



EMBARGO UNTIL 1600 GMT 10 JANUARY 2025

WMO confirms 2024 as warmest year on record at about 1.55°C above pre-industrial level

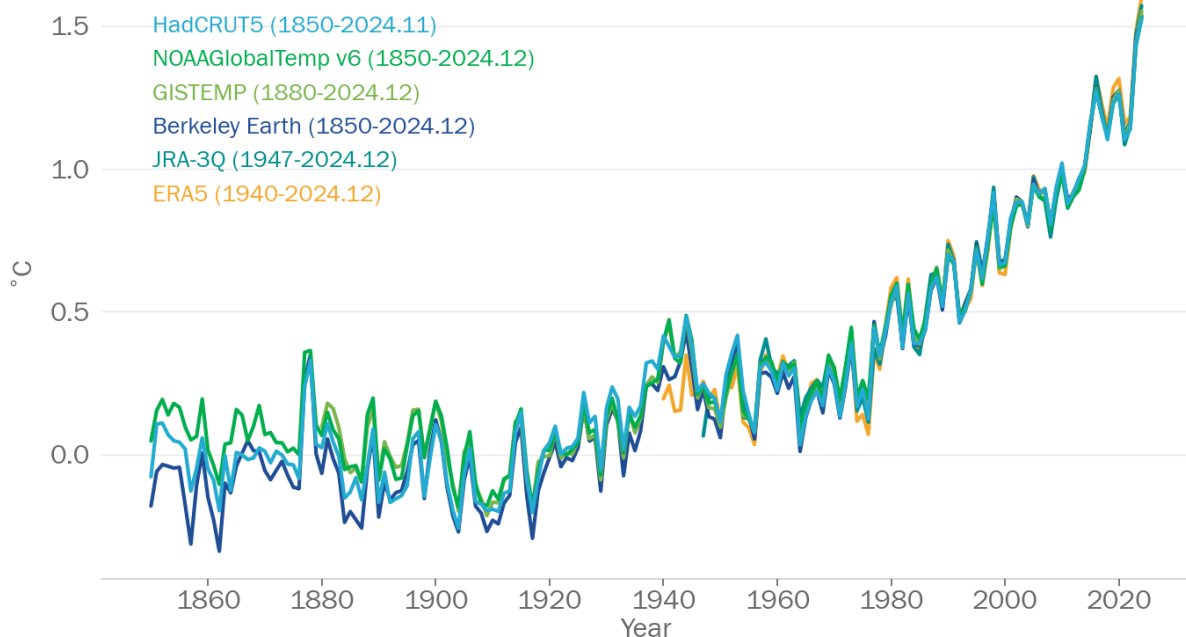
- *The past ten years 2015-2024 are the ten warmest years on record*
- *We have likely seen the first calendar year with a global mean temperature of more than 1.5°C above the 1850-1900 average*
- *Six international datasets are used to reach the consolidated WMO global figure*
- *2024 saw exceptional land and sea surface temperatures and ocean heat*
- *Long-term temperature goal of the Paris Agreement not yet dead but in grave danger*

Geneva (WMO - The World Meteorological Organization (WMO) has confirmed that 2024 is the warmest year on record, based on six international datasets. The past ten years have all been in the Top Ten, in an extraordinary streak of record-breaking temperatures.

The global average surface temperature was 1.55 °C (with a margin of uncertainty of ± 0.13 °C) above the 1850-1900 average, according to WMO's consolidated analysis of the six datasets. This means that we have likely just experienced the first calendar year with a global mean temperature of more than 1.5°C above the 1850-1900 average.

Global mean temperature 1850-2024

Difference from 1850-1900 average



“Today’s assessment from the World Meteorological Organization (WMO) proves yet again – global heating is a cold, hard fact,” said UN Secretary-General António Guterres.

