



New Theory and New Challenge for the Richat Structure Formation

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Abstract



The Richat Structure (Eye of the Sahara, Mauritania), a ≈ 50 km circular feature, is conventionally explained as the slow erosion of a approx 100 million year old igneous dome. This paper proposes the **Catastrophic Aqueous Vortex Model (CAVM)**, which posits that the structure's distinct geometry and central igneous core are products of a single, **rapid, high-energy hydrodynamic event** tied to the **Global Flood approx $\approx 4,400$ years ago** and **Catastrophic Plate Tectonics (CPT)**. We hypothesize that a massive, stable **Horizontal Aqueous Vortex** rapidly carved the structure at a geological weak point. We present four critical lines of physical evidence—including the structure's unique fluid mechanics signature—to challenge the long-age, slow-erosion paradigm.

Key Words

Richat Structure's formation , Catastrophic Aqueous Vortex Model , Catastrophic Plate Tectonics , Fountains of the Great Deep , Rapid Erosion and Preservation, Fluid Inclusions.

1. Introduction and Traditional Interpretations

The Richat Structure's striking ≈ 50 km circular symmetry is unique. Following the rejection of the impact crater hypothesis (due to the lack of **shocked quartz**), the mainstream view adopted the model of a slowly eroded, 100 million year old elliptical dome (Carbonatite-Alkaline Complex) [1,2].

However, this paper contends that the geometry, preservation state, and geological evidence are better explained by a **single, short-duration catastrophic event**.

2. The Catastrophic Aqueous Vortex Model (CAVM)

The CAVM places the Richat Structure's formation within the highly energetic, short timeframe of the Global Flood, synchronous with the onset of Catastrophic Plate Tectonics.

2.1. Simultaneous Driving Forces

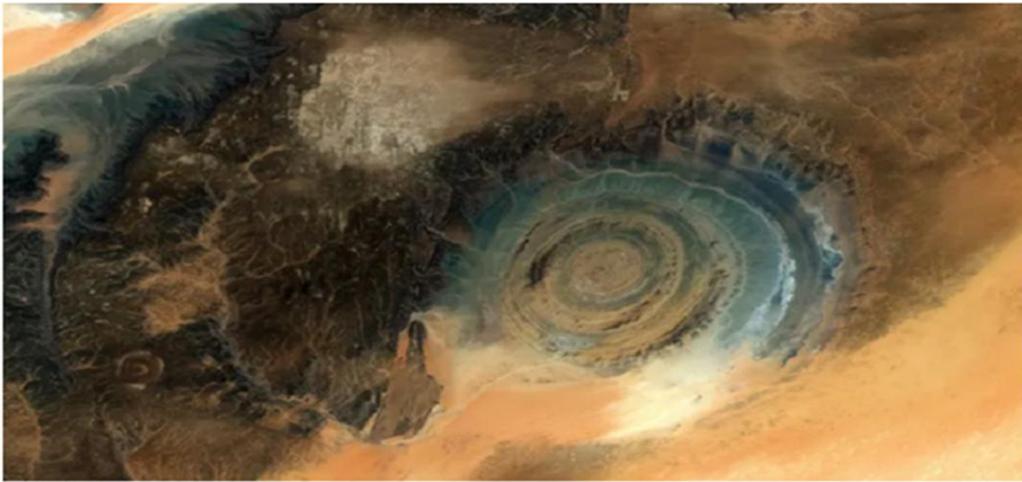
The immense energy required for such rapid carving and magmatic extrusion originated from the synchronized action of three forces:

