



## **Gas hydrates in the deep water Ulleung Basin, East Sea, Korea.**

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Studies on gas hydrates in the deep-water Ulleung Basin, East Sea, Korea was initiated by the Korea Institute of Geoscience and Mineral Resources (KIGAM) to secure the future energy resources in 1996. Bottom simulating reflectors (BSRs) were first identified on seismic data collected in the southwestern part of the basin from 1998 to 1999. Regional geophysical surveys and geological studies of gas hydrates in the basin have been carried out by KIGAM from 2000 to 2004. The work included 12,367 km of 2D multi-channel seismic reflection lines and 38 piston cores 5 to 8 m long. As a part of the Korean National Gas Hydrate Program that has been performed since 2005, 6690 km of 2D multi-channel reflection seismic lines, 900 km<sup>2</sup> of 3D seismic data, 69 piston cores and three PROD cores were additionally collected. In addition, two gas hydrate drilling expeditions were performed in 2007 and 2010.

Cracks generally parallel to beddings caused by the dissociation of gas hydrate were often observed in cores. The lack of higher hydrocarbons and the carbon isotope ratios indicate that the methane is primarily biogenic. The seismic data showed clear and wide-spread bottom-simulating reflectors (BSRs). The BSR was identified by (a) its polarity opposite to the seafloor, (b) its seafloor-parallel reflection behavior, and (c) its occurrence at a sub-bottom depth corresponding to the expected base of gas hydrate stability zone. Several vertical to sub-vertical chimney-like blank zones up to several kilometers in diameter were also identified in the study area. They are often associated with velocity pull-up structures that are interpreted due to higher velocity in gas hydrate-bearing deposits. Seismic velocity analysis also showed a high velocity anomaly within the pull-up structure. Gas hydrate samples were collected from the shallow sedimentary section of blanking zone by piston coring in 2007.

BSRs mainly occur in the southern part of the basin. They also locally observed in the central and northeastern part of the study area. Seismic blanking zones mainly occur in the central part of the study area. They also locally observed in the northern study area.

Gas hydrates occurred as “pore-filling” type associated with discrete turbidite sandy layers that are mainly developed in the northern part of the basin. “Fracture-filling” veins and nodules were mostly found at vent-sites.