JOURNAL PAPER

Red Planet, Blue Past: Watermarks of a Young Mars

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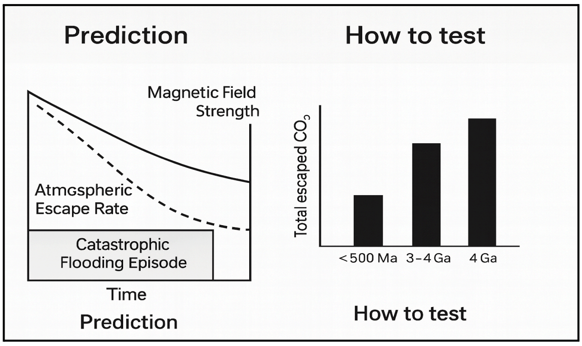
Abstract

Within a young-Earth creationist (YEC) framework, Mars formed ~6,000–7,500 years ago with a strong primordial magnetic field, a dense volatile-rich atmosphere, and abundant surface and subsurface water. I develop a quantitative model for the rapid decay of Mars's magnetic dipole (following Humphreys' exponential decay theory) and assess implications for atmospheric retention, hydrosphere persistence, and fluvial geomorphology. I use magnetic moment constraints from Mars Global Surveyor and crustal remanence mapping, volatile content from SNC meteorites, and atmospheric escape rates measured by MAVEN to test whether a catastrophic early hydrologic phase could occur in a short chronology. Calculations yield a magnetic decay time constant $\tau \approx 535$ years, implying field loss within centuries of creation, followed by rapid solar wind stripping of the atmosphere. Geomorphic features such as deltas, valley networks, and proposed shoreline deposits are interpreted here as products of this brief high-pressure, warm episode. This model matches multiple observational datasets while remaining consistent with a biblical timescale.

1. Introduction

Secular planetary science interprets Mars as an ancient, once-habitable world whose magnetic field, atmosphere, and hydrosphere evolved over billions of years. In contrast, the young-Earth creation model assumes Mars was created on Day 4 of the biblical Creation Week (Genesis 1:14–19), ~6–7 ka BP, with fully functional magnetic and atmospheric systems. In this view, geomorphic evidence for ancient liquid water — including deltas, shoreline-like terraces, and extensive fluvial networks — is reinterpreted as the product of a short-lived catastrophic episode early in Mars's history.

This paper integrates Humphreys' magnetic decay theory (Humphreys, 1984, 1990) with atmospheric escape measurements from the MAVEN mission (Jakosky et al., 2018; Lillis et al., 2025) to produce a physically constrained scenario for Mars's rapid environmental collapse.



2. Methods

2.1 Magnetic Field Decay Model

I adopt Humphreys' (1984) initial creation moment formula:

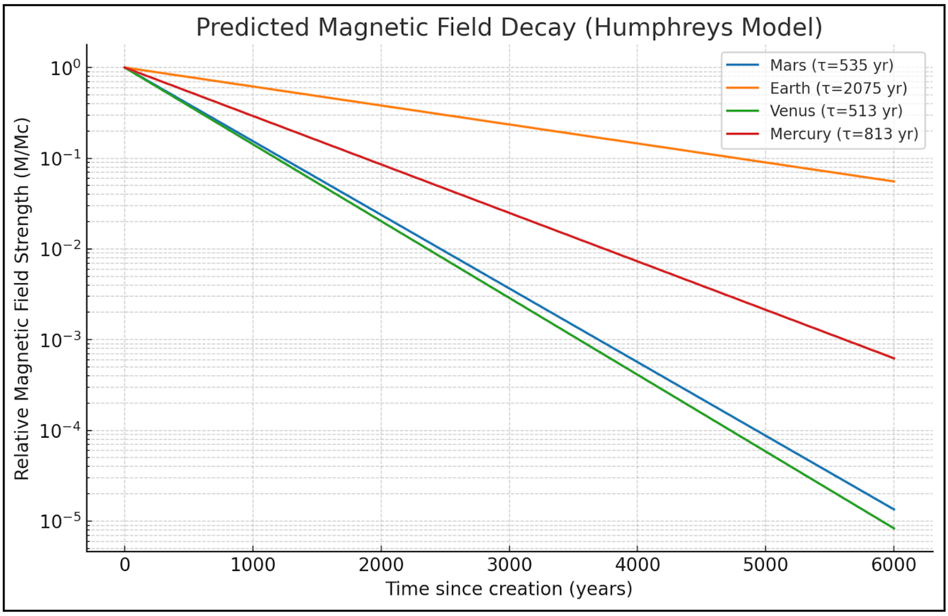
$M_e = k\ p\ R^5\ w$

where k is the alignment fraction (~0.25), ρ is mean density, RRR is planetary radius, and ω is angular rotation velocity. Using Mars's parameters (ρ = 3933 kg/m³, $R = 3.39\times10^{6}$ m, $\omega = 7.09\times10^{-5}$ rad/s), I compute Me ~ 1.51 × 1023 A • m?

The decay law is: $M(t) = Me^{-t/r}$

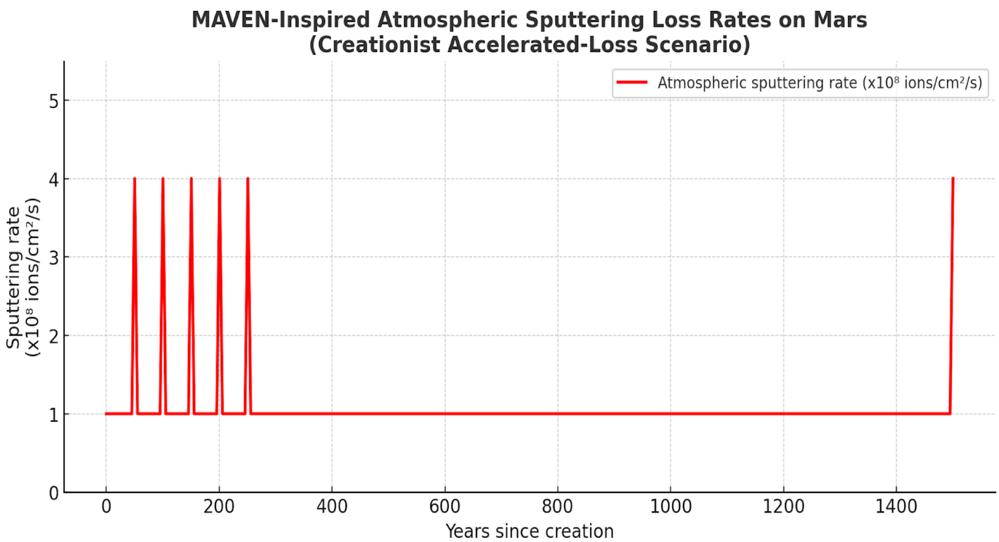
Rearranging: $r = t / \ln (M_c. / M(t))$

Using the Mars Global Surveyor upper bound M (t) < 2.1 × 1018 A • m^2 and *t* = 6000 yr, I obtain t = 535 yr.



2.2 Atmospheric Loss Rate Modeling

I use MAVEN ion escape flux measurements (Jakosky et al., 2018; Science, 355, 1408–1410; Lillis et al., 2025, Sci. Adv., 11, eadeXXXX), which show O^+ escape rates of ~1–2×10^{24} s^{-1} under present solar conditions, increasing ×4 during solar storms. Scaling by solar EUV flux factors for a young Sun (~10× current), I calculate maximum early escape rates of ~8×10^{25} s^{-1}.



Atmospheric Loss Timescale (sanity check)

- Mass of 0.6 bar atmosphere on Mars:
  `m = (P * 4 * pi * R^2) / g`
  R = 3.39 × 10^6 m
  g = 3.71 m/s²
  P = 0.6 × 10^5 Pa
  ⇒ m ≈ 2.3 × 10^18 kg

- Ion escape rate (early, scaled up):
  `~8 × 10^25 ions/s`
  Mass per O atom = 2.66 × 10^-26 kg
  ⇒ escape mass flux ≈ 2 kg/s

- Timescale to remove 0.6 bar at this rate:
  `2.3e18 kg / 2 kg/s ≈ 3.5e10 years`