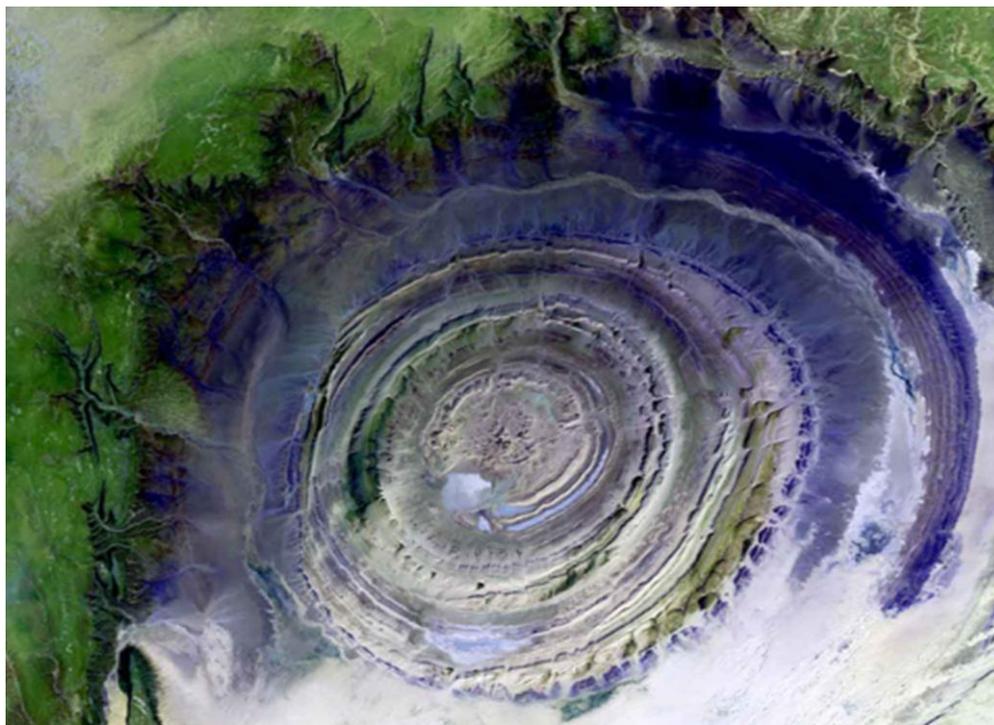
1. **Internal Energy Source:** A **geological weak point** at the Richat location allowed for the catastrophic **upwelling of magma** (carbonatite/kimberlite), associated with the "**Fountains of the Great Deep**".
 2. **Kinetic Energy:** The rapid displacement of water caused by the vigorous and massive movement of continental plates (CPT) generated a profound hydrodynamic force.
 3. **Hydrodynamic Energy:** The interaction between the rapidly ejected magma and the displaced floodwaters created a turbulent, colossal **Aqueous Vortex**.
- **Anticipated Criticism:** The conventional view holds that carbonatites derive from unique, deep mantle sources, implying slow, deep magmatic processes.
 - **Rebuttal:** The CPT framework necessitates **massive, rapid upwelling and degassing** from the mantle ("Fountains of the Great Deep"). This mechanism inherently provides the means to rapidly transport these **deep-seated, carbon-rich magmas** (Carbonatites) to the surface, perfectly synchronizing the required unique composition with the catastrophic surface event.

2.2. Mechanism, Geometry, and Stability

The vortex carved the structure by acting as a rapidly spinning abrasive tool, confined to the 50 km diameter.

- **Rotational Integrity (Axial Stability):** The stability of the vortex at this massive scale was ensured by the synergy of internal and external forces. The continuous, high-pressure **magma/steam upwelling** from the center served as a stable **Axial Pivot**, organizing the fluid dynamics. The immense **Tectonic Shear force** from the moving plates provided the initial **Torque** required to force the water into an organized, **counter-clockwise** rotation, which was then sustained by the Coriolis effect.
- **Rapid Erosion and Preservation:** The Horizontal Aqueous Vortex rapidly carved the concentric layers through differential erosion. The 50 km diameter represents the **maximum effective reach** of the rotational force. The carving ceased abruptly due to the **short duration of the Cataclysm** (approx 40 - 150 days), preserving the pristine geometry (Ref Figures "A" & "D").





