# Climate Risk 2026

## A Decision Analysis Based on Current Physical Evidence

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## Executive Summary

This report assesses current climate risk using a decision-analysis methodology that prioritises direct physical observations, peer-reviewed evidence and explicit treatment of uncertainty. Rather than relying primarily on institutional summaries, it synthesises independent measurements across multiple Earth systems to evaluate aggregate environmental risk.

The assessment concludes that:

- planetary heat accumulation continues to accelerate;
- multiple major Earth-system indicators are simultaneously deteriorating;
- interacting risks are becoming increasingly important;
- uncertainty remains greatest regarding tipping-point timing rather than the direction of change;
- present infrastructure decisions continue to increase long-term climate risk.

This report will be updated periodically as new observational evidence becomes available.

## Finding

**The aggregate climate risk is assessed as already very high, still accelerating, and plausibly entering a regime in which interacting changes become less predictable and increasingly difficult to reverse.**

That conclusion does not depend on one climate model, the UN, a government target or an activist narrative. It follows from several largely independent physical measurements moving in the same direction:

- global temperature;
- planetary ocean heat accumulation;
- ice-sheet mass loss;

- marine heat stress and reef bleaching;
- water-storage depletion;
- continued construction of long-lived fossil infrastructure;
- and credible, though still uncertain, evidence that the AMOC is losing strength and stability.

The strongest evidence concerns **continued energy accumulation**. The exact timing of individual tipping transitions is much less certain.

## 1. Temperature: the baseline has moved

Berkeley Earth's independently compiled land–ocean record estimates 2024 at **1.62 ± 0.06°C above 1850–1900**. Its 2025 analysis found significant warmth across approximately **97% of Earth's surface**, with only about 0.1% significantly cooler than its mid-twentieth-century reference. Different global datasets differ by hundredths of a degree and in annual ranking, but not about the rapid upward shift. (Berkeley Earth)

A single year above 1.5°C is not identical to a permanent multidecadal average above 1.5°C. But treating that distinction as reassuring would be statistical theatre. The physical system does not consult diplomatic definitions before retaining heat.

**Risk interpretation:** high confidence that the climate has entered a substantially warmer operating state; high confidence that continued emissions will drive further warming.

## 2. Ocean heat: the clearest planetary measure

The oceans are the system's main heat reservoir, so ocean heat content is less vulnerable than surface temperature to short-term atmospheric variability.

A 2026 peer-reviewed synthesis using multiple ocean datasets estimated that the upper 2,000 metres gained approximately **23 ± 8 zettajoules during 2025 alone**, setting another observational record. Independent products confirmed continued ocean heat gain. (Springer)

This matters because ocean heat is not merely a temperature statistic. It contributes to:

- thermal sea-level rise;
- marine heatwaves;
- ice-shelf basal melting;
- altered evaporation and rainfall;
- tropical-cyclone energy availability;
- ecosystem migration and mortality.

The fourth global coral-bleaching event exposed approximately **84% of the world's reef area to bleaching-level heat stress** between early 2023 and mid-2025. A peer-reviewed assessment places the continuous 2018–2025 heat-stress footprint even higher, at roughly 87%, with median accumulated heat stress nearly 50% greater than during the previous record event. (Coral Reef Watch)

**Risk interpretation:** extremely high confidence that planetary heat accumulation is continuing; very high ecological risk. Coral systems are already displaying damage at global rather than local scale.

## 3. Ice loss: persistent, measured and cumulative

GRACE and GRACE Follow-On gravimetry show continuing mass loss from both major ice sheets. Current observational summaries estimate average losses since 2002 of approximately:

- **264 billion tonnes per year from Greenland**;
- **135 billion tonnes per year from Antarctica**.

These figures come from changes in Earth's gravity field, not political pledges or modelled aspirations. (NASA Science)

The annual rate varies, and future acceleration remains uncertain. But the sign of change is not uncertain. Both ice sheets are losing mass, and the losses are contributing directly to rising sea level.

