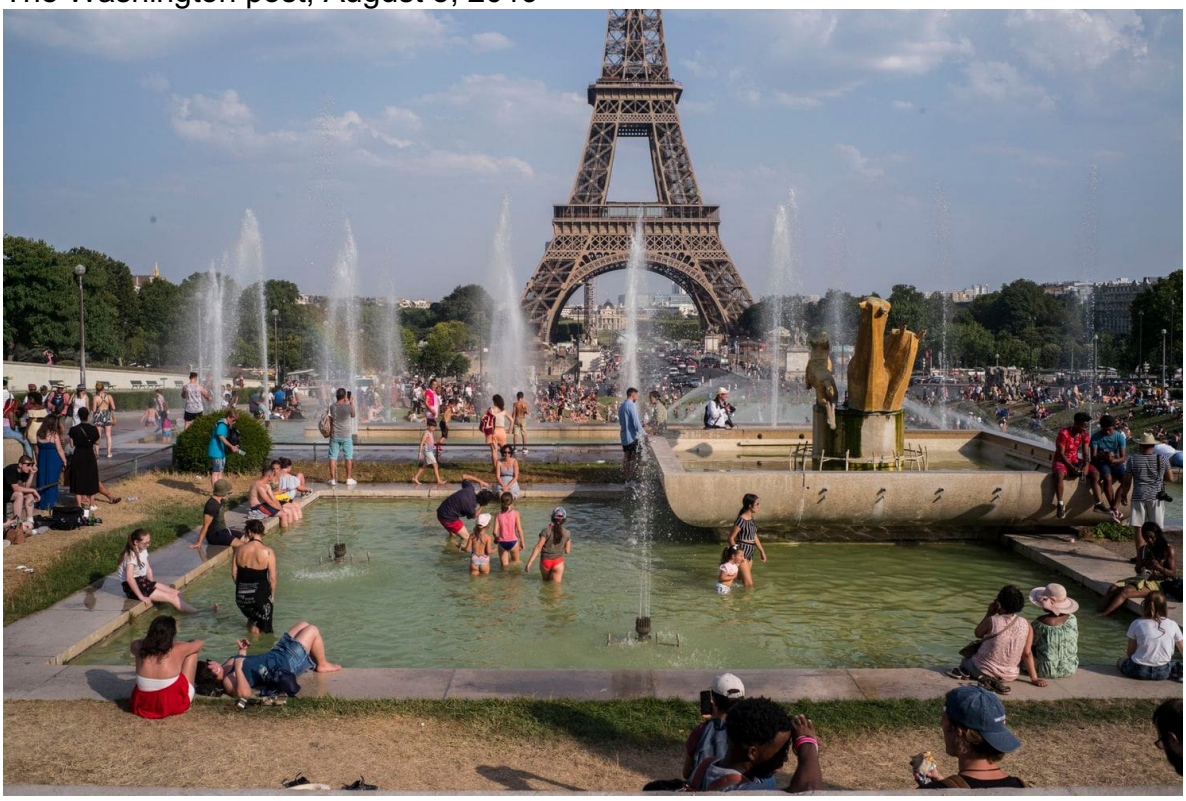
July was Earth's hottest month on record, beating or tying July 2016

