

Detailed topographic research using a multi-beam system in off Joetsu in the eastern margin of the Japan Sea

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Submarine natural methane hydrate occur on and just below seafloor, and pockmarks and mounds are observed, on the top of the Umitaka Spur and the Joetsu Knoll, off Joetsu, eastern margin of the Japan Sea. Main purpose of these surveys were to clarify micro topographic characteristics like the pockmarks, mounds, and land slides in relations to formation of methane hydrates and methane seeps. In the area of the Joetsu Knoll and the Umitaka Spur off Joetsu, eastern margin of the Japan Sea, methane hydrates are distributed.

Bathymetric surveys were carried out, using SEABAT8160 during NT05-09, NT06-19, and NT07-20 aboard R/V NAT-SUSHIMA and SEABEAM2000 during KY05-08 aboard R/V KAIYO. Conditions of topographic surveys during NT05-09 and NT06-19 are as follows. The sampling interval of raw data was 6 meters in line and beam spacing width were 23 meters at the depths of 1,000 meters. An improved condition of topographic surveys in the shallow water areas during NT07-20 is that the sampling intervals of raw data were 2 to 3 meters in line. But NT07-20 cruise data is too difficult to erases error data, because the heights of micro topography like the pockmarks and mounds are often less than 10 meters. So, we made data correction by anomaly analysis data method.

Before NT07-20 cruise, we could find some pockmarks and mounds on the Umitaka Spur in relation to the structural trend, but not those on the Joetsu Knoll due to the lack of resolution. On the Umitaka Spur, distributions of pairs of mounds and pockmarks are related to an extension trend of the Spur. Then, methane hydrate samples and gas-plume indications on the echo sounder profiles were obtained from the mounds, which are supported by piston-coring and seafloor observations by the dives of ROV Hyper-Dolphin. The landslide area distributes of the southeast slope of near the north end in the Joetsu Knoll.

In data of the 2007,high-resolution map cleared characteristics of the pockmarks and mounds in detail and features of pairing of them. Profiles of the Single Channel Seismic:(SCS) during the NT07-20 shows pockmarks and mounds in relation to trend of anticlines structures both the Umitaka Spur and the Joetsu Knoll. Furthermore two arrays exist above the Joetsu Knoll. Below the pockmarks and mounds migrated methane gas from the deep gas-column in the Umitaka Spur and the Joetsu Knoll.