

Spatial Distribution of Seismic Signatures of Gas and Gas Hydrate in the Ulleung Basin, East Sea, Offshore Korea

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The 2005 Gas Hydrate Expedition Program led by KIGAM has revealed various seismic anomalies of the presence of gas hydrate in the Ulleung Basin that is filled with vertically and/or laterally stacked mass-transport complexes (MTC). The seismic indicators identified in 2D and 3D high-resolution seismic reflection data include (a) a bottom-simulating reflector (BSR), (b) seismic chimneys, (c) acoustic blanking, (d) enhanced reflection below the BSR, and (e) sub-circular seafloor seismic expression. The BSR is most commonly found over much of the basin including continental slopes and basin floors. The seismic chimneys seem to be associated either with the MTC or with vent structures in the central basin and along the northeastern slopes. The acoustic blanking is associated with the seismic chimneys that apparently rooted in the MTC/pelagic sediments in the central basin area. The enhanced reflections immediately below the BSR prevail in the basin area in which the BSR contains a relatively high amplitude variation. The sub-circular depressed/domed seafloor features on the seismic profiles are predominant on the southern slopes in conjunction with mud volcanoes and pockmarks. Recently gas-hydrates were recovered where gas fields are reliably suggested by the seismic indicators including the seismic chimneys associated with a vertical vent structure or fault. The successful recovery confirmed that the deepwater in the Ulleung Basin provides favorable condition for gas-hydrate formation and there may be more recoverable, highly-concentrated, gas-hydrate accumulations over the entire basin areas.