

Can AI Predict Clouds? Not Yet.

A 2026 science review exposes a critical gap in climate modeling — and AI's role in it.

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not yet able to predict how global cloud distribution will evolve

Cloud Distribution Prediction Gap

Despite two centuries of scientific progress, meteorologists still lack the tools to forecast how clouds will shift under climate change.

This gap underscores a deeper systemic issue: even with advanced AI models, we remain unable to simulate fundamental atmospheric processes with high fidelity. The inability to model cloud behavior accurately undermines climate projections and, by extension, AI-driven climate risk assessments. This is not a data problem — it's a modeling and governance failure.

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https://www.nature.com/articles/d41586-026-03217-6?error=cookies_not_supported&code=75ee318d-12b4-4c87-986b-75727ff66e00



01

AI Safety Requires Epistemic Humility

The persistence of cloud prediction gaps despite decades of AI and computational progress reveals a dangerous overconfidence in model-based forecasting. AI safety frameworks must incorporate formal mechanisms for acknowledging and auditing uncertainty, especially in high-stakes domains like climate modeling. Without this, AI systems will propagate false confidence in their outputs, even when foundational physics remains incomplete.



02

Governance Must Preempt Model Overreach

Just as 19th-century cloud science began with a single chemist's observations, today's AI governance must begin with the recognition that current models are incomplete. The failure to predict cloud dynamics reflects not a lack of data, but a lack of epistemic humility in model design. AI safety protocols should mandate transparency about model boundaries — especially when models are used to inform policy, finance, or infrastructure decisions. The danger is not in inaccuracy, but in the illusion of certainty.

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Director, ALEX Companies

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george@alex.realestate · +1 713.918.9951



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