Temperatures 1.5C above pre-industrial era average for 12 months, data shows

Copernicus Climate Change Service says results a ‘large and continuing shift’ in the climate

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Alameda, California. An extended heatwave is predicted to blanket northern California. Photograph: Noah Berger/AP

The world has baked for 12 consecutive months in temperatures 1.5C (2.7F) greater than their average before the fossil fuel era, new data shows.

Temperatures between July 2023 and June 2024 were the highest on record, scientists found, creating a year-long stretch in which the Earth was 1.64C hotter than in preindustrial times.

The findings do not mean world leaders have already failed to honour their promises to stop the planet heating 1.5C by the end of the century – a target that is measured in decadal averages rather than single years – but that scorching heat will have exposed more people to violent weather. A sustained rise in

temperatures above this level also increases the risk of uncertain but catastrophic tipping points.

Carlo Buontempo, director of the Copernicus Climate Change Service, which analysed the data, said the results were not a statistical oddity but a "large and continuing shift" in the climate.

"Even if this specific streak of extremes ends at some point, we are bound to see new records being broken as the climate continues to warm," he said. "This is inevitable unless we stop adding greenhouse gases into the atmosphere and the oceans."

Copernicus, a scientific organisation that belongs to the EU's space programme, uses billions of measurements from satellites, ships, aircraft and weather stations to track key climate metrics. It found June 2024 was hotter than any other June on record and was the 12th month in a row with temperatures 1.5C greater than their average between 1850 and 1900.

Because temperatures in some months had "relatively small margins" above 1.5C, the scientists said, datasets from other climate agencies may not confirm the 12-month temperature streak.

Whether pumped out the chimney of a coal-burning power plant or ejected from the exhaust pipe of a passenger plane, each carbon molecule clogging the Earth's atmosphere traps heat and warps weather. The hotter the planet gets, the less people and ecosystems can adapt.

"This is not good news at all," said Aditi Mukherji, a director at research institute CGIAR and co-author of the latest Intergovernmental Panel on Climate Change (IPCC) report. "We know that extreme events increase with every increment of global warming – and at 1.5C, we witnessed some of the hottest extremes this year."

Some ecosystems are more vulnerable than others. In its latest review of the science, the IPCC found that 1.5C of warming will kill off 70-90% of tropical coral reefs, while warming of 2C will wipe them out almost entirely.

A Guardian survey of hundreds of IPCC authors this year found three-quarters expect the planet to heat by at least 2.5C by 2100, with about half of the scientists expecting temperatures above 3C. The increments sound small but can mean the difference between widespread human suffering and "semi-dystopian" futures.

Mukherji compared 1C of global heating to a mild fever and 1.5C a medium-to-high grade fever. “Now imagine a human body with [that] temperature for years. Will that person function normally any more?”

“That’s currently our Earth system,” she added. “It is a crisis.”

François Gemenne, an IPCC author and director of the Hugo Observatory at the University of Liège, said the climate crisis is not a binary issue. “It is not 1.5C or death – every 0.1C matters a great deal because we’re talking about global average temperatures, which translate into massive temperature gaps locally.”

Even in a best-case scenario, he said, people need to prepare for a warmer world and “beef up” response plans. “Adaptation is not an admission that our current efforts are useless.”