

Study says since 1979 climate change has made heat waves last longer, spike hotter, hurt more people

March 30 2024, by Seth Borenstein



Tourists visit the ancient Acropolis hill during a heat wave in Athens, Greece, on July 21, 2023. Climate change is making heat waves crawl slower across the globe and last longer with higher temperatures over larger areas, a new study finds. Credit: AP Photo/Petros Giannakouris, File

Climate change is making giant heat waves crawl slower across the globe and they are baking more people for a longer time with higher temperatures over larger areas, a new study finds.

Since 1979, global heat waves are moving 20% more slowly—meaning more people stay hot longer—and they are happening 67% more often, [according](#) to a study in Friday's *Science Advances*. The study found the highest temperatures in the heat waves are warmer than 40 years ago and the area under a heat dome is larger.

Studies have shown heat waves worsening before, but this one is more comprehensive and concentrates heavily on not just temperature and area, but how long the high heat lasts and how it travels across continents, said study co-authors and climate scientists Wei Zhang of Utah State University and Gabriel Lau of Princeton University.

From 1979 to 1983, global heat waves would last eight days on average, but by 2016 to 2020 that was up to 12 days, the study said.

Eurasia was especially hit harder with longer lasting heat waves, the study said. Heat waves slowed down most in Africa, while North America and Australia saw the biggest increases in overall magnitude, which measures temperature and area, according to the study.

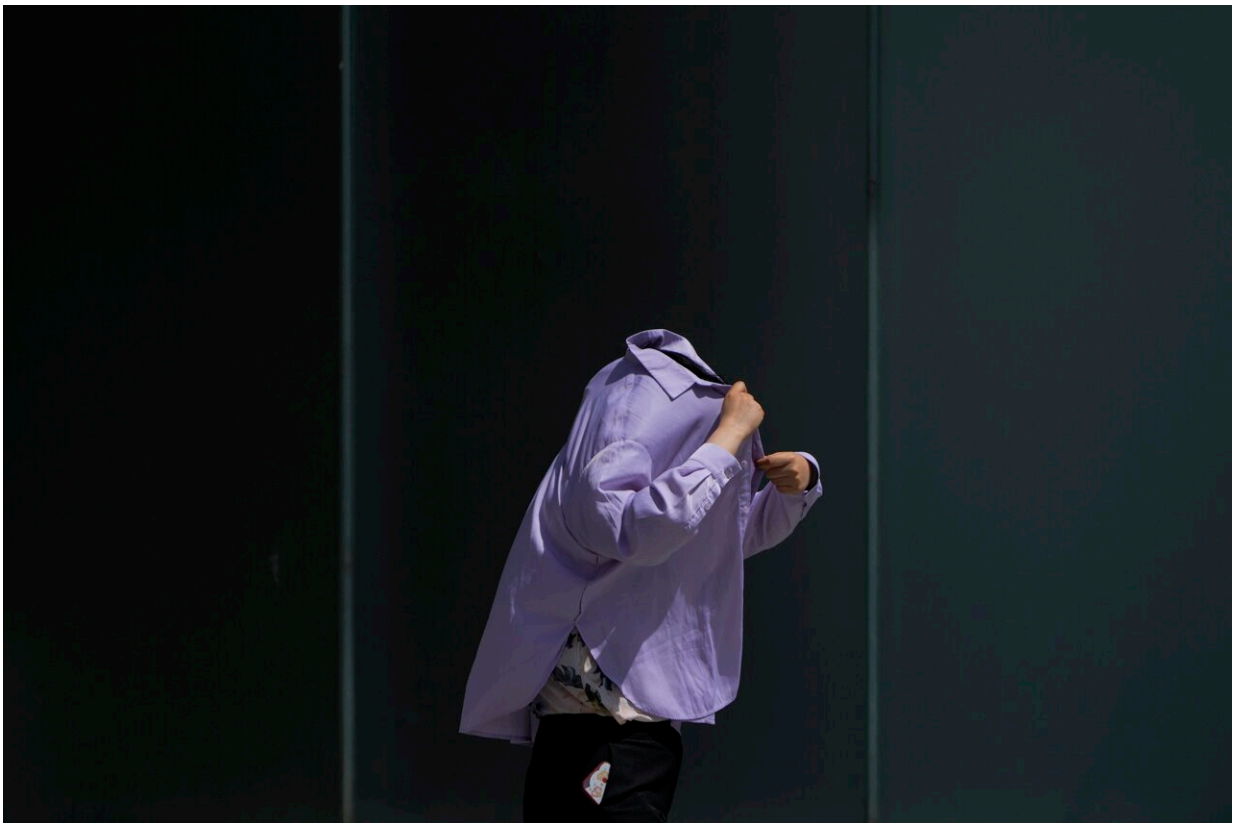
"This paper sends a clear warning that [climate change](#) makes heat waves yet more dangerous in more ways than one," said Lawrence Berkeley National Lab climate scientist Michael Wehner, who wasn't part of the research.

Just like in an oven, the longer the heat lasts, the more something cooks. In this case it's people, the co-authors said.

"Those heat waves are traveling slower and so slower so that basically

means that ... there's a heat wave sitting there and those heat waves could stay longer in the region," Zhang said. "And the adverse impacts on our [human society](#) would be huge and increasing over the years."

The team conducted [computer simulations](#) showing this change was due to heat-trapping emissions that come from the burning of coal, oil and [natural gas](#). The study found climate change's fingerprint by simulating a world without [greenhouse gas emissions](#) and concluding it could not produce the worsening heat waves observed in the last 45 years.



A woman uses a shirt to shield from the sun as she walks at an outdoor shopping mall on a sweltering day in Beijing, July 6, 2023. Climate change is making heat waves crawl slower across the globe and last longer with higher temperatures over larger areas, a new study finds. Credit: AP Photo/Andy Wong, File

The study also looks at the changes in weather patterns that propagate heat waves. Atmospheric waves that move weather systems along, such as the jet stream, are weakening, so they are not moving heat waves along as quickly—west to east in most but not all continents, Zhang said.

Several outside scientists praised the big picture way Zhang and colleagues examined heat waves, showing the interaction with [weather patterns](#) and their global movement and especially how they are slowing down.

This shows "how heat waves evolve in three dimensions and move regionally and across continents rather than looking at temperatures at individual locations," said Kathy Jacobs, a University of Arizona climate scientist who wasn't part of the study.

"One of the most direct consequences of global warming is increasing [heat waves](#)," said Woodwell Climate Research Center scientist Jennifer Francis, who wasn't part of the study. "These results put a large exclamation point on that fact."

More information: Ming Luo et al, Anthropogenic forcing has increased the risk of longer-traveling and slower-moving large contiguous heatwaves, *Science Advances* (2024). [DOI: 10.1126/sciadv.adl1598](https://doi.org/10.1126/sciadv.adl1598)

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