

Delineation of gas hydrate-bearing sediments by multi seismic attributes using 3D seismic survey, offshore Tokai, Japan

Takao Inamori[1]; Tatsuo Saeki[1]

[1] JOGMEC TRC

The Research Consortium for Methane Hydrate Resources in Japan (the MH21 Research Consortium) was established to undertake research in accordance with Japan's Methane Hydrate Exploitation Program. Bottom Simulating Reflectors (BSRs) were widely found on the marine seismic survey data acquired offshore Japan, especially in the shelf slope near the Nankai Trough. METI conducted three-dimension seismic survey in 2002. BSRs are considered to a bottom of gas hydrate-bearing sediments, they, however, do not estimate the amount of gas hydrate as the reservoir parameters.

In order to estimate the amount of gas hydrate accurately, we have to get the more detailed reservoir parameters such as the gas hydrate saturation, the porosity or the thickness of the gas hydrate reservoir layer. We found the relationship between the gas hydrate and P-wave interval velocity from the NMO velocity analysis and P-wave impedance, S-wave impedance, pseudo Poisson's ratio, attenuation of seismic wave from the seismic attributes analysis using the 3D seismic survey data.

We applied the hybrid method and KSOM, Kohonen Self-Organizing Map, method to integrate seismic attribute results. We compared hybrid and KSOM results with borehole logging data. We found good correlations between integrated seismic attributes such as a hybrid attribute and KSOM attributes, and the range of hydrate-bearing sediments estimated from logging data. We delineated the extension of gas hydrate-bearing sediments, offshore Tokai, Japan by the seismic attributes analysis.