2015 absence of the Chandler wobble? *Earth, Planets and Space* 76, 1. CC BY 4.0. We read it through a summary.

16 Jaroszewicz, S., Mendez, N., Beccar-Varela, M. P., and Mariani, M. C. (2026). Multifractal complexity of the Chandler wobble and its anomalous disappearance (2015–2020): a MFDFA study. arXiv:2605.29056, a preprint not yet peer reviewed.

17 Xu, X.-Q., Fang, M., Zhou, Y.-H., and Liao, X.-H. (2024). Continental and oceanic AAM contributions to Chandler Wobble with the amplitude attenuation from 2012 to 2022. *Journal of Geodesy* 98, 59. CC BY 4.0.

18 Gubbins, D., Jones, A. L., and Finlay, C. C. (2006). Fall in Earth's magnetic field is erratic. *Science* 312(5775), 900–902.

19 IAGA Working Group V-MOD. International Geomagnetic Reference Field, 14th generation (IGRF-14), coefficient file; read October 19, 2026.

20 Finlay, C. C. (2008). Historical variation of the geomagnetic axial dipole. *Physics of the Earth and Planetary Interiors* 170(1–2), 1–14. We read the author's copy.

21 Laj, C., and Kissel, C. (2015). An impending geomagnetic transition? Hints from the past. *Frontiers in Earth Science* 3, 61. We read it through a summary.

22 Magli, G. (2003). On the astronomical orientation of the IV dynasty Egyptian pyramids and the dating of the second Giza pyramid. arXiv:physics/0307100.

23 Mauritsen, T., et al. (2025). Earth's energy imbalance more than doubled in recent decades. *AGU Advances* 6(3), e2024AV001636. CC BY 4.0.

METHOD

How this was checked

On October 19, 2026, we checked every statement, number and drawing on the original infographic, 51 items, against ECDO's own articles and the community compilation that collects them, and against studies of Earth's rotation, gravity field, deep mantle, magnetic field, deep-ocean warming and energy budget. We recomputed Earth's moments of inertia from the IERS constants, the geometry of a 104° turn on today's map, the speed and energy of the turn and the heat-flow arithmetic, and we fitted a map projection to the original globe to find where its marks fall. The check corrected several statements; the change log lists them.

The verdicts and the items tagged "Our analysis" are our own assessment, built on the cited sources: the inertia, speed, energy and geometry calculations, and our reading of ECDO's claims. ECDO is quoted from its author's pages for review. The globe is drawn by factchecked.science from Natural Earth's public-domain outlines [12]. ECDO's author writes under a pseudonym, and this page names no real person.

After the page was built, a second reviewer who hadn't seen the drafting recomputed the inertia, speed, energy, heat-flow and map numbers, checked the globe's marks against the projection, re-read every quotation in ECDO's articles and the cited studies, and checked the references on Crossref. The changes that followed: ECDO's falsification statement is given with both of its conditions; its climate claim keeps its author's "may"; the rule that a spinning body is stable about its axis of greatest or least inertia now says that a body that loses energy, like Earth, ends up spinning about the greatest; the deep-mantle structures keep the pole away from them rather than favouring it; the 4400 BCE date is traced to the author's chronology, and the genetic record is described as male-line only; two quotations are credited to the studies that Laj and Kissel review; the monument rating now appears in the verdict key; and several smaller corrections.

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.
OVERSTATED	Has some basis but claims much more than the evidence supports.
UNSUPPORTED	No evidence we could find backs it up, though it hasn't been strictly disproven.

All ten verdicts, and how we check

CORRECTIONS

Corrections and changes

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

Change log

Oct 19, 2026 — Published on factchecked.science after a full check against the sources. Changes from the infographic: added our verdicts on four of ECDO's claims and rated its monument statistic Overstated. The globe is redrawn: the original drew the "31°E" path along about 52–58°E, so E sat in the Indian Ocean east of Madagascar and D, labelled 12°N, sat on the equator; the Africa icon, whose pin pointed to about 27°S, is not reproduced. The infographic credited the 4400 BCE scenario to a named person, for which we found no reliable source; the date is the pseudonymous author's own, and the page credits the pseudonym. "6–8 hours claimed" now gives ECDO's other figures, 48 hours and 6–24 hours; "50–400 years" notes that a 2024 copy said 10–50; and the return, "route and duration unspecified", is implied along the same meridian at a speed ECDO never states. "A simple Dzhanibekov flip does not apply directly" now says ECDO itself calls the flip mediated, and the point on the deep-mantle structures now says they keep the pole away from them. The Chandler wobble row adds the wobble's return around 2020, and "the geomagnetic dipole has declined for centuries" became about 5% per century since 1840, with the earlier trend debated. The 2013–2025 energy imbalance of 1.12 W/m^2, which we couldn't reproduce without the satellite data, is replaced by the published 1.0 W/m^2 for 2013–2022 and 1.8 W/m^2 in 2023. "Would imply dramatic latitude changes worldwide" now gives about 70% of the surface by more than 30°. "Warming at depth does not uniquely identify an increased internal heat source" now says the warming pattern points to water sinking from the surface. "A full budget is missing" now gives our estimate of 6.6×10^{26} J to spin about another axis. Test 3's "physically closed transition model" now allows outside torques if they are quantified, since ECDO calls its system open, and the tests now note ECDO's own falsification statement and monument test. The slogans and the typo "Backgroud" were dropped.