

Study tracks the impacts of western wildfires on New York air quality

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Hazy conditions seen at the NYS Mesonet site in Queens, July, 20 2021. Credit: University at Albany

A new study has found that more frequent and intense western wildfires are not only impacting the air quality and visibility in surrounding areas, but also as far away as the East Coast.

The study, led by researchers at the University at Albany, monitored

transported wildfire smoke and its impact on air pollution across New York in July 2021 using observational data from the [NYS Mesonet](#)—an advanced network of weather stations located across the state.

They found that [wildfire](#) smoke originating from the northwestern U.S. and southern Canada significantly elevated air pollutants less than 2.5 micrometers (PM2.5) across the state over two multiday time periods, adversely affecting local and regional [air quality](#).

According to the researchers, PM2.5 emissions have declined across New York and nationally over the last few decades due to new environmental mandates and regulations. However, increased wildfire activity threatens to reverse this trend.

Their findings were published this month in *Geophysical Research Letters*.

"Wildfires are common across the western U.S. and southern Canada in the [summer months](#) and are projected to increase due to [climate change](#)," said Bhupal Shrestha, a senior research support specialist with UAlbany's Atmospheric Sciences Research Center and the paper's lead author. "Through our observational research, we detected two significantly elevated multiday PM2.5 episodes across New York that can be directly connected to transported wildfire smoke."

"The increasing frequency and intensity of wildfires due to climate change are projected to enhance these emissions even more in the near future, potentially offsetting nationwide efforts to regulate air pollution."

Wildfire smoke detection

To detect wildfire smoke, the researchers relied on data from the Mesonet's [17 profiler sites](#). Each profiler site is comprised of a scanning

Doppler LiDAR and a microwave radiometer that scan the atmosphere and report back in real time. Data is collected, quality-controlled and archived every 10 minutes.

Two significantly elevated emissions observations were recorded across the profiler network between July 18–20 and July 25–27, timed around the peak of the summer's western fire season. The average peak of hourly PM_{2.5} exceeded 50.1 micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$) during the first observations and 36.8 $\mu\text{g}/\text{m}^3$ during the second. Both were above the U.S. EPA 24-hour standards, a major concern for hazardous air quality.

The increased emissions started about 36 hours earlier in upstate regions than in downstate regions, providing convincing evidence that the aerosols were transported from western wildfires and moving across New York, not from local sources.

"Our research demonstrates how the NYS Mesonet Profiler data can improve monitoring of wildfire smoke on a regional scale, assess impacts on air quality, aid satellite measurements and air quality forecasting models," Shrestha said. "This is a prime example of how the Mesonet serves as a vital observational awareness tool that can improve numerical forecasting models around severe weather events."

Along with Mesonet data, the researchers used [satellite imagery](#) and a back-trajectory model to confirm and track the transport paths of the emissions arriving in NYS.

More information: Bhupal Shrestha et al, Observations and Impacts of Long-Range Transported Wildfire Smoke on Air Quality Across New York State During July 2021, *Geophysical Research Letters* (2022). [DOI: 10.1029/2022GL100216](https://doi.org/10.1029/2022GL100216)

Provided by University at Albany

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