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Last decade was Earth's hottest on record, exposing grim reality of climate change

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(CNN) — A new report released Wednesday details how 2019 was another year of extremes for Earth's climate, adding to a litany of evidence exposing the grim reality of our [warming world](#).

Last year saw devastating wildfires burn through Australia; large regions including Europe, Japan, Pakistan, and India experienced deadly [heat waves](#); almost 100 tropical cyclones created havoc; glaciers and sea ice continued to melt at worrying levels; and drought and floods destroyed vital crops and infrastructure.

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Among the key findings of the [State of the Climate in 2019](#), published by the American Meteorological Society, was that 2019 was among the warmest years on record, that

greenhouse gases in the Earth's atmosphere are at their highest recorded levels and this decade is the hottest since records began in the mid-1800s.

"Each decade since 1980 has been successively warmer than the preceding decade, with the most recent (2010-2019) being around 0.2°C warmer than the previous (2000-2009)," the report said. "As a primary driver for our changing climate, the abundance of many long-lived greenhouse gases continues to increase."

The study also reported other key findings:

- The six warmest years on record have all occurred in the past six years, since 2014.
- 2019 was among the three hottest years since records began in the mid-1800s. Only 2016, and for some datasets 2015, were warmer than 2019.
- Average sea surface temperatures in 2019 was the second highest on record, surpassed only by 2016.
- Sea levels rose to a new record high for the eighth consecutive year.
- Surface air temperatures for the Arctic were the second highest in 120 years of records, trailing only 2016. In the Antarctic, 2019 was the second warmest year for the continent since 1979.
- Glaciers continue to melt at a concerning rate for the 32nd straight year.

The warming influence of the major greenhouse gas concentrations in the atmosphere - including carbon dioxide (CO₂), methane and nitrous oxide -- was 45% higher than in 1990, the researchers found. The burning of fossil fuels in our cars, airplanes, and factories releases heat-trapping pollution into the air, warming up our planet.

Global carbon dioxide concentrations, which represent the bulk of the gases' warming power, rose during 2010 to a record 409.8 parts per million, the study found. That was the "highest in the modern 61-year measurement record as well as the highest ever measured in ice core records dating back as far as 800,000 years," the report said.

The report was led by the National Oceanic and Atmospheric Administration's [Centers for Environmental Information](#) and was based on contributions from more than 520 scientists from 60 countries. The annual report is often described by meteorologists as the "annual physical of the climate system."

Robert Dunn, one of the report's lead editors from the UK Met Office, said in a [statement](#) that, "The view for 2019 is that climate indicators and observations show that the global climate is continuing to change rapidly."

"A number of extreme events, such as wildfires, heatwaves and droughts, have at least part of their root linked to the rise in global temperature. And of course the rise in global temperature is linked to another climate indicator: the ongoing rise in emissions of greenhouse gases, notably carbon-dioxide, nitrous oxide and methane," Dunn said.

Record heat, rising seas

July 2019 was Earth's hottest month on record, the report found.

More than a dozen countries across Africa, Europe, Asia, Australia, and the Caribbean reported record high annual temperatures last year. It was so warm that Belgium and the Netherlands saw 40°C (104°F) temperatures for the time.

Deadly and [intense heat waves](#) last year exacerbated [India's](#) water crisis -- which saw [entire cities](#) running out of water -- [worsened drought conditions](#) in Australia that led to [months of destructive wildfires](#), and scorched Europe's cities -- which are [not designed to deal](#) with such temperatures.

Dunn said that the start of this millennium has been warmer than any other period since the start of the Industrial Revolution.

"Global average temperature is perhaps the simplest climate indicator through which to view the changes taking place in our climate. 2019 was one of the top three warmest years in the historical record dating back to 1850. It also marks the end of a decade in which the average global temperature had risen by 0.2 °C when compared with the previous decade," he said.

Increasing ocean temperatures have continued to reduce sea ice at alarming levels. The extent and magnitude of ice loss over the Greenland ice sheet -- the second biggest in the world -- last year rivaled 2012, the previous year of record ice loss.

Scientists found that after months of record temperatures, Greenland's [ice sheet lost 197 billion tons of ice](#) -- the equivalent of around 80 million Olympic swimming pools in July 2019 alone.

Melting of glaciers and ice sheets, along with warming oceans, account for the trend in rising global sea levels, the report said.

In 2019, sea levels rose for the eighth consecutive year and hit a record high for the 27 years since satellite recordings began, having risen about 3.4 inches, or 87.6 millimeters, in that time above the 1993 average.

The report comes as the world is struggling to contain the coronavirus pandemic, which is overwhelming many healthcare systems, and shattering economies across the world.

Scientists have repeatedly warned that the impacts of the climate crisis to our health systems and economies will be much more severe if left unchecked. Experts say the pandemic has [valuable lessons](#) on preparing for future crises, such as [acting early to mitigate against climate impacts](#), reducing emissions, developing green technology and implementing effective climate policies.

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