

Spikes in carbon emissions detected with NASA satellite

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This photo from 2014 shows an artist's rendering obtained from NASA/JPL-Caltech of NASA's Orbiting Carbon Observatory (OCO)-2, which examines how carbon dioxide moves across the Earth system and how it changes over time

Data from a circling NASA satellite shows spikes in carbon emissions worldwide, particularly in winter, along with new insights into the rising levels of pollutants that drive global warming, researchers said Thursday.

The findings in the journal *Science* are based on data from a carbon-tracking satellite launched in 2014 by the US space agency, known as NASA's Orbiting Carbon Observatory-2 (OCO-2).

The satellite's mission is to examine how carbon dioxide, the leading greenhouse gas produced by the burning of fossil fuel, moves across the Earth system and how it changes over time.

"The data reveal a striking change in the carbon cycle in the Northern Hemisphere across seasons, where in the spring there's a dramatic uptake of carbon by terrestrial plants," said one of the five papers in *Science*.

"During the winter, however, carbon uptake by plants is minimal, while the breakdown or decay of plant material feeds carbon back into the atmosphere."

This cycle, coupled with the continual emissions from [fossil fuel burning](#) over China, Europe and the southeast United States, means carbon levels reach a seasonal high in April in the [northern hemisphere](#), it said.

Then, as spring gets under way and summer approaches, plants begin to soak up more carbon again.

Another study in *Science* found that the ocean warming phenomenon known as El Nino resulted in far more carbon release in the tropics than in previous years.

El Nino is a weather pattern that causes sea surface temperature and air pressure in the Pacific Ocean to fluctuate, and may last years at a time.

The 2015 El Nino "resulted in the release of about 2.5 gigatons more carbon into the atmosphere in 2015 than in 2011," said the report.

"Lower precipitation in South America and increased temperatures in Africa were key drivers" of this change, it added.

In tropical Asia, the increased [carbon release](#) was mostly due to biomass burning.

Since climate change is expected to bring less rain to South America and higher temperatures to Africa by the end of the century, researchers warn the trend will get worse in the tropics, which have traditionally served as a buffer for [fossil fuel emissions](#) because they absorb so much carbon.

More information: A. Eldering et al., "The Orbiting Carbon Observatory-2 early science investigations of regional carbon dioxide fluxes," *Science* (2017). [science.sciencemag.org/cgi/doi ... 1126/science.aam5782](https://science.sciencemag.org/cgi/doi/10.1126/science.aam5782)

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A. Chatterjee at Universities Space Research Association in Columbia, MD et al., "Influence of El Niño on atmospheric CO₂ over the tropical Pacific Ocean: Findings from NASA's OCO-2 mission," *Science* (2017). [science.sciencemag.org/cgi/doi ... 1126/science.aam5776](https://science.sciencemag.org/cgi/doi/10.1126/science.aam5776)

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