Comparison of shear wave estimation method for Gas Hydrate saturated sediments

Bo-Yeon Yi, Nyeon-Keon Kang, and Dong-Geun Yoo

Korea Institute of Geoscience & Mineral Resources, Petroleum & Marine Research Division, Daejeon, Korea, Republic Of (byyi@kigam.re.kr)

We have compared various estimation method of shear wave velocities for two wells (UBGH2-2_2 and UBGH2-6) located in Ulleung Basin, East Sea to reveal calibration and limitations among the estimation methods. The shear wave velocities have played important parameter in performing AVO inversion and in predicting pore fluid properties. Therefore, it is useful to estimate gas hydrate distribution and saturation. However, there are no record of shear wave velocity during well-logging, usually. Even if the shear wave velocity logs are recorded, it is bad in quality. Therefore, various estimation methods for shear wave velocity are developed by previous researches. We have estimated the shear wave velocities at each well using conventional estimation method : 1) simple empirical relationship, 2) lithological log constrained relation, 3) rock physics model. As a results, mud-rock line equation which is one of the simple empirical relationship, underestimated the shear wave velocity that because the equation is not considered lithology. Lithological log constrained relation overestimated the shear wave velocity due to richness of Opal-A in study area. Finally, we have conducted simplified three-phase Biot-type equation(STPBE) with elastic properties of solid components of sediment, which is one of the rock physics model. Elastic properties computed from lithological log data and the core X-ray diffraction data shows overestimation and comparable estimation, respectively. In conclusion, it shows good correlation with lab measuring data and estimation method considering accurate elastic property.