

Climate crisis: 2020 was joint hottest year ever recorded

Global heating continued unabated despite Covid lockdowns, with record Arctic wildfires and Atlantic tropical storms

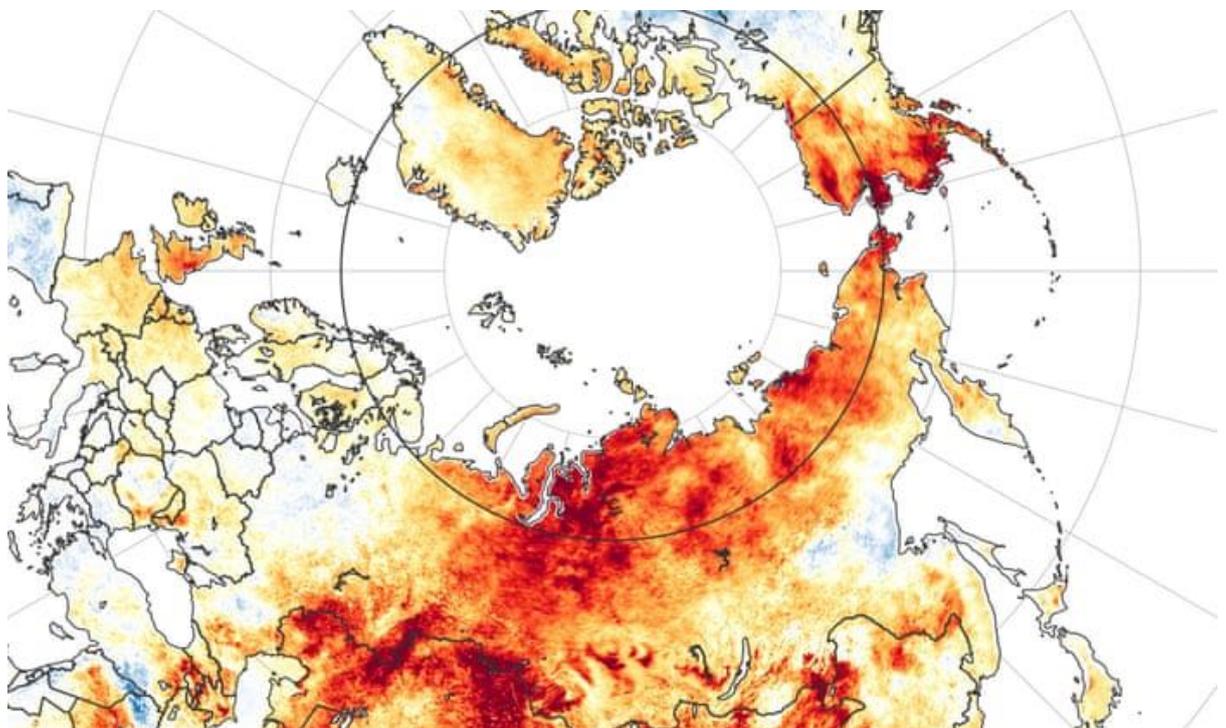
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The Arctic and northern Siberia saw particularly extreme average temperatures in 2020, with a large region 3C higher than the long-term average. Photograph: Nasa/EPA

The climate crisis continued unabated in 2020, with the joint highest global temperatures on record, alarming **heat and record wildfires in the Arctic**, and a **record 29 tropical storms in the Atlantic**.

