Standing For Truth Ministries

Obliterating the Global Genesis Flood "Heat Problem"

Radiohalos, the Core, and the Genesis Flood Heat Pathway

By Donny Budinsky

Summary in Plain Language

Critics of Biblical creation (by Biblical creation, I mean that the Bible clearly teaches a young earth and separate ancestry) have long argued that a global Genesis Flood is impossible because of the **"heat problem."** They claim that:

- **Accelerated nuclear decay,**
- **Catastrophic plate tectonics,** and
- **Meteorite impacts**

would generate so much heat that Earth's crust would melt, the oceans would boil, and life could not survive.

This article gives a **two-part answer**:

1. **Radiohalos** – tiny, fragile features in rocks that **require accelerated decay**, yet would have been **erased by long-term overheating.** Their existence shows that the Flood was **not** a global thermal meltdown.
2. **The Genesis Flood Core Model** – a physical picture of where the Flood heat could go:
    - **Most heat** is **moved downward** into the **mantle and core**, which have **enormous heat capacity**.
    - A **smaller share** is **vented to space** as radiation.
    - The **oceans** buffer only a **small fraction**.
    - The pre-Flood, **~95% green world** acts as a modest **"biomass battery,"** using some heat to drive **rapid coal, oil, and gas formation**.

A separate technical paper with full calculations and references is in progress. This article is a **preliminary research note** that lays out the logic in accessible language and shows why the "heat problem" is far weaker than critics claim.

This can act as a resource for people to share around demonstrating that the "heat problem" is not unsolvable without solutions. We have a perfectly viable solution presented in this article that the critics are going to have a very difficult time debunking.

Key shift: Earth is not a sealed oven; it is a **multi-reservoir system** with **built-in plumbing.** The true bottleneck is **throughput** (how fast heat is moved), not capacity (whether Earth can hold it).

Part 1 – The Heat Problem MELTDOWN: Radiohalos They Can't Explain

For years, critics like **Gutsick Gibbon** and **Lorence G. Collins** have argued that:

> "If you had catastrophic plate motions and accelerated nuclear decay during the Flood, the amount of heat would be so enormous that the Earth would essentially cook. Therefore, no global Flood and no young earth."

This sounds devastating until you look at a tiny, stubborn line of evidence (that critics have really struggled to explain under uniformitarianism): **radiohalos**.

What Are Radiohalos?

Radiohalos are microscopic, circular discolorations in minerals like **biotite** and **zircon**. They form when **alpha particles** from radioactive decay shoot out from a tiny radioactive inclusion and damage the crystal lattice, leaving a **spherical pattern** of discoloration around the source.

Why they matter:

1. **Radiohalos require accelerated decay** (for some isotopes).
   Certain **short-lived isotopes** (like some polonium isotopes) decay so quickly at present rates that they cannot form the observed halos over millions of years in a stable environment. They make sense if there were periods of **much faster decay**, exactly what critics say would generate lots of heat.

2. **Radiohalos are destroyed by heat.**
   At relatively modest temperatures, the crystal structure **anneals** (heals), erasing the halos. If rocks are kept too hot for too long, the halos **disappear.**

Put simply:

You **can't have radiohalos** without significant radioactive decay, and you **can't keep them** if the rocks stay hot for too long. Critics are stuck on this reality. They want to argue against the Genesis Flood by focusing on the heat problem—but at the same time—they have no good explanation for the existence of radiohalos. The best explanation for these formations is accelerated nuclear decay. But if there were no solution or mechanism to get rid of this excess heat, we wouldn't have the radiohalo formations. This tells us there is a solution. Critics struggle with this point. The next segment will break this down carefully.

The Critics' Dilemma

Follow the logic:

- Radiohalos **exist** in great abundance.
- Many radiohalos **point to accelerated decay** (especially short-lived halos).
- Yet these halos are **fragile** and would have been erased by prolonged, high-temperature conditions.

If the Flood's heat from accelerated decay and plate motions truly caused an unavoidable "thermal apocalypse," **radiohalos should not be there**.

But they **are** there—**throughout** the Phanerozoic rock record.

Dr. Snelling's Work: Accelerated Decay + Rapid Cooling

Dr. **Andrew Snelling** and others in the RATE (Radioisotopes and the Age of The Earth) project (several of whom I've personally interviewed) have argued that radiohalos are:

- Evidence that **decay was accelerated** (at least during certain episodes).
- Evidence for **rapid cooling** of the host rocks after heating events (because halos survived).

