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Quantitative and qualitative analysis of distribution of macrobenthos around Joetsu Gas Hydrate Field.

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Distribution of macrobenthos was investigated in the Joetsu Gas Hydrate Field, the Japan Sea, in June 2010. Benthic organisms and bottom sediments were collected using a CASQ corer by the R/V *Marion Dufresne* and also using a slurp gun and a Kumade sampler (like scoop) by the ROV *Hyper-Dolphin*. The core sample collected in two points (Core No. 3297 in 894 m deep, Core No. 3307 in 930m deep) in the Umitaka Spur, 2 points (Core No. 3318 in 1000m deep, Core No. 3324 in 1179m deep) in the Joetsu Knoll, and 1 point (Core No. 3328 in 3444m deep) in the Okushiri Ridge was used for the analysis. The columnar core of 15cm X 13cm in width was divided from the bottom surface to 5cm, 5-10cm, 10-20cm, 20-30cm, 30-50cm, and 50-100cm, and cryopreserved onboard of the R/V *Marion Dufresne*.

Living macrobenthos such as porifera, bivalvia, polychaete, pogonophora and amphipoda were collected by a CASQ corer. Numerical density and biomass of each section was 0 to 2051.28 individuals/m³ and 0 to 1656.41g/m³, respectively. The core where living specimens appeared was one station (Core No. 3307) in the Umitaka Spur and 2 stations (Core No. 3318 and 3324) in the Joetsu Knoll. A lot of living specimens were distributed from 0 to 10 cm, but were few in a deep section. Among five cores analyzed in the present study, the gas-hydrate was included only in Core No. 3318. There were neither other cores nor great differences though solemyid bivalvia in which chemosynthetic bacteria were lived together appeared in this core. About the appearance of shells that related to the methane seep, the diversity of shells were high, and living specimens or shell fragments of chemosynthetic bivalvia and gastropoda such as Solemyidae, Thyasiridae and Provannidae was collected by each section in Core No. 3318. It was thought that the methane had been comparatively supplied for a long term in this station. Moreover, it was thought that the existence of the gas-hydrate influenced the amount of distribution of macrobenthos because there were a lot of biomasses in Core No. 3318. It is general to do the biomass investigation of macrobenthos by using a Smith-Macintyre grab sampler and a box corer. Then, the biomass of the section from the bottom surface to 10cm where a Smith-Macintyre grab sampler was able to be collected was converted into the biomass per 0.1m² of the bottom surface. Numerical density and biomass were under 1 individuals/0.1m² and under 0.5g/0.1m² in Core No. 3307, 15 individuals/0.1 m² and 33.49g/0.1 m² in Core No. 3318 and 5.1 individuals/0.1 m² and 0.21g/0.1 m² in Core No. 3324. According to Tsujimoto et al. (2006), bivalves and the polychaetes were collected, macrobenthos of 18-64 individuals/0.1 m² (average was 33.8 individuals/0.1 m²) in the Toyama Bay abyssal floor (393-631m in depth). Also, biomass was 0.41-1.86g/0.1 m² (average was 1.05 g/0.1 m²). When the biomass was compared with Core No. 3318 where the gas-hydrate existed, it was high with 8-82 times. But, the number of individuals was little with 20-86%. As for this, it was suggested that it be causes that the gas-hydrate's existing the comparatively large size benthos (bivalves) that mainly depended on chemosyntheses was distributed at the bottom, and polychaetes and non-chemosyntheses bivalves that occupied the majority of the biomass in other sea areas were few. And, result of the ROV *Hyper-Dolphin* survey is also discussed.

Reference

Tsujimoto, R., Shozen, K., Hayashi, S., Wananabe, T. and Imao, K. (2006). Distribution of macrobenthos and bottom environment parameters in Toyama Bay. Bull. Toyama Pref. Res. Inst. (17), 19-36.

Keywords: gas hydrate, benthos, distribution, chemosynthetic benthic community