# Geochemical characteristics of pore waters from gas hydrate-bearing sediment cores retrieved at the Sea of Okhotsk, Russia

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The Sea of Okhotsk is known as one of the biggest reservoirs of gas hydrates. Gas hydrate at the Sea of Okhotsk was first discovered at seeps close to Paramushir Island, Russia. Later, gas hydrate occurred at subsurface of the seafloor was retrieved within gas-venting areas in the Derugin Basin on the continental slope offshore Sakhalin Island, Russia.

The Sakhalin Slope Gas Hydrate Project (SSGH Project: from 2007) is an international collaboration effort among scientists from Japan, Korea and Russia to investigate on natural gas hydrates accumulated on a continental slope offshore Sakhalin Island. From July to August of 2009, field operation of SSGH-09 project was conducted as the 47th cruise of R/V Akademic M.A. Lavrentyev. Gas hydrate-bearing and -free sediment cores were retrieved inside and outside of gas seepage structures, respectively, using steel gravity corers. The sediment pore water was obtained onboard by using a squeezer designed and constructed at Kitami Institute of Technology. The ionic compositions (chloride, sulfate, hydrogen carbonate, sodium, calcium etc.) in sediment pore- and seawater samples, stable isotopic compositions ($\delta^{18}O$ and $\delta$ D) of these water samples, water-content distribution in the sediment cores and lithologies of the cores are compared to figure out the geochemical characteristics of the cores.

The concentration-depth profiles of sulfate in pore water samples have inverse correlations with those of methane in the pore water. The anaerobic bacterial oxidation of methane (AOM) is responsible for the phnomena since sulfate is consumed as an oxidant in the process of AOM. The depths of sulfate-methane interface (SMI) are 0.5 mbsf for gas hydrate-bearing LV47-24HC core and 1.0-4.0 mbsf for the other gas hydrate-free cores. SMI is not observed for the reference LV47-33HC core. In most cases, authigenic carbonates are located above the depths of their SMI. But in some cores, the authigenic carbonates are found below the depths of SMI. It might be suggested that the methane flux activity probably is not constant and is increased after formation of the authigenic carbonates in the sediment cores.