“Individual years pushing past the 1.5 degree limit do not mean the long-term goal is shot. It means we need to fight even harder to get on track. Blazing temperatures in 2024 require trail-blazing climate action in 2025,” he said. “There's still time to avoid the worst of climate catastrophe. But leaders must act – now,” he said.

The WMO provides a temperature assessment based on multiple sources of data to support international climate monitoring and to provide authoritative information for the UN Climate Change negotiating process. The datasets are from the [European Center for Medium Range Weather Forecasts \(ECMWF\)](#), Japan Meteorological Agency, NASA, the US National Oceanic and Atmospheric Administration (NOAA), the [UK's Met Office in collaboration with the Climatic Research Unit at the University of East Anglia \(HadCRUT\)](#), and Berkeley Earth.

“Climate history is playing out before our eyes. We’ve had not just one or two record-breaking years, but a full ten-year series. This has been accompanied by devastating and extreme weather, rising sea levels and melting ice, all powered by record-breaking greenhouse gas levels due to human activities,” said WMO Secretary-General Celeste Saulo.

“It is important to emphasize that a single year of more than 1.5°C for a year does NOT mean that we have failed to meet Paris Agreement long-term temperature goals, which are measured over decades rather than an individual year. However, it is essential to recognize that every fraction of a degree of warming matters. Whether it is at a level below or above 1.5°C of warming, every additional increment of global warming increases the impacts on our lives, economies and our planet,” said Celeste Saulo.

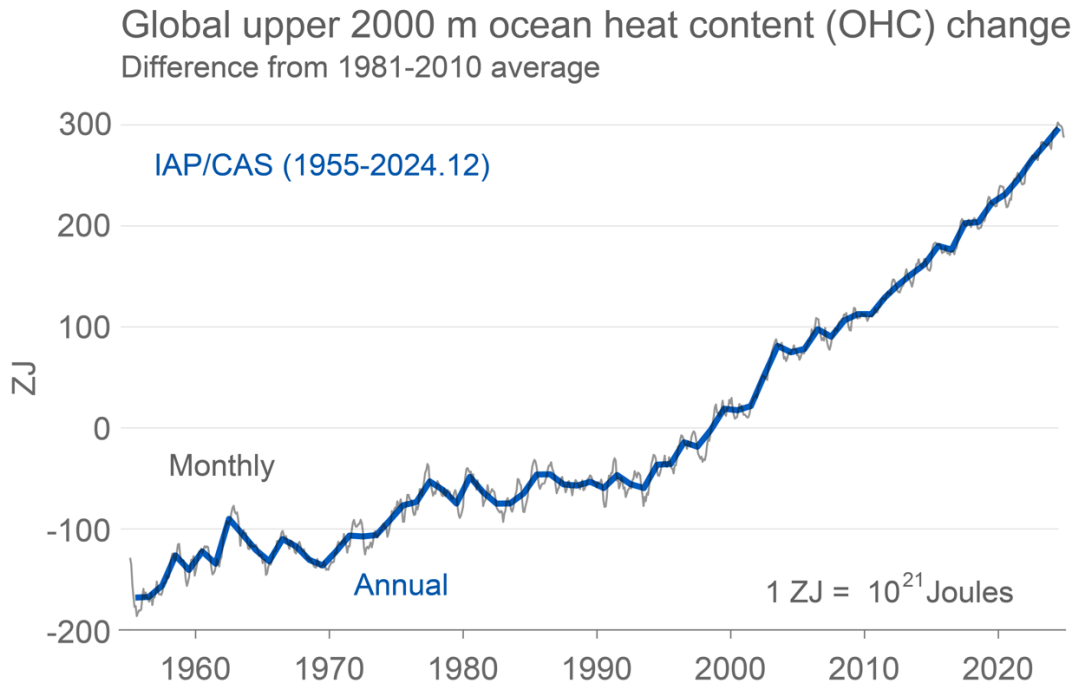
There is a margin of uncertainty in all temperature assessments. All six datasets place 2024 as the warmest year on record and all highlight the recent rate of warming. But not all show the temperature anomaly above 1.5 °C due to differing methodologies.

