Scientists zoom in on carbon dioxide in NYC

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In this Wednesday June 24, 2009 photo, With children playing on the athletic field below, Wade McGillis, professor of Earth and Environmental Engineering at Columbia University, makes an adjustment to his rooftop carbon dioxide monitor at an elementary school in the Harlem neighborhood of New York, Wednesday June 24, 2009. The urban experiment shows a growing interest by researchers in tracking how much of the heat-trapping gas a city, neighborhood or building puts in the atmosphere, and how much the urban environment can suck out. (AP Photo/Bebeto Matthews)

(AP) -- Wade McGillis peered up at the structure propped like a high-tech stick figure - minus the head - on an elementary school roof. Then he examined the electronics attached to its spindly metal frame, looking out over the Harlem brownstones nearby and the skyscrapers farther away.

Within 15 minutes, a graph spiked in his office eight blocks away. The

abrupt peak marked the carbon dioxide the Columbia University environmental engineering professor and three visitors had exhaled.

The spike was an anomaly, but it proved the rooftop device had done its job, helping to break down questions about global warming to a local level.

"We're unraveling the story of how carbon (dioxide) changes over the day, changes from neighborhood to neighborhood, and changes from the country to the city," said McGillis, who has set up seven sensors in and around New York City. The newest, in Central Park, was installed this spring.

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Some scientists hope the data might eventually help shape efforts to curb emissions of carbon dioxide - one of the main contributors to global warming - and measure whether such efforts are effective.

Carbon dioxide is emitted by various natural processes, including animals' breathing. But human activities - especially burning coal, oil natural gas and other fossil fuels - have greatly increased the amount of carbon dioxide in the atmosphere, according to the federal Environmental Protection Agency. Carbon dioxide and other greenhouse gases trap heat on the planet's surface, causing a range of climate effects, many scientists and regulators say.

The rise of greenhouse gases already has increased temperatures, sea levels and heavy rains enough to affect water supplies, agriculture and health, and the effects are expected to worsen, scientists told the Obama

administration in a report released last month. The report calls for more work on distinguishing human and natural factors in climate change and scaling the information down to local levels.

McGillis' monitors are in locales ranging from Harlem to rural eastern Long Island, about 80 miles away. The sensors measure carbon dioxide levels, wind speeds and other weather data every 15 minutes, submitting the data wirelessly. Readings are posted online soon after they're taken.

The monitors in Central Park and Harlem are only about two miles apart but often show notable differences in carbon dioxide levels, he said, and reflect how people and nature intertwine to affect the gases' ebb and flow.

McGillis' three-year-old project joins a growing list of efforts to keep tabs on carbon dioxide.

The National Oceanic and Atmospheric Administration now has about 70 carbon dioxide sensors around the world, many in remote areas. The agency hopes to do more carbon dioxide monitoring in cities to help test whether efforts to curb carbon emissions are effective, said Pieter Tans, who runs the monitor network.

Most power plants have been required to monitor their carbon dioxide emissions since the 1990s. Scientists have done carbon monitoring experiments of their own in Chicago, Salt Lake City and southern California, among other places.

Purdue University researcher Kevin Gurney sends a low-flying plane over Indianapolis to sample the gas in an attempt to gauge carbon dioxide emissions building by building. He combines air samples with a range of emissions, traffic and other data.

The U.S. Environmental Protection Agency also is seeking more local specifics on greenhouse gas emissions, and proposed requiring annual reports from about 13,000 fuel refineries, car manufacturers and other large industrial facilities.

The reporting could involve some monitoring but would largely rely on calculating emissions from burning fuel, said Bill Irving, an official in the EPA's climate change division.

"Our view is, at this stage, the advanced, rigorous calculation approaches are justified," he said.

Coal industry lobbyist Scott Segal says industrial emissions calculations are refined enough that more monitoring wouldn't add much information.

On the Net:

- Lamont Atmospheric Carbon Dioxide Observation Project: http://www.ldeo.columbia.edu/outr/LACOP/