

# The Catastrophic Burial Hypothesis: Reinterpreting Earth's Fossil Record

## Core Hypothesis

The fossil record does not primarily record death events - it records **BURIAL** events.

## The Fundamental Logic

All creatures die the same way - death is continuous throughout history. If normal death created fossils, we should have a smooth, continuous fossil record with no gaps. But we don't. We have:

- **GAPS** (no fossils, missing rock layers)
- **CLUSTERS** (abundant fossils in specific layers)
- **GAPS** again
- **CLUSTERS** again

**This pattern only makes sense if fossilization requires SPECIAL burial conditions - catastrophic events that bury organisms rapidly.**

## The Three Mechanisms

1. **Large Igneous Provinces (LIPs)** - Massive volcanic eruptions providing global ash fallout for rapid burial
2. **Impact Events** - Asteroid/comet impacts creating ejecta and shock effects
3. **The Combination** - Impacts may trigger LIPs, creating dual catastrophic burial conditions

## The Circular Reasoning Problem

- LIPs produce volcanic ash
- Ash buries organisms → creates fossils
- Ash is radiometrically dated → "507 Ma"
- Fossils between ash layers are dated by association → "507 Ma"
- "Extinction" defined by fossil assemblage → "507 Ma extinction event"

**The LIP both CREATES the fossil record AND DATES the fossil record!**

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## The Deep Time Evidence: 2500 Ma to Present

### THE KENORLAND SUPERCONTINENT ERA (2.7-2.1 GA)

#### Assembly (~2.7 Ga)

- Kenorland forms from Neoproterozoic cratons

- Comprised: Laurentia (N. America), Baltica (Scandinavia), Western Australia, Kalahari
- One of Earth's first supercontinents

## **Breakup Begins (~2.5-2.4 Ga) - THE CRITICAL PERIOD**

### **What Traditional Science Says:**

- "Huronian Glaciation" - 300 million years of global ice
- Great Oxidation Event - cyanobacteria slowly produce oxygen
- First "Snowball Earth"

### **What The Evidence Actually Shows:**

#### 1. SUAVJÄRVI IMPACT (~2.4 GA)

- **Location:** Karelian Craton, Fennoscandian Shield, Russia
- **Size:** 16 km diameter (original size disputed, possibly much larger)
- **Age:** 2.7-2.2 Ga (commonly cited as ~2.4 Ga)
- **Status:** Impact origin controversial but evidence present
- **Timing:** Exactly coincides with "Great Oxidation Event"

**Significance:** Could have released oxygen through water splitting, NOT cyanobacteria!

#### 2. HAMERSLEY PROVINCE LIP (2.449 ±3 GA)

- **Location:** Pilbara Craton, Western Australia
- **Volume:** >30,000 km<sup>3</sup> of dolerite, basalt, and rhyolite
- **Rate:** RAPID deposition, not slow accumulation
- **Result:** Banded Iron Formations (BIFs) formed during volcanic event
- **Significance:** Proves BIFs formed catastrophically, not gradually!

**This is where "Huronian tillites" are found in Western Australia!**

#### 3. TRANSCONTINENTAL DIKE SWARMS (2.4-2.2 GA)

- **Extent:** Global - found on multiple continents
- **Cause:** Mantle plumes impinging on continental crust
- **Duration:** THE ENTIRE "Huronian Glaciation" period!
- **Result:** Continuous volcanic activity for 300 million years

**Not ice for 300 Myr - VOLCANISM for 300 Myr!**

#### 4. GLOBAL MAFIC MAGMATISM (~2.2 GA)

- **Documented on:** India (Dharwar Craton), multiple cratons globally
- **Cause:** Intracontinental rifting via mantle upwelling
- **Timing:** End of "Huronian glaciation"

## The "Great Oxidation Event" (2.4 Ga) - REINTERPRETED

### Traditional View:

- Cyanobacteria evolved ~2.7 Ga
- Slowly produced oxygen over hundreds of millions of years
- Oxygen accumulated, causing glaciation by destroying methane greenhouse

### Problems with Traditional View:

1. **Cyanobacteria biomarkers at 2.7 Ga = CONTAMINATION** (proven by French et al. 2015)
2. **Oldest CERTAIN cyanobacteria fossils = 1.9 Ga** (*Eoentophysalis belcherensis*)
3. **Circular reasoning:** Assume cyanobacteria → infer oxygen → explain glaciation → prove cyanobacteria

### Alternative Explanation:

- **Suavjärvi impact** (~2.4 Ga) releases oxygen via water splitting
- **Hamersley LIP** (2.449 Ga) releases volcanic gases + provides burial material
- **Rapid oxygen increase** causes iron oxidation → Banded Iron Formations
- **Global volcanic ash + impact ejecta** = catastrophic burial conditions

## The "Huronian Glaciation" (2.45-2.2 GA) - REINTERPRETED

### Traditional View:

- Three major ice ages over 300 million years
- "Snowball Earth" - global ice coverage
- Evidence: tillites, dropstones, striations

### Critical Problems:

1. **Continuous mechanism impossible:** How does Earth stay frozen 300 Myr with continuous solar radiation?
2. **Tillites = diamictites:** Poorly sorted sediments that can form MULTIPLE ways
3. **Never directly observed:** No modern tillites observed forming from glaciers
4. **Alternative explanations work better:** Landslides, debris flows, volcanic mudflows, **IMPACT EJECTA**

