



FW: Reply re-methane at depth

Marcia K McNutt o Mark K Sogge

07/02/2010 12:20 PM

Here you go.

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From: Brewer, Peter <brpe@mbari.org> [mailto:Brewer, Peter <brpe@mbari.org>]
Sent: Tuesday, June 29, 2010 1:16 PM
To: "Marcia K McNutt" <mcnutt@usgs.gov>
Subject: Reply re-methane at depth

Marcia:

This has come up a few times. I have a call from staff of the Senate Environment and Public works Committee on this, and a call from a newspaper re-measurements made by John Kessler (TAMU) and Dave Valentine (UCSB). I know them both well, and served on Kessler's thesis committee. They reported far higher levels of methane than normal background.

Methane itself will not be an environmental problem, but it is rapidly oxidized by bacteria to CO₂, consuming oxygen via $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ – thus 2 molecules of O₂ are drawn down for each molecule of CH₄. The fate of the bacterial organic matter produced is very likely to be eaten by others and respired as in $C_{org} + O_2 \rightarrow CO_2$, so if all this happened at 100% we would finish up with 2 moles of CO₂ added, and 3 moles of O₂ lost per mole of CH₄ released.

Since the microbes can work quite quickly the methane observed now is less than has been released.

The biggest environmental problem is if all the O₂ is consumed and we have anoxia. That's not likely to happen. The deep waters of the Gulf typically contain 10s of micromolar O₂; the methane signals are typically 10s of nanomolar. The core of the loop current does contain quite low O₂ water, but the platform is quite far offshore and my guess is that there is enough background dissolved O₂ in normal deep Gulf waters to handle the load. I can check further if needed.

Peter

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From: Marcia K McNutt [mailto:mcnutt@usgs.gov]
Sent: Tuesday, June 29, 2010 5:13 AM
To: Brewer, Peter
Subject: RE: A request re-a sample of oil from depth

Peter -

My boss at DOI is interested to know whether from all of the Gulper data there is any concern about methane in the water column. Or concern about methane in general associated with this incident. What do you think?

Marcia

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