

NASA map gives most accurate space-based view of L.A.'s carbon dioxide

June 8 2021, by Carol Rasmussen



Credit: CC0 Public Domain

Using data from NASA's Orbiting Carbon Observatory 3 (OCO-3) instrument on the International Space Station, researchers have released one of the most accurate maps ever made from space of the human

influence on carbon dioxide (CO₂) in the Los Angeles metropolitan area. The map shows tiny variations in airborne CO₂ from one mile of the giant L.A. Basin to the next.

The highest CO₂ readings, in yellow on the map, are on the west side of downtown L.A. – a densely populated area with congested freeways and CO₂-emitting industries. Yellow indicates atmospheric CO₂ elevated by five or more molecules out of every million molecules of air, or five parts per million. That's equivalent to the amount that global atmospheric CO₂ is rising globally on average every two years

The animation shows five adjoining swaths of [data](#) the OCO-3 instrument collected over the [metropolitan area](#) to create a map of CO₂ concentrations that covers about 50 square miles (80 square kilometers). Each pixel is about 1.3 miles (2.2 kilometers); the color indicates how much higher the concentration of CO₂ is in that spot than in clean desert air north of the city (measured at NASA's Armstrong Research Center, upper right).

Most of the increasing CO₂ in the global atmosphere comes from humans burning fossil fuels for energy, and 70% of that comes from cities. Los Angeles has set goals for cutting its carbon emissions. This type of data can help decisionmakers choose the most effective policies to reach those goals and to measure the effectiveness of new regulations. Data from [ground level](#) provides critical local measurements, but [satellite data](#) is equally necessary because it covers a wider area and also measures CO₂ throughout the entire depth of the atmosphere.

The International Space Station, which hosts the OCO-3 instrument, circles Earth between 52 degrees north and 52 degrees south latitudes—about the latitudes of London and Patagonia. Almost all cities on Earth come within its view on average once every three days. The OCO-3 team at NASA's Jet Propulsion Laboratory in Southern

California schedules measurements at up to 40 locations a day. Most of these targets are high-CO₂-emitting cities.

The instrument consists of a telescope and three spectrometers, a kind of instrument that analyzes wavelengths of the electromagnetic spectrum of sunlight to find the spectral "fingerprint" of carbon dioxide. The telescope swivels rapidly to collect as many adjoining swaths of data as possible over a targeted location within two minutes. OCO-3 usually collects a single swath of data as it orbits, like its predecessor the OCO-2 mission (which is still operating), but it's designed to create snapshot maps like this one to give researchers a more complete picture of emissions from cities and other areas of interest.

The maps were published this week in a paper in the journal *Remote Sensing of Environment*.

More information: Matthäus Kiel et al, Urban-focused satellite CO₂ observations from the Orbiting Carbon Observatory-3: A first look at the Los Angeles megacity, *Remote Sensing of Environment* (2021). [DOI: 10.1016/j.rse.2021.112314](https://doi.org/10.1016/j.rse.2021.112314)

Provided by Jet Propulsion Laboratory

Citation: NASA map gives most accurate space-based view of L.A.'s carbon dioxide (2021, June 8) retrieved 11 May 2024 from <https://phys.org/news/2021-06-nasa-accurate-space-based-view-la.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.