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Geophysical Evidence for the Occurrence of Gas Hydrate in the Ulleung Basin, East Sea off Korea

D.-G. Yoo, G.-Y. Kim, D.-H. Kang, and B.-J. Ryu

Korea Institute of Geoscience & Mineral Resources, Marine & Petroleum Research Division, Daejon, Democratic People's Republic Of Korea (dgyoo@kigam.re.kr)

Analysis of multi-channel seismic reflection data collected from the Ulleung Basin, East Sea reveals five types of seismic indicators that imply the existence of gas hydrate including the bottom simulating reflector (BSR), seismic chimney/column, acoustic blanking, enhanced reflections, and gas seepage. The BSR, the most common seismic indicator in the Ulleung Basin, is of high amplitude and good continuity in the southern slope, whereas it is of low amplitude and poor continuity in the northern basin. Seismic chimney/column of reduced reflectivity and velocity pull-up is commonly seen in the central basin and northeastern part of the study area and suggests that imply the probability of gas hydrate or gas fluids. Acoustic blanking of reduced reflectivity partly occurs on the central basin consisting of turbidite/pelagic sediment. Acoustic blanking related to column structures is common in the southeastern slope of the study area. Enhanced reflection below the BSR is seen in the western slope of the area and suggests the existence of free gas due to strong negative amplitude. Gas seepages combined with dome structures and pockmark are widely distributed on the southern slope, consisting of debris flow deposits.