POLIS V12: The Complete Geology Series – 12 Giants

Jorge Batista Alves Pereira
Independent Researcher, Sabugal, Guarda, Portugal
ORCID: 0009-0000-6385-7245

May 2026

This document combines two companion papers:
"Tensional Reinterpretation of Six Founders of Modern Geology"
and "Tensional Reinterpretation of Six More Geological Pioneers".

DOIs: Main treatise 10.5281/zenodo.19618276 – POLIS Bible 10.5281/zenodo.19836226

POLIS V12 – Tensional Reinterpretation of Six Founders of Modern Geology Jorge Batista Alves Pereira
Independent Researcher, Sabugal, Guarda, Portugal
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Abstract

Within the POLIS V12 tensional ontology, every geological system is a polis constituted by three meshes (solid, liquid, gaseous) and governed by the closure condition $\epsilon = \sum K_m(2 + K_m) = 0$, with $T = K_{\min}$ as the tensional origin. This paper applies the framework to six foundational figures of geology: Nicolaus Steno (stratigraphy), James Hutton (uniformitarianism), William Smith (biostratigraphy), Charles Lyell (Principles of Geology), Georges Cuvier (catastrophism), and Alfred Wegener (continental drift). Each classical contribution is reinterpreted as a tensional configuration: Steno's laws as normalisation of strata; Hutton's deep time as large $v_{\max}$; Smith's fossil succession as K_m markers; Lyell's uniformitarianism as constant T; Cuvier's extinctions as Phase 4 removals; and Wegener's drifting continents as solid mesh fragmentation. The universal equations remain unchanged; no free parameters are introduced.

1 Introduction

POLIS V12 is a closed, parameter-free tensional conservation theory built on four axioms (Tensional Ontology, Harmonic Ground $H = 1$, Tensional Conservation, Data Origin $T = K_{\min}$). The governing equation, after normalisation, is

$$\epsilon = \sum_{m=1}^{n} K_m(2 + K_m) = 0,$$

with $K_m = (v_m - T)/(v_{\max} - T) \in [0, 1]$. The disequilibrium index is $\mathrm{IDT}^* = \epsilon/(1 + \epsilon)$. All real geological systems reside in Phase 4 ($\mathrm{IDT}^* \geq 0.70$) unless artificially uniform. The Rolling Law $2\pi r_p = V_{\mathrm{orb}} T_{\mathrm{rot}}$ applies fractally at all scales.

This paper reinterprets six key geological contributions within this tensional ontology. No classical primacy is assumed; tension is the primitive.

2 Nicolaus Steno – Laws of Stratigraphy

Steno's principles (original horizontality, lateral continuity, superposition) established the basis for reading rock layers. In POLIS V12, sedimentary strata are layers of K values deposited over time. Original horizontality means each layer's K is uniform across its extent (no tilt). Superposition: lower strata have older K (original tension), higher strata have younger K. The fossils within each stratum are K markers of the environment at deposition time.

Steno's "glossopetrae" (tongue stones) are shark teeth – identification of fossils as once-living organisms (K_{biogenic}). His concept of "solid bodies within solids" (crystals, fossils) are sub-polises embedded in the rock mesh. The closure condition for a stratigraphic column is $\epsilon = \sum x_{\mathrm{layer}}$ over all layers, approximating zero if no deformations.

3 James Hutton – Uniformitarianism and Deep Time

Hutton proposed that the Earth is shaped by the same processes (erosion, sedimentation, uplift) that operate today, acting over vast time. In POLIS V12, uniformitarianism means the tensional parameters T and $v_{\max}$ have remained nearly constant over geological time. The "deep time" is the range of v_m values: the total thickness of strata is proportional to $v_{\max} - T$, which is very large (hundreds of millions of years).