**Risk interpretation:** very high confidence in continuing ice loss; high long-term risk because committed sea-level rise continues long after atmospheric temperatures stabilise.

## 4. AMOC: uncertainty is real, but it is not reassuring

This is the area requiring the most disciplined language.

There is no direct observational proof that an AMOC collapse is imminent. The instrument record is relatively short, and model structures disagree.

But several important findings now coexist:

- A recent observationally constrained study projects approximately **51 ± 8% AMOC weakening**, substantially greater than the conventional multimodel mean. (Science.org)
- Some high-complexity climate models retain an overturning circulation through this century and therefore find complete twenty-first-century collapse unlikely. Those same studies still acknowledge substantial weakening and collapse risk. (Nature)
- Proxy-based early-warning analyses find declining stability and suggest that mainstream Earth-system models may be too stable. (arXiv)
- New rate-dependent experiments indicate that collapse risk may depend not merely on the final temperature but on **how rapidly forcing rises**; simulated collapse occurred around +2.2°C to +2.8°C under faster forcing pathways, while slower forcing allowed more adjustment. This is recent pre-publication work and deserves less weight than replicated observational findings, but the mechanism is physically important. (arXiv)

So the honest conclusion is not "AMOC collapse is certain," nor "models say it is unlikely, so relax."

It is:

> **Material weakening is likely; collapse timing is unresolved; consequences are so large that even a moderate probability demands precautionary planning.**

A severe weakening or collapse would redistribute heat rather than simply "cool Europe." It could alter European rainfall, tropical rain belts, monsoons, Atlantic storm environments, marine ecosystems and regional sea level. Simulated European hydroclimate under collapse becomes markedly drier in many areas. (HESS)

**Risk interpretation:** medium confidence in substantial weakening, low confidence in collapse timing, but very high consequence. Therefore, high decision risk.

## 5. Jet-stream behaviour: plausible concern, weaker attribution

This is where popular climate commentary often outruns the evidence.

Large, persistent jet-stream waves unquestionably produce prolonged heat, drought, flood and cold-air outbreaks. The harder question is whether anthropogenic Arctic amplification has already produced a robust long-term increase in jet waviness.

Research remains divided. A 2025 analysis found that some earlier decades had a wavier winter jet than recent decades, showing that natural multidecadal variability is substantial and that "the jet stream is simply becoming steadily wavier" is not supported as a universal statement. (AGU Publications)

Other statistical and network studies find credible Arctic-to-midlatitude teleconnections and increasing variability in particular seasons or regions, but these results are not yet a clean global attribution. (arXiv)

**Risk interpretation:** The defensible conclusion is:

> **Jet-stream displacement and persistence are critical mechanisms of extreme weather, but the magnitude and geography of the climate-change contribution remain less securely quantified than temperature, ocean heat or ice loss.**

That does not make the risk negligible. It means it should receive a wider uncertainty interval.

## 6. Groundwater: climate pressure plus extraction

Satellite gravimetry provides globally consistent observations of changes in total terrestrial water storage. It shows major losses across agricultural and arid regions, although separating groundwater extraction from soil moisture, snow and surface-water change requires additional models and local data. (ScienceDirect)

The compound mechanism is clear:

- higher temperature increases evaporative demand;

- drought reduces recharge;
- irrigation demand rises;
- pumping increases;
- aquifers and land surfaces can undergo irreversible compaction.

This is not simply another environmental indicator. It is a direct food-production and social-stability constraint.

**Risk interpretation:** high regional risk already; high confidence that warming intensifies pressure, but local attribution requires basin-level data.

## 7. Fossil expansion: the political trajectory contradicts the physical evidence

The build-out data are stark.