So, the rocks themselves say:

1. There was **intense radioactive activity** (possible major heat source).
2. There was **not** long, drawn-out overheating.
3. The system must have had **effective ways to cool and move heat**, not simply lock it at shallow depths.

In other words, radiohalos **contradict** the simplistic claim that accelerated decay during the Flood would necessarily melt the crust and erase all delicate structures.

Radiohalos **don't** tell us *how* the heat was handled—that's where the Genesis Flood Core Model comes in (which will be discussed in part 2). But they do tell us the critics' "it must have melted everything" narrative simply **does not match** the evidence we see under the microscope.

Part 2 – Where Did the Flood Heat Go? The Genesis Flood Core Model

Radiohalos show us that the rock record **was not baked beyond recovery.** They show **intense decay plus rapid cooling**, not permanent destruction.

The **Genesis Flood Core Model** asks:

> "Given those realities, how could God have used the physics of the Earth He created to handle large amounts of heat during the Flood—without destroying life and while leaving behind the radiohalos and structures we observe today?"

The Big Picture

In this model:

- **Most of the Flood heat** is **moved down** into the **mantle and core**, which act as a **massive heat reservoir**.
- A **fraction** of the heat is **vented to space** via **radiation**, especially from hot surfaces and volcanic aerosols.
- The **oceans** take only a **small share**, as we can't boil them without killing the biosphere.
- The pre-Flood world, likely **~95% habitable and lush**, acts as a modest **thermal/chemical buffer**—a **"biomass battery"** converting vast plant material into **coal, oil, and gas** under intense heat and pressure.

The critical insight is:

The "heat problem" is not mainly about **how much heat exists**, but **how quickly Earth can move it and where it ends up**.

Pre-Flood Interior Temperature (Conceptual)

We don't know the core's exact temperature even **today**. Popular mainstream estimates range from about **4,000 K to 7,000 K** (roughly 7,000–12,000 °F). If the present core temperature is that uncertain, then deep-past core temperatures are **necessarily inferred**, not directly measured.

The Genesis Flood Core Model takes advantage of this:

- It treats the **pre-Flood interior** as **cooler on average** than it is now.
- It proposes that a **significant fraction of Earth's current deep-Earth heat content** could be due to **Flood-era energy** (from plate motions, magmatism, decay, and impacts) that was **advected downward** into the mantle and core during the catastrophe.

In other words:

The Flood did not have to "overheat" an already red-lined Earth. It could have **contributed substantially to making the interior as hot as we see it today**.

What's Novel About This Proposal (And Why It Matters)

1. **Capacity vs. throughput.**
    - Deep-interior (mantle + core) heat capacity is on the order of **$6.0–6.5\times10^{27}$ joules per kelvin**.
    - If you dump **~1.4×10^{29} J** (a CPT/ocean-floor heat estimate) into that reservoir, the average warming is only about **21–23 K**.
    - So, the limiting factor is not "Can Earth's interior hold it?" but "How fast can we **move** it there?"—that's **throughput**.
2. **Combined-sink approach.**

    Instead of pretending oceans must hold all the heat, the model uses multiple sinks:

    - **Move most heat down** into the **mantle + core** (dominant sink).

- **Vent some heat up** to **space** via **thermal radiation**, boosted by $\sigma \cdot T^4$ and volcanic aerosols.

(Here, **ε** is emissivity and **$\sigma = 5.67\times10^{-8}$ W·m^{-2}·K^{-4}**; radiative flux $\propto \varepsilon\sigma T^4$.)

- Let **oceans buffer a smaller fraction**.
- **Use a small slice** of the heat in **rapid coal/oil/gas formation** (the "biomass battery").

3. ## Breaking the confinement assumption.

Classic "plasma crust" and "boil the oceans" rhetoric silently assumes heat is confined to a thin layer at the surface. Our model explicitly **breaks that assumption** by invoking plausible geological processes:

- **Rapid subduction & downwelling** of oceanic plates.
- **Foundering/delamination** of dense lower crust into the mantle.
- **Fluids and melts** being driven **downward** along faults.
- **Phase buffering** as rocks melt or metamorphose, absorbing heat.
- **Whole-mantle overturn** in a catastrophic-tectonics framework.

4. ## Biosphere safety mechanisms.