Figures "A" of the Richat Structure from different angles

3. Physical Evidences / Testable Predictions

The CAVM is supported by existing geological findings and requires three critical, unique tests to prove the catastrophic mechanism.

3.1. Extant Evidence: Marine Fossils (Ref. Figures "B") :

The discovery of **Paleozoic marine fossils** (trilobites, brachiopods) Ref."B" within the structure's sedimentary rings is compelling evidence that the area was covered by **massive volumes of water** [3]. This confirms the required medium for the vortex's operation—the global floodwaters.



Figures "B" for Trilobites

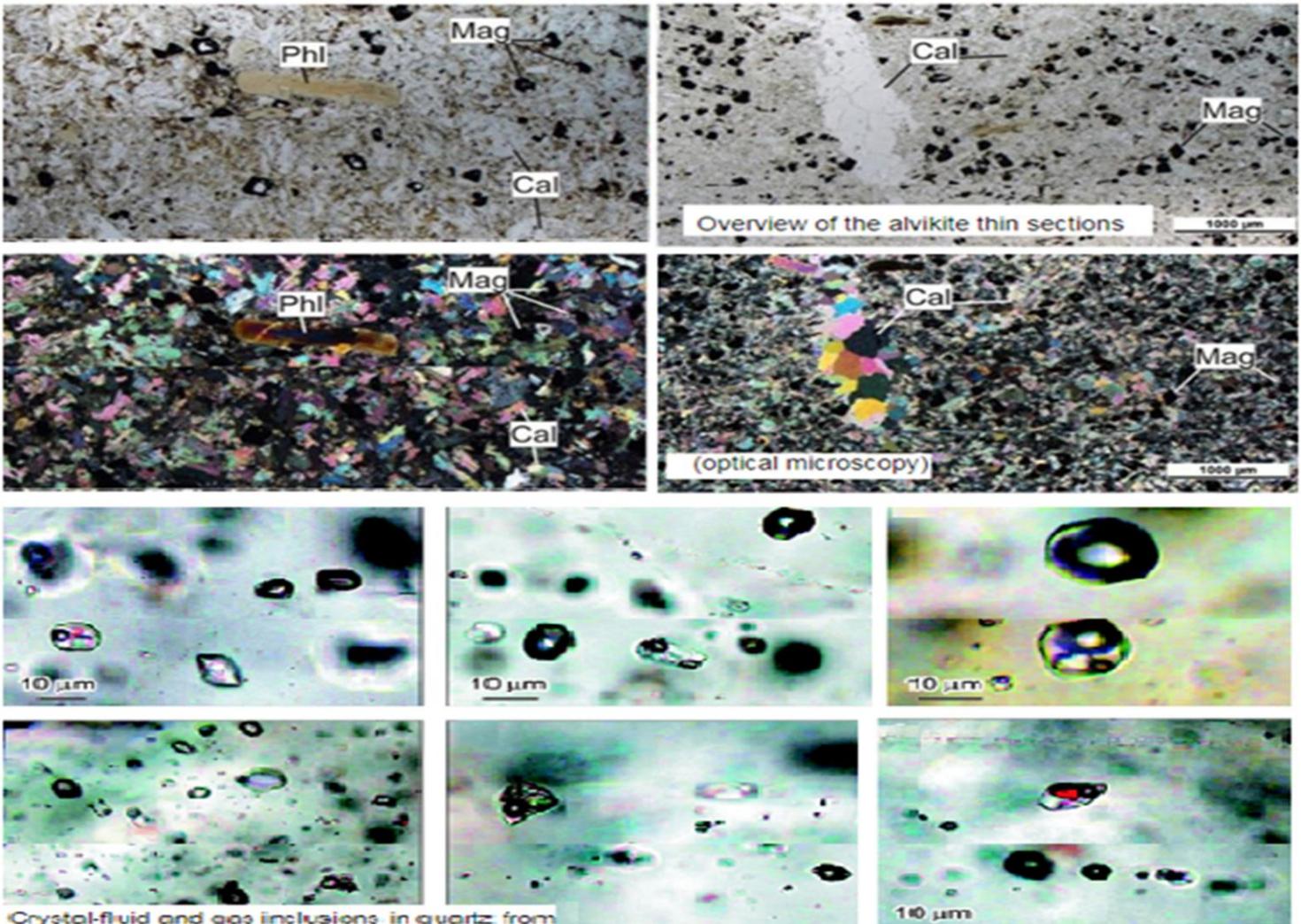
3.2. Geochemical Evidence of Rapid Quench:

