TRACE ANALYSIS OF METHANOL AND FORMALDEHYDE IN PORE WATER OF DEEP-SEA SEDIMENTS FROM EASTERN MARGIN OF THE SEA OF JAPAN

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ABSTRACT
We have investigated distribution of methanol and formaldehyde in pore water of deep-sea sediments obtained from eastern margin of the Sea of Japan during the expedition of R/V Marion Dufresne in 2010 (MD179). Headspace gas of the pore water was analyzed by gas chromatography mass spectrometry (GC-MS). Derivative of o-(2,3,4,5,6-pentafluorobenzyl)-hydroxylamine (PFBOA) hydrochloride was used for formaldehyde detection. Concentrations of methanol and formaldehyde gradually increase with depth from 1-3 μmol/l and 0.5-1 μmol/l beneath the seafloor to 5-20 μmol/l and 1.5-2.5 μmol/l around 30 meters below the seafloor, respectively. The results suggest that these compounds may be produced and consumed in situ in deep-sea sediments.

Keywords: methanol, formaldehyde, pore water, natural gas hydrate, GC-MS

NOMENCLATURE
C  concentration [μmol/l]
d  depth [mbsf: meters below the seafloor]
m/z  mass to charge ratio

INTRODUCTION
Gas hydrate is a clathrate compound that engages gas molecules by hydrogen-bonded water molecules. Natural gas hydrate is found in deep-sea sediments that contain natural radioisotopes like uranium-series, thorium-series, and 40K. Natural radiation from those radioisotopes will

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