CLIMATE CENTRAL

Analysis: Global extreme heat in June 2024 strongly linked to climate change

June 27, 2024

Nearly 5 billion people suffered from climate-change-driven extreme heat over 9 days in June.

More than 60% of the world population faced extreme heat that was made at least three times more likely by climate change during June 16-24, 2024.

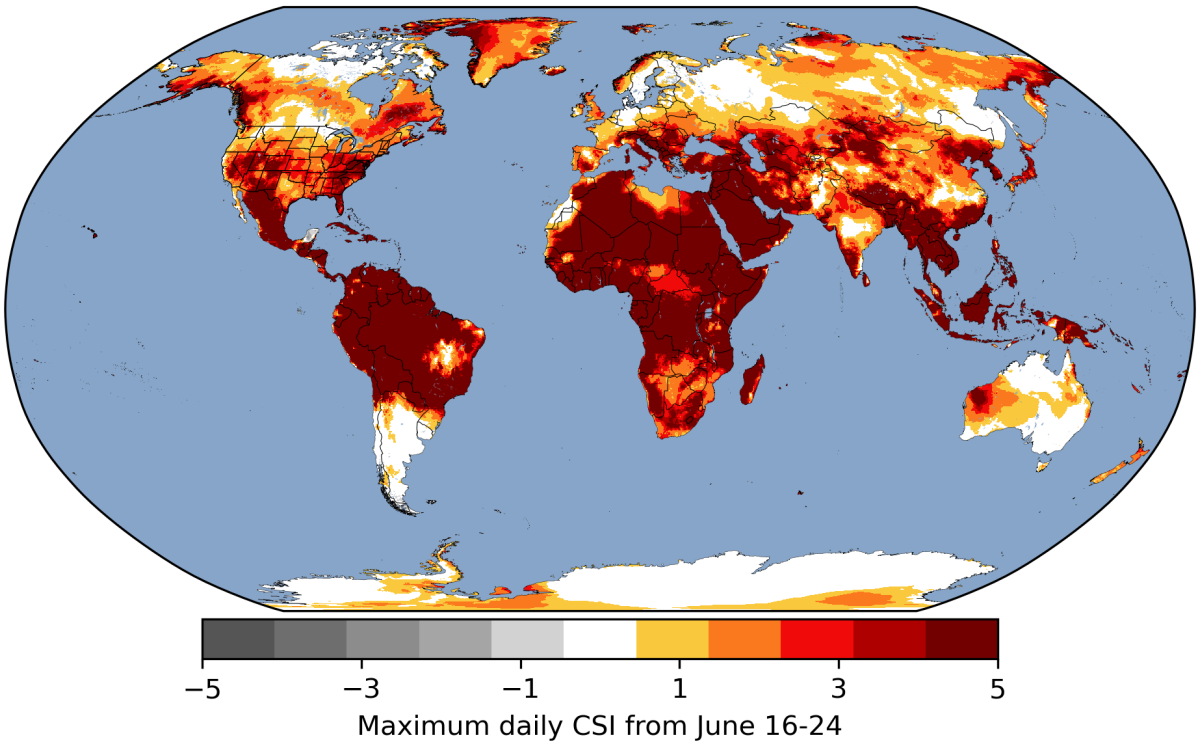

Figure 1. Highest daily Climate Shift Index (CSI) values reached in each location during June 16-24, 2024. Analysis based on ECMWF ERA5 data and NCEI GFS data. Produced June 26, 2024.

Introduction

In June 2024, extreme temperatures soared around the world. Every heat wave in the world is now made stronger and more likely to happen by climate change, caused by burning oil, gas and coal, and deforestation. Climate Central's Climate Shift Index (CSI) determines the influence of climate change on temperatures around the globe. (See the ***About the Climate Shift Index*** box below for more details.)

This analysis uses CSI to look at the role of climate change on global temperatures over June 16-24, 2024, and the number of people who were exposed to these temperatures.