Andrew Freedman
The Washington post, August 5, 2019

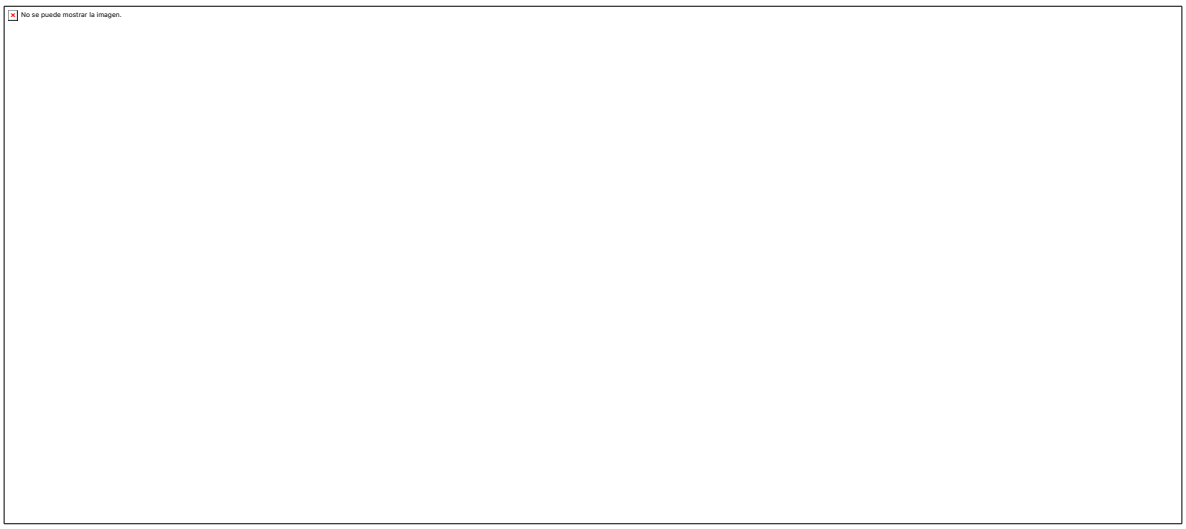


People try to cool off in the fountains of the Trocadero gardens in Paris on July 25 when a new all-time high temperature of 108.7 F degrees hit the French capital. (Rafael Yaghobzadeh/AP)

(This story has been updated with new data released on August 5)

July was Earth's hottest month ever recorded, coming in slightly higher than the previous warmest month, which was July 2016, according to data from the Copernicus Climate Change Service. This European climate agency said in a statement Monday that July 2019 was 1.01 degrees (0.56 Celsius) above the 1981 to 2010 average, "which is close to 1.2 Celsius above the preindustrial level as defined by the Intergovernmental Panel on Climate Change (IPCC)," the agency said in a statement.

The month beat July 2016 by about 0.07 degrees (0.04 Celsius).



Surface air temperature anomalies relative to the 1981-2010 average during July. (Credit: Copernicus Climate Change Service)

On Thursday, U.N. Secretary General António Guterres cited preliminary Copernicus data at a news conference as an example of why more ambitious action to cut planet-warming greenhouse gases is needed.

“We have always lived through hot summers. But this is not the summer of our youth. This is not your grandfather’s summer,” Guterres said as he called upon countries to rapidly cut their carbon emissions.

[Listen on Post Reports: ‘This is not your grandfather’s summer’]

Through the Paris climate agreement, world leaders have committed to preventing the planet from warming more than 3.6 degrees (2 Celsius), and are trying to keep global warming even more limited, to 2.4 degrees (1.5 Celsius), relative to preindustrial levels.

July’s numbers clearly indicate that the planet is already lapping up against the lower threshold. It also means the world is headed for a top 3 warmest year, up from a top-5 warmest ranking earlier in the year. The period from 2015 to 2019 will go down in history as the warmest five-year period on record since the late 19th century and, probably, well before that.

A month of extremes

The temperature spike was driven largely by record warmth in Western Europe, noteworthy warmth stretching across the Arctic that culminated in one of the most significant melt events ever recorded in Greenland at the end of the month.

