

# Greenhouse gas level highest in two million years, NOAA reports (Update 2)

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In this Sunday, Dec. 2, 2012 photo, a flock of Geese fly past the smokestacks at the Jeffrey Energy Center coal power plant as the sun sets near Emmett, Kan. Worldwide levels of the chief greenhouse gas that causes global warming have hit a milestone, reaching an amount never before encountered by humans, federal scientists said Friday, May 10, 2013. Carbon dioxide was measured at 400 parts per million at the oldest monitoring station in Hawaii which sets the global benchmark. The last time the worldwide carbon level was probably that high was about 2 million years ago, said Pieter Tans of the National Oceanic and Atmospheric Administration. (AP Photo/Charlie Riedel)

Worldwide levels of the greenhouse gas that plays the biggest role in global warming have reached their highest level in almost 2 million years—an amount never before encountered by humans, U.S. scientists said Friday.

Carbon dioxide was measured at 400 parts per million Thursday at the oldest monitoring station in Hawaii, which sets the global benchmark.

The number 400 has been anticipated by climate scientists and environmental activists for years as a notable indicator, in part because it's a round number.

"What we see today is 100 percent due to human activity," said Pieter Tans, a senior scientist with the National Oceanic and Atmospheric Administration. The burning of fossil fuels, such as coal for electricity and oil for gasoline, has caused the overwhelming bulk of the man-made increase in carbon in the air, scientists say.

At the end of the Ice Age, it took 7,000 years for carbon dioxide levels to rise by 80 parts per million, Tans said. Because of the burning of fossil fuels, carbon dioxide levels have gone up by the same amount in just 55 years.

The speed of the change is the big worry, said Pennsylvania State University climate scientist Michael Mann. If carbon dioxide levels go up 100 parts per million over thousands or millions of years, plants and animals can adapt. But that can't be done at the speed it is now happening.

The last time the worldwide carbon level was probably this high was about 2 million years ago, Tans said. That was during the Pleistocene Era.

"It was much warmer than it is today," Tans said. "There were forests in Greenland. Sea level was higher, between 10 and 20 meters (33 to 66 feet)."

Other scientists say it may have been 10 million years since Earth last encountered this level of carbon dioxide. The first modern humans only appeared in Africa about 200,000 years ago.

When measurements were first taken in 1958, carbon dioxide was measured at 315 parts per million. Levels are now growing about 2 parts per million per year. That's 100 times faster than at the end of the Ice Age.

Before the Industrial Revolution, carbon dioxide levels were around 280 ppm, and they were closer to 200 during the Ice Age, which is when sea levels shrank and polar places went from green to icy.

Some scientists and environmental groups promote 350 parts per million as a safe level for CO<sub>2</sub>, but scientists acknowledge they don't really know what levels would stop the effects of global warming.

"Physically, we are no worse off at 400 ppm than we were at 399 ppm," Princeton University climate scientist Michael Oppenheimer said. "But as a symbol of the painfully slow pace of measures to avoid a dangerous level of warming, it's somewhat unnerving."

The world pumps on average 2.4 million pounds of carbon dioxide into the air every second for a total of 38.2 billion tons in 2011, according international calculations published in a scientific journal in December. China spews 10 billion tons of carbon dioxide into the air per year, leading all countries, and its emissions are growing about 10 percent annually. The U.S. at No. 2 is slowly cutting emissions and is down to 5.9 billion tons per year.

Environmental activists, such as former U.S. Vice President Al Gore, seized on this week's milestone.

"This number is a reminder that for the last 150 years—and especially over the last several decades—we have been recklessly polluting the protective sheath of atmosphere that surrounds the Earth and protects the conditions that have fostered the flourishing of our civilization," Gore said in a statement. "We are altering the composition of our atmosphere at an unprecedented rate."

There are natural ups and downs of the greenhouse gas, which comes from volcanoes and decomposing plants and animals. But that's not what has driven current levels so high, Tans said. He said the amount should be even higher, but the world's oceans are absorbing quite a bit, keeping it out of the air.

Carbon dioxide traps heat just like in a greenhouse and most of it stays in the air for about a century. Some lasts for thousands of years, scientists say. It accounts for three-quarters of the planet's heat-trapping gases. There are others, such as methane, which has a shorter life span but traps heat more effectively. Both trigger temperatures to rise over time, scientists say, which is causing sea levels to rise and some weather patterns to change.

Last year, regional monitors briefly hit 400 ppm in the Arctic, but those monitoring stations aren't seen as a world mark like the one at Mauna Loa, Hawaii.

Generally carbon levels peak in May then fall slightly, so the yearly average is usually a few parts per million lower than May levels.

**More information:** NOAA monitoring at Mauna Loa:  
[www.esrl.noaa.gov/gmd/ccgg/trends/weekly.html](http://www.esrl.noaa.gov/gmd/ccgg/trends/weekly.html)

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