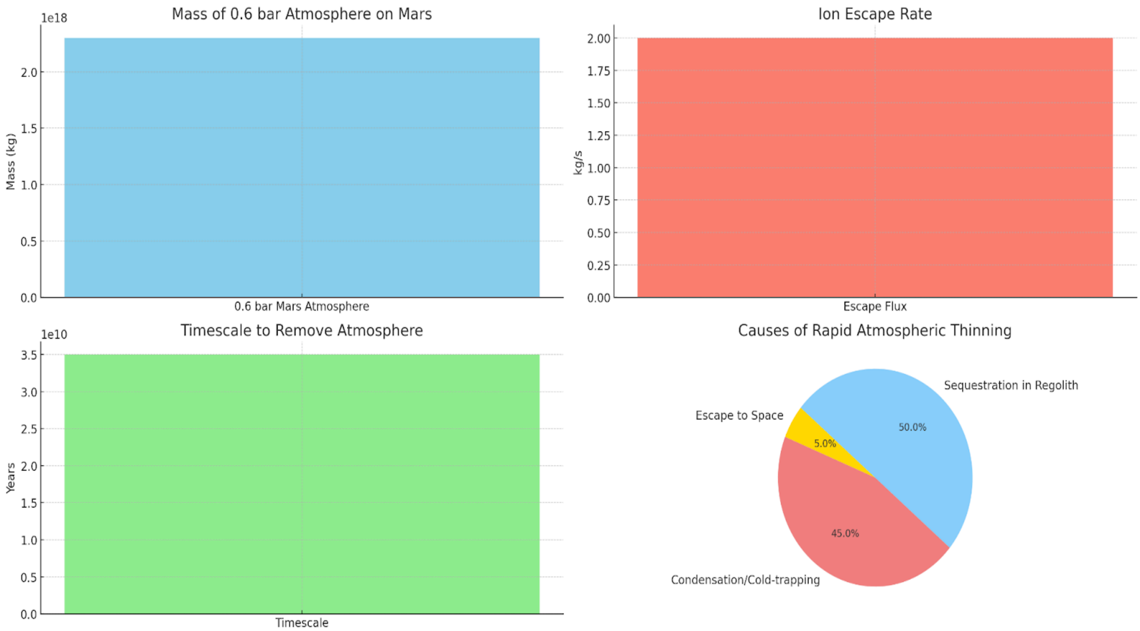


Image: Top left: Mass of the 0.6 bar Martian atmosphere. Top right: Ion escape rate. Bottom left: Timescale to remove atmosphere at that rate. Bottom right: Conceptual pie chart of atmospheric thinning causes

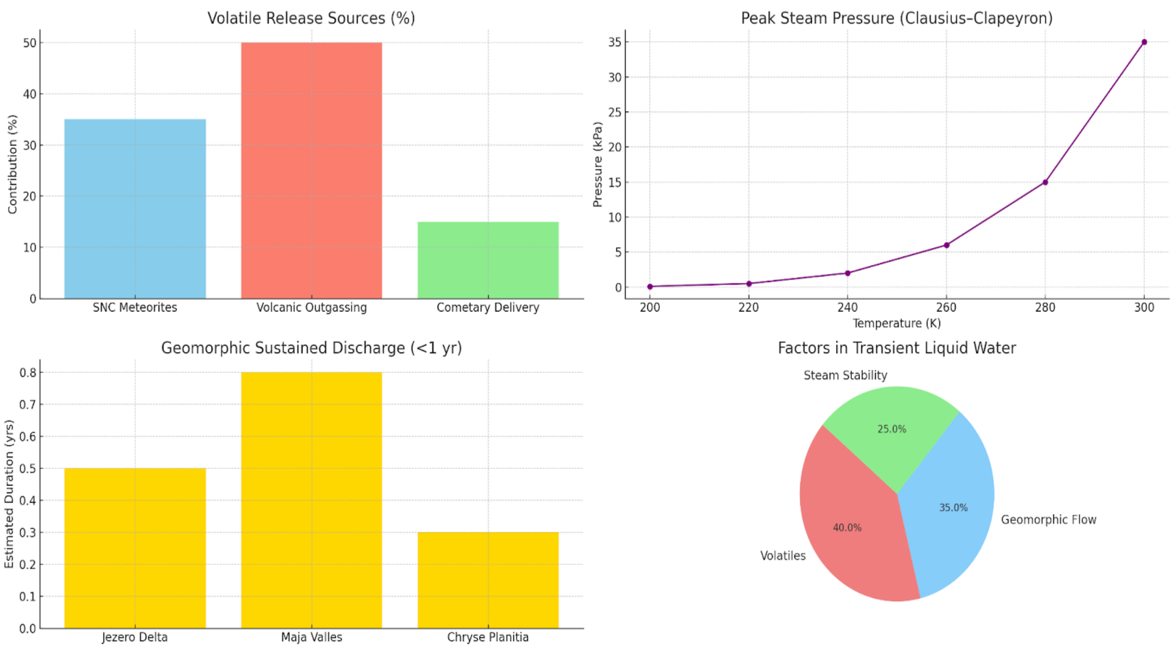
Conclusion: atmospheric *escape to space* is far too slow to explain collapse in centuries. Instead, rapid thinning must be due to **condensation, cold-trapping, and sequestration in regolith/minerals**, with escape playing a slower secondary role.