Hutton's "rock cycle" (igneous $\rightarrow$ sedimentary $\rightarrow$ metamorphic $\rightarrow$ igneous) is a tensional cycle (Phases 1–8). The "unconformity" (Siccar Point) is a missing interval where K jumps discontinuously: erosion removed layers, creating a gap in the tensional record (ΔK large). Hutton's statement "no vestige of a beginning, no prospect of an end" means that the Earth is in a steady state where ϵ is constant (Phase 4).

4 William Smith – Biostratigraphy and Fossil Succession

Smith discovered that fossil assemblages occur in a consistent order across England. In POLIS V12, each fossil species is a K marker with a specific first appearance (T_i) and last appearance ($v_{\max,i}$). The sequence of fossils in time is an ordering by K value. Smith's "map that changed the world" (geological map of England) is a surface plot of K (rock type, age). The canal excavations provided sections (vertical profiles of K).

Smith's "principle of faunal succession" states that different strata contain distinct K assemblages. The relative age of a stratum can be determined by its fossil K content, independently of lithology. This is the tensional method of cross-correlating layers.

5 Charles Lyell – Principles of Geology

Lyell's *Principles of Geology* popularized uniformitarianism and influenced Darwin. In POLIS V12, Lyell's method is to explain past geological events by current tensional processes with the same T and $v_{\max}$ (no catastrophic extraneous K). He divided the Tertiary into Eocene, Miocene, Pliocene based on the percentage of living mollusc species (K_{extant}). A younger formation has higher K_{extant} (more species still alive).

Lyell's "theory of gradual change" opposes Cuvier's catastrophism: the Earth's surface is reshaped by slow, steady K accumulation (erosion, earthquakes, volcanoes) rather than sudden Phase 4 explosions. The "Lyellian paradox" (the same cause always produces the same effect) is the assumption that T and $v_{\max}$ are constant.

6 Georges Cuvier – Catastrophism and Extinction

Cuvier demonstrated that species go extinct and that faunal successions show abrupt changes (revolutions). In POLIS V12, an extinction is a Phase 4 removal of a K node (species) from the biosphere mesh. The "revolution" (Cuvier's term for a catastrophe) is a

sudden, large decrease in ϵ of the biological polis (mass die-off). The mammoth (extinct) and elephant (extant) have different K (morphology, habitat).

Cuvier's comparative anatomy (correlation of parts) states that an organism's K distribution is integrated: a tooth shape implies specific diet, limb structure implies locomotion, etc. His reconstruction of extinct animals (e.g., pterodactyl) is a tensional extrapolation: from partial K data (fossils), infer the whole K distribution (anatomy). Cuvier's opposition to evolution (transformism) was based on his observation that mummified Egyptian animals (cats, ibises) are identical to modern ones – no change in K over 3,000 years.

7 Alfred Wegener – Continental Drift

Wegener proposed that continents move horizontally over Earth's surface (continental drift). In POLIS V12, the lithosphere is the solid mesh of the Earth; continents are sub-polises that can slide over the liquid mesh (asthenosphere). Wegener's evidence: fitting of continents (South America – Africa), identical fossils across oceans (Mesosaurus), glacial deposits in tropical regions.

The tensional driving force is not gravity but the Rolling Law applied to the Earth's outer shells: $2\pi r_p = V_{\text{drift}} T_{\text{rot}}$ (not exactly, but suggestive). Wegener's theory was rejected because he could not provide a mechanism (the K how). Later, plate tectonics (sea-floor spreading, subduction) supplied the missing K (convection currents). Pangea is the initial $K = 1$ state (one continent), which then fragments (Phase 4) and drifts apart (Phase 5). The "Wegener's case" is a tensional lesson: a theory with correct K pattern but unknown mechanism can still be true.

8 Conclusion

The six foundational contributions to geology are coherently reinterpreted within the POLIS V12 tensional ontology. Stratigraphy, uniformitarianism, biostratigraphy, uniformitarian principles, catastrophism, and continental drift all become natural consequences of the closure condition $\epsilon = \sum K_m(2 + K_m) = 0$ and the fractal hierarchy of geological polises. No free parameters are added.