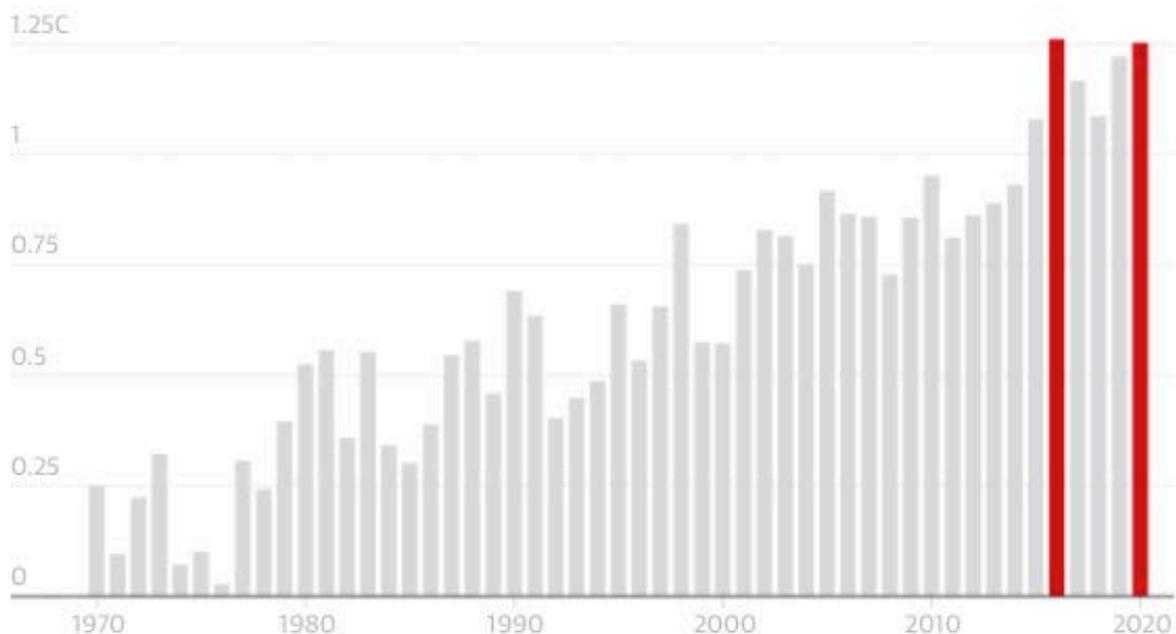
Despite a **7% fall in fossil fuel burning** due to coronavirus lockdowns, heat-trapping carbon dioxide continued to build up in the atmosphere, also setting a new record. The average surface temperature across the planet in 2020 was 1.25C higher than in the pre-industrial period of 1850-1900, dangerously close to the 1.5C target set by the world's nations **to avoid the worst impacts**.

Only 2016 matched the heat in 2020, but that year saw a natural **El Niño** climate event which boosts temperatures. Without that it is likely 2020 would have been the outright hottest year. Scientists have warned that without urgent action the future for many millions of people “looks black”.

The temperature data released by the European Union’s **Copernicus Climate Change Service** (C3S) showed that the past six years have been the hottest six on record. They also showed that Europe saw its hottest year on record, 1.6C above the long-term average, with a searing **heatwave hitting western Europe** in late July and early August.

2020 tied with 2016 as the hottest year on record

Average annual global temperature (deg C) relative to 1850-1900



Guardian graphic. Source: ERA5 / Copernicus Climate Change Service

The **Arctic** and **northern Siberia** saw particularly extreme average temperatures in 2020, with a large region 3C higher than the long-term average and some locations more than 6C higher. This resulted in **extensive wildfires**, with a record 244m tonnes of CO₂ released within the Arctic Circle. Arctic sea ice was also **significantly lower**, with July and October seeing the smallest extent on record for those months.

“[The year] 2020 stands out for its exceptional warmth in the **Arctic**,” said Carlo Buontempo, director of C3S. “It is no surprise that the last decade was the

warmest on record, and is yet another reminder of the urgency of ambitious emissions reductions to prevent adverse climate impacts.”

“The extraordinary climate events of 2020 show us we have no time to lose,” said Matthias Petschke, at the European commission. “It will be difficult, but the cost of inaction is too great.”



A record 29 tropical storms formed in the Atlantic Ocean in 2020. Photograph: AP

“Despite the absence of the cyclical boost of El Niño to global temperatures [we are] getting dangerously close to the 1.5C limit,” said Prof Dave Reay, at the University of Edinburgh. “Covid lockdowns around the world may have caused a slight dip in emissions, but the CO₂ accumulating in the atmosphere is still going up fast. Unless the global economic recovery from the nightmares of 2020 is a green one, the future of many millions of people around the world looks black indeed.”

The level of CO₂ in the atmosphere reached a new record in 2020, with the cut in emissions due to Covid lockdowns described as a **“tiny blip” by the UN’s World Meteorological Organisation**. Vincent-Henri Peuch, director of the Copernicus Atmosphere Monitoring Service, said: “Until the net global emissions reduce to zero, CO₂ will continue to accumulate in the atmosphere and drive further climate change.”

The UK **Met Office** issued a forecast on Friday that CO₂ levels will pass a new milestone in 2021 – being 50% higher than before the Industrial Revolution. Its scientists said CO₂ will exceed 417 parts per million (ppm) for several weeks from April to June, which is 50% higher than the 278 ppm in the late 18th century when industrial activity began.

