

U.S. Midwest Freezes, Australia Burns: This Is the Age of Weather Extremes



The Lake Michigan shore in Chicago on Tuesday. Overnight temperatures in the city dipped to minus 21 degrees Fahrenheit, or minus 29 Celsius, near the record low.

By Somini Sengupta
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In Chicago, officials warned about the risk of almost instant frostbite on what could be the city's coldest day ever. Warming centers opened around the Midwest. And schools and universities closed throughout the region as rare polar winds streamed down from the Arctic.

At the same time, on the other side of the planet, [wildfires raged in Australia's record-breaking heat](#). Soaring air-conditioner use overloaded electrical grids and caused widespread power failures. The authorities slowed and canceled trams to save power. Labor leaders called for laws that would require businesses to close when temperatures reached hazardous levels: nearly 116 degrees Fahrenheit, or 47 Celsius, as was the case last week in Adelaide, the capital of South Australia.

This is weather in the age of extremes. It comes on top of multiple extremes, all kinds, in all kinds of places.

"When something happens — whether it's a cold snap, a wildfire, a hurricane, any of those things — we need to think beyond what we have seen in the past and assume there's a high probability that it will be worse than anything we've ever seen," said Crystal A. Kolden, an associate professor at the University of Idaho, who specializes in wildfires and who is currently working in Tasmania during one of the state's worst fire seasons.

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Consider these recent examples: Heat records were toppled from [Norway to Algeria](#) last year. In parts of Australia, a drought has gone on so long that a child in kindergarten will hardly have seen rain in her lifetime. And California saw its most ruinous wildfires ever in 2018, [triggering a bankruptcy filing](#) this week by the state's largest utility, Pacific Gas and Electric.

Is it climate change?

Heat and drought extremes are consistent with scientific consensus: More greenhouse gas emissions in the atmosphere bring a greater likelihood of abnormally high temperatures. Also, broadly speaking, scientists say, a hotter planet makes extreme weather more frequent and more intense.

The real-life numbers bear out the climate models. Concentrations of carbon dioxide in the atmosphere are higher than they have been in 800,000 years, and average global temperatures have risen. The last four years have been the hottest on record, [according to the World Meteorological Organization](#), and the 20 warmest years on record have all come in the past 22 years. Ocean temperatures [have broken records](#) several straight years.



A dust storm in New South Wales this season in a photo posted to social media.

Credit
Bromwyn Alder, via Reuters

As for the extremely low temperatures this week in parts of the United States, they stand in sharp contrast to the [trend toward warmer winters](#). They may also be a result of warming, strangely enough.

Emerging research suggests that a warming Arctic is causing [changes in the jet stream](#) and pushing polar air down to latitudes that are unaccustomed to them and often unprepared. Hence this week's atypical chill over large swaths of the Northeast and Midwest.

Friederike Otto, an Oxford University climate scientist who studies how specific weather events are exacerbated by global warming, said that while not all of these extreme events can be attributed to climate change, the profound changes in the earth's atmosphere raise "the likelihood of a large number of extreme events."

"This means it becomes crucial to understand well where your community is vulnerable and this can be something that was not on the agenda without climate change," she said.

Take Chicago, for instance. It woke up to the hazards of heat two decades ago, when a five-day heat wave in the summer of 1995 killed hundreds of people, particularly those who lived alone. The city developed a heat action plan. It planted thousands of trees, set up neighborhood cooling centers and created a text messaging system so residents could request that city officials check on vulnerable people.

Now comes [a cold spell](#) that a generation of Chicago residents has never experienced, with Wednesday night temperatures that dipped to minus 21 degrees Fahrenheit, or minus 29 Celsius (the city's record low is minus 27 Fahrenheit, recorded in January 1985). The city said it would send out five buses to cruise the streets as mobile warming centers for homeless people. It has issued instructions on how to warm pipes so they don't freeze.



[If the Earth Is Warming, Why Is It So Cold Outside?](#)

<https://www.nytimes.com/interactive/2019/climate/winter-cold-weather.html>

Even on a day when it is colder than average where you live, the world as a whole is frequently warmer than average. You can even see it for yourself.