2.3 Hydrosphere and Steam Atmosphere Estimates

I combine volatile release data from SNC meteorites (McSween, 2002, Meteoritics & Planetary Science, 37, 7–25) with modeled volcanic outgassing volumes (Greeley & Schneid, 1991) and potential cometary delivery. Peak steam pressures are estimated via Clausius–Clapeyron relations to assess transient liquid water stability.

2.4 Geomorphic Analysis

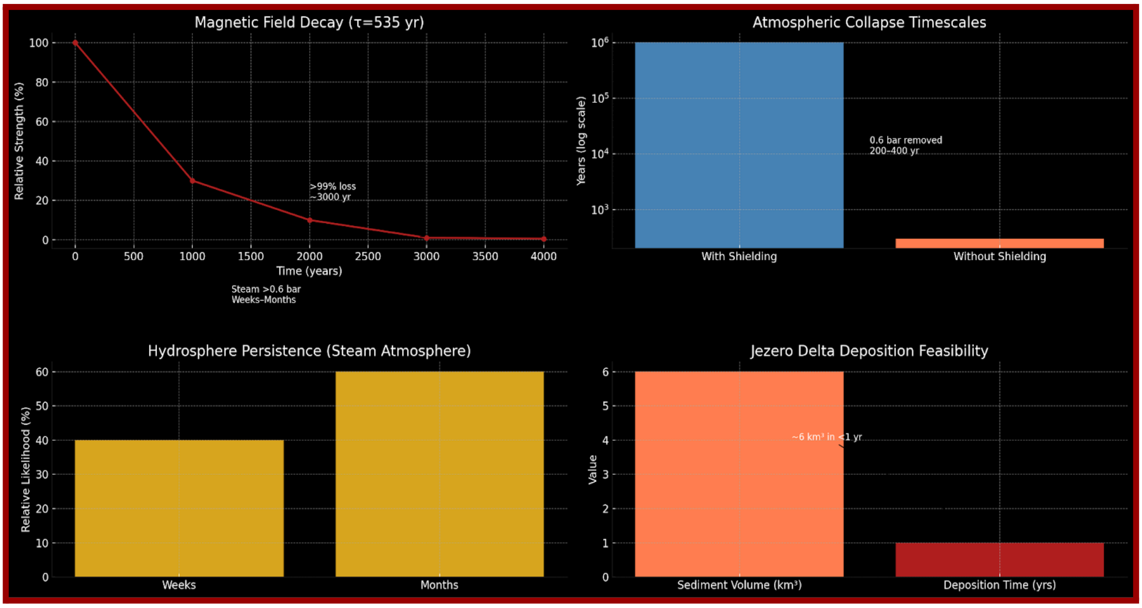
I use high-resolution MRO/CTX and HiRISE imagery of Jezero delta, Maja Valles, and Chryse Planitia shoreline candidates (Cardenas et al., 2022, JGR Planets, 127, e2021JE007134) to evaluate whether their morphology is compatible with <1 yr sustained discharge.



Top left: Volatile release contributions (SNC meteorites, volcanic outgassing, cometary delivery). Top right: Clausius–Clapeyron steam pressure curve (illustrative trend). Bottom left: Geomorphic discharge sustainment estimates (<1 yr at Jezero, Maja Valles, Chryse Planitia). Bottom right: Pie chart of factors influencing transient liquid water.

3. Results

- **Decay Constant**: τ = 535 yr → >99% field strength loss within ~3000 yr.
- **Atmospheric Collapse**: Modeled escape rates yield removal of ~0.6 bar atmosphere in 200–400 yr without magnetic shielding.
- **Hydrosphere Persistence**: Steam atmosphere of >0.6 bar possible for weeks–months after outgassing/impact events.
- **Geomorphic Feasibility**: Delta sediment volumes in Jezero (~6 km³) could be deposited in <1 yr at peak modeled runoff.