The central igneous core must demonstrate formation via violent, water-contact cooling, inconsistent with slow subterranean cooling.

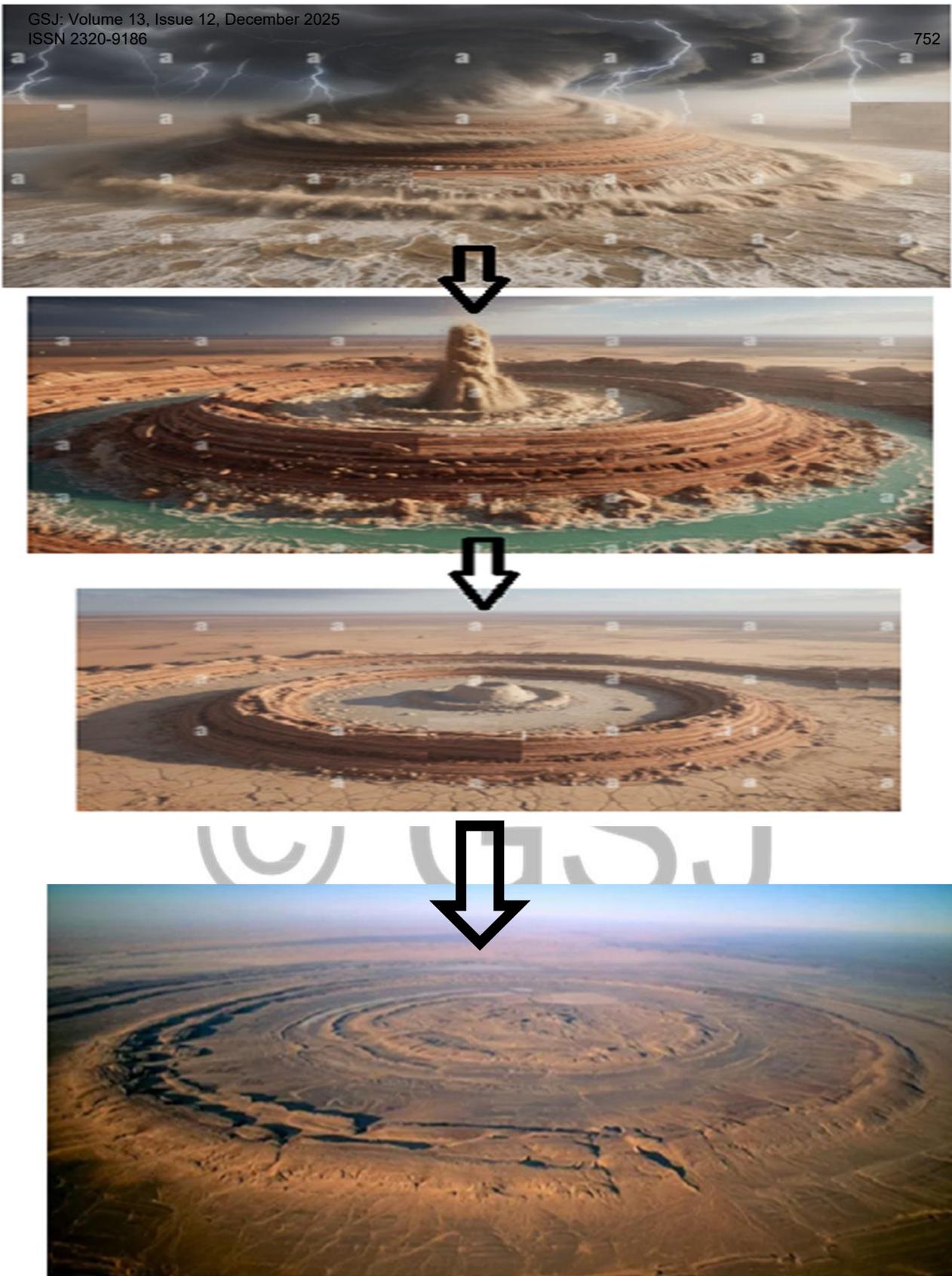
Prediction: Analysis should show physical signs of thermal shock and rapid pressure sealing.