The timing of the release of the six temperature datasets was coordinated across the institutions in order to underline the exceptional conditions experienced during 2024.

[A separate study published in *Advances in Atmospheric Sciences*](#) found that ocean warming in 2024 played a key role in the record high temperatures. The ocean is the warmest it has ever been as recorded by humans, not only at the surface but also for the upper 2000 meters, according to the study led by Prof. Lijing Cheng with the Institute of Atmospheric Physics at the Chinese Academy of Sciences. It involved a team of 54 scientists from seven countries and 31 institutes.

About 90% of the excess heat from global warming is stored in the ocean, making ocean heat content a critical indicator of climate change. From 2023 to 2024, the global upper 2000 m ocean heat content increase is 16 zettajoules (10^{21} Joules), about 140 times the world's total electricity generation in 2023, according to the study, which is based on the Institute of Atmospheric Physics dataset.

WMO will provide full details of key climate change indicators, including greenhouse gases, surface temperatures, ocean heat, sea level rise, glacier retreat and sea ice extent, in its State of the Global Climate 2024 report to be issued in March 2025. This will also give details of high-impact events.



Institute of Atmospheric Physics (Chinese Academy of Sciences)

Paris Agreement

Mr Guterres called on governments to deliver new national climate action plans this year to limit long-term global temperature rise to 1.5°C, and support the most vulnerable deal with devastating climate impacts.

One or more individual years exceeding 1.5°C does not mean that we have missed the goal of “holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change” as stated in the Paris Agreement. This refers to an extended period, typically decades or longer, although the Agreement itself does not provide a specific definition.

Short-term temperature spikes in long-term warming can be caused by naturally occurring phenomena like El Niño, which persisted from mid-2023 to May 2024.

As global warming continues, there is an urgent need for careful tracking, monitoring and communication with regard to where the warming is relative to the long-term temperature goal of the Paris Agreement, to help policymakers in their deliberations.

An international team of experts established by WMO has given an initial indication that long-term global warming as assessed in 2024 is currently about 1.3°C compared to the 1850-1900 baseline.

Notes for Editors

WMO uses datasets based on climatological data from observing sites and ships and buoys in global marine networks, developed and maintained by the United States National Oceanic and Atmospheric Administration (NOAA), NASA's Goddard Institute for Space Studies (NASA GISS), the United Kingdom's Met Office Hadley Centre and the University of East Anglia's Climatic Research Unit (HadCRUT), and the Berkeley Earth group.

WMO also uses reanalysis datasets from the European Centre for Medium-Range Weather Forecasts and its Copernicus Climate Change Service, and the Japan Meteorological Agency (JMA). Reanalysis

combines millions of meteorological and marine observations, including from satellites, using a weather model to produce a complete three-dimensional and global dataset.

The datasets used by WMO provide a globally complete or near-globally complete picture of near surface temperatures using statistical methods to fill gaps in data sparse areas such as the polar regions. Reanalyses also provide a globally complete analysis using the a model to estimate temperatures in all regions.

To calculate the consolidated figures for temperatures relative to pre-industrial, WMO calculates anomalies relative to 1981-2010 for each dataset and then adds an offset of 0.69°C, which is the difference between 1981-2010 and 1850-1900 as estimated by IPCC. The uncertainty in the offset is 0.12°C. The anomalies from the six datasets are then averaged to get a single value for the year. The spread of the six datasets is combined with the uncertainty in the offset to get a combined uncertainty of 0.13°C. This method was used in the State of the Global Climate 2023 and adapted to the six datasets used in 2024. The description can be found in this [link](#)

The World Meteorological Organization is the United Nations System's authoritative voice on
Weather, Climate and Water

www.wmo.int

For further information contact:

Clare Nullis, WMO media officer, cnullis@wmo.int or media@wmo.int , Tel +41-79-7091397