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Gas Outlets off Spitsbergen Are No New Phenomenon Expedition to the Greenland Sea with Surprising Results

September 19, 2012/Kiel. Marine scientists from Kiel, together with colleagues from Bremen, Great Britain, Switzerland and Norway, spent four and a half weeks examining methane emanation from the sea bed off the coast of Spitsbergen with the German research vessel **MARIA S. MERIAN**. There they gained a very differentiated picture: **Several of the gas outlets have been active for hundreds of years.**

Frequent storms and sub-zero temperatures – nature drove the marine researchers that were assessing gas outlets on the sea bed off the coast of Spitsbergen for four and a half weeks to their limits. Nevertheless the participants were very pleased when they returned: “We were able to gather many samples and data in the affected area. With the submersible JAGO we even managed to form an impression of the sea bed and the gas vents” summarised the chief scientist Professor Dr. Christian Berndt from GEOMAR | Helmholtz Centre for Ocean Research Kiel.

The reason for the expedition was the supposition that ice-like methane hydrates stored in the sea bed were dissolving due to rising water temperatures. “Methane hydrate is only stable at very low temperatures and under very high pressure. The gas outlets off Spitsbergen lie approximately at a depth which marks the border between stability and dissolution. Therefore we presumed that a measurable rise in water temperature in the Arctic could dissolve the hydrates from the top downwards” explained Professor Berndt. Methane could then be released into the water or even into the atmosphere, where it would act as a much stronger greenhouse gas than CO₂.

In fact, what the researchers found in the area offers a much more differentiated picture. Above all the fear that the gas emanation is a consequence of the current rising sea temperature does not seem to apply. At least some of the gas outlets have been active for longer. Carbonate deposits, which form when microorganisms convert the escaping methane, were found on the vents. “At numerous emergences we found deposits that might already be hundreds of years old. This estimation is indeed only based on the size of the samples and empirical values as to how fast such deposits grow. On any account, the methane sources must be older” says Professor Berndt. The exact age of the carbonates will be determined from samples in GEOMAR’s laboratories.

“Details will only be known in a few months when the data has been analysed; however the observed gas emanations are probably not caused by human influence” says Berndt. There are two other possible explanations instead: Either they are symptoms of a long term temperature rise or they show a seasonal process where gas hydrates continuously melt and reform.

Another interesting observation made on the expedition, was that a very active microbial community that consumes the methane has established itself on the sea bed. “We were able to detect high concentrations of hydrogen sulphide, which is an indication of methane consuming microbes in the sea bed, and, with the help of JAGO, discovered typical biocoenoses that we recognised from other, older methane outlets” explained microbiologist Professor Dr. Tina Treude from GEOMAR, who also took part in the expedition. “Methane consuming microbes grow only slowly in the sea bed, thus their high activity indicates that the methane has not just recently begun effervescing.”

Colleagues from Bremen, Switzerland, Great Britain and Norway worked alongside marine scientists from GEOMAR and from the Cluster of Excellence “The Future Ocean”. “The study of the gas outlets in the Norwegian Sea is a good example for combined European research” stressed Professor Berndt. Hence German scientists recovered an ocean floor observatory, installed by the British research vessel James Clark Ross a year ago during a joint expedition of the National Oceanography Centre Southampton and the Institut français de recherche pour l'exploitation de la mer (Ifremer). “Understanding the ocean as a system is a challenge that only works in international co-operations” emphasized Berndt. The analysis of the gathered data will also be carried out internationally.

The expedition at a glance:

FS MARIA S. MERIAN journey: MSM21/4

Head of Expedition: Prof. Dr. Christian Berndt (GEOMAR)

Length of Expedition: 13th Aug. 2012-11th Sept. 2012

Place of Departure: Reykjavik

Research Area: West of Spitsbergen

Place of Arrival: Emden

Further Information on the GEOMAR expedition page under www.geomar.de/forschen/expeditionen

Links:

www.geomar.de GEOMAR | Helmholtz Centre for Ocean Research Kiel

www.ozean-der-zukunft.de The Cluster of Excellence the Future Ocean

Images:

Downloads: www.geomar.de/n903-e

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