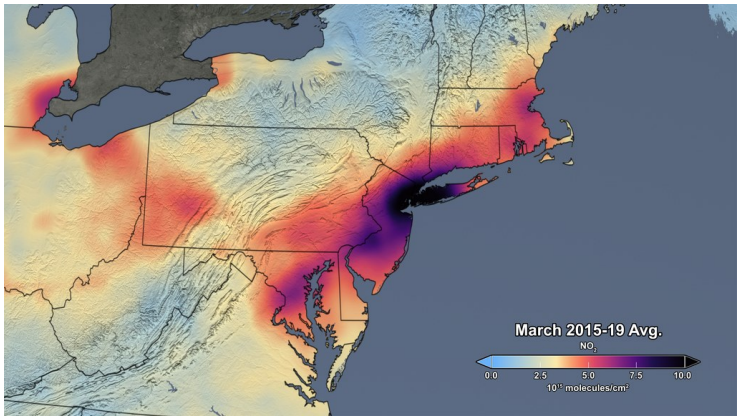
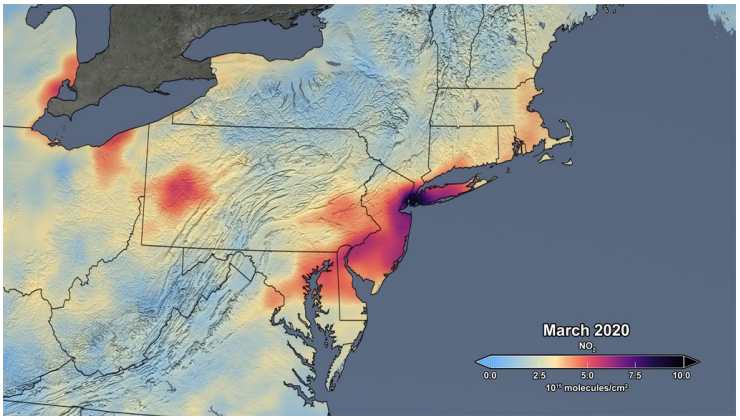
Air Pollution





Air Pollution Drop Over Northeast U.S. during COVID,
Credit: NASA's Scientific Visualization Studio

Link images to enlarge.

Nitrogen dioxide (NO_2), primarily emitted from burning fossil fuels for transportation and electricity generation, can be used as an indicator of changes in human activity. These images show average concentrations of atmospheric NO_2 as measured by the Ozone Monitoring Instrument (OMI) on NASA's Aura satellite. The left image shows the average concentration in March from 2015 to 2019, while the right image shows the average concentration measured in March 2020.

Though variations in weather from year to year cause variations in the monthly means for individual years, March 2020 shows the lowest monthly atmospheric NO_2 levels of any March during the OMI data record, which spans 2005 to the present. In fact, the data indicate that NO_2 levels in March 2020 are about 30% lower on average across the region of the I-95 corridor from Washington, D.C. to Boston than March averages from 2015 to 2019.

If processed and interpreted carefully, nitrogen dioxide levels observed from space serve as an effective proxy for NO_2 levels at Earth's surface, though there will likely be differences in the measurements from space and those made at ground level.

Health effects
Breathing air with a high concentration of NO_2 can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms. Longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly, are generally at greater risk for the health effects of NO_2.

Environmental effects
NO_2 and other NO_x chemicals interact with water, oxygen, and other chemicals in the atmosphere to form acid rain. Acid rain harms sensitive ecosystems such as lakes and forests by altering their pH.

Text courtesy of NASA: NASA Satellite Data Show 30 Percent Drop In Air Pollution Over Northeast U.S. and Environmental Protection Agency: Nitrogen Dioxide (NO_2) Pollution.

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DISCUSSION PROMPTS

- Are you concerned about air quality in your community?
- Are some neighborhoods in your community experiencing worse air quality than others?
- Do you think there is a relation between the quality of the air and the land cover of these neighborhoods?
- What ideas and concrete solutions would you offer to improve air quality in your community?
- Share your ideas and prospective solutions with us on social media.

OPTIONAL

- Take images of the land cover and trees in these neighborhoods.
- Share your images with us on social media.

AIR POLLUTION RESOURCES

NASA's TEMPO Mission
MassDEP: Air Quality in Massachusetts
Smithsonian Environmental Research Center: Explore Earth's Changing Atmosphere

Additional Resources:

NASA Global Climate Change: Vital Signs of the Planet
NASA Overview: Weather, Global Warming, and Climate
Action for the Climate Emergency
Perspectives of Earth: Main Website
Perspectives of Earth: UN Sustainable Development Goals: Six Essential Elements
Windows on Earth: See Earth Through the Astronauts' Lens