

オホーツク海網走沖ROV調査で得られた海底湧出ガスの特徴 Characteristics of seep gas retrieved in the ROV expedition off Abashiri, the Sea of Okhotsk

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Many gas plumes ascending from the sea floor have been discovered off Abashiri, the Sea of Okhotsk. In the OS249 cruise using TS Oshoro-maru, we found a large seabed mound with active gas plume in 2012. Natural gas hydrates were recovered in the NT13-20 and C020 cruises using RV Natsushima and TS Oshoro-maru, respectively, at the gas plume site. Hydrate-bound gas was mainly methane, and small amount of hydrogen sulfide was detected. Molecular and isotopic compositions of hydrate-bound hydrocarbons suggested microbial origin. However, nobody checked the difference between hydrate-bound gas and the seep gas. In this study, we developed a gas sampling tool and got the seep gas using a remotely operated vehicle (ROV, KAIYO3000) belonging to Kaiyo Engineering Co. Ltd.

The gas sampling tool is composed of pressure chamber (volume: 75mL), ball valve, and large funnel. Opening and closing processes of the ball valve can be operated by a manipulator of ROV. The 1KY17 cruise was executed on July 2017 off Abashiri, where gas hydrates were recovered in the previous cruises. We obtained four gas samples from two gas-seepage sites. Sediment cores close to the gas vent points were also obtained using a push corer to check sediment gas dissolved in pore water, and measured their gas profiles by a headspace gas method.

Molecular and isotopic compositions of hydrocarbons of the seep gases were almost the same as those of the hydrate-bound gas, whereas hydrogen sulfide was not detected, suggesting that hydrogen sulfide generated by a process of anaerobic oxidation of methane (AOM) mixed with the seep gas ascending from deeper sediment layer. Depth of SMI (sulfate-methane interface) close to the seep point was less than 2cm. Concentration of methane in the sediment cores was 1-10mM, while those of CO₂ and hydrogen sulfide were around 1mM at the depth from 2cm to 22cm. $\delta^{13}\text{C}$ of CO₂ distributed between -60‰ to -40‰, indicating that large amount of light methane in the seep gas is oxidized beneath the sea floor.

キーワード：ガスハイドレート、オホーツク海、無人潜水艇、ガス起源

Keywords: gas hydrate, Sea of Okhotsk, remotely operated vehicle, gas origin