



HORIZON FILES RESEARCH PAPER

FORTY DAYS

Rotational Deceleration, Hydrodynamic Concentration, and the Formation of Catastrophic Bone Beds

A hypothesis-development paper testing whether prolonged circulation change could concentrate biological debris without requiring an instantaneous global mega-tsunami.

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Research status: Exploratory hypothesis. The forty-day rotational scenario is not presented as an established historical event. The purpose is to derive testable predictions and identify evidence capable of falsifying the idea.

Abstract

Popular pole-shift narratives often assume an effectively instantaneous halt of Earth's rotation, leaving the atmosphere and oceans moving at the former surface velocity. This paper tests a different thought experiment: distribute a major rotational change over forty days. Reducing equatorial rotational velocity (about 465 m/s) uniformly to zero over 40 days gives a mean tangential deceleration of about $1.35 \times 10^{-4} \text{ m/s}^2$. The scenario remains extreme, but the dominant physics changes from a single inertial impulse to prolonged forcing, angular-momentum exchange, circulation reorganization and mass redistribution.

The paper then connects that result to vertebrate taphonomy. Published bone-bed studies demonstrate hydraulic sorting, drift concentration, reworking, debris-flow transport and depositional trapping. A maritime observation supplies the hypothesis-generating analogy: floating pollution and natural debris often concentrate in eddies, convergence zones and low-throughput recirculation environments rather than in the fastest current. The proposed hypothesis is that some dense bone accumulations may record prolonged hydrodynamic concentration followed by burial, rather than a single enormous wave.

1. Research Question

Does stretching a hypothetical major reduction in Earth's rotation across forty days change the expected depositional mechanism from instantaneous global wave transport toward prolonged hydrodynamic redistribution and concentration?

The forty-day interval is a scenario parameter inspired by recurring ancient flood traditions. Its presence in ancient texts is not evidence that Earth's rotation changed. It is useful because it converts an instantaneous-catastrophe claim into a finite-timescale physical problem.

2. First-Order Physical Model

At the equator, Earth's surface speed is approximately 465 m/s (about 1,040 mph). A linear reduction to zero over 3,456,000 seconds gives $a = 1.35 \times 10^{-4} \text{ m/s}^2$, roughly 14 millionths of standard gravity. The atmosphere and ocean would not remain dynamically detached from the slowing surface for forty days; friction, terrain, turbulence and pressure gradients would continuously exchange momentum. Actual winds would require a general-circulation model.

Stopping interval	Mean tangential deceleration
1 second	465 m/s ²
1 minute	7.75 m/s ²
1 hour	0.129 m/s ²
1 day	0.00538 m/s ²
40 days	0.000135 m/s ²

3. Ocean Response

NOAA tsunami references use the shallow-water relation $c = \sqrt{gh}$. At 4,000 m depth, tsunami phase speed is about 198 m/s or 713 km/h. Ocean-basin communication therefore occurs on timescales of hours, much shorter than forty days. A slowly forced ocean would have repeated opportunities to redistribute mass while forcing continued.

A crude equilibrium estimate uses free-surface slope approximately equal to a/g . Across 10,000 km, the forty-day mean

tangential acceleration corresponds to a characteristic height difference of roughly 138 m; across 20,000 km, roughly 275 m. These are **not tsunami-height predictions**. Complete cessation of rotation would additionally alter centrifugal acceleration and Earth's equilibrium figure, requiring a far more sophisticated global model.

4. Maritime Observation and the Hypothesis

Mariners routinely observe that debris does not remain distributed according to current speed alone. Floating material can collect along fronts, shear boundaries, windrows, convergence lines, eddy margins, recirculation cells and sheltered low-throughput regions. The accumulation point can therefore be a relatively low-speed environment supplied by faster surrounding flow.

The concentration point is not necessarily the place of greatest violence; it may be the place where transport loses the ability to keep material dispersed.

This observation is not evidence for an ancient rotational event. It is a source of a testable depositional hypothesis.

5. Taphonomic Context

Bone-bed formation is diagnosed using articulation, skeletal-element representation, abrasion, weathering, breakage, orientation, sedimentology, taxonomic mixture, size sorting and evidence for reworking. Published cases demonstrate multiple pathways. The Naskal assemblage includes drought-related mortality with hydraulic sorting. The Lamy amphibian quarry shows hydrodynamic sorting. Dalton Wells records debris-flow-hosted bone beds with earlier hydraulic winnowing and later reworking. The Geraldine Bonebed includes carcasses and plant debris interpreted as concentrated by wind-induced drift. These examples establish that concentration can be a secondary physical process superimposed on a separate mortality mechanism.

