

In Situ Mass Spectrometry in Marine Science: Distribution and Fate of Methane Released from Submarine Sources

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The use of an improved *in situ* mass spectrometer (UWMS, Inspectr200-200) to answer key questions in marine science is presented. Key benefits of using this technique in aquatic systems is the high sampling frequency and quantification of major and trace gases *in situ*, online and real time.

Methane (CH₄) is the most abundant organic compound in the atmosphere and its influence on global climate is the subject of current scientific discussion. One source of atmospheric methane is the release of CH₄ from the oceans seafloor. These submarine sources are characterized by rising gas bubbles or diffusive methane flux into the water column. Due to the limited number of samples taken by conventional *ex situ* methods, an accurate quantification of the contribution of these sources to the atmospheric methane budget could not be estimated. With the help of an optimized *in situ* mass spectrometer it is possible for the first time to obtain high resolution distribution patterns of dissolved CH₄ in the water column.

Here we will present the detection, mapping and inventory calculation of submarine released methane by novel *in situ* mass spectrometry as well as its potential contribution to the atmospheric methane budget.