



High dissolved methane concentrations in the deep-water Ulleung Basin, East Sea of Korea

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As a part of the Korean National Gas Hydrate Program, a production test in the Ulleung Basin is planned to be performed in 2015. The targets are the gas hydrate-bearing sand reservoirs, which were found during the Second Ulleung Basin Gas Hydrate Drilling Expedition (UBGH2) in 2010. To ensure a safe production test, an environmental program has been conducted by the Korea Institute of Geoscience and Mineral Resources (KIGAM) since 2012. This program includes a baseline survey using a KIGAM Seafloor Observation System (KISOS) and R/V TAMHAE II of KIGAM, development of a KIGAM Seafloor Monitoring System (KIMOS), and seafloor monitoring on various potential hazards associated with the dissociated gas from gas hydrates using the KIMOS during the production test. A survey for measuring the dissolved methane concentrations in the area at and nearby the gas hydrate production testing site was performed using R/V TAMHAE II and the KISOS. The water samples were also collected and analyzed to measure the dissolved methane concentrations by the SBE carousel water sampler installed in the KISOS and gas chromatography (GC) at KIGAM. The dissolved methane concentrations were also measured using a Frantech METS methane sensor installed in the KISOS. No dissolved methane anomaly was detected at the site where any evidence of gas hydrate presence has not been observed. On the other hand, the water analysis showed high dissolved methane concentrations at the water depth above and within the gas hydrate stability zone (GHSZ) at the site where gas hydrates were identified by drilling. However, these dissolved methane anomalies within the GHSZ were not detected by methane sensor. To examine these uncertain dissolved methane anomalies within the GHSZ, the water samples will be collected and analyzed once again, and the analytical result will be also carefully compared with the data collected using the methane sensor and deep ocean mass spectrometer (DOMS) developed by the University of Hawaii. The results of baseline surveys will be used to set up the KIMOS efficiently.