6. Proposed Hydrodynamic Concentration Hypothesis

During a prolonged large-scale circulation disturbance, biological remains may be transported through energetic flow but preferentially accumulate in persistent convergence zones, recirculation cells, channel lags, eddy margins or topographic traps. A later burial event may preserve the concentration as an apparently catastrophic bone bed.

The model separates three processes often treated as one: mortality, concentration and burial. They may be simultaneous, but they need not be.

7. Competing Predictions

Observation	Rapid high-energy event	Prolonged concentration
Orientation	Single event-flow fabric may dominate.	Repeated or changing preferred fabrics may occur.
Sorting	Size/density segregation during transport.	Selective retention and lag concentration expected.
Weathering	Potentially similar if burial is rapid.	Mixed stages more plausible with variable residence times.
Articulation	Rapid burial may preserve articulation.	Long residence generally favors disarticulation.
Sediments	Event bed and erosional/high-energy signatures.	Lag, reworking, slack-water or multiple depositional pulses.

8. Falsification

The concentration model should be rejected for a site if independent sedimentological and taphonomic evidence shows that mortality, transport and final burial occurred in one rapid event and a prolonged collector adds no explanatory value. Evidence of mixed weathering stages, hydraulic sorting, repeated reworking, current-controlled orientation, lag deposits or depositional trapping would instead justify testing a multi-stage model.

Even if hydrodynamic concentration explains a bone bed, that does not demonstrate that Earth's rotation changed. The rotational hypothesis requires an independent global geophysical signature. Bone beds alone cannot carry that inference.

9. Proposed Research Program

Select well-documented bone beds with quarry maps and sedimentological data. Classify each site without reference to the rotational hypothesis. Model simplified circulation fields containing convergence and recirculation zones and release particles with different sizes and densities. Compare predicted sorting, orientation and residence-time signatures with fossil assemblages. Only after the depositional mechanism is independently tested should broader paleogeophysical correlations be considered.

10. Conclusion

Changing an assumed instantaneous rotational catastrophe into a forty-day process fundamentally changes the physical question. The mean imposed tangential deceleration becomes small while the duration becomes long relative to ocean-basin communication times. The expected response shifts away from a simple picture of one global wall of water toward sustained circulation reorganization, redistribution and evolving convergence zones.

The maritime debris analogy is therefore scientifically useful as a hypothesis generator. Fossil concentration need not identify the location or intensity of the original mortality event; under some conditions it may identify a hydraulic collector. Existing taphonomic research already establishes hydraulic sorting, drift concentration, reworking and depositional trapping as real bone-bed-forming processes.

The testable proposition is modest: **some deposits popularly interpreted as evidence of singular catastrophic transport should be re-examined as possible products of prolonged hydrodynamic concentration.** Whether a forty-day rotational disturbance ever occurred is a separate and substantially harder hypothesis.

References and Selected Literature

1. NOAA / Pacific Marine Environmental Laboratory. *Tsunami Warning Center Reference Guide*. Shallow-water wave relation $c = \sqrt{gh}$ and tsunami propagation fundamentals.
2. Gonzalez, F. I. et al. NOAA/PMEL. *Tsunami Hazard Assessment and Nuclear Power Plant Sites*. Representative phase speeds, including approximately 713 km/h at 4,000 m depth.
3. Prasad, G. V. R. & Khajuria, C. K. (1998). Taphonomy of a Late Cretaceous mammal-bearing microvertebrate assemblage from Naskal, India. *Palaeogeography, Palaeoclimatology, Palaeoecology* 137:153-172.
4. Lucas, S. G. et al. (2010/2011). Taphonomy of the Lamy amphibian quarry: a Late Triassic bonebed in New Mexico. *Palaeogeography, Palaeoclimatology, Palaeoecology*.
5. Britt, B. B. et al. (2009). Taphonomy of debris-flow hosted dinosaur bonebeds at Dalton Wells, Utah. *Palaeogeography, Palaeoclimatology, Palaeoecology* 280:1-22.
6. Taphonomic study of the Lower Permian Geraldine Bonebed, Archer County, Texas (1987). *Palaeogeography, Palaeoclimatology, Palaeoecology* 61:221-236.
7. Voorhies, M. R. and related vertebrate-taphonomy literature on hydrodynamic sorting, transport groups and skeletal-element behavior in fluvial systems.
8. Behrensmeyer, A. K. Foundational vertebrate taphonomy research on fluvial transport, weathering and preservation.

Methodological note: This paper deliberately distinguishes established processes from the proposed paleogeophysical scenario. Numerical values are first-order estimates intended to define scale and testable questions, not to substitute for coupled atmosphere-ocean-solid-Earth modeling.