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サハリン島沖テルペニヤリッジおよびタタールトラフの天然ガスハイドレート
Natural gas hydrates retrieved at the Terpeniya Ridge and the Tatar Trough, off the Sakhalin Island

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We report molecular and isotopic compositions of hydrate-bound hydrocarbons in the new seepage sites of offshore Sakhalin Island, the Sea of Okhotsk. Sakhalin Slope Gas Hydrate (SSGH) project was started from 2007 and we retrieved sediment cores off northeastern Sakhalin Island in 2009-2011. We also sampled some cores at the Terpeniya Ridge, southeastern Sakhalin Island in these cruises; however, we could not retrieve hydrate-bound cores at the area. Because gas plumes ascend and the dissolved methane in pore water was very rich, existence of gas hydrate crystals in the shallow sediment layers were expected. In August 2012, we visited the Terpeniya Ridge again and the Tatar Trough (southwestern Sakhalin Island) and got hydrate-bound sediment cores from both fields in the cruise of SSGH12. We sampled gas hydrate crystals and stored into liquid nitrogen tank. We also obtained the samples of hydrate-bound gas and dissolved gas in pore water on board, and we measured molecular and stable isotope compositions of them in our laboratory. Empirical classification of the methane stable isotopes; delta ^{13}C and delta D according to Whiticar *et al.* (1986) indicated that the gases obtained at the Terpeniya Ridge are microbial origin via carbonate reduction, whereas some cores at the Tatar Trough showed typical thermogenic origin (methane delta ^{13}C = -47 permil). Because ethane delta ^{13}C of the all gas samples suggested their thermogenic origin, microbial methane is mixed with the small amount of thermogenic gas at the Terpeniya Ridge. Results of Raman spectroscopic analysis revealed that the hydrate crystals of both Terpeniya Ridge and Tatar Trough belonged to the structure I, and the hydration number was 6.0 in the both fields. Small amount of hydrogen sulfide was also enclathrated with methane.

Whiticar MJ, Faber E, Schoell M (1986) Biogenic methane formation in marine and freshwater environments: CO_2 reduction *vs.* acetate fermentation - Isotope evidence. *Geochim Cosmochim Acta* **50**: 693-709

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