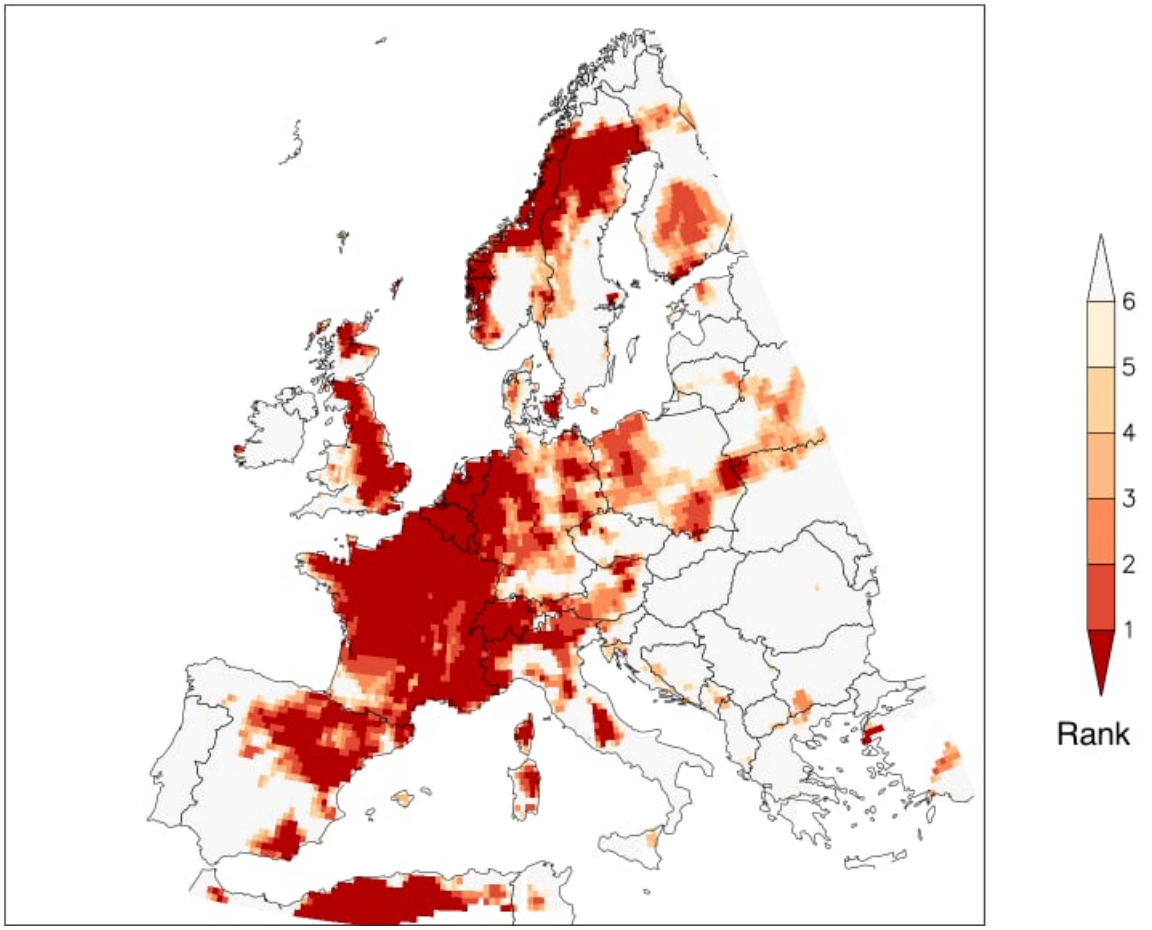
During the entire month of July, the Greenland ice sheet poured 197 billion tons of water into the North Atlantic in July alone, enough to raise global sea levels by 0.5 millimeters, or 0.02 inches.

[Images show staggering extent of melting on Greenland Ice Sheet due to heat wave]

Noteworthy extreme weather events during July include a widespread heat wave in Western Europe that set national temperature records in Britain, Germany, the Netherlands and Belgium. Paris soared to its highest temperature ever recorded, 108.7 degrees (42.6 Celsius).

Globally, Copernicus found that temperatures were well above average across Alaska, Baffin Island and Greenland, parts of Siberia, the central Asian Republics and Iran, as well as large parts of Antarctica. In addition, nearly the entire continents of Africa and Australia were warmer than average. Parts of western Canada and Asia saw cooler-than-average conditions.

A study released Friday from a group of researchers that study climate change's possible role in extreme weather and climate events found that climate change made this heat wave at least 10 times as likely to occur, compared with a climate without an increased amount of greenhouse gases, such as carbon dioxide.



Rank of annual maximum temperatures observed in Europe in 2019 compared to 1950 to 2018. (World Weather Attribution)

The report, from World Weather Attribution, also found that by raising global average surface temperatures, climate change boosted the heat wave's temperatures by up to 5.4 degrees (3 Celsius).

"The July 2019 heat wave was so extreme over continental Western Europe that the observed magnitudes would have been extremely unlikely without climate change," the report, which has not been peer-reviewed by an academic journal, states.

Elsewhere during July, a record flare-up of simultaneous, large and persistent wildfires erupted from Siberia to northern Alaska. These fires have consumed millions of acres and emitted large amounts of greenhouse gases, constituting a positive feedback loop by worsening future global warming.

Arctic sea ice was at a record low for the month, and it's possible, though not assured, that 2019 will have a record low for sea ice extent in the Arctic. The previous record was set in 2012, and numerous scientific assessments show the Arctic will be seasonally ice-free as early as the 2040s under continued global warming, even if emissions of greenhouse gases are curtailed in the near-term.

Key caveats

Copernicus, a climate services program from the European Union, reports its monthly temperature rankings earlier than other temperature tracking agencies such as NASA, and its rankings may differ slightly. This is because it uses a different source for its data.

The ranking was generated using what are called reanalysis records, which take data collected for weather forecasting and feed many different observational variables into a weather model for each hour of every month.

