

Global ethane concentrations rising again, study says

June 14 2016

Global emissions of ethane, an air pollutant and greenhouse gas, are on the uptick again, according to a new study led by the University of Colorado Boulder.

The team found that a steady decline of global ethane [emissions](#) following a peak in about 1970 ended between 2005 and 2010 in most of the Northern Hemisphere and has since reversed, said CU-Boulder Associate Research Professor Detlev Helmig, lead study author. Between 2009 and 2014, ethane emissions in the Northern Hemisphere increased by about 400,000 tons annually, the bulk of it from North American oil and [gas](#) activity, he said.

The decline of ethane and other non-methane hydrocarbons (NMHC) starting around 1970 is believed to be primarily due to better emission controls, said Helmig. The controls resulted in reduced emissions from oil and gas production, storage and distribution, as well as combustion exhaust from cars and trucks.

"About 60 percent of the drop we saw in ethane levels over the past 40 years has already been made up in the past five years," said Helmig. "If this rate continues, we are on track to return to the maximum ethane levels we saw in the 1970s in only about three more years. We rarely see changes in atmospheric gases that quickly or dramatically."

Ethane, propane and a host of other NMHCs are released naturally by the seepage of fossil carbon deposits, volcanic activity and wildfires, said

Helmig. But human activities, which also include biomass burning and industrial use, constitute the most dominant source of the NMHCs worldwide.

"These human sources make up roughly three-quarters of the atmospheric ethane that is being emitted," said Helmig.

The air samples for the study were collected from more than 40 sites around the world, from Colorado and Greenland to Germany, Switzerland, New Zealand and the Earth's polar regions. More than 30,000 soda bottle-sized air containers were sampled at the National Oceanic and Atmospheric Administration's (NOAA) Earth Systems Research Laboratory (ESRL) in Boulder over the past decade.

The study also showed that among the air sampling locations around the world, the largest increases in ethane and shorter-lived propane were seen over the central and eastern United States, areas of heavy oil and gas activity, said Helmig.

"We concluded that added emissions from U.S. oil and gas drilling have been the primary source for the atmospheric ethane trend reversal," he said.

The study, published in *Nature Geoscience*, also indicated that emissions of total NMHC in the Northern Hemisphere are now increasing by roughly 1.2 million tons annually.

The findings from the flask network, which INSTAAR and NOAA have been operating for more than 10 years, were supported by additional measurements showing very similar ethane behavior from a number of continuous global monitoring sites, he said.

A component of natural gas, ethane plays an important role in Earth's

atmosphere. As it breaks down near Earth's surface it can create ground-based ozone pollution, a health and environmental risk.

Chemical models by the team show that the increase in ethane and other associated hydrocarbons will likely cause additional ground-based ozone production, particularly in the summer months, he said.

"Ethane is the second most significant hydrocarbon emitted from oil and gas after methane," said Helmig. "Other studies show on average there is about 10 times as much methane being emitted by the oil and gas industry as ethane."

There is high interest by scientists in methane since it is a strong [greenhouse gas](#), said Helmig. The new findings on [ethane](#) increases indicate there should be more research on associated methane emissions.

Provided by University of Colorado at Boulder

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