Test: Petrographic and Geochemical Analysis of the central **Carbonatite** and associated fine-grained rocks (e.g., **Alvikite**).

Findings: The presence of **fine-grained textures** (Alvikite) and, crucially, abundant **Fluid Inclusions** within the crystals (Ref. Figures "C" below). The existence of these inclusions proves **rapid sealing** of the crystal structure under the extreme pressure of the overlying water column, validating the simultaneous nature of the magma intrusion and the flood event [5].



**Figures "C" Showing The fine-grained textures for Alvikite
And abundant Fluid Inclusions within the Quartz crystals**

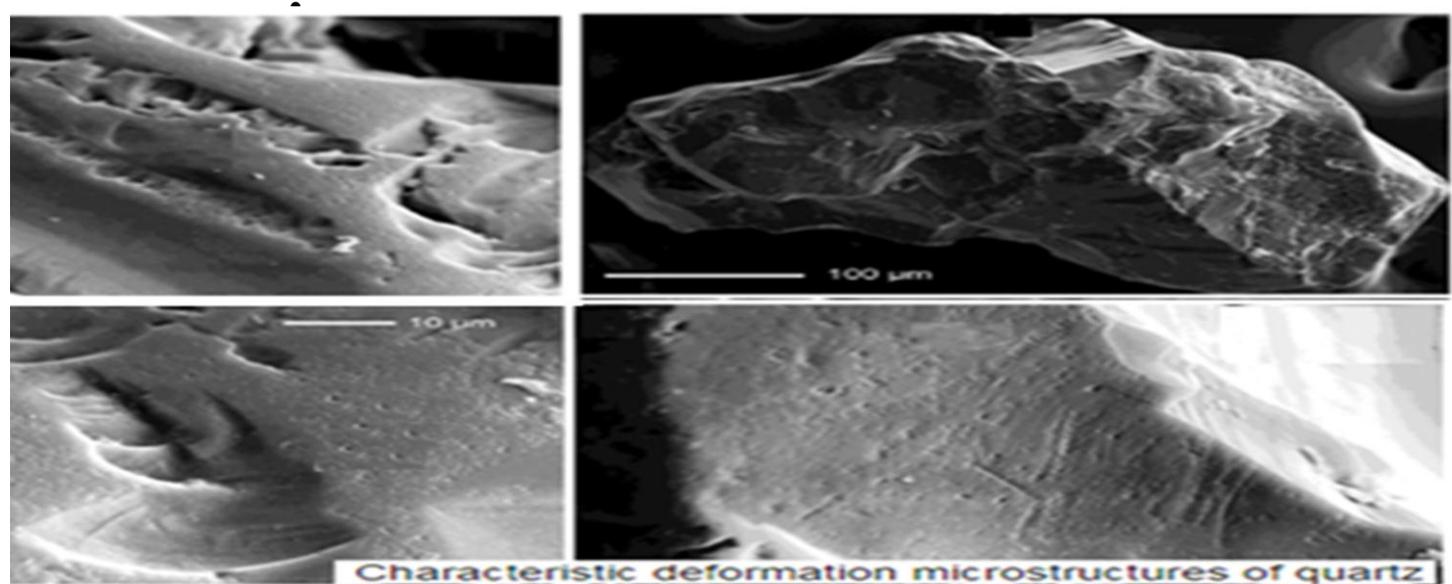


Figures "D" showing the stages of the formation of Richat Structure based on the Catastrophic Aqueous Vortex Model with rotational erosion

3.3. Mechanical Evidence of Rotational Erosion (Ref. Figures "D") :

The circular macro-signature must be confirmed at the micro-level to prove rotational carving.