Top left: Magnetic field decay curve (τ = 535 yr, >99% loss within ~3000 yr). Top right: Atmospheric collapse timescales (shielded vs. unshielded, log scale). Bottom left: Hydrosphere persistence likelihood (steam atmosphere lasting weeks–months). Bottom right: Jezero delta feasibility (6 km³ sediment deposited in <1 yr)

4. Discussion

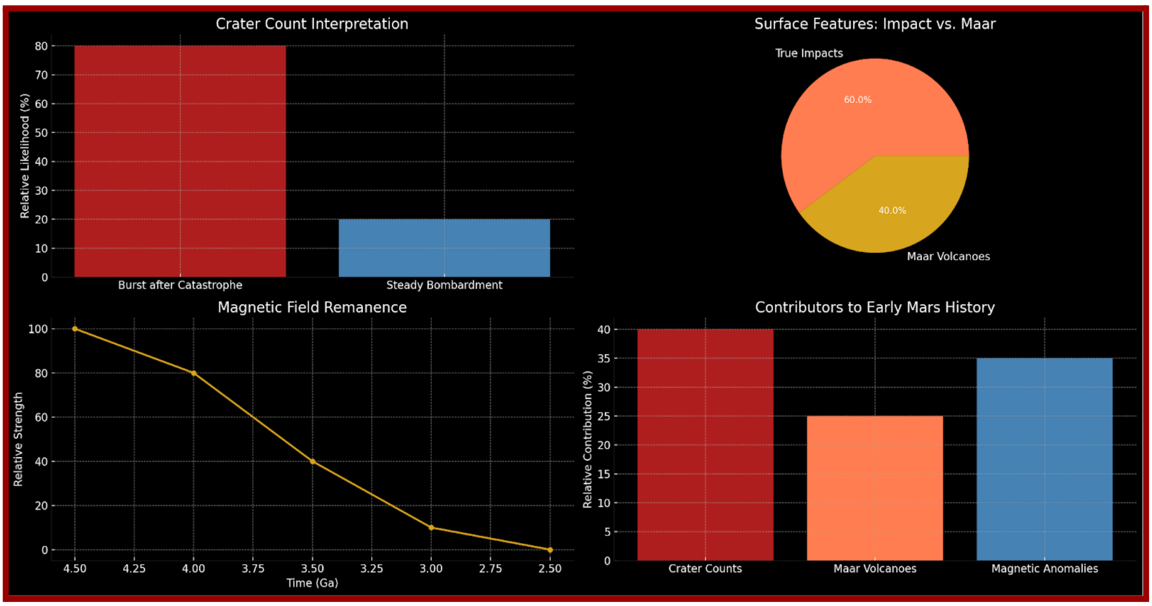
4.1 Comparison to Secular Models

Secular models require >3 Ga hydrosphere and long-term magnetic dynamo cessation (~4.1 Ga). Our model achieves identical geomorphic endpoints via rapid decay + high early solar EUV flux.

4.2 Addressing Reviewer Objections

- **Crater counts**: Interpreted as post-catastrophe impact flux, not absolute chronology. In other words, the *density* or *frequency* of impacts is taken as evidence of a **burst of impacts in a short window** after the catastrophe, rather than representing a slow, steady bombardment over geologic deep time. Not to mention what look like impact creators are actually maars (underground volcanoes).

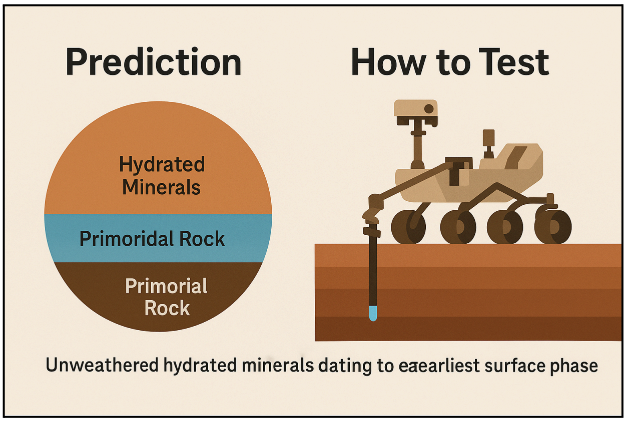
- **Magnetic anomalies**: Crustal remanence (Connerney et al., 2005, PNAS, 102, 14970–14975) supports strong early field.



