



Estimation of gas-hydrate distribution from 3-D seismic data in a small area of the Ulleung Basin, East Sea

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We estimated the gas-hydrate resource in a small (5 km x 5 km) area of the Ulleung Basin, East Sea from 3-D seismic and well-log data together with core measurement data, using seismic inversion and multi-attribute transform techniques. Multi-attribute transform technique finds the relationship between measured logs and the combination of the seismic attributes and various post-stack and pre-stack attributes computed from inversion. First, the gas-hydrate saturation and S-wave velocity at the wells were estimated from the simplified three-phase Biot-type equation (STPBE). The core X-ray diffraction data were used to compute the elastic properties of solid components of sediment, which are the key input parameters to the STPBE. Next, simultaneous pre-stack inversion was carried out to obtain P-wave impedance, S-wave impedance, density and lambda-mu-rho attributes. Then, the porosity and gas-hydrate saturation of 3-D seismic volume were predicted from multi-attribute transform. Finally, the gas-hydrate resource was computed by the multiplication of the porosity and gas-hydrate saturation volumes.