Jan. 28, 2019

Extreme heat, though, is the bigger problem overall.

[Heat records have been broken twice as often as cold records](#) in the United States since the 2000s.

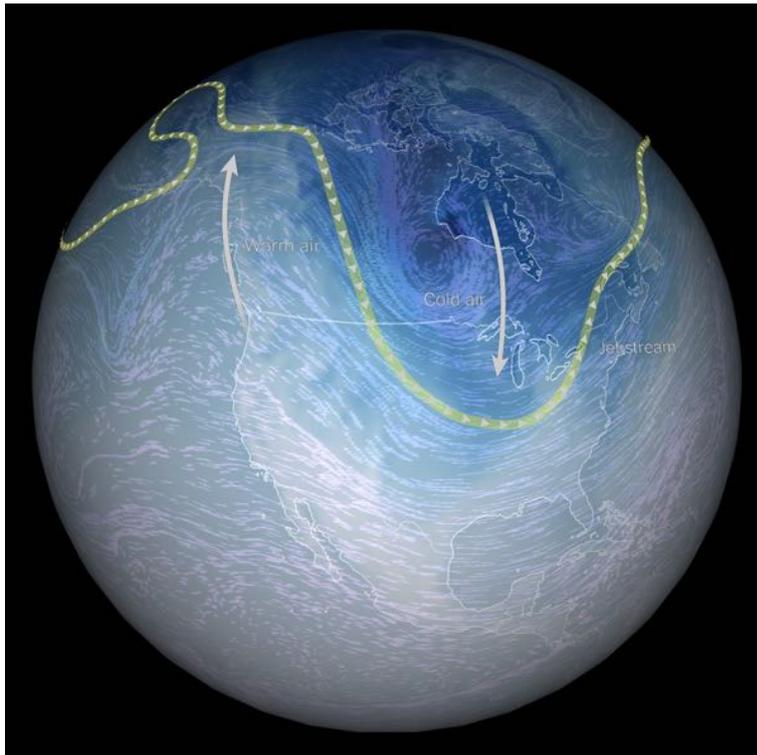
One recent [study in the journal PLOS Medicine](#) projected a fivefold rise in heat-related deaths for the United States by 2080. The outlook for less wealthy countries is worse; for the Philippines, researchers forecast 12 times more deaths. Extreme heat is already devastating the health and livelihoods of tens of millions of people, especially in South Asia.

Extreme heat also affects the nutritional value of many crops. Even some of our most precious indulgences, [like coffee](#), are in danger as temperatures rise.

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This year, heat has been a problem in both the Northern and Southern Hemispheres. In Alaska, warmer-than-usual temperatures forced the [cancellation of sled dog races](#), while cities in New Zealand, where the weather is generally so temperate that most homes don't have heating or air-conditioners, broke heat records. On Tuesday, Wellington, the capital, soared past 87 degrees Fahrenheit, the highest since record-keeping began in 1927, and Hamilton topped 91 degrees, the highest since record-keeping began in 1940.

Bob Henson, a meteorologist at Weather Underground, a forecasting service, said that in preparing for how climate change affects the weather, "we have to be prepared for a wider range of possibilities."



[A Closer Look at the Polar Vortex's Dangerously Cold Winds](https://www.nytimes.com/interactive/2019/01/30/science/polar-vortex-extreme-cold.html)

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Chicago will be as cold as the Arctic on Wednesday. We'll show you why.

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Some preparation is connected to resiliency. Mayors promise to make their cities more resilient to climate change after one disaster or another. Scientists experiment with crop seeds that are more resilient to the vagaries of extreme heat and drought.

Dr. Kolden, the fire specialist, noted that as a species, we pride ourselves on being resilient. But that human trait can also have a downside. It's why, often, even when officials tell us to evacuate from a fire zone or a flood plain, we don't. We think we'll make it, because we've made it before. Or that the forecasters are wrong.

"In our DNA, we've got this extreme resilience baked in," Dr. Kolden said. "That ends up being our downfall when it comes to the changing conditions."

Livia Albeck-Ripka and Charlotte Graham-McLay contributed reporting.

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