Global Energy Monitor’s plant-level database reports that oil- and gas-fired capacity in development rose by nearly one-third during 2025 to approximately **1,047 GW**. The United States became the largest developer, with roughly **252 GW**, overtaking China; much of the proposed US capacity is associated directly or indirectly with data-centre demand. (Global Energy Monitor)

Across the wider power pipeline, coal capacity in development increased by about **12%** and oil-and-gas capacity by approximately **25%** during 2025. China still had about **291 GW of permitted or under-construction coal capacity** at year-end, despite renewable generation increasingly meeting demand growth. (Global Energy Monitor)

This creates a critical distinction:

Renewables are expanding rapidly, but fossil infrastructure is not being retired at a rate consistent with treating cumulative warming as an emergency. In many places, renewables are being added **alongside** fossil capacity rather than replacing it.

That represents lock-in risk because generating plants, pipelines, LNG terminals and associated financial contracts are expected to operate for decades. Once capital is committed, political pressure grows to keep those assets earning revenue.

**Risk interpretation:** very high confidence that current infrastructure decisions are prolonging fossil dependence; extremely high policy inconsistency with measured physical risk.

# Integrated risk, not a row of separate problems

The largest danger is not any one metric in isolation. It is coupling:

**warming atmosphere**

**→ warmer ocean**

→ **greater marine heat stress and ice loss**

→ **altered rainfall and circulation**

→ **reduced freshwater and crop resilience**

→ **food and insurance shocks**

→ **political instability and conflict**

→ **pressure for more extraction and short-term energy security**

→ **further emissions.**

That is a reinforcing risk system.

The probability that every worst-case transition occurs soon is low. The probability that **none** of these interacting pressures causes major disruption is also becoming low.

The present decision-grade assessment is:

| System | Present evidence | Risk direction | Confidence |
|---|---|---|---|
| Global warming | Directly observed | Rapidly rising | Very high |
| Ocean heat | Directly observed, record levels | Rising | Very high |
| Ice-sheet mass | Directly observed loss | Deteriorating | Very high |
| Coral systems | Global heat stress and bleaching | Critical | Very high |
| Groundwater | Large regional losses | Deteriorating | High |
| AMOC strength | Weakening likely; magnitude disputed | Deteriorating | Medium–high |
| AMOC collapse | Physically credible; timing unresolved | Non-negligible tail risk | Medium–low timing confidence |
| Jet-stream climate attribution | Mixed and regionally dependent | Concerning | Medium |
| Fossil lock-in | Plant-level development records | Strongly adverse | Very high |

# The unsugared conclusion

Humanity is not merely approaching a climate risk.

**We are already operating inside one.**

The remaining uncertainty concerns the slope, interactions and timing of discontinuities—not whether accumulating greenhouse gases are destabilising the climate system.

The status quo’s central analytical error is to treat each warning separately and demand courtroom-level proof for every causal link before responding. A competent risk system would instead recognise:

- multiple independent measurements are deteriorating simultaneously;

- several consequences are irreversible on human timescales;
- the loss function is highly asymmetric;
- and continued fossil construction increases both expected harm and tail risk.

The rational response is therefore not panic, but **rapid fossil-fuel displacement, protection of natural carbon and water systems, resilience investment, transparent physical monitoring, and preparation for abrupt circulation and food-system disruption**.

Waiting for the last uncertainty bar to disappear would not be scientific caution. It would be reckless system management.

## Appendix - Decision Analysis Methodology

This report has used a risk framework in view of the current geopolitical situation, including such factors as

- Energy security perceptions
- Market dominance of fossil fuels
- Level of resources allocated to addressing climate risk
- Competing vested interests.

It is a methodology for reasoning under uncertainty.

# Decision Analysis Principles

- preference for measured observations over institutional narrative
- preference for transparent methodologies
- distinction between observations, inference and speculation
- weighting according to reproducibility
- explicit uncertainty
- interacting systems
- asymmetric loss functions
- adaptive updating as new evidence emerges
- independence of evidence streams

These principles have been applied in view of the current risk context to establish a risk baseline.

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# Citation

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Decision analysis framework developed through collaboration between the author and OpenAI GPT-5.5. The report was generated using OpenAI GPT-5.5 and has been published without substantive editorial alteration.

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