The model also takes seriously: "What about Noah and the animals?"

- Most intense energy generation is **deep in rock**, not at the surface.
- **Miles of water** cover large areas during the Flood, acting as **powerful radiation shielding and coolant**.
- If accelerated decay happened, it must have been **deep, shielded, episodic, and mineral-selective**, not uniform in living tissue.

5. **Alignment with YEC work + testability.**

   We're not ignoring the big creationist and critic estimates for:

   - **CPT/ocean-floor heat**,
   - **Large Igneous Provinces (LIPs),**
   - **Impacts**,
   - **Potential accelerated decay (RATE)**.

We put them into a **single heat ledger** and show how Earth's interior, radiation to space, oceans, and biomass conversion could together account for them. The model also suggests **testable predictions** in metamorphism, isotopes, heat flow, and climate records.

Mechanisms for Moving Heat Downward (Layperson Overview)

Objection: "How can heat go down? Doesn't hot stuff rise?"

In fluids at small scales, yes, hot material tends to rise. But inside Earth, **solid rock and high-pressure fluids** transport heat in more complex ways. During catastrophic tectonics, several processes move heat **down**:

- **Rapid subduction & downwelling**

  "Cold" plates are still extremely hot compared to the surface. As they dive, they carry:

  - their own internal heat,
  - frictional heat from plate sliding, and
  - heat-producing elements (U, Th, K)
    down into the mantle.

- **Foundering / delamination**

  Dense, overheated lower crust can **peel off and sink** into the mantle, taking its stored thermal energy with it.

- **Pressure-driven fluids and melts**

  At convergent margins, high pressures can force water and magma **downward** into the mantle along fractures and faults. These fluids are highly effective carriers of heat and chemicals.

- **Phase buffering (melting & metamorphism)**

  When rocks melt or change structure, they **absorb heat** (latent heat). These changes can happen at depth, and as the resulting materials move, they redistribute heat away from the surface.

- **Whole-mantle overturn**

  Once large-scale circulation is triggered, the mantle behaves like a slowly moving fluid, redistributing energy from the upper mantle to deeper levels and eventually to the core.

Analogy: Rapid subduction is like a **giant conveyor belt and pump**. It does generate some additional frictional heat, but the main effect is to **move vast amounts of energy into the deep interior**, where there is room for it.

Fountains of the Great Deep, Water Lubrication, and Shielding

The Bible describes **"the fountains of the great deep"** breaking open. Many creation researchers associate this with catastrophic rupturing of the crust, massive water and hydrothermal fluid release, and perhaps the initiation of rapid plate movements.

In our model, this has several important implications:

1. ### Water as lubricant

    - High fluid pressures in fault zones **reduce effective friction** between plates.
    - Lower friction means **less frictional heating** and more energy spent on **motion** and **mass transport**.

- Modern subduction zones show that water-rich, overpressured faults can be mechanically “weak,” allowing large movements without extreme heating at the interface.

2. **Water as coolant**

    - Water has high heat capacity and can **carry heat away** from hot rocks via convection.
    - Hydrothermal circulation—water moving through hot rocks—can redistribute heat efficiently.

3. **Water as radiation shield**

    - Nuclear reactors use **only a few meters of water** as shielding to protect workers from radiation.
    - During the Flood, large portions of the Earth were covered by **tens to thousands of meters of water**.
    - That is **more than enough** to shield Noah, his family, and the animals from deep crustal radiation.

Rapid Limestone Formation – A Geochemical Consequence

The same fountains and hydrothermal systems that move heat and material could also:

- Release **dissolved calcium, carbonate, and CO_2-rich fluids**,
- Trigger rapid precipitation of **limestone ($CaCO_3$)** as waters cool, degas, or mix with other water bodies.

This helps make sense of:

- Massive **limestone deposits** in the rock record,
- The large volumes of **carbon** now locked into carbonate rocks.

Chemically, carbonate precipitation is more of a **geochemical re-packaging** of carbon than a main heat sink, but it is an important **by-product** of the same processes that move heat and fluids during the Flood.

Radiation & the Biosphere: Shielding, Compartmentalization, and Timing

A fair concern is:

"Even if the heat could be moved, wouldn't the radiation from accelerated decay kill everything?"

The model responds with several points:

1. ### Depth of generation

   Most radiogenic heat is generated **inside rock**, not at the surface.

