

Global heating may breach 1.5°C in 2024—here's what that could look like

January 11 2024, by Jack Marley



Credit: Pixabay/CC0 Public Domain

It's official: 2023 was Earth's hottest year [ever recorded](#), beating the previous record set in 2016 by a huge margin. Last year was also the first in which the world was close to 1.5°C (1.48°C) hotter than the pre-industrial average (1850-1900). We are brushing against the threshold scientists urged us to limit long-term warming to.

Some scientists, including [former Nasa climatologist James Hansen](#),

predict 2024 will be humanity's first year beyond 1.5°C. As what were once dire warnings from [climate experts](#) become our shared reality, what can you expect?

The 1.5°C [temperature](#) target, enshrined in the 2015 Paris agreement, is not shattered on first contact. Most of the climate tipping points scientists fear could send warming hurtling out of control are not expected until Earth is consistently warmer than 1.5°C. The [global average temperature](#) is likely to dip down again once the present El Niño (a warm phase in a natural cycle focused on the equatorial Pacific Ocean) dissipates.

Instead, 2024 could be our first glimpse of Earth at 1.5°C. Here's what research suggests it will look like for people and nature.

Ecosystems on the brink

Tropical coral reefs are in hot water

These habitats comprise a network of polyp-like animals (related to jellyfish) and colorful algae encased in calcium carbonate. The complex forms they build in shallow water around the Earth's equator are thought to harbor more species than any other ecosystem.

"Corals have adapted to live in a specific temperature range, so when ocean temperatures are too hot for a prolonged period, corals can bleach—losing the colorful algae that live within their tissue and nourish them via photosynthesis—and may eventually die," say coral biologists Adele Dixon and Maria Beger (University of Leeds) and physicists Peter Kalmus (Nasa) and Scott F. Heron (James Cook University).

Climate change has already raised the frequency of these marine heat waves. In a world made 1.5°C hotter, 99% of reefs will be exposed to

intolerable heat too often for them to recover according to Dixon's research, threatening food and income for roughly one billion people—not to mention biodiversity.

Coral reefs will earn their reputation as the "canaries in the coal mine" for [climate change](#)'s impact on the [natural world](#). As global heating ticks up towards 2°C, the devastation already seen on reefs will become evident elsewhere according to an analysis by biodiversity scientist Alex Pigot at UCL:

"We found that limiting global warming to 1.5°C would leave **15% of species at risk** of abruptly losing at least one third of their current geographic range. However, this doubles to 30% of species on our present trajectory of 2.5°C of warming."

Heat beyond human tolerance

Above 1.5°C, humanity risks provoking heat waves so intense they defy the human body's capacity to cool itself.

Intense heat and humidity have rarely conspired to create "wetbulb" temperatures of 35°C. This is the point at which the air is too hot and humid for sweating to cool you down—different from the "drybulb" temperature a thermometer reports.

Earth's rising temperature could soon change that according to climate scientists Tom Matthews (Loughborough University) and Colin Raymond (California Institute of Technology).

"Modeling studies had already indicated that wetbulb temperatures could regularly cross 35°C if the world sails past the 2°C warming limit ... with The Persian Gulf, South Asia and North China Plain on the frontline of deadly humid heat," they say.

But different areas of the the world are warming at different rates. In a world that is 1.5°C hotter on average, temperatures in your local area may have actually risen by more than that.

To account for this, Matthews and Raymond studied records from individual weather stations worldwide and found that many sites were closing in much more rapidly on the lethal heat and humidity threshold.

"The frequency of punishing wetbulb temperatures (above 31°C, for example) has more than doubled worldwide since 1979, and in some of the hottest and most humid places on Earth, like the coastal United Arab Emirates, wetbulb temperatures have already flickered past 35°C," they say.

"The climate envelope is pushing into territory where our physiology cannot follow."

How long do we have?

Species extinctions and deadly heat become more likely after 1.5°C. So do catastrophic storms and collapsing ice sheets.

For a chance to avoid these horrors, we must eliminate the [greenhouse gas emissions](#) heating Earth and that means rapidly phasing out coal, oil and gas, which account for [80% of energy use worldwide](#).

How fast? According to the latest estimate, published in October, very fast indeed.

"If humanity wants to have a 50-50 chance of limiting [global warming](#) to 1.5°C, we can only emit another 250 gigatonnes (billion metric tons) of CO₂," say climate and atmospheric scientists Chris Smith at the University of Leeds and Robin Lamboll at Imperial College London.

"This effectively gives the world just six years to get to net zero."

This article is republished from [The Conversation](#) under a Creative Commons license. Read the [original article](#).

Provided by The Conversation

Citation: Global heating may breach 1.5°C in 2024—here's what that could look like (2024, January 11) retrieved 27 April 2024 from <https://phys.org/news/2024-01-global-breach-15c.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.