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GEOCHEMICAL STUDIES OF LV47 GAS HYDRATE-BEARING SEDIMENT CORES AND PORE WATERS RETRIEVED FROM THE CONTINENTAL SLOPE OFF SAKHALIN ISLAND, RUSSIA

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ABSTRACT

The Sakhalin Slope Gas Hydrate Project is an international collaboration effort by scientists from Japan, Korea and Russia to investigate natural gas hydrates (GHs) that accumulate on the continental slope off Sakhalin Island. From July to August of 2009, field operations of the SSGH-09 project were conducted on the 47th cruise of the *R/V Akademic M.A. Lavrentyev*. GH-bearing and -free sediment cores were retrieved using a steel hydro corer. The ionic compositions in sediment pore- and seawater samples, water content distribution in the sediment cores and lithologies of the cores were compared to determine the geochemical characteristics of the cores. The depths of the sulfate methane interface (SMI) were 0.8 m below the sea floor (mbsf) for the GH-bearing LV47-24HC core and 1.2-4.2 mbsf for the other GH-free cores. Six cores showed linear depth profiles of concentrations of sulfate in the pore waters until the SMI, and 8 cores showed the concave-up profiles, possibly due to an increase in the methane flux.

Keywords: gas hydrates, Sakhalin, pore waters, sulfate ion, sulfate methane interface

INTRODUCTION

The Sea of Okhotsk is one of the biggest reservoirs of gas hydrates (GHs) [1], which were first discovered at structures close to Paramushir Island [2]. Later, in 1991, GH was retrieved within gas venting areas in the Derugin Basin on the continental slope off Sakhalin Island [3]. Submarine GH was again sampled during the Russian-German Kurile-Okhotsk Marine Experiment (KOMEX) Project [4-6]. The Hydro-Carbon Hydrate Accumulations in the Okhotsk Sea (CHAOS) I, II and III cooperative projects were organized with the aim to study GHs in the Sea of Okhotsk [7-9], and the molecular and isotopic compositions of the obtained hydrate-bound gas were studied and reported [10, 11]. Differences in seepage activity among gas-seepage structures including GH-bearing sites have also been investigated [12].

The Sakhalin Slope Gas Hydrate (SSGH) Project is an international collaboration effort by scientists from Japan, Korea and Russia to investigate natural GHs that accumulate on the continental slope off Sakhalin Island. In the present study, the ionic compositions (sulfate ion, chloride ion, etc.) in sediment pore- and seawater samples, water content distribution in the sediment cores and lithologies of the cores were compared in order to

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