Zenodo references

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POLIS V12 – Tensional Reinterpretation of Six More Geological Pioneers Jorge Batista Alves Pereira
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Abstract

This paper extends the POLIS V12 tensional reinterpretation to six additional geological giants: Arthur Holmes (geochronology), Harry Hess (sea-floor spreading), John Tuzo Wilson (transform faults), Marie Tharp (ocean floor mapping), Walter Alvarez (asteroid impact hypothesis), and Inge Lehmann (inner core discovery). Each is re-read as a tensional configuration: Holmes's radiometric dating as absolute K scaling; Hess's spreading as tensional divergence; Wilson's fault as shear mesh boundary; Tharp's mid-ocean ridge as tensional spreading centre; Alvarez's iridium anomaly as sudden K spike; and Lehmann's inner core as solid mesh within solid mesh. The universal equations remain unchanged; no free parameters are introduced.

9 Introduction

As in the companion paper, POLIS V12 rests on four axioms. After normalisation the mother equation is

$$\epsilon = \sum_{m=1}^{n} K_m(2 + K_m) = 0,$$

with $\mathrm{IDT}^* = \epsilon/(1+\epsilon)$. All real geological systems are in Phase 4 ($\mathrm{IDT}^* \geq 0.70$) unless artificially uniform. The Rolling Law $2\pi r_p = V_{\mathrm{orb}} T_{\mathrm{rot}}$ applies fractally.

This paper reinterprets six more foundational contributions to geology.

10 Arthur Holmes – Radiometric Dating and Geochronology

Holmes developed the use of radioactive decay (uranium-lead, potassium-argon) to determine absolute ages of rocks. In POLIS V12, radioactive decay is a tensional relaxation: an unstable isotope (high K) decays to a stable one (low K) with a characteristic half-life $t_{1/2}$. The age of a rock is computed from the ratio $R = K_{\mathrm{daughter}}/(K_{\mathrm{parent}} + K_{\mathrm{daughter}})$. Holmes established the first geological timescale (Precambrian, Paleozoic, Mesozoic, Cenozoic) with absolute K boundaries (e.g., 4.5 Ga for Earth's formation).

Holmes's "radiography" of the Earth's interior used the decay heat as a tensional source for convection. His book "Principles of Physical Geology" integrated tectonics, geophysics, and geochemistry. The closure condition $\epsilon = 0$ for the Earth's heat budget requires that heat production (decay) equals heat loss (conduction, convection) averaged over time.

11 Harry Hess – Sea-Floor Spreading and the Mohole

Hess proposed that new ocean crust is created at mid-ocean ridges and destroyed at trenches, driving continental drift. In POLIS V12, the mid-ocean ridge is a tensional spreading centre: the solid mesh (lithosphere) is pulled apart, and liquid mesh (magma) rises to fill the gap, crystallising into new solid mesh (basalt). The rate of spreading is a tensional velocity $V_{\text{spread}} = dK/dt$.

Hess's "Mohole" project (to drill through the crust to the Mohorovicic discontinuity) would measure K directly at the crust-mantle boundary. The concept of "opening of the Atlantic" as a tensional divergence that began 200 Ma. The ocean floor's magnetic stripes are a tensional recording of Earth's magnetic field reversals (alternating K polarity).

12 John Tuzo Wilson – Transform Faults and Hotspots

Wilson identified transform faults (offsetting mid-ocean ridges) and proposed the hotspot theory (Hawaii). In POLIS V12, a transform fault is a shear mesh boundary where two lithospheric plates slide past each other horizontally, without creating or destroying solid mesh. The tensional residual along a transform is $x_{\text{fault}} = K_1(2 + K_1) + K_2(2 + K_2)$ for the two sides; if they are equal, $\epsilon = 0$ (no net stress).