Attribution Analysis

Between June 16-24, 4.97 billion people experienced extreme heat reaching CSI levels of at least 3, indicating that climate change made these temperatures at least three times more likely to occur. This includes:

- 619 million people in India
- 579 million people in China
- 231 million people in Indonesia
- 206 million people in Nigeria
- 176 million people in Brazil
- 171 million people in Bangladesh
- 165 million people in the United States
- 152 million people in Europe (excluding Russia)
- 123 million people in Mexico
- 121 million people in Ethiopia
- 103 million people in Egypt

Impacts

In Saudi Arabia, at least 1,300 people died from heat-related illnesses during the Hajj pilgrimage. Temperatures were extremely high, with some cities passing 50°C. Climate Central's analysis found that the city of Mecca has been experiencing temperatures made at least three times more likely due to climate change every day since May 18, and five times more likely since May 24. A previous analysis by climate scientists at Climameter found that climate change, caused by burning oil, gas and coal, made the heat wave in Saudi Arabia up to 2.5°C hotter.

The U.S. suffered two back-to-back heat episodes during the last two weeks of June.

The first heat wave affected the southern part of the country, Mexico and countries in Central America. In Mexico, at least 125 people died. On June 21, temperatures reached 52°C in the

Sonora state. A study by the World Weather Attribution group found that climate change made the extreme heat of May and June 35 times more likely.

The extreme temperatures are also impacting the Copa America football tournament. An assistant referee collapsed due to the heat during the match between Peru and Canada, when temperatures hit 38°C and humidity levels were above 50%.

In India, one of the country's worst-ever and long-running heat waves, which finally relented in mid-June, left more than 40,000 people with heatstroke, with over 100 dead. Temperatures approached 50°C, with a night-time low of 37°C, reportedly the highest ever recorded in India.

In Egypt, high temperatures of nearly 50°C have been recorded in the last few days. In the southern province of Aswan, at least 40 people have died. The high temperatures have caused a surge in energy consumption across the country and the government has been forced to impose daily power cuts to avoid overloading the electrical grid.

Reporting Resources

Until carbon pollution ends, heat waves everywhere will continue to become hotter and more dangerous. Explore quick facts and local analyses on the links between climate change and extreme heat in:

- Climate Central's Extreme Weather Toolkit: Extreme Heat
- World Weather Attribution's guide to reporting on extreme heat and climate change
- Yale Climate Connections' summary of the connection between heat waves and climate change.
- Potential Energy's Guide to Reporting on Unnatural Disasters

Quotes

Dr. Andrew Pershing, VP for Science at Climate Central, said:
"More than a century of burning coal, oil, and natural gas has given us an increasingly dangerous world. The heat waves popping up around the world this summer are unnatural disasters that will become more and more common until carbon pollution stops."

To request an interview with a Climate Central scientist, please contact Peter Girard at pgirard@climatecentral.org

Methods

We found the maximum CSI value over time for every pixel in the world over June 16-24, 2024. We then summed up the population present at those pixels where the CSI was greater than or equal to 3. We then repeated this process for each country individually, to get global and country-wide population exposures to temperatures very strongly driven by climate change.

About Climate Central

Climate Central is an independent group of scientists and communicators who research and report the facts about our changing climate and how it affects people's lives. Climate Central is a policy-neutral 501(c)(3) nonprofit.

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About the Climate Shift Index

Climate Central's Climate Shift Index® (CSI) system, grounded in the latest peer-reviewed attribution science, quantifies the influence of climate change on daily temperatures around the world.

CSI levels indicate how much human-caused climate change has altered the frequency of daily temperatures at a particular location.

The CSI scale is centered on zero. A CSI level of zero means that there is no detectable influence of human-caused climate change. In other words, that day's temperature is equally likely in both the modern climate and one without global warming.

Positive CSI levels 1 to 5 indicate conditions that are increasingly likely in today's climate. A CSI level of 1 means that climate change is detectable (technically, the temperature is at least 1.5x more likely). CSI levels 2 and higher correspond with the multipliers (2 = at least 2x more likely, 3 = at least 3x more likely, etc.). The CSI scale is currently capped at level 5 which means that a CSI of 5 includes higher values and thus should be read as *at least 5*. CSI level 5 events would be very difficult to encounter in a world without climate change—not impossible, but extremely unlikely.

The CSI can also be applied to temperatures that are unusually cool. For instance, a CSI level -2 means that the temperature in question is two times less likely due to human-caused climate change.

For this analysis, temperatures come from ERA5.