

# Study finds climate change fingerprints on July heat waves in Europe, China and America

July 25 2023, by Seth Borenstein

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Sweat covers the face of Juan Carlos Biseno after dancing to music from his headphones as afternoon temperatures reach 115 degrees Fahrenheit (46.1 Celsius), July 19, 2023, in Calexico, Calif. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Gregory Bull, File

The fingerprints of climate change are all over the intense heat waves gripping the globe this month, a new study finds. Researchers say the deadly hot spells in the American Southwest and Southern Europe could not have happened without the continuing buildup of warming gases in the air.

These unusually strong heat waves are becoming more common, Tuesday's study said. The same research found the increase in heat-trapping gases, largely from the burning of coal, oil and [natural gas](#) has made another heat wave—the one in China—50 times more likely with the potential to occur every five years or so.

A stagnant atmosphere, warmed by carbon dioxide and other gases, also made the European [heat wave](#) 4.5 degrees Fahrenheit (2.5 degrees Celsius) hotter, the one in the United States and Mexico 3.6 degrees Fahrenheit (2 degrees Celsius) warmer and the one in China one 1.8 degrees Fahrenheit (1 degree Celsius) toastier, the study found.

Several [climate scientists](#), using [tree rings](#) and other stand-ins for temperature records, say [this month's heat](#) is [likely the hottest](#) Earth has been in about 120,000 years, easily the hottest of human civilization.

"Had there been no climate change, such an event would almost never have occurred," said study lead author Mariam Zachariah, a climate scientist at Imperial College of London. She called heat waves in Europe and North America "virtually impossible" without the increase in heat from the mid 1800s. Statistically, the one in China could have happened without global warming.



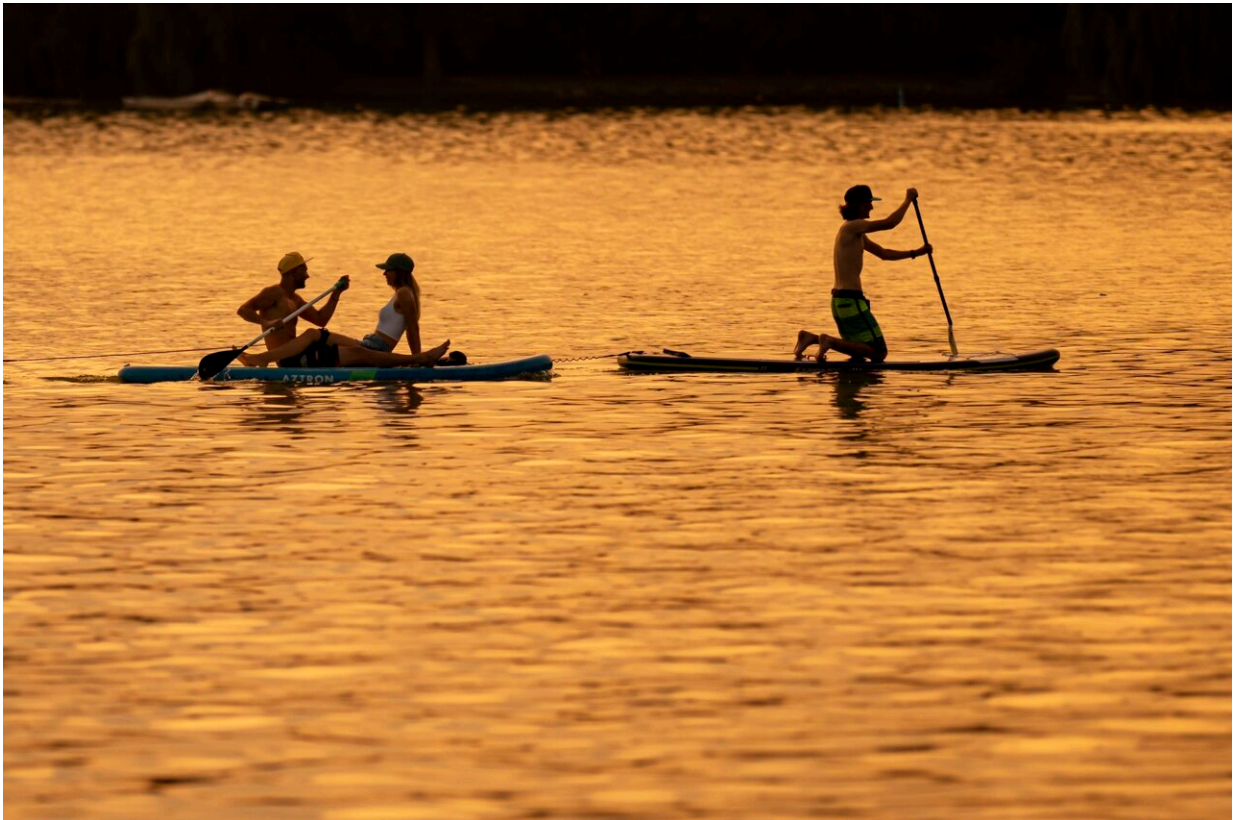
A sign displays an unofficial temperature as jets taxi at Sky Harbor International Airport at dusk, July 12, 2023, in Phoenix. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Matt York, File