Reanalysis data tends to allow for faster reporting of monthly global temperatures, but it still must be checked against observational records gathered from networks of thousands of measuring sites worldwide.

Those readings will be reported by NASA, NOAA and other agencies in the coming weeks, but they're not likely to differ significantly from Copernicus. These agencies may, however, give the month a slightly different ranking.

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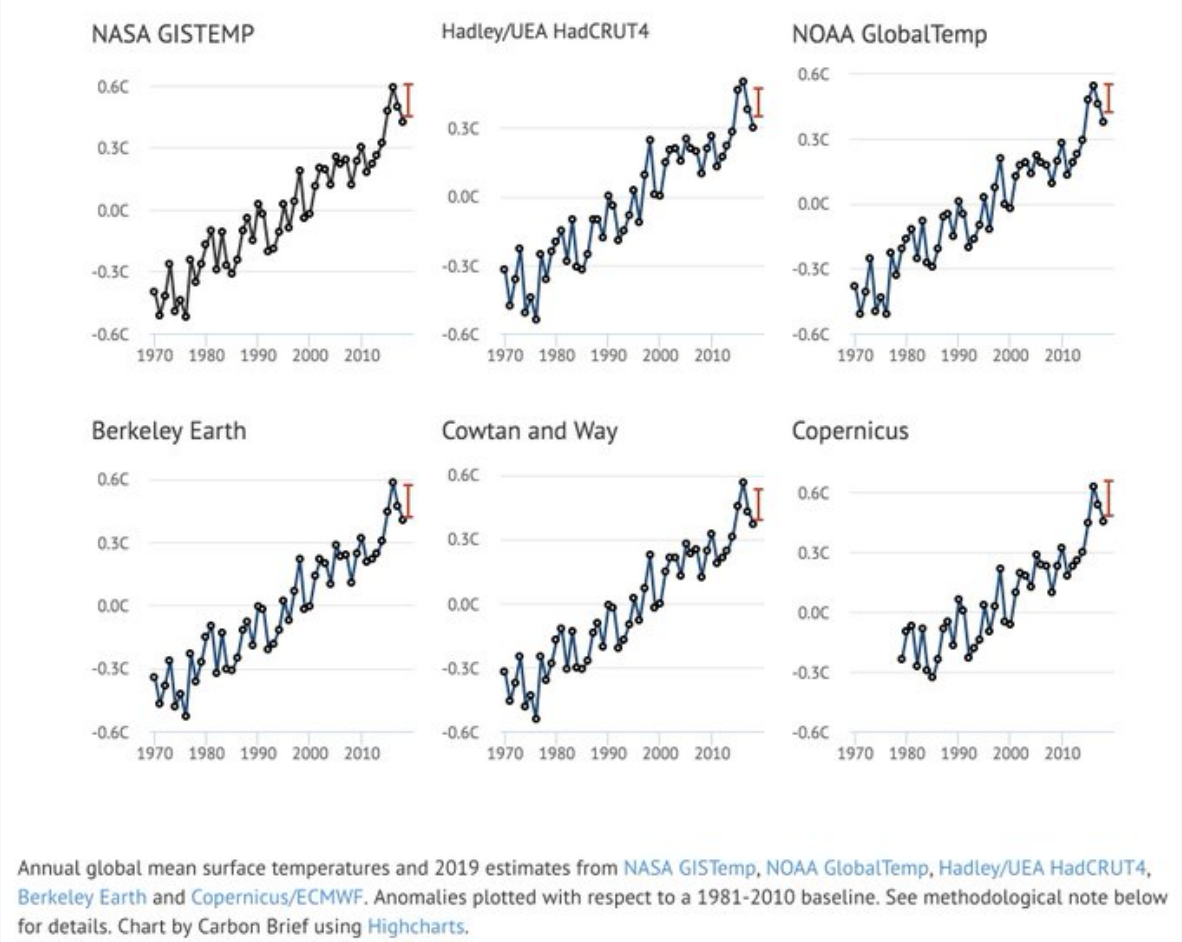
July 2019 will be the warmest month ever recorded in the @CopernicusECMWF ERA5 dataset, and likely either the warmest or second warmest on record for other temperature datasets. 2019 as a whole is on-track to be the second warmest year on record after the 2016 super-El Nino event



Annual global mean surface temperatures and 2019 estimates from NASA GISTemp, NOAA GlobalTemp, Hadley/UEA HadCRUT4, Berkeley Earth and Copernicus/ECMWF. Anomalies plotted with respect to a 1981-2010 baseline. See methodological note below for details. Chart by Carbon Brief using Highcharts.

