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As Arctic Ocean warms, megatonnes of methane bubble up

17:02 17 August 2009 by **Michael Marshall**

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It's been predicted for years, and now it's happening. Deep in the Arctic Ocean, water warmed by climate change is forcing the release of methane from beneath the sea floor.

Over 250 plumes of gas have been discovered bubbling up from the sea floor to the west of the Svalbard archipelago, which lies north of Norway. The bubbles are mostly methane, which is a greenhouse gas much more powerful than carbon dioxide.

The methane is probably coming from reserves of methane hydrate beneath the sea bed. These hydrates, also known as clathrates, are [water ice with methane molecules embedded in them](#).

The methane plumes were discovered by an expedition aboard the research ship James Clark Ross, led by [Graham Westbrook](#) of the University of Birmingham and [Tim Minshull](#) of the National Oceanography Centre, Southampton, both in the UK.

Warm gas

The region where the team found the plumes is being warmed by the West Spitsbergen current, which has warmed by 1 °C over the past 30 years.

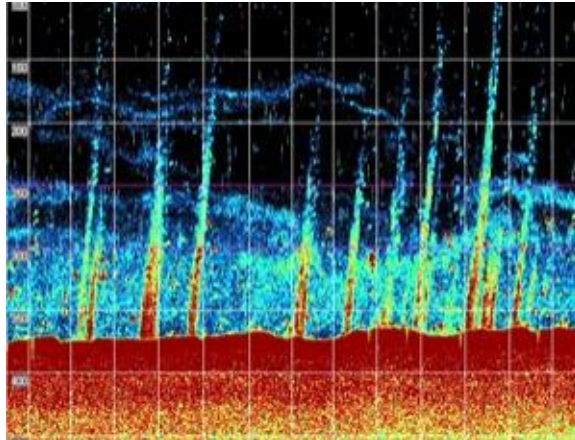
"Hydrates are stable only within a particular range of temperatures," says Minshull. "So if the ocean warms, some of the hydrates will break down and release their methane."

None of the plumes the team saw reached the surface, so the methane was not escaping into the atmosphere and thus contributing to climate change – not in that area, at least. "Bigger bubbles of methane make it all the way to the top, but smaller ones dissolve," says Minshull.

Just because it fails to reach the surface doesn't mean the methane is harmless, though, as some of it gets converted to carbon dioxide. The CO₂ then dissolves in seawater and [makes the oceans more acidic](#).

And it is possible that other, more vigorous plumes are releasing methane into the atmosphere. The team studied only one group of plumes, which were in a small area and were erratic.

"Almost none of the Arctic has been surveyed in a way that might detect a gas release like this,"



Sonar image of methane plumes rising from the Arctic Ocean floor (Image: National Oceanography Centre, Southampton)

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Minshull says.

Methane megatonnes

[Ronald Cohen](#) of the Carnegie Institution for Science in Washington DC says it's a striking result: "What's amazing is that they see such enormous quantities of methane."

The methane being released from hydrate in the 600-square-kilometre area studied probably adds up to 27 kilotonnes a year, which suggests that the entire hydrate deposit around Svalbard could be releasing 20 megatonnes a year.

If methane began escaping at similar rates throughout the Arctic, it would [dramatically increase methane levels in the atmosphere](#).

Globally, it's thought that [around 500 to 600 megatonnes of methane are released into the atmosphere each year](#).

[Matt Rigby](#) of the Massachusetts Institute of Technology says, "If there is potential for clathrates to destabilise and release methane, it needs to be intensively studied."

Gas from where?

Cohen cautions that the Arctic methane may not be from hydrate, but could be coming from the methane's primary source, which might be deep within the Earth.

If that was the case, the warming of the West Spitsbergen current may not be to blame.

He says that the large amounts of methane being released make this unlikely, however: "If the methane is all primary, it would be an unprecedented amount." So the idea that the hydrates are at least partly to blame is more plausible. "It's not definitively proven, but it's certainly reasonable," he says.





Methane hydrate could be used as a new, somewhat greener fossil fuel, but extracting the methane without releasing any into the atmosphere [remains a challenge](#).

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