Since the advent of industrial-scale burning, the world has warmed 2.2 degrees Fahrenheit (1.2 degrees Celsius), so "they are not rare in today's climate and the role of climate change is absolutely overwhelming," said Imperial College climate scientist Friederike Otto, who leads the team of volunteer international scientists at [World Weather Attribution](#) who do these studies.

The particularly intense heat waves that Texas, California, Arizona, New

Mexico, Nevada, Baja California, Sonora, Chihuahua and Coahuila are now roasting through are likely to happen about once every 15 years in the current climate, the study said.

But the climate is not stabilized, even at this level. If it warms a few more tenths of a degree, this month's heat will become even more common, Otto said. Phoenix has had a record-shattering 25 straight days of temperatures at or above 110 degrees Fahrenheit (43.3 degrees Celsius) and more than a week when the nighttime temperature never dropped below 90 degrees Fahrenheit (32.2 Celsius)



Youngsters enjoy a warm evening before sunset in Bucharest, Romania, July 19, 2023. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Andreea

Alexandru, File

The heat in Spain, Italy, Greece and some Balkan states is likely to reoccur every decade in the current climate, the study said.

Because the weather attribution researchers started their analysis of three simultaneous heat waves on July 17, the results are not yet peer reviewed, which is the gold standard for science. But it used scientifically valid techniques, the team's research regularly gets published and several outside experts told The Associated Press it makes sense.

The way scientists do these rapid analyses is by comparing observations of current weather in the three regions to repeated computer simulations of "a world that might have been without climate change," said study co-author Izidine Pinto, a [climate scientist](#) at the Royal Netherlands Meteorological Institute.

In Europe and North America, the study doesn't claim human-caused [climate change](#) is the sole cause of the heat waves, but it is a necessary ingredient because natural causes and random chance couldn't produce this alone.



Tourists sip cold water as they shelter from a hot sunny afternoon near the Rome's Colosseum, July 5, 2023. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Gregorio Borgia, File



A woman fans herself in Madrid, Spain, July 10, 2023. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Manu Fernandez, File



Children play with water at a fountain during a heat wave, at Stavros Niarchos foundation Cultural Center in Athens, July 21, 2023. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Petros Giannakouris, File





A man pushes a trolley with bottles of water on a hot summer day, in Istanbul, Turkey, July 13, 2023. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Francisco Seco



People walk through cooling misters along the Las Vegas Strip, July 13, 2023, in Las Vegas. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/John Locher, File



Tourists cool off near a fan as they queue to enter Rome's Colosseum, July 18, 2023. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Gregorio Borgia, File



A man holds an umbrella as he and other tourists enter the ancient Acropolis hill during a heat wave, in Athens, Greece, July 13, 2023. A new study Tuesday, July 25, finds these intense and deadly hot spells gripping much of the globe in the American Southwest and Southern Europe could not have occurred without climate change. Credit: AP Photo/Petros Giannakouris, File

Texas state climatologist John Nielsen-Gammon said the study was reasonable, but looks at a broad area of the U.S. Southwest, so it may not be applicable to every single place in the area.

"In the United States, it's clear that the entire southern tier is going to see the worst of the ever-worsening heat and this summer should be considered a serious wake-up call," said University of Michigan environment dean Jonathan Overpeck.

With [heat waves](#), "the most important thing is that they kill people and they particularly kill and hurt and destroy lives and livelihoods of those most vulnerable," Otto said.

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