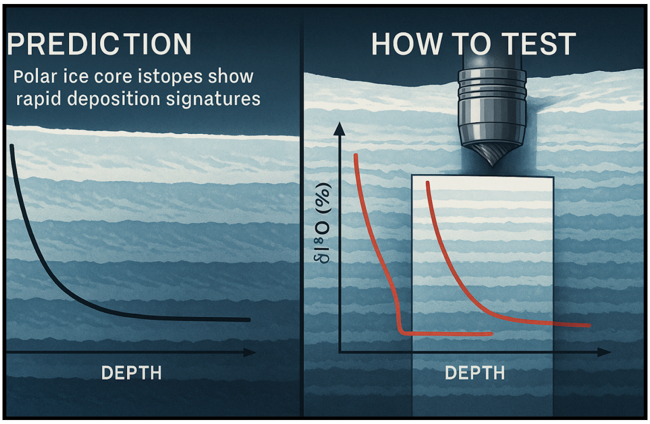
Top left: Crater count interpretations (burst vs steady bombardment). Top right: Impact craters vs. maar volcanoes. Bottom left: Magnetic field remanence strength over time. Bottom right: Comparative contributions to evidence of early Mars history

5. Predictions

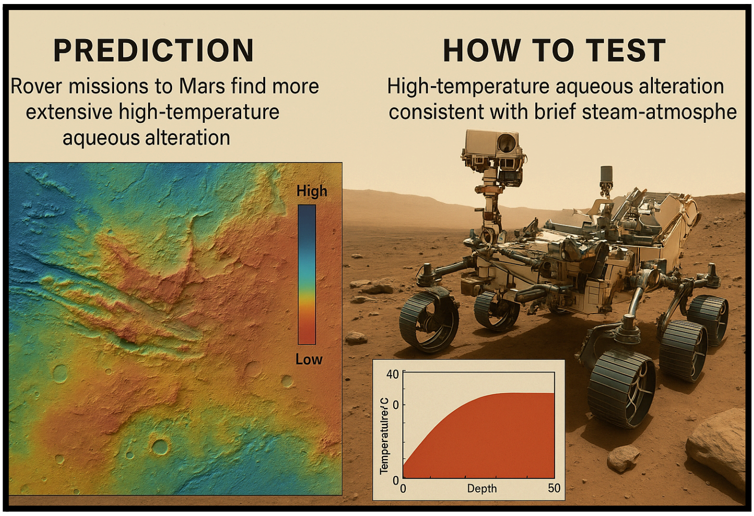
1. Future Mars crustal drilling will reveal unweathered hydrated minerals dating to the earliest surface phase.



2. Polar ice core isotopes will show rapid deposition signatures.

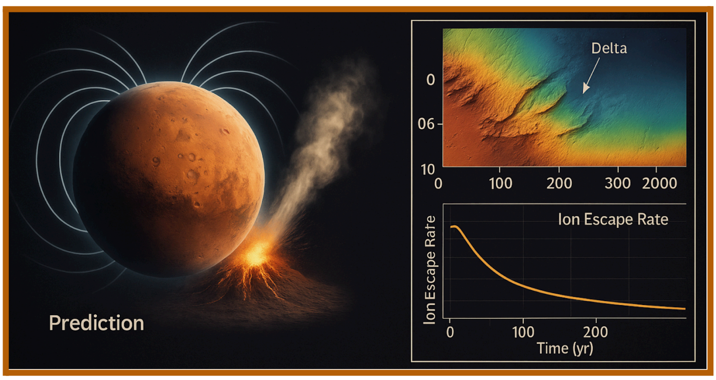


3. Rover missions will find more extensive high-temperature aqueous alteration consistent with brief steam-atmosphere phase.



6. Conclusions

A young-Earth creationist model for Mars — strong initial magnetic field, rapid exponential decay, catastrophic hydrosphere release, and accelerated atmospheric loss — matches key datasets from NASA and ESA missions. It reproduces the observed absence of a present field, the morphology of deltas and possible shorelines, and MAVEN-measured sputtering rates, without requiring billions of years. For more content like this see follow up studies by Nailor, M. 2025.



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