

Studies find different reasons for global methane riddle

August 10 2011

Two new UC Irvine papers reach markedly different conclusions about why methane, a highly potent greenhouse gas, unexpectedly leveled off near the end of the 20th century. They appear today in the journal *Nature*.

Both note that after decades of increases due to worldwide industry and [agriculture](#), the tapering off of the hazardous [hydrocarbon](#) in the atmosphere – which began in the 1980s – was remarkable.

"It was an amazing mystery as to why this occurred," said earth system science professor Eric Saltzman, a co-author of one paper, which suggests that reduced use of petroleum and increased capture and commercial use of natural gas were the driving factors.

A second UCI paper found that water efficiency and heavier commercial fertilizer use in the booming Asian farming sector provided less fertile ground for soil microbes that create methane, while at the same time increasing nitrous oxide, another greenhouse gas.

Associate researcher Murat Aydin, lead author on the first paper, drilled into South Pole and Greenland glaciers to extract trapped air as much as a century old. The samples were analyzed for ethane, a chemical that has some of the same sources as methane but is easier to track.

"Levels rose from early in the century until the 1980s, when the trend reverses, with a period of decline over 20 years," Aydin wrote. "We find

this variability is primarily driven by changes in emissions from fossil fuels."

The authors posit that replacement of oil with lower-priced natural gas could be key.

The second team measured and analyzed the chemical composition of methane in the [atmosphere](#) from the late 1980s to 2005. They found no evidence of fewer methane atoms linked to fossil fuel. Instead, the sharpest trend by far was changes in the Northern Hemisphere linked to new farm practices, mainly the use of inorganic fertilizers instead of traditional manure and drainage of fields mid-season.

"Approximately half of the decrease in methane can be explained by reduced emissions from rice agriculture in Asia over the past three decades, associated with increases in fertilizer application and reductions in water use," said lead author Fuu Ming Kai, who wrote his UCI doctoral thesis on the work and is now with the Singapore-MIT Alliance for Research & Technology.

Martin Heimann, director of Germany's Max Planck Institute for Biogeochemistry, was asked by Nature editors to write a commentary on both papers.

"It is indeed very remarkably rare that two differing studies about the same subject come out from the same department – I can't think of a similar case. But I think both analyses are scientifically sound and in themselves consistent," said Heimann, lead author on the Nobel Prize-winning Intergovernmental Panel on Climate Change reports. "At this time I would not favor one over the other."

Heimann has invited members of both teams to a September symposium at which, he said, "we will discuss the two studies from all angles."

Identifying methane sources is urgent. Research has shown that the fast-acting greenhouse gas is the second-largest contributor to climate change. Scientists around the world were heartened by the stabilizing levels, but there are now signs the hydrocarbon may be on the upswing again.

"We will need to reconcile the differences," said earth system science professor James Randerson, a co-author on the second paper. "The important thing is that we must figure out – as scientists and a society – ways to reduce [methane](#) emissions."

Provided by University of California - Irvine

Citation: Studies find different reasons for global methane riddle (2011, August 10) retrieved 26 April 2024 from <https://phys.org/news/2011-08-global-methane-riddle.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--