

Isotopic composition of natural gas hydrate obtained from offshore Sakhalin, the Sea of Okhotsk

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The seepage structures offshore Sakhalin, the Sea of Okhotsk, have been investigated from 2003 to 2007 within the framework of the CHAOS project (hydroCarbon Hydrate Accumulations in the Okhotsk Sea). We obtained hydrate-bearing sediments by using gravity corer on October 2003 and May 2005 (CHAOS1 and CHAOS2, respectively). Whiticar *et al.* (1986) proposed a genetic classification diagram for natural gas using methane isotopes. In the diagram, large and small $\delta^{13}\text{C}$ values of methane indicate thermogenic and microbial origins, respectively, and δD of methane also provides information on methyl-type fermentation or CO_2 reduction in the microbial origin. Isotopic compositions of carbon and hydrogen were measured by using a mass spectrometer (DELTA plus XP; Thermo Finnigan). Methane $\delta^{13}\text{C}$ and δD were in the range of -65 to -62 permil and -205 to -195 permil, respectively. These results indicate a microbial origin produced by CO_2 reduction according to Whiticar's diagram. Ethane concentration was 30-150ppm for hydrate-bearing sediments and 10-100ppm for non-hydrate sediments, and depended on each seepage structure. In this presentation we will show characteristics of some seepage structures offshore Sakhalin from the viewpoints of isotopic composition and gas concentration.