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Seismic attribute analysis of the indicators for the occurrence of gas hydrate in the northwestern area of the Ulleung Basin, East Sea

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Abstract: Based on the interpretation of 3D seismic profiles acquired in the northwestern area of the Ulleung Basin, East Sea, the shallow sediments consist of five seismic units separated by regional reflectors. An anticline is present in the study area that documents activity of many faults. Bottom simulating reflectors are characterized by high RMS amplitude. Acoustic blanking with low RMS amplitude is distinctively recognized in the gas hydrate stability zone. Seismic attribute analysis shows that if gas hydrates are underlain by free gas, the high reflection strength and the low instantaneous frequency are displayed below the boundary between them. Whereas, if not, the reflection strength is low and instantaneous frequency is high continuously below the gas hydrate zone. Based on the spectral decomposition of the bottom simulating reflector, the high envelope at the specific high frequency range indicates the generation of the tuning effect due to the lower free gas content. Four models for the occurrence of the gas hydrate are suggested considering the slope of sedimentary layers as well as the presence of gas hydrate or free gas

Keywords: Ulleung Basin, gas hydrate, seismic attribute analysis, bottom simulating reflector, acoustic blanking, UBGH2 (the Second Ulleung Basin Gas Hydrate Drilling Expedition)-6 well