



## **Long-term monitoring of methane release and associated oceanographic setting offshore Svalbard**

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Large amounts of methane are stored in the Arctic Ocean sediments, both as free gas and in form of methane hydrates. Warming of Arctic Ocean bottom water can destabilize methane hydrates and cause extensive methane release to the ocean, influencing marine environments (Åström et al., 2016). Previous oceanographic studies have shown a significant methane release from seep-sites offshore western Svalbard, mainly based on hydrographic snapshots and/or echosounder data. These studies have shown that the methane release has significant temporal variations, and these variations can only be investigated properly with ocean observatories. Two K-Lander ocean observatories, developed in collaboration between CAGE and Kongsberg Maritime were deployed at two of these seep sites at 90 and 240 meter depth, from July 2015 to May 2016. Time series obtained from these two observatories include ocean current profiles, temperature, salinity, pressure, as well as dissolved methane and CO<sub>2</sub> concentration. The oceanographic data show a clear seasonal variation and indicates that the water column can be significantly affected by atmospheric forcing during winter season. At the same time, methane concentration shows significant temporal variations on both relatively short (hours) and long (seasonal) time scales, with values ranging from 90 to 800 nmol/kg. The short term variations indicates a non-mixed benthic boundary layer with respect to dissolved methane, while the long term variations may indicate seasonal changes in the vertical transport of methane in the water column.

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### **Reference**

Åström, E. Carrol, M. L., Ambrose, W., Carrol, J. "Arctic cold seeps in marine methane hydrate environments: impacts on shelf macrobenthic community structure offshore Svalbard". Marine Ecology Progress Series, 2016 (1616-1599) 552 p. 1-18.