



Pockmarks and seismic blanking zones in the southwestern Ulleung Basin of the East Sea

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A five-year research project on gas hydrate in the deep-water Ulleung Basin of the East Sea off the east coast of Korea was carried out by the Korea Institute of Geoscience and Mineral Resources (KIGAM) since the year of 2000, involving 2D multichannel reflection seismic survey and piston coring. This project was financially supported by the Ministry of Commerce, Industry and Energy (MOCIE) and the Korea Gas Corporation (KOGAS). In this study, 2511 km of seismic lines acquired from the southwestern part of the Ulleung Basin were investigated for mapping and characterizing the pockmarks, seismic blanking zones (or chimneys) and bottom simulating reflectors (BSRs). Sixteen piston cores with 5 - 8 m in length recovered from the water depth of 846 to 1975 m were also analyzed for geological and geochemical studies. The core analyses showed high amounts of total organic carbon and residual hydrocarbon gases, indicating favorable conditions for gas hydrate formation. In the piston cores, cracks generally developed parallel to the bedding also suggest significant gas content. The pockmarks formed by gas migrating to the seafloor were sporadically found in the entire study area. Their occurrence may indicate the presence of free gas below the hydrate stability zone. A number of vertical to sub-vertical seismic blanking zones up to several hundred meters in diameter were also observed in the study area. They may suggest fluid upwelling and gas (and/or gas hydrate) rich layer. Some of blanking zones penetrate the entire sediment column and they are associated with seafloor expressions. They also often show the seismic reflector pull-up structures and high interval velocities (2200 - 2800 m/s) that may be explained by high gas hydrate concentrations (> 30 - 40 % saturation of pore space). Most of the blanking zones occur in the well bedded sediments in the northeastern part of the study area. Few zones occasionally appear in the southern study. The blanking zones in the study area

show a similarity to cold vents in the northern Cascadia margin offshore Vancouver Island where massive gas hydrates were recovered from within the center of the most prominent blanking zones.