### Evidence Actually Shows:

## **A. The "Tillite" Deposits Are Found ON ANCIENT CRATONS:**

- Superior Craton (Canada) - Type locality
- Fennoscandian/Karelian Craton (Russia/Finland) - **WHERE SUAVJÄRVI IS!**
- Pilbara/Yilgarn Cratons (Western Australia) - **WHERE HAMERSLEY LIP IS!**
- Kaapvaal Craton (South Africa)
- North China Craton

**Why?** These are the **ONLY** places old enough to preserve 2.4 Ga deposits!

## **B. "Tillites" = Mixed Impact Ejecta + Volcanic Ash:**

- Chaotic, poorly sorted deposits = **Impact ejecta falling back through atmosphere**
- "Dropstones" in fine sediment = **Impact-ejected boulders**
- Multiple layers = **Multiple impacts/eruptions over 300 Myr**
- Global distribution = **Like Chicxulub ejecta** (found globally)
- Striated/fractured rocks = **Shock features from impacts**
- On ancient cratons = **Only places that preserve old rocks**

## **C. Impacts Can TRIGGER LIPs:**

- Computer simulations show large impacts cause decompression melting
- Melt volumes comparable to LIPs
- Suavjärvi impact may have triggered Hamersley LIP!

## **Summary: What Actually Happened 2.5-2.1 Ga**

**NOT:** 300 million years of continuous ice (impossible mechanism)

**BUT:** 300 million years of catastrophic volcanic activity + impacts:

1. **~2.5 Ga:** Kenorland supercontinent begins breaking up
2. **~2.4 Ga:** Suavjärvi impact(s) + Hamersley LIP erupts
3. **2.4-2.2 Ga:** Continuous transcontinental dike swarm volcanism
4. **~2.2 Ga:** Global mafic magmatism pulse
5. **2.023 Ga:** Vredefort impact (170-300 km diameter!) - South Africa
6. **1.849 Ga:** Sudbury impact (130 km diameter) - Canada

## **Result:**

- Global volcanic ash fallout + impact ejecta = "tillites"
- Rapid oxygen release = Banded Iron Formations

- Catastrophic burial = Fossil clusters on cratons
  - Gaps between events = No fossils (no burial)
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## **POST-KENORLAND: CONTINUING PATTERNS (2.1 GA - 541 MA)**

### **The "Boring Billion" (1.8-0.8 Ga)**

- Called "boring" because minimal fossil record
- **NOT because life didn't exist - because burial events were rare!**
- Supports hypothesis: No LIPs/impacts = No fossils = Gap

### **Ediacaran Period (635-541 Ma)**

- First complex multicellular life (soft-bodied)
  - Then disappears at Cambrian boundary
  - **NOT extinction - burial event ended!**
  - Central Iapetus Magmatic Province (~615 Ma) LIP present
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## **THE PHANEROZOIC EON (541 MA - PRESENT)**

### **Cambrian Explosion (541 Ma)**

- **NOT sudden evolution**
- **Sudden FOSSILIZATION** due to burial conditions
- Life existed before but wasn't being fossilized

### **The Pattern Continues Through All Periods:**

Each geological period boundary marked by:

1. **LIP eruption** providing volcanic ash burial
2. **Often accompanied by impact event**
3. **Fossil "extinction"** = end of burial conditions
4. **"Recovery"** = return of burial conditions

### **Examples:**

- **End-Ordovician** (~443 Ma): Mass "extinction" = end of Ordovician fossilization
- **End-Permian** (252 Ma): Siberian Traps LIP
- **End-Triassic** (201 Ma): CAMP LIP
- **End-Cretaceous** (66 Ma): Deccan Traps LIP + Chicxulub impact

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## **IMPLICATIONS**

### **For Understanding Extinctions**

- Many "extinctions" may not be real death events
- They're the END of good preservation conditions
- Life continued but wasn't fossilized until next burial event

### **For Dating Methods**

- Circular reasoning: LIPs both create AND date fossils
- Need to separate burial events from biological events

### **For Climate Interpretations**

- "Glaciations" may actually be impact/volcanic events
- Diamictites ≠ necessarily ice
- Need alternative explanations for poorly sorted deposits

### **For The Fossil Record**

- Gaps = absence of burial conditions (normal)
  - Clusters = catastrophic burial events (rare)
  - The record is preservation bias, not death record
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## **QUESTIONS REMAINING**

1. Which other "glacial" deposits are actually impact/volcanic ejecta?
  2. How many "extinctions" are real vs. preservation artifacts?
  3. Can we identify specific LIPs for each period boundary?
  4. What is the actual impact crater record vs. identified craters?
  5. How does this change our understanding of evolution rates?
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## **METHODOLOGY NOTES**

### **How to Test This Hypothesis**

1. Look for LIPs at every "extinction" boundary
2. Search for impacts at same times

3. Check if "tillites" are on ancient cratons (preservation bias)

4. Look for shock features in "glacial" deposits

5. Test alternative mechanisms for diamictite formation

## **Evidence Types**

- **Physical:** Rock layers, crater structures, shock features
- **Chemical:** Isotopic signatures, iridium anomalies, volcanic chemistry
- **Spatial:** Global distribution on cratons
- **Temporal:** Correlation of LIPs, impacts, and "extinctions"

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*This document will be updated as we continue investigating the catastrophic burial hypothesis through geological time.*