This is despite the expectation that weather conditions brought by the counterpart of El Niño, La Niña, will see higher natural growth in tropical forests that will soak up some of humanity's emissions.

“The human-caused buildup of CO₂ in the atmosphere is accelerating,” said Prof Richard Betts at the Met Office. “It took over 200 years for levels to increase by 25%, but now just over 30 years later we are approaching a 50% increase. Global emissions will need to be brought down to net zero within about the next 30 years if global warming is to be limited to 1.5C.”

Climate change: 2020 in a dead heat for world's warmest year

By Matt McGrath Environment correspondent



High temperatures persisted across the year

New data from EU satellites shows that 2020 is in a statistical dead heat with 2016 as the world's warmest year. The Copernicus Climate Change Service says that last year was around 1.25C above the long-term average.

The scientists say that unprecedented levels of heat in the Arctic and Siberia were key factors in driving up the overall temperature.

The past 12 months also saw a new record for Europe, around 0.4C warmer than 2019.

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Last December, the World Meteorological Organization **predicted that 2020 would be one of the three warmest years on record.**

This new, more complete report from Copernicus says that last year is right at the top of the list.



High temperatures saw fires rage in spring and summer in many locations inside the Arctic circle. The Copernicus data comes from a constellation of Sentinel satellites that monitor the Earth from orbit.

Temperature data from the system shows that 2020 was 1.25C warmer than the average from 1850-1900, a time often described as the "pre-industrial" period.

One key factor driving up the temperatures was the heating experienced in the Arctic and Siberia.

In some locations there, temperatures for the year as a whole were 6C above the long-term average.

This exceptional warming led to a very active wildfire season.

Fires in the Arctic Circle released a record amount of CO₂, according to the study, up over a third from 2019.

The Copernicus service concludes that while 2020 was very marginally cooler than 2016, the two years are statistically on a par as the differences between the figures for the two years are smaller than the typical differences found in other temperature databases for the same period.

More data on 2020's temperature will be released in the next week or so from other agencies, including Nasa and the UK Met Office.

The scientists say that the closeness between the years is all the more remarkable considering the impacts of the El Niño/La Niña weather cycle.



People saw their homes burnt down in some parts of Siberia

Twenty-sixteen was made warmer by a strong El Niño event while 2020 was made slightly cooler by an emerging La Niña in the second half of the year.

Europe also saw a new record level of warming for the year, 0.4C warmer than 2019. A major heat wave in July and August was an important factor driving up the mercury across the continent.

Globally, the 10-year period from 2011-2020 is the warmest decade, with the last six years being the six hottest on record.

"Twenty-twenty stands out for its exceptional warmth in the Arctic and a record number of tropical storms in the North Atlantic," said Carlo Buontempo, director of the Copernicus Climate Change Service.

"It is no surprise that the last decade was the warmest on record, and is yet another reminder of the urgency of ambitious emissions reductions to prevent adverse climate impacts in the future."

While a strong La Niña may cool temperatures a little in 2021, levels of carbon dioxide in the atmosphere are likely to remain high, contributing to ongoing warming.

New data from the UK's Met Office suggests that average concentrations of CO₂ will reach levels that are 50% higher than they were before the industrial revolution.

Researchers predict that annual average CO₂ concentration at the Mauna Loa recording station in Hawaii will be around 2.29 parts per million (ppm) higher in 2021 than in 2020.

Despite the global slowdowns caused by the Covid-19 pandemic, the scientists say this rise is being driven by emissions from the use of fossil fuels and from deforestation.

Europe saw a prolonged heat wave in July and August that pushed the year to a new record

While weather patterns linked to the La Niña event may boost growth in tropical forests and increase the amount of the gas that's absorbed, it won't be enough to slow the overall rise.

The Met Office says that CO₂ will exceed 417ppm in the atmosphere for several weeks from April to June.



This is 50% higher than the level of 278ppm that pertained in the late 18th Century as widespread industrial activity was just beginning.

"The human-caused build-up of CO₂ in the atmosphere is accelerating," said Prof Richard Betts from the Met Office.

"It took over 200 years for levels to increase by 25%, but now just over 30 years later we are approaching a 50% increase."

"Reversing this trend and slowing the atmospheric CO₂ rise will need global emissions to reduce, and bringing them to a halt will need global emissions to be brought down to net zero. This needs to happen within about the next 30 years if global warming is to be limited to 1.5C."

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