

New study finds Earth warming at record rate, but no evidence of climate change accelerating

June 5 2024, by Seth Borenstein



A woman is silhouetted against the setting sun as triple-digit heat indexes continue in the Midwest, Aug. 20, 2023, in Kansas City, Mo. The rate Earth is warming hit an all-time high in 2023 with 92% of last year's surprising record-shattering heat caused by humans, top scientists calculated. Credit: AP Photo/Charlie Riedel, File

The rate Earth is warming hit an all-time high in 2023 with 92% of last year's surprising [record-shattering heat](#) caused by humans, top scientists calculated.

The group of 57 scientists from around the world used United Nations-approved methods to examine what's behind [last year's deadly burst of heat](#). They said even with a faster warming rate they don't see evidence of significant acceleration in human-caused [climate change](#) beyond increased fossil fuel burning.

Last year's record temperatures were so unusual that scientists have been debating what's behind the big jump and whether climate change is accelerating or if other factors are in play.

"If you look at this world accelerating or going through a big tipping point, things aren't doing that," study lead author Piers Forster, a Leeds University climate scientist, said. "Things are increasing in temperature and getting worse in sort of exactly the way we predicted."

It's pretty much explained by the buildup of carbon dioxide from rising [fossil fuel use](#), he and a co-author said.

Last year the rate of warming hit 0.26 degrees Celsius (0.47 degrees Fahrenheit) per decade—up from 0.25 degrees Celsius (0.45 degrees Fahrenheit) the year before. That's not a significant difference, though it does make this year's rate the highest ever, Forster said.



People suffering from heat related ailments crowd the district hospital in Ballia, Uttar Pradesh state, India, June 20, 2023. The rate Earth is warming hit an all-time high in 2023 with 92% of last year's surprising record-shattering heat caused by humans, top scientists calculated. Credit: AP Photo/Rajesh Kumar Singh, File

Still, outside scientists said this report highlights an ever more alarming situation.

"Choosing to act on climate has become a political talking point but this report should be a reminder to people that in fact it is fundamentally a choice to save human lives," said University of Wisconsin climate scientist Andrea Dutton, who wasn't part of the international study team. "To me, that is something worth fighting for."

The team of authors—formed to provide annual scientific updates between the every seven- to eight-year major U.N. scientific assessments—determined last year was 1.43 degrees Celsius warmer than the 1850 to 1900 average with 1.31 degrees of that coming from human activity. The other 8% of the warming is due mostly to El Niño, the natural and temporary warming of the central Pacific that changes weather worldwide and also a freak warming along the Atlantic and just other weather randomness.

On a larger 10-year time frame, which scientists prefer to single years, the world has warmed about 1.19 degrees Celsius (2.14 degrees Fahrenheit) since pre-industrial times, the report in [the journal *Earth System Science Data*](#) found.

The report also said that as the world keeps using coal, oil and [natural gas](#), Earth is likely to reach the point in 4.5 years that it can no longer avoid crossing the internationally accepted threshold for warming: 1.5 degrees Celsius (2.7 degrees Fahrenheit).



Braxton Hicks, 7, of Livingston, Texas, holds his face to a portable fan to cool off during the DYB, formerly Dixie Youth Baseball, Little League tournament in Ruston, La., Aug. 9, 2023. The rate Earth is warming hit an all-time high in 2023 with 92% of last year's surprising record-shattering heat caused by humans, top scientists calculated. Credit: AP Photo/Gerald Herbert, File

That fits with earlier studies projecting Earth being committed or stuck to at least 1.5 degrees by early 2029 if emission trajectories don't change. The actual hitting of 1.5 degrees could be years later, but it would be inevitable if all that carbon is used, Forster said.

