Why Physics Matters in Climate Interpretation

Vault Intro Note

This paper explains why PaleoTech adopts a physics-led interpretation of climate systems. It does not describe specific variables, equations, or models.

1. Correlation versus causation

Many climate analyses rely on correlation between observed variables. While correlations can describe relationships, they do not explain why systems behave as they do, nor when those relationships may break down.

Physics-based interpretation focuses on constraints, balances, and system coupling rather than surface-level coincidence.

2. Conservation and system limits

Physical systems are governed by conservation of energy, mass, and momentum. Climate behaviour is therefore bound, not arbitrary.

Interpreting climate through physical constraints provides stability when empirical relationships weaken.

3. Coupled systems

Atmosphere, oceans, land, and cryosphere are tightly coupled. Changes in one domain propagate through others with delays and feedback.

Physics-based framing emphasises interaction and timing rather than isolated indicators.

4. Why this matters for applied insight

When interpretation is grounded in physical principles, signals can be assessed for plausibility, persistence, and lead time.

This improves confidence in early insight without requiring perfect prediction.