Greenhouse gases make high temps hotter in China (Update)

April 12 2013, by Seth Borenstein

A vendor rides his tricycle near a coal-fired power plant in Beijing on Friday, April 12, 2013. China, the world's largest producer of carbon dioxide, is directly feeling the man-made heat of global warming, scientists conclude in the first study to link the burning of fossil fuels to one country's rise in its daily temperature spikes. (AP Photo/Andy Wong)

China, the world's largest producer of carbon dioxide, is directly feeling the man-made heat of global warming, scientists conclude in the first

study to link the burning of fossil fuels to one country's rise in its daily temperature spikes.

China emits more of the greenhouse gas than the next two biggest carbon polluters—the U.S. and India—combined. And its emissions keep soaring by about 10 percent per year.

While other studies have linked averaged-out temperature increases in China and other countries to greenhouse gases, this research is the first to link the warmer daily hottest and coldest readings, or spikes.

Those spikes, which often occur in late afternoon and the early morning, are what scientists say most affect people's health, plants and animals. People don't notice changes in averages, but they feel it when the daily high is hotter or when it doesn't cool off at night to let them recover from a sweltering day.

The study by Chinese and Canadian researchers found that just because of greenhouse gases, daytime highs rose 0.9 degree Celsius (1.7 degrees Fahrenheit) in the 46 years up to 2007. At night it was even worse: Because of greenhouse gases, the daily lows went up about 1.7 degrees Celsius (3 degrees Fahrenheit).

China is the world's biggest producer and consumer of coal, which is the largest source of man-made carbon dioxide emissions. While the country has made huge investments in alternative energy such as wind, solar and nuclear in recent years, its heavy reliance on coal is unlikely to change any time soon.

About 90 percent of the temperature rise seen by the researchers could be traced directly to man-made greenhouse gases, the study said. Man-made greenhouse gases also include methane and nitrous oxide, but carbon dioxide is considered by far the biggest factor.

The study appeared online in late March in the peer-reviewed journal *Geophysical Research Letters*.

Smoke is emitted from chimneys of a cement plant in Binzhou city, in eastern China's Shandong province on Thursday, Jan. 17, 2013. China, the world's largest producer of carbon dioxide, is directly feeling the man-made heat of global warming, scientists conclude in the first study to link the burning of fossil fuels to one country's rise in its daily temperature spikes. The study appeared online in late March 2013 in the peer reviewed journal Geophysical Research Letters. (AP Photo)

The study uses the accepted and traditional method that climate scientists employ to attribute a specific trend to man-made global warming or to rule it out as a cause.

Researchers ran computer simulations trying to replicate the observed

increase in daily and nighttime high temperatures in China between 1961 and 2007. They first plugged in only natural forces—including solar variation—to try to get the heat increase. That didn't produce it.

The only way the computer simulations came up with the increase in daily high and low temperatures that occurred was when the actual amounts of atmospheric heat-trapping greenhouse gases were included.

"It is way above what you would expect from normal fluctuations of climate," study author Xuebin Zhang of the climate research division of Canada's environmental agency said in a telephone interview. "It is quite clear and can be attributed to greenhouse gases."

China did not become the largest emitter of greenhouse gases until 2007; for much of the period studied, it had a smaller economy. Because carbon dioxide stays in the atmosphere for about a century, China and its defenders maintain that the U.S. and other developed nations bear more responsibility for climate change.

Outside experts praised the research as using proper methods and making sense. An earlier study didn't formally blame the proliferation of U.S. heat records to a rise in greenhouse gases but noted that they were increasing substantially with carbon dioxide pollution.

"The study is important because it formalizes what many scientists have been sensing as a gut instinct: that the increase in extreme heat that we've witnessed in recent decades, and especially in recent years, really cannot be dismissed as the vagaries of weather," said Pennsylvania State University climate scientist Michael Mann.

China has rapidly grown from a nation of subsistence farmers at the end of the 1970s into the world's second-largest economy behind the U.S., and the environmental costs of such change are often visible.

Beijing is no longer dominated by bicycles but by cars, and the skyline is barely visible at times because of thick pollution. More people are living in cities, buying air conditioners and other energy-hungry home electronics and consuming more energy for transportation and heating.

China passed the United States as the No. 1 carbon dioxide emitter about six years ago and "the gap is widening, it's huge," said Appalachian State University professor Gregg Marland, who helps track worldwide emissions for the U.S. Energy Department.

When developed countries around the world in 1997 agreed to limit their greenhouse gas emissions, developing countries, including China, were exempted.

U.S. Energy Department statistics say that China gets 70 percent of its energy from coal, compared with 20 percent in the United States. China is also a world leader in the production of cement, a process that also causes greenhouse emissions.

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