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Science News

Warming Of Arctic Current Over 30 Years Triggers Release Of Methane Gas

ScienceDaily (Aug. 16, 2009) — The warming of an Arctic current over the last 30 years has triggered the release of methane, a potent greenhouse gas, from methane hydrate stored in the sediment beneath the seabed.

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Scientists at the National Oceanography Centre Southampton working in collaboration with researchers from the University of Birmingham, Royal Holloway London and IFM-Geomar in Germany have found that more than 250 plumes of bubbles of methane gas are rising from the seabed of the West Spitsbergen continental margin in the Arctic, in a depth range of 150 to 400 metres.

Methane released from gas hydrate in submarine sediments has been identified in the past as an agent of climate change. The likelihood of methane being released in this way

has been widely predicted.

The data were collected from the royal research ship RRS James Clark Ross, as part of the Natural Environment Research Council's International Polar Year Initiative. The bubble plumes were detected using sonar and then sampled with a water-bottle sampling system over a range of depths.

The results indicate that the warming of the northward-flowing West Spitsbergen current by 1° over the last thirty years has caused the release of methane by breaking down methane hydrate in the sediment beneath the seabed.

Professor Tim Minshull, Head of the University of Southampton's School of Ocean and Earth Science based at that the National Oceanography Centre, says: "Our survey was designed to work out how much methane might be released by future ocean warming; we did not expect to discover such strong evidence that this process has already started."

Methane hydrate is an ice-like substance composed of water and methane which is stable in conditions of high pressure and low temperature. At present, methane hydrate is stable at water depths greater than 400 metres in the ocean off Spitsbergen. However, thirty years ago it was stable at water depths as shallow as 360 metres.

This is the first time that such behaviour in response to climate change has been observed in the modern period.

While most of the methane currently released from the seabed is dissolved in the seawater before it reaches the atmosphere, methane seeps are episodic and unpredictable and periods of more vigorous outflow of methane into the atmosphere are possible. Furthermore, methane dissolved in the seawater contributes to ocean acidification.

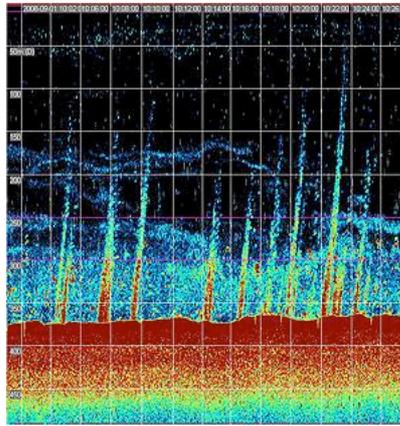
Graham Westbrook Professor of Geophysics at the University of Birmingham, warns: "If this process becomes widespread along Arctic continental margins, tens of megatonnes of methane per year – equivalent to 5-10% of the total amount released globally by natural sources, could be released into the ocean."

The team is carrying out further investigations of the plumes; in particular they are keen to observe the behaviour of these gas seeps over time.

Journal reference:

- Westbrook, G.K. et al. **Escape of methane gas from the seabed along the West Spitsbergen continental margin.** *Geophysical Research Letters*, 2009; DOI: 10.1029/2009GL039191

Adapted from materials provided by National Oceanography Centre, Southampton (UK).



Researchers in Germany have found that more than 250 plumes of bubbles of methane gas are rising from the seabed of the West Spitsbergen continental margin in the Arctic, in a depth range of 150 to 400 metres. (Credit: Image courtesy of National Oceanography Centre, Southampton)

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