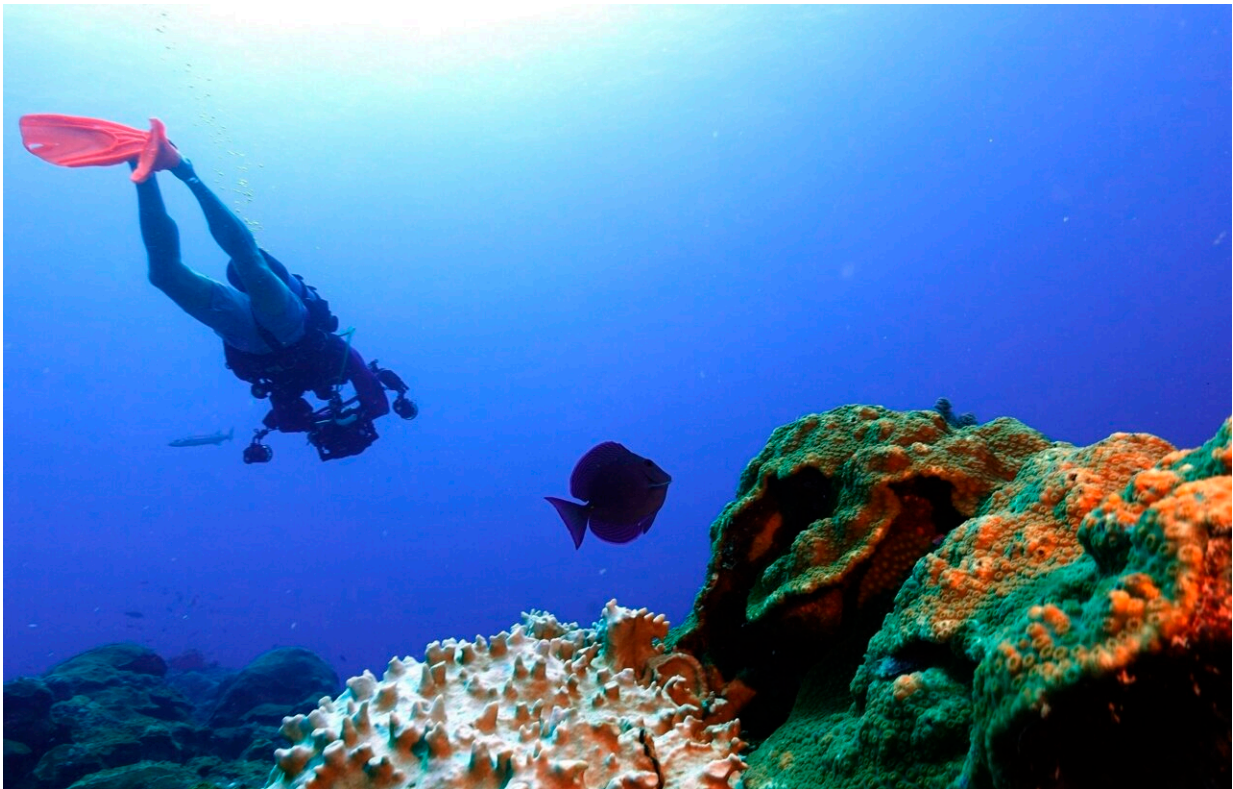
It's not the end of the world or humanity if temperatures blow past the 1.5 limit, but it will be quite bad, scientists said. Past U.N. studies show massive changes to Earth's ecosystem are more likely to kick in between

1.5 and 2 degrees Celsius of warming, including eventual loss of the planet's [coral reefs](#), Arctic sea ice, species of plants and animals—along with nastier extreme weather events that kill people.

Last year's temperature rise was more than just a little jump. It was especially unusual in September, said study co-author Sonia Seneviratne, head of land-climate dynamics at ETH Zurich, a Swiss university.

The year was within the range of what was predicted, albeit it was at the upper edge of the range, Seneviratne said.

"Acceleration if it were to happen would be even worse, like hitting a global tipping point, it would be probably the worst scenario," Seneviratne said. "But what is happening is already extremely bad and it is having major impacts already now. We are in the middle of a crisis."



A scuba diver swims near bleached coral, left, and healthy coral at the Flower Garden Banks National Marine Sanctuary, off the coast of Galveston, Texas, Sept. 15, 2023. The rate Earth is warming hit an all-time high in 2023 with 92% of last year's surprising record-shattering heat caused by humans, top scientists calculated. Credit: AP Photo/LM Otero, File

University of Michigan environment dean Jonathan Overpeck and Berkeley Earth climate scientist Zeke Hausfather, neither of whom were part of the study, said they still see acceleration. Hausfather pointed out the rate of warming is considerably higher than 0.18 degrees Celsius (0.32 Fahrenheit) per decade of warming that it was between 1970 and 2010.

Scientists had theorized a few explanations for the massive jump in September, which Hausfather called "gobsmacking." Wednesday's report didn't find enough [warming](#) from other potential causes. The report said the reduction of sulfur pollution from shipping—which had been providing some cooling to the atmosphere—was overwhelmed last year by carbon particles put in the air from Canadian wildfires.

The report also said an undersea volcano that injected massive amounts of heat-trapping water vapor into the atmosphere also spewed cooling particles with both forces pretty much canceling each other out.

Texas Tech climate scientist and chief scientist at the Nature Conservancy Katharine Hayhoe said "the future is in our hands. It's us—not physics, but humans—who will determine how quickly the world warms and by how much."

More information: Piers M. Forster et al, Indicators of Global Climate Change 2023: annual update of key indicators of the state of the climate system and human influence, *Earth System Science Data* (2024). DOI: [10.5194/essd-16-2625-2024](https://doi.org/10.5194/essd-16-2625-2024)

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