

Distribution and behavior of microbiogenic methane from the eastern margin of the Japan Sea

Toshitaka Gamo[1], Akinari Hirota[2], Urumu Tsunogai[3], Jing Zhang[4], Hiroko Yamakoshi[4], Akira Takeuchi[5], Yukinobu Okamura[6]

[1] Div. Earth Planet. Sci., Hokkaido Univ., [2] Earth and Planetary Sci., Hokkaido Univ, [3] Division of Earth and Planetary Sciences,

Grad. School Sci., Hokkaido Univ., [4] Sci. Faculty, Toyama Univ., [5] Dept. Earth Sci., Toyama Univ., [6] MRE, AIST

<http://www.ep.sci.hokudai.ac.jp/~geochem/gamo/index.html>

We discovered microbiogenic methane for the first time from cold seepage zones of the eastern margin of the Japan Sea, which is believed to be a convergent plate boundary. The maximum CH₄ concentrations were 97 micro-mol/kg and 344 micro-mol/kg for bottom seawater and pore fluid, respectively. Relatively low carbon isotope ratios (δ¹³C: -75 to -84 permil) and high CH₄/C₂H₆ ratios (~10000 to ~100000) indicate the CH₄ source to be microbiological activity. Gas hydrate below seafloor may be a dominant origin of the CH₄ gas, judging from chemical and isotope characteristics of the pore fluid samples (Zhang et al., this meeting). The relationship between CH₄ concentration and its δ¹³C in the pore fluids show the microbiological CH₄ oxidation with an isotope fractionation factor of 1.004. On the other hand, dilution by water mixing and microbiological CH₄ oxidation occur at the same time in the water column above the cold seepage zone.