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Arctic permafrost leaking methane at record levels, figures show

The Guardian (U.K.), Jan. 14, 2010

Experts

say methane emissions from the Arctic have risen by almost one-third in just five years, and that sharply rising temperatures are to blame

Scientists

have recorded a massive spike in the amount of a powerful greenhouse gas seeping from Arctic permafrost, in a discovery that highlights the risks of a dangerous climate tipping point.

The

discovery follows a string of reports from the region in recent years that previously frozen boggy soils are melting and releasing methane in greater quantities. Such Arctic soils currently lock away billions of tonnes of methane, a far more potent greenhouse gas than carbon dioxide, leading some scientists to describe melting permafrost as a ticking time bomb that could overwhelm efforts to tackle climate change.

They

fear the warming caused by increased methane emissions will itself release yet more methane and lock the region into a destructive cycle that forces temperatures to rise faster than predicted.

Paul

Palmer, a scientist at Edinburgh University who worked on the new study, said: "High latitude wetlands are currently only a small source of methane but for these emissions to increase by a third in just five years is very significant. It shows that even a relatively small amount of warming can cause a large increase in the amount of methane emissions."

Global

warming is occurring twice as fast in the Arctic than anywhere else on Earth. Some regions have already warmed by 2.5C, and temperatures there are projected to increase by more than 10C by 2100 if carbon emissions continue to rise at current rates.

Palmer

said: "This study does not show the Arctic has passed a tipping point, but it should open people's eyes. It shows there is a positive feedback and that higher temperatures bring higher emissions and faster warming."

The

change in the Arctic is enough to explain a recent increase in global methane levels in the atmosphere, he said. Global levels have risen steadily since 2007, after a decade or so holding steady.

The new study, published in the journal Science, shows that methane emissions from the Arctic increased by 31% from 2003-07. The increase represents about 1m extra tonnes of methane each year. Palmer cautioned that the five-year increase was too short to call a definitive trend.

The

findings are part of a wider study of methane emissions from global wetlands, such as paddy fields, marshes and bogs. To identify where methane was released, the researchers combined methane levels in the atmosphere with surface temperature changes. They did not measure methane emissions directly, but used satellite measurements of variations in groundwater depth, which alter the way bacteria break down organic matter to release or consume methane.

They

found that just over half of all methane emissions came from the tropics, with some 20m tonnes released from the Amazon river basin each year, and 26m tonnes from the Congo basin. Rice paddy fields across China and south and south-east Asia produced just under one-third of global methane, some 33m tonnes. Just 2% of global methane comes from Arctic latitudes, the study found, though the region showed the largest increases. The 31% rise in methane emissions there from 2003-07 was enough to help lift the global average increase to 7%.

Palmer

said: "Our study reinforces the idea that satellites can pinpoint changes in the amount of greenhouse gases emitted from a particular place on earth. This opens the door to quantifying greenhouse gas emissions made from a variety of natural and man-made sources."

Palmer

said it was a "disgrace" that so few satellites were launched to monitor levels of greenhouse gases such as carbon dioxide and methane. He said it was unclear whether the team would be able to continue the methane monitoring in future. The pair of satellites used to analyse water, known as Grace, are already over their expected mission life time, while a European version launched last year, called Goce, is scheduled to fly for less than two years.

The

new study follows repeated warnings that even modest levels of global warming could trigger huge increases in methane release from permafrost. Phillipe Ciais, a researcher with the Laboratory for Climate Sciences and the Environment in Gif-sur-Yvette, France, told a scientific meeting in Copenhagen last March that billions of tonnes could be released by just a 2C average global rise.

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