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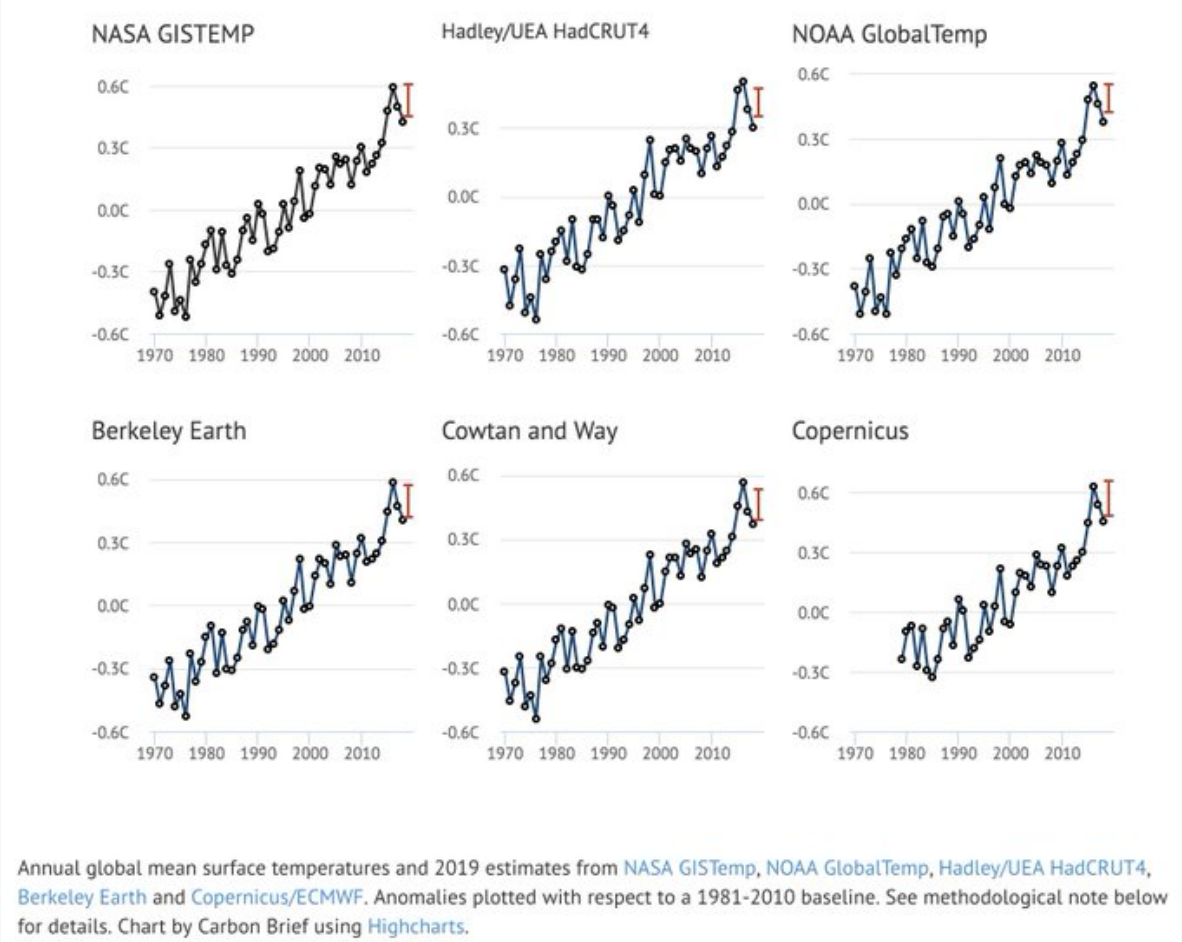

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The monthly temperature record comes without the added warming influence of a strong El Niño event in the tropical Pacific Ocean. Such events add heat to the oceans and atmosphere and help boost planetary temperatures. The 2016 record, for example, occurred during a year with a strong El Niño. The lack of a significant El Niño this July shows how much easier it is to set temperature records on a rapidly warming planet.

“The fact that summer 2019 is as warm (or warmer) than 2016 shows that in a few years the relentless march upward of temperatures driven by increasing atmospheric greenhouse gas concentrations can make what was an exceptionally warm El Niño event into a typical summer,” said Zeke Hausfather, a climate scientist with Berkeley Earth, via email.

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