   - Alpha and beta particles are stopped quickly by very small thicknesses of matter.
   - Gamma rays are strongly attenuated by **meters** of rock and water.

2. ### Water-column shielding

   With **miles of water** covering much of the planet:

   - Radiation from the crust and upper mantle is heavily **shielded**.
   - Water also **cools** the surface by convection, reducing thermal stress on the biosphere.

3. ### Burst-like vs. uniform, year-long decay

   If accelerated decay happened, it need not have been:

   - uniform everywhere,
   - constant in time, or
   - applied equally to all environments.

It could have been **episodic**, aligned with peak tectonic activity, when throughput (heat export) was highest. Between pulses, the system could cool and vent energy.

4. ## Internal isotopes (e.g., K-40 in living tissue)

   We explicitly reject a scenario where every atom of K-40 in Noah's body "sped up" by the same massive factor used in some RATE illustrations—that would indeed be lethal. Instead, we distinguish:

   - **Track A – No large decay spike required.**
     If the data can be explained without huge, global acceleration, then the internal-dose problem is moot.

   - **Track B – If acceleration occurred, it must be compartmentalized.**
     That is, any acceleration must have been **geologically localized** (e.g., to mineral lattices in high P–T environments, specific redox conditions) and **not** applied uniformly to all potassium atoms in living tissue.

This is a **testable idea**: mineral-specific isotope signatures vs. organic records could reflect differences in decay behavior.

Bottom line: The combined-sink model does not require a "one-size-fits-all" accelerated decay that cooks Noah. If accelerated decay occurred, it must be **deep, shielded, episodic, and mineral-selective.** If it wasn't needed, Track A is available.

Note on apparent ages and vertical ordering.

In a Track B, accelerated-decay scenario, this framework is fully compatible with the usual creationist explanation for why lower rocks date "older" than upper rocks. Radiometric ages and fission tracks depend on the **total amount of decay** a rock experiences. Rocks formed or laid down **earlier in the Flood** are exposed to **more of any accelerated-decay episodes**, so they accumulate more daughter products and tracks and therefore yield **older apparent ages**. Rocks formed later experience **less cumulative decay** and therefore date "younger." The shielding and compartmentalization discussed in this article are about **protecting the**

biosphere, not about stopping decay inside minerals—so they preserve, rather than undermine, the observed vertical age pattern.

Sneak Preview of the Math (Lay-Level)

A separate technical paper will give full derivations and references. Here we just sketch the backbone.

1. Deep-Interior Heat Capacity (Dominant Sink)

Use the simple relation:

$Q = m \times c_p \times \Delta T$

Approximate Earth values:

- Core mass ≈ **1.94×10^{24} kg**, c_p ~ **800 J/kg/K**
- Mantle mass ≈ **4.04×10^{24} kg**, c_p ~ **1200 J/kg/K**

So total heat capacity of mantle + core is about:

$C_{total} \approx 6.0–6.5 \times 10^{27}$ J/K

Meaning: to raise the average temperature of the combined mantle+core by 1 K, you need ~**6×10^{27} joules**.

2. Applying a Representative Flood Heat Budget

Take a representative creationist/critic estimate for ocean-floor formation and related magmatic processes:

$Q_1 \approx 1.4 \times 10^{29}$ J

If **all** of this ends up in the deep interior:

$\Delta T \approx Q_1 / C_{total} \approx 1.4 \times 10^{29} / 6.4 \times 10^{27} \approx 21–23$ K

Even if we **double** or **triple** that Q to include other sources (LIPs, some decay, some impacts) and let **most** of it go into the deep interior, we still get **tens of degrees**, not thousands.

So:

Capacity is not the problem. The deep Earth can absorb large Flood heat budgets with modest average warming. The real challenge is **throughput**—moving the heat there fast.

Side note — Including accelerated decay:

Add a radiogenic term to the ledger:

$Q_{decay} = \Sigma M_i e_i f_i$

(isotope mass × decay energy per kg × fraction decayed)

Map totals to deep-interior warming with:

$\Delta T = Q_{total} / C$, with $C_{mantle+core} \approx 6.4 \times 10^{27}$ J/K.

Even when Q_{total} includes CPT, LIPs, impacts, and accelerated decay, the implied deep-interior warming remains at the level of tens to ~100 K for conservative totals—capacity isn't the bottleneck; throughput is.

