

Climate change confirmed? Last year called the warmest on record

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Members of the glaciology unit of Peru's national water authority walk on the Pastoruri glacier in Huaraz, Peru, Dec. 4, 2014. The glaciology unit was studying the measurement of ice thickness. Photo: AP Photo/Rodrigo Abd

Scientists began recording average surface temperatures on Earth in 1880. Last year, 2014, was the warmest year ever recorded since that time.

The planet is warming over the long term, scientists announced Friday. The Earth's average temperature has risen 1.4 degrees Fahrenheit since 1880.

While a less than two-degree difference may seem small, this rise in temperatures could cause big problems. Flooding along coastlines, more severe storms, and global droughts are all threats, climate experts from NASA and the National Oceanic and Atmospheric Administration (NOAA) said.

Scientists from NASA, the U.S. space agency, and NOAA used data collected from around the world. They had 6,300 weather stations on land, ships and floating buoys in the world's oceans, and research stations in Antarctica.

The Warmest Years Yet

Experts from both agencies found 2014's temperatures to be higher than average temperatures in the 1900s.

Sometimes high temperatures on the Earth's surface are caused by El Nino: a change in currents and temperatures in the Pacific Ocean. Scientists are worried because the high global temperatures in 2014 were not tied to El Nino.

December 2014 was the warmest month ever measured, NOAA reported. May, June, August and September set new records for monthly highs.

A hotter 2014 continued a trend: 9 of the 10 warmest years ever recorded have occurred since 2002, NOAA said.

The climate scientists said that this warming trend — temperatures going up over a long period of time — could only be explained if you looked at human activity. They blamed burning fossil fuels. Burning fossil fuels, such as coal, release greenhouse gases into the Earth's atmosphere. These greenhouse gases help to trap in heat.

"Greenhouse gas trends are responsible for the majority of the trend that we see," said NASA scientist Gavin Schmidt.

Because more greenhouse gases are being released, Schmidt added, "we may anticipate further record highs in the years to come."

Blazing Heat And Other Hot Spells

Land temperatures in 2014 were just the fourth warmest of all time. It was record-high temperatures in the oceans that moved the global average up. Ocean water holds in heat longer than land. As water heats up, ice melts, causing sea levels to rise.

"This was very clearly the warmest year in the ocean records," Schmidt said. "It wasn't quite the warmest year in the land records, but combined, this did actually give the warmest year" since 1880.

Last year was the warmest ever despite a colder-than-usual U.S. winter caused by a "polar vortex," the scientific agencies said. The colder U.S. winter was balanced out by hotter periods elsewhere: blazing heat in the Western U.S., and hot spells in Europe and Australia.

Both Alaska, and Siberia in northern Russia, saw warmer-than-usual temperatures in 2014. The city of Anchorage, Alaska, did not have temperatures drop below zero degrees in 2014. It was the first time ever.

Temperatures in the far northern latitudes of the Earth: northern Canada, Russia and Scandinavia, for example, are rising twice as fast as areas closer to the equator. The rising temperatures in the north are melting snow. Less snow means the Earth can reflect less heat.

“A lot of additional heat is gained because there’s less snow to reflect the sunlight back to space,” said Tom Karl, head of NASA’s National Climatic Data Center in North Carolina.

Arctic sea ice melted more due to higher summer temperatures, Schmidt said, with ice at the Earth’s far north at its sixth lowest level ever.

Steady Rise Since 1970s

Meanwhile, Antarctic sea ice — at the south of the planet — hit record highs in 2014. This is “a little surprising given the warmth on the rest of the planet,” Schmidt said.

Antarctic sea ice is less tied to global temperatures, Schmidt said, and more influenced by local factors including wind and fresh water from melting ice on land.

Skeptics who doubt global warming often point to record-high temperatures in 1998 to argue that the warming has slowed down, or stopped. But NASA and NOAA scientists said the new data clearly showed that there has been a steady rise in temperatures since the 1970s.

“2014 is exactly where we would’ve expected, before 1998,” Schmidt said. “There are going to be periods when short-term trends go up and go down. But there’s no evidence that the long-term trend is much different from what it has been.”

Tim Barnett, a marine physicist with the Scripps Institution of Oceanography at the University of California, San Diego, said the evidence showed that warming had not paused since the late 1990s.

“You have to interpret what you’re seeing over the long haul,” he said. “You have to look at a couple of decades at least before you begin to see that things have changed.”

Running Hot And Cold

Until last year, the warmest years ever were 2005 and 2010. The global average for 2014 was higher than those years by 0.07 degree Fahrenheit, government scientists said.

Between 1880 and 1970, the global annual temperature increased at an average rate of 0.11 degree Fahrenheit per decade. Since then, it has increased by 0.28 degree Fahrenheit per decade, NOAA data show.

In the U.S., California, Alaska, Nevada and New Mexico saw all-time warm years in 2014. At the same time, most of the Midwest and East Coast experienced temperatures far lower than usual, NOAA said.

Quiz

- 1 How is the author's analysis structured in the article?
 - (A) as a comparison between short- and long-term changes in the Earth's temperature
 - (B) as an analysis of the gradually increasing temperature of the Earth in the last century
 - (C) as a central discussion of the effect of greenhouse gases on the Earth's temperature
 - (D) as a description of the extensive research conducted by the weather department

- 2 The article describes the seriousness of the temperature rise of the Earth by:
 - (A) showing that 2014 was warmer than two of the warmest years in the last decade
 - (B) highlighting the consequences of greenhouse gas trends on the Earth's climate
 - (C) illustrating the melting of ice that causes the Earth to absorb sunlight
 - (D) revealing that the temperature rise is a direct result of El Nino

- 3 Why does the author include the first four paragraphs in the article?
 - (A) to show that the collected data confirms a gradual increase in temperature over the years
 - (B) to illustrate that the average rise in Earth's temperature has been happening since 1880
 - (C) to illustrate how an ever so small increase in temperature can lead to big problems like storms and droughts
 - (D) to show how climate experts from NASA and NOAA have been collecting data from around the world

- 4 Why is paragraph 5 of the section "Blazing Heat And Other Hot Spells" important to the article?
- (A) It shows how the increase in temperature means less snow in the northern latitudes of the Earth.
 - (B) It shows that colder regions closer to the equator are experiencing a greater increase in temperature.
 - (C) It shows that the melting of ice because of global warming further adds to an increase in temperature.
 - (D) It shows how the effect of global warming is widespread and can be seen even on the colder regions of the Earth.