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Methane from shallow seep areas of the NW Svalbard Arctic margin does not reach the sea surface

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Methane, an important greenhouse gas, leaks from large areas of the Arctic Ocean floor. One overall question is how much methane passes from the seabed through the water column, potentially reaching the atmosphere. Transport of methane from the ocean floor into and through the water column depends on many factors such as distribution of gas seeps, microbial methane oxidation, and ambient oceanographic conditions, which may trigger a change in seep activity.

From June-July 2014 we investigated dissolved methane in the water column emanating from the "Prins Karls Forland seeps" area offshore the NW Svalbard Arctic margin. Measurements of the spatial variability of dissolved methane in the water column included 65 CTD stations located in a grid covering an area of 30 by 15 km.

We repeated an oceanographic transect twice in a week for time lapse studies, thus documenting significant temporal variability in dissolved methane above one shallow seep site ($\sim$100 m water depth). Analysis of both nutrient concentrations and dissolved methane in water samples from the same transect, reveal striking similarities in spatial patterns of both dissolved methane and nutrients indicating that microbial community is involved in methane cycling above the gas seepage.

Our preliminary results suggest that although methane release can increase in a week's time, providing twice as much dissolved gas to the water column, no methane from a seep reaches the sea surface. Instead it spreads horizontally under the pycnocline. Yet microbial communities react rapidly to the methane supply above gas seepage areas and may also have an important role as an effective filter, hindering methane release from the ocean to the atmosphere during rapid methane ebullition.

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