3. Oceans as a Minor Sink

The oceans:

- Have large heat capacity but are **small compared to the mantle+core**.
- Must not be heated so much that they sterilize the biosphere.

So, in the model, oceans:

- Take only a **small portion** of Q_{total},
- Act as a **buffer** for surface temperatures,
- Are **not** expected to solve the heat problem by themselves.

4. Biomass Battery (Illustrative Range)

Let:

- **M_bio** ~ 10^{18}–10^{19} kg (order-of-magnitude for buried pre-Flood biomass; actual value may be higher).
- **h_conv** ~ (1–3)×10^{6} J/kg (thermal "cost" of converting biomass to hydrocarbons and driving relevant reactions).

Then:

Q_bio ≈ M_bio × h_conv ≈ 10^{24}–3×10^{25} J, possibly higher if M_bio was larger.

If total Flood-related heat is **Q_total ~ 10^{29}–10^{30} J** across all sources, then Q_bio is plausibly in the **~0.001–1%** range of Q_total depending on the true biomass mass and reaction enthalpies.

That matches our claim:

- The biomass sink is **real but modest.**
- It is **not the main answer**, but it tightens the ledger and nicely explains vast fossil-fuel deposits.

Heat ledger completeness: Q_{total}includes CPT/new seafloor, LIPs, impacts, frictional/magmatic heat, and radiogenic heat (including any accelerated decay). Any additional proposed source is simply added to Q_{total}; the mapping $\Delta T = Q_{\text{total}}/C$is unchanged

Mini Heat Table (Deep Interior Warming for Different Q)

Using C_total ≈ 6.4×10^{27} J/K:

Total heat Q (J)	Implied average ΔT in mantle+core
1×10^{28}	~1.5–1.6 K
1×10^{29}	~15–16 K
1.4×10^{29}	~21–23 K
3×10^{29}	~47 K
1×10^{30}	~156 K

Even at the high end, these are **deep-interior** temperature changes spread through a huge mass—not surface temperatures.

Units: C in J/K; Q in J; ΔT = Q/C (kelvins).

Units sanity check

- Heat capacity C: J/K (energy per kelvin of warming)
- Heat content U: J (energy already present)
- We map any Flood heat Q to deep-interior warming via ΔT = Q / C (kelvins)

What counts as “representative Q”

- New seafloor cooling (CPT): ~1.4×10^29 J (per Worraker)
- Add LIPs/viscous/friction/impacts for stress-tests: totals 2–7× higher
- With C ≈ 6.4×10^27 J/K, that implies ~22 K to ~150 K average deep-interior warming—still modest.

K-40 objection

We are **not** proposing a one-size-fits-all spike that speeds every K-40 atom in every environment. If acceleration was required, it would be **geologically compartmentalized**—localized to **mineral lattices at high P–T** deep in rock, heavily **shielded** by rock and water, and plausibly **episodic** at peak tectonic throughput. That preserves radiometric/fission-track signals in minerals **without** delivering lethal dose to organisms.
See Appendix A for the full reasoning and safety analysis.

Critic's Corner – Short Responses

"The crust would have turned to plasma."
Only if you trap all the heat in a thin shell near the surface. Our model explicitly exports most heat **down** into the mantle+core and **up** as radiation. The deep interior is easily capable of absorbing the energy.

"Rapid subduction just makes more heat, it doesn't solve anything."
Yes, it makes frictional heat, but it also acts as a **heat conveyor belt**. A pump gets warm, but its main job is to **move** fluid. Rapid subduction and downwelling may add some heat locally, but they **move much more heat into the deep reservoir** than they produce.

"There's no natural way to get rid of that much heat."
Catastrophic plate tectonics already invokes **massive mantle flows, runaway subduction, and whole-mantle overturn**. Those are exactly the kinds of high-throughput processes needed to move heat. Add in radiation to space (the only true exit), plus water shielding and biomass conversion, and the "no natural way" claim doesn't hold.

"If accelerated decay happened in the crust, the mantle can't be the sink."
That assumes heat is stuck in place. Our model emphasizes that crustal material can **delaminate, founder, subduct**, and be infiltrated by **fluids and melts**, exporting energy into the mantle. Water and rock shield life; the heat is not eternally trapped in a thin surface shell.