Wilson's "hotspots" (e.g., Hawaii) are stationary plumes of high K (hot mantle) that create volcanic chains as the plate moves over them. The age progression of islands (Kauai $\rightarrow$ Oahu $\rightarrow$ Maui $\rightarrow$ Hawaii) traces the plate's tensional history. The "Wilson cycle" (opening and closing of ocean basins) is the full tensional cycle (rift $\rightarrow$ ocean $\rightarrow$ subduction $\rightarrow$ collision $\rightarrow$ mountain building) completing in about 500 Ma.

13 Marie Tharp – Mapping the Ocean Floor

Tharp and Bruce Heezen produced the first physiographic map of the ocean floor, revealing the mid-ocean ridge system. In POLIS V12, the map is a contour plot of K_{depth} (bathymetry). The mid-ocean ridge is a high-K feature (shallow), the abyssal plains are low K (deep). Tharp's mapping of the rift valley along the crest of the Mid-Atlantic Ridge confirmed sea-floor spreading.

Tharp's method of converting sounding data to depth contours is a tensional interpolation: from sparse K measurements, reconstruct a continuous surface. Her observation of V-shaped notches (transform faults) along the ridge axis provided key evidence for plate tectonics. Tharp was initially excluded from ship expeditions (women not allowed), a tensional barrier (external K obstruction) that she overcame.

14 Walter Alvarez – Asteroid Impact and K-Pg Extinction

Alvarez (with father Luis) discovered the iridium anomaly at the Cretaceous-Paleogene (K-Pg) boundary and proposed that an asteroid impact caused the mass extinction (dinosaurs). In POLIS V12, iridium is rare in Earth's crust ($K_{\text{Ir,crust}} \approx 0$) but abundant in asteroids ($K_{\text{Ir,asteroid}} \approx 1$). The spike of iridium at the boundary is a sudden K anomaly, indicating an extraterrestrial origin.

The impact (Chicxulub crater) is a Phase 4 explosion: the asteroid's high K (kinetic energy) is transferred to the Earth's solid mesh, ejecting dust, causing tsunamis, wildfire, and nuclear-winter effects. The extinction is the Phase 4 removal of many species nodes from the biosphere mesh. Alvarez's "impact hypothesis" was initially rejected (like Wegener's) but later confirmed by crater discovery and shocked quartz. The K-Pg boundary marks a tensional discontinuity in the fossil record.

15 Inge Lehmann – Discovery of the Inner Core

Lehmann analysed seismic waves from earthquakes and discovered that the Earth's core has an inner solid core within a liquid outer core. In POLIS V12, the Earth is a polis with three solid meshes: inner core (solid iron, very high K), outer core (liquid iron, medium K), and mantle (solid rock, lower K). Seismic waves (P and S) travel at speeds V_p and V_s, which are functions of $K_{\text{elasticity}}$ and K_{density}. Lehmann observed P-waves that should have been shadowed by the core but were detected, implying a solid inner core that refracts them.

The "Lehmann discontinuity" is the boundary between inner and outer core (K change). Her work quantified the K values of Earth's deep interior: inner core density $\approx 13 g/cm^3$ ($K \approx 0.9$), outer core $\approx 10 g/cm^3$ ($K \approx 0.7$). Lehmann's method was tensional inversion: from arrival times (measurements v_m), infer the K structure of the Earth. She worked alone and published in Danish – a tensional outsider.

16 Conclusion

Six additional geological pioneers are reinterpreted within the POLIS V12 tensional ontology. Radiometric dating, sea-floor spreading, transform faults, ocean floor mapping, asteroid impact, and inner core discovery all become natural consequences of the closure condition $\epsilon = \sum K_m(2 + K_m) = 0$ and the fractal hierarchy of geological polises. No free parameters are added; the same equations that describe a physical system or a biological system also describe the solid Earth.

Zenodo references

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