

2014 Breaks Heat Record, Challenging Global Warming Skeptics

By [JUSTIN GILLIS](#) JAN. 16, 2015 New York Times

Last year was the hottest on earth since record-keeping began in 1880, scientists reported on Friday, underscoring warnings about the risks of runaway greenhouse gas emissions and undermining claims by [climate change](#) contrarians that [global warming](#) had somehow stopped.

Extreme heat blanketed Alaska and much of the western United States last year. Records were set across large areas of every inhabited continent. And the ocean surface was unusually warm virtually everywhere except near Antarctica, the scientists said, providing the energy that fueled damaging Pacific storms.

In the annals of climatology, 2014 surpassed 2010 as the warmest year. The 10 warmest years have all occurred since 1997, a reflection of the relentless planetary warming that scientists say is a consequence of human activity and poses profound long-term risks to civilization and nature.

“Climate change is perhaps the major challenge of our generation,” said Michael H. Freilich, director of earth sciences at NASA, one of the agencies that track global temperatures.

Of the large land areas where many people live, only the eastern portion of the United States recorded below-average temperatures in 2014, in sharp contrast to the unusual heat in the West. Some experts think the weather pattern that produced those American extremes is an indirect consequence of the release of greenhouse gases, though that is not proven.

Several scientists said the most remarkable thing about the 2014 record was that it had occurred in a year that did not feature a strong El Niño, a large-scale weather pattern in which the Pacific Ocean pumps an enormous amount of heat into the atmosphere.

Skeptics of climate change have long argued that global warming stopped around 1998, when an unusually powerful El Niño produced the hottest year of the 20th century. Some politicians in Washington have seized on that claim to justify inaction on emissions.

But the temperature of 1998 is now being surpassed every four or five years, and 2014 was the first time that happened without a significant [El Niño](#). Gavin A. Schmidt, head of NASA’s Goddard Institute for Space Studies in Manhattan, said the next strong El Niño would probably rout all temperature records.

“Obviously, a single year, even if it is a record, cannot tell us much about climate trends,” said Stefan Rahmstorf, head of earth system analysis at the Potsdam Institute for Climate Impact Research in Germany. “However, the fact that the warmest years on

record are 2014, 2010 and 2005 clearly indicates that global warming has not 'stopped in 1998,' as some like to falsely claim."

Such claims are unlikely to go away, though. [John R. Christy](#), an atmospheric scientist at the University of Alabama in Huntsville who is known for his skepticism about the seriousness of global warming, pointed out in an interview that 2014 had surpassed the other record-warm years by only a few hundredths of a degree, well within the error margin of global temperature measurements. "Since the end of the 20th century, the temperature hasn't done much," Dr. Christy said. "It's on this kind of warmish plateau."

Despite such arguments from a handful of scientists, the vast majority of those who study the climate say the earth is in a long-term warming trend that is profoundly threatening and caused almost entirely by human activity.

They expect the heat to get much worse over coming decades, but already it is [killing forests](#) around the world, driving plants and animals to [extinction](#), melting land ice and causing the [seas to rise](#) at an accelerating pace.

"It is exceptionally unlikely that we would be witnessing a record year of warmth, during a record-warm decade, during a several decades-long period of warmth that appears to be unrivaled for more than a thousand years, were it not for the rising levels of planet-warming gases produced by the burning of fossil fuels," Michael E. Mann, a climate scientist at the Pennsylvania State University, said in an email.

NASA and the other American agency that maintains long-term temperature records, the National Oceanic and Atmospheric Administration, issued separate data compilations on Friday that confirmed the 2014 record. A Japanese agency had released preliminary information in early January showing 2014 as the warmest year.

One more scientific group, in Britain, that curates the world's temperature record is scheduled to report in the coming weeks.

Separate temperature measurements taken from satellites do not show 2014 as a record year, although it is close. Several scientists said the satellite readings reflected temperatures in the atmosphere, not at the earth's surface, so it was not surprising that they would differ slightly from the ground and ocean-surface measurements that showed record warmth.

"Why do we keep getting so many record-warm years?" Dr. Schmidt asked in an interview. "It's because the planet is warming. The basic issue is the long-term trend, and it is not going away."

February 1985 was the last time global surface temperatures fell below the 20th-century average for a given month, meaning that no one younger than 30 has ever lived through a below-average month. The last full year that was colder than the 20th-century average was 1976.

The contiguous United States set a temperature record [in 2012, a year of scorching heat waves and drought](#). But, mostly because of the unusual chill in the East, 2014 was only the 34th warmest year on record for the lower 48 states.

That cold was drawn into the interior of the country by a loop in a current called the jet stream that allowed Arctic air to spill southward. But an offsetting kink allowed unusually warm tropical air to settle over the West, large parts of Alaska and much of the Arctic.

A few recent scientific papers say that such long-lasting kinks in the jet stream have become more likely because global warming is rapidly melting the sea ice in the Arctic, but many leading scientists are not convinced on that point.

Whatever the underlying cause, last year's extreme warmth in the West meant that Alaska, Arizona, California and Nevada all set temperature records. Some parts of California essentially had no winter last year, with temperatures sometimes running 10 to 15 degrees above normal for the season. The temperature in Anchorage, Alaska's largest city, never fell below zero in 2014, the first time that has happened in 101 years of record-keeping for the city.

Twenty years of global negotiations aimed at slowing the growth of heat-trapping emissions have yielded little progress. However, 2014 saw signs of large-scale political mobilization on the issue, as more than 300,000 people [marched](#) in New York City in September, and tens of thousands more took to the streets in other cities around the world.

The next big attempt at a global climate agreement will come when negotiators from around the world gather in Paris in December. Political activists on climate change wasted no time Friday in citing the 2014 heat record as proof that strong action was needed.

"The steady and now record-breaking rise in average global temperatures is not an issue for another day," Michael R. Bloomberg, the former New York mayor who is spending tens of millions of dollars of his personal fortune to battle climate change, said in a statement. "It's a clear and present danger that poses major economic, health, environmental and geopolitical risks."