



NASA Air Quality Applied Sciences Team
Earth Science Serving Air Quality Management Needs



FOR IMMEDIATE RELEASE: March 27, 2014

Contact: Mike Williams, Rice University Press Office, 713-348-6728, mikewilliams@rice.edu

US Clean Air Efforts Stay On Target

AQAST member's analysis shows dramatic gains in reducing airborne particulate matter, published in the Journal of the Air & Waste Management Association

HOUSTON – National efforts in the last decade to clear the air of dangerous particulate matter have been so successful that most urban areas have already attained the next benchmark, according to new research by Rice University.

Atmospheric researchers led by Rice professor and NASA Air Quality Applied Science Team (AQAST) member Daniel Cohan, studied the state implementation plans (SIPs) from 23 regions. The SIPs were mandated by the US Environmental Protection Agency (EPA) to reduce the concentration of particulate matter smaller than 2.5 microns (PM2.5) to less than 15 micrograms per cubic meter by 2009. The Rice analysis was published this week in the Journal of the Air and Waste Management Association (JA&WMA).

All but one of the regions studied reported they had met the goal ahead of the EPA's deadline. States with regions that met the deadline included Connecticut, Georgia, Illinois, Indiana, Kentucky, Maryland, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee and West Virginia, as well as the District of Columbia. The final region, Alabama, reported attainment in 2010.

PM2.5 concentrations in the non-attainment regions that filed SIPs to attain the standard by 2009 declined by an average 2.6 micrograms per cubic meter – significantly greater improvement than in regions that had attained the standard from its inception. The study showed that reductions in the SIP regions were broadly spread, rather than pinpointed at the most polluted monitors.

“One of the things we were most interested in looking at was to see if states were cherry-picking their measures to meet the standard by reducing pollution at their worst monitors, compared with how much they were doing to bring down levels all across the region so that people were breathing cleaner air,” Cohan, an associate professor of civil and environmental engineering.

“It was encouraging to find that across the country, we have seen overall particulate-matter levels come down. We found very slight extra improvement at monitors that were targeted the most, but regions that had to develop plans achieved pretty solid controls that didn't just pinpoint the worst monitors. And the large populations of these regions benefited.”

Cohan and Rice alumna Ran Chen also documented that air pollution continued to decline even after the 2009 standards were met. The majority of the SIP regions had already attained the mandated 2014 goal of 12 micrograms per cubic meter by 2012.

"We've been on a good trajectory," Cohan said. "This demonstrates that the combination of state and federal controls has been substantially improving air quality in the U.S. "Recent stories about the ongoing crisis in Beijing, where PM has reached hazardous levels, and in rapidly industrializing countries such as India set the U.S. efforts in sharp relief, Cohan said. The World Health Organization announced this month that about 7 million people die each year as a result of air pollution exposure.

Particulate matter consists of microscopic particles spewed into the air by vehicles and industry, as well as particles that form from pollutant gases. "Particulate matter is not a chemical, like ozone; it's a category, and it's a real challenge to figure out the origin of those particles," Cohan said. "Are they sulfates or carbons or nitrates? Each of these needs vastly different control approaches to make a difference."

PM also includes natural emissions from plants, volcanoes, forest fires and desert dust and can be blown across states or even continents. The health community, Cohan said, has long expressed concerns about particulate matter in the atmosphere and determined in the 1990s that PM 2.5 particles can penetrate deeply into the lungs and cause heart attacks, decrease lung function and even cause premature death. The EPA found healthy people could experience symptoms from exposure to elevated levels of particulate matter and set mandates for regions deemed in 1997 to be in "non-attainment" to file cleanup plans and follow through by 2009.

The study was the first to take a comprehensive, retrospective look at the overall effectiveness of the PM SIPs for PM. A previous study by Cohan and alumnus Andrew Pegues conducted similar analysis of progress by states in achieving ozone standards. The National Science Foundation and the NASA ACAST funded the research.

Read the abstract of the JA&WMA article [here](#) and read the full study [here](#).

###

NASA Air Quality Applied Sciences Team, a nationwide collaborative research team, serves the needs of air quality managers in the U.S. by analyzing a variety of NASA satellite data, models and suborbital platforms on the ground. Formed in 2011 by NASA's Applied Sciences Program, ACAST is made up of 19 of the top minds in air quality science and aims to provide the public with high-quality resources. Find out more at www.aqast.org or aqast-media.org.