Earth’s First Tectonics: A 3.95-Billion-Year-Old AI Problem

New data suggests subduction began when life was just forming—AI is now modeling it.

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THE DATA

3.95 billion years ago

Earliest evidence of subduction

This discovery redefines the timeline of Earth’s geological evolution during the Hadean eon.

This challenges the long-held view that tectonic activity began only after the Hadean period ended.



Source: nature.com
https://www.nature.com/articles/d41586-026-03499-w

01

AI Models the First Geologic Feedback Loop

AgTech AI systems are now being trained on deep-time geological data to simulate how early mantle dynamics influenced nutrient cycling in primordial oceans. These models use machine learning to identify patterns in rock composition that predate life, suggesting that tectonic activity may have created the first habitable environments on Earth.



02

From Mantle Depletion to Soil Genesis

The same processes that shaped Earth’s crust billions of years ago are now informing AI-driven soil formation models in agroecology. By simulating how tectonic stress and mantle flow contributed to early crustal mineralization, researchers are refining predictive algorithms for soil fertility in degraded lands—especially in arid and post-mining regions.

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