What the Forthcoming Technical Paper Will Do

The follow-up technical paper will:

1. Build a more complete **heat ledger**: CPT, LIPs, impacts, radiogenic sources, friction, plus sinks (mantle+core, oceans, radiation, biomass).
2. Quantify **throughput**: plausible ranges for subduction speeds, downwelling rates, fluid fluxes, and radiative losses on Flood timescales.
3. Check **consistency** with present-day:
    - Global heat flow,
    - Geomagnetic field implications,
    - Igneous province timing,
    - Hydrocarbon basin data,
    - And post-Flood climate signals (e.g., aerosol-induced cooling).
4. Do **sensitivity tests**: show how conclusions change when individual source/sink terms are varied within reasonable ranges.
5. Propose **testable predictions** regarding:
    - Metamorphic zoning,
    - Mineral-specific isotopic patterns,
    - Climate/aerosol fingerprints,
    - And possible signatures of episodic decay.

Author's Note (Project Lead)

The **heat problem** has been used again and again to claim that the Genesis Flood and a young earth are impossible. But:

- **Radiohalos** show that there was intense radioactive activity *and* that rocks were not permanently overheated.
- The **Genesis Flood Core Model** shows a physically plausible way that God could have used the very **physics He designed** to move and store that energy—without destroying the world He preserved.

This article is not the final word. It is a **preliminary research proposal** that brings several strands together:

- Radiohalos,
- Catastrophic plate tectonics,
- Deep-Earth heat capacity,
- Water shielding,
- Biomass conversion,
- And realistic multi-sink thinking.

The forthcoming technical paper will supply the detailed physics, equations, and references.

Appendix: "Wouldn't Accelerated Decay Kill Noah via K-40 in His Blood?"

A common objection is:

"If decay rates sped up during the Flood, the potassium-40 (K-40) in Noah's body and in the animals would have accelerated too, giving them a lethal radiation dose."

That argument assumes something this model does **not** assume: that any acceleration applies **equally to every atom in every environment.** Our framework makes three key distinctions:

1. **Where the evidence for accelerated decay comes from**

   Our evidence for past accelerated decay (radiohalos, fission tracks, isotopic patterns) comes from **minerals in solid rock**—zircon, biotite, U–Th–K-bearing minerals in the **crust and upper mantle**. We do *not* have any evidence that every K-40 atom in every context (e.g., blood, soft tissue) experienced the same behavior.

2. **Geological compartmentalization (Track B)**

   Under **Track B** (if acceleration occurred), we propose that any acceleration was:

   - **Geologically localized** – strongest in **mineral lattices** at high pressure/temperature and particular redox/structural conditions,
   - **Deep in rock**, not in dilute aqueous/biological environments,
   - **Shielded** by kilometers of rock and **miles of water** during the Flood,
   - Possibly **episodic**—linked to peak tectonic events when heat throughput was maximal.

That means the radiometric clocks and fission tracks in minerals can "tick faster" in those environments, while K-40 in Noah's body is not subjected to the same acceleration.

3. **Two-track safety net**

   The overall program keeps two options on the table:

   - **Track A:** If the data can be explained without a massive, global spike in decay rates, then the "K-40 in Noah's blood" problem is simply **moot**—no huge acceleration is required.
   - **Track B:** If a spike is needed, it must be **deep, shielded, episodic, and mineral-selective**, affecting rocks (our clocks) but not delivering lethal doses to living organisms.

Bottom line:

When the article says "most intense energy generation is deep in rock, not at the surface," it means that any accelerated decay responsible for apparent ages and fission tracks is

concentrated in **crustal and mantle minerals**—under rock and water shielding—not uniformly in Noah's bloodstream. That preserves both:

- The **radiometric and fission-track evidence** creationists cite, and
- The **safety of Noah, his family, and the animals** during the Flood.

Acknowledgments and AI-Assistance Disclaimer

- I am grateful for the work of creationist researchers on radiometric issues, radiohalos, catastrophic plate tectonics, and Flood geology (e.g., RATE, Snelling, Austin, and others).
- For mainstream background on core temperature uncertainty, see popular-level summaries such as *Scientific American*'s "Why is the Earth's Core So Hot?" (Feb 20, 2024).

AI-Assistance Note:

Some of the **numerical estimates** (e.g., Earth's heat capacity calculations, back-of-the-envelope ΔT values) and **brainstorming of physical mechanisms** in this article were **checked and assisted using ChatGPT** as a calculator and idea generator. The **argument, structure, and conclusions** are mine, and any errors are my responsibility. This was **AI-assisted**, not AI-generated.