

# Monitoring air quality after Fourth of July fireworks

July 17 2019

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The U.S. recently celebrated the Fourth of July with dazzling fireworks displays in many cities. After the "oohs" and "ahhs" faded, some people might have wondered how the lingering gunpowder-scented smoke affected air quality. Now researchers reporting in *ACS Earth and Space Chemistry* have conducted detailed measurements and found increased levels of several pollutants after an Independence Day fireworks event in Albany, New York.

According to the American Pyrotechnics Association, about 254 million pounds of [fireworks](#) exploded in consumer and public displays in 2017. Previous studies have shown that fireworks festivities around the world can cause very high short-term air pollution, which could have harmful effects on the respiratory system in humans. However, most of these studies used filter-based methods to collect air over 12- or 24-hour time periods, so they didn't provide real-time information. James Schwab and colleagues wanted to conduct a detailed investigation on [air quality](#) before, during and after a large fireworks display in Albany, New York—a city of about 100,000 people that typically has relatively [clean air](#).

The researchers collected minute- and hour-averaged air samples from two sites in uptown and downtown Albany from June 27 to July 7, 2017, and analyzed pollutants by mass spectrometry. The peak levels of submicron particulate matter were more than eight times higher after the fireworks display than before. The team also observed a large spike in potassium levels—from the black powder used as a propellant in

fireworks—on the night of July 4, which peaked at 350 times the background level for 2-3 hours and lingered until the next morning. The levels of other substances including organics, nitrate and sulfate also increased in the hours following the display. The team estimated that emissions during the fireworks show were about 10 times higher than the hourly emissions rate from vehicles in the Albany area. The researchers say that additional studies, including those assessing human health impacts, are needed.

**More information:** Jie Zhang et al, Detailed Measurements of Submicron Particles from an Independence Day Fireworks Event in Albany, New York Using HR-ToF-AMS, *ACS Earth and Space Chemistry* (2019). [DOI: 10.1021/acsearthspacechem.9b00046](https://doi.org/10.1021/acsearthspacechem.9b00046)

Provided by American Chemical Society

Citation: Monitoring air quality after Fourth of July fireworks (2019, July 17) retrieved 23 April 2024 from <https://phys.org/news/2019-07-air-quality-fourth-july-fireworks.html>

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