- **Prediction:** Quartz grains will show unique, high-energy impact damage.
- **Test: Scanning Electron Microscopy (SEM) analysis** of surface textures of Quartzite/Sandstone layers.
- **Finding:** Discovery of **deep striations, crescentic fractures, and rotational wear patterns** (Ref Figures E) that cannot be explained by slow, low-energy processes like wind or gradual surface runoff [4].



Figures "E" Microstructures of Quartz with Crescentic fractures, rotational wear patterns and deep striations

3.4. Chronological Evidence (Short Age) :

The prevailing long-age interpretation is contingent upon the established date.

- **Prediction:** The formation must be dated to the short-age timeframe.
- **Test:** Application of **short-range dating techniques** (e.g., C-14 analysis on any suitable associated organic material or other short-age radioisotope dating methods) to challenge the existing Ar-Ar dates (approx 100 Ma).
- **Finding:** A date consistent with a **post-Creation, post-Flood timeframe**, which would decisively overturn the foundation of the long-age model [6].

4. Conclusion

The Catastrophic Aqueous Vortex Model (CAVM) provides a cohesive, physically plausible, and energetically coherent explanation for the Richat Structure, successfully integrating its unique circularity, central composition, and geological context. The discovery of the predicted short-age, rapid quench, and rotational micro-erosion signatures would provide definitive empirical validation for this catastrophic hypothesis.

In light of this new theory, the Catastrophic Aqueous Vortex Model (CAVM), presented as a new challenge, compels the scientific community to undertake further critical tests to evaluate the extent to which any theory can be applied. This is especially true for C-14 dating across the Richat structure and its contents and spectroscopic data analysis for rocks and minerals, as referred and mentioned in this theory.

Some References

[1] Matton, G. and Jébrak, M. (2014) ‘The “eye of Africa” (Richat dome, Mauritania): An isolated Cretaceous alkaline–hydrothermal complex’, *Journal of African Earth Sciences*, 97, pp. 109–124. <https://doi.org/10.1016/j.jafrearsci.2014.04.006>

[2] Matton, G., Jébrak, M. and Lee, J.K.W. (2005) ‘Resolving the Richat enigma: Doming and hydrothermal karstification above an alkaline complex’, *Geology*, 33(8), pp. 665–668. <https://doi.org/10.1130/G21542AR.1>

[3] Sougy, J. (1964). Les formations paléozoïques du Zemmour Noir (Mauritanie septentrionale). (Documents the presence of Paleozoic sedimentary strata and marine fossils in the region).

https://primo.sorbonne-universite.fr/discovery/fulldisplay/alma991001774439806616/33BSU_INST:33BSU

https://en.wikipedia.org/wiki/Richat_Structure

[4] The Eye of The Sahara: Richat Structure

<https://www.geologyin.com/2022/11/richat-structure-geological-wonder-in.html>

[5] Richat structure in Mauritania Sahara desert

<https://www.facebook.com/groups/ancientcivilizations.st/posts/1244248403218532/>

https://www.researchgate.net/figure/The-about-50km-wide-Richat-structure-of-western-Mauritania-For-details-see-text-Space_fig37_260112404

[6] Unveiling the Mysteries of the Richat Structure

<https://www.youtube.com/watch?v=iuZpxQg3LII>

https://scholar.google.com/scholar?q=richat+structure&hl=en&as_sdt=0,5