

South Pole is the last place on Earth to pass a global warming milestone

June 17 2016



Credit: NOAA Headquarters

The Earth passed another unfortunate milestone May 23 when carbon dioxide (CO₂) surpassed 400 parts per million (ppm) at the South Pole for the first time in 4 million years.

The South Pole has shown the same, relentless upward trend in CO₂ as the rest of world, but its remote location means it's the last to register the impacts of increasing emissions from [fossil fuel consumption](#), the

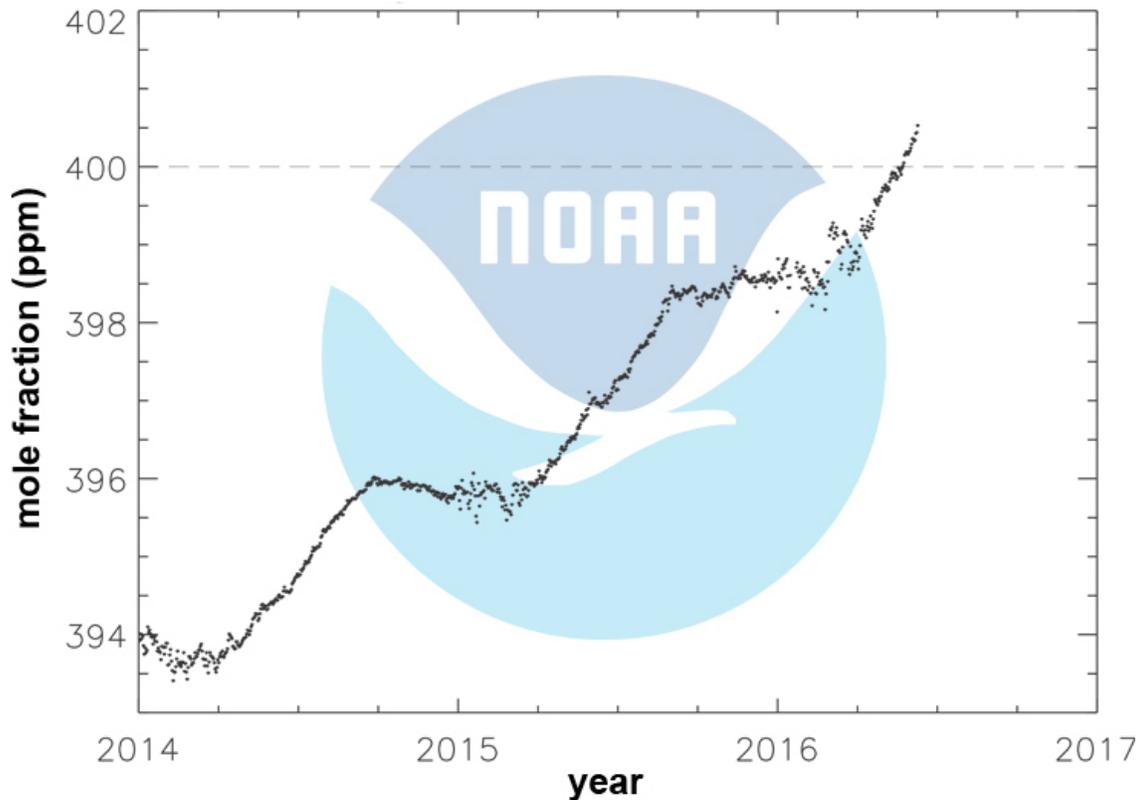
primary driver of [greenhouse gas](#) pollution.

"The far southern hemisphere was the last place on earth where CO₂ had not yet reached this mark," said Pieter Tans, the lead scientist of NOAA's Global Greenhouse Gas Reference Network. "Global CO₂ levels will not return to values below 400 ppm in our lifetimes, and almost certainly for much longer."

Over the course of the year, CO₂ levels rise during fall and winter and decline during the Northern Hemisphere's summer as terrestrial plants consume CO₂ during photosynthesis. But plants only capture a fraction of annual CO₂ emissions, so for every year since observations began in 1958, there has been more CO₂ in the atmosphere than the year before.

Last year's global CO₂ average reached 399 ppm, meaning that the global average in 2016 will almost certainly surpass 400 ppm. The only question is whether the lowest month for 2016 will also remain above 400.

Daily average carbon dioxide at South Pole



Daily average carbon dioxide levels rose to a new high level of 400 parts per million on May 23 for the first time in four million years. This chart shows readings at the South Pole from 2014 to present, as recorded by NOAA's greenhouse gas monitoring network. Credit: NOAA

Upward trend continues

And the annual rate of increase appears to be accelerating. The annual growth rate of atmospheric [carbon dioxide](#) measured at NOAA's Mauna Loa Observatory in Hawaii jumped 3.05 ppm during 2015, the largest year-to-year increase in 56 years of monitoring. Part of last year's jump

was attributable to El Nino, the cyclical Pacific Ocean warming that produces extreme weather across the globe, causing terrestrial ecosystems to lose stored CO₂ through wildfire, drought and heat waves.

Last year was the fourth consecutive year that CO₂ grew more than 2 ppm – which set another record. This year promises to be the fifth.

"We know from abundant and solid evidence that the CO₂ increase is caused entirely by human activities," Tans said. "Since emissions from fossil fuel burning have been at a record high during the last several years, the rate of CO₂ increase has also been at a record high. And we know some of it will remain in the atmosphere for thousands of years."

Provided by NOAA Headquarters

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