Geophysical Research Abstracts
Vol. 18, EGU2016-13741, 2016
EGU General Assembly 2016

A new fast-response, real-time and continuous dissolved methane sensor.

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Continuous high resolution profiling of dissolved methane down to ocean depths is made possible as a result of technological innovations achieved in the search for the oldest ice in Antarctica. Testing for the SUBGLACIOR probe, which is being developed at LGGE in response to the IPICS >1Ma old ice challenge, showed that much of the technology to extract the trapped gases from ice can also significantly improve the extraction and analysis of dissolved methane from the sea compared to current available sensors.

To develop this potential, an oceanographic instrument 'SubOcean' was built and deployed over a gas-hydrate zone of western Svalbard, in collaboration with CAGE, in October 2015. Continuous measurements to depths of 400 m were made over three days resulting in high-resolution 3D profiles. The very fast response time of the sensor allows to display the *in-situ* measurements in real-time and compare them directly to data from other instrumentation aboard the ship whilst underway. The sensor contains a membrane based gas extraction system coupled to a laser spectrometer to provide accurate measurements over a wide concentration range. We will present the overall design of the instrument and highlight how it can help provide new insights into the spatial distribution and flux of methane in the marine environment.