

Methane Hydrate Formation Evaluation in the Eastern Nankai Trough Using Well Logging Data

Tokujiro Takayama[1]; Tetsuya Fujii[1]; Osamu Takano[2]

[1] JOGMEC; [2] JAPEX Research Center

METI 'Tokai-oki to Kumano-nada' wells were drilled in order to explore methane hydrate resources in the Eastern Nankai Trough in 2004. The LWD (Logging While Drilling) data of 16 wells and the wire line logging data of 2 wells were acquired in this area.

The methane hydrate occurrences in the formations, the characterizations of methane hydrate reservoirs, and sedimentary environments of methane hydrate reservoirs have been examined in this area using well logging data and seismic records. The occurrences and the characterizations of methane hydrate in the formation were examined by lithofacies using resistivity logging image and well logging composite charts. The sedimentary environments of methane hydrate reservoirs were examined from sedimentary structure analysis and seismic sequence interpretation using well logging data and seismic records. Moreover, the geological properties of depth around Bottom Simulating Reflectors (BSRs) were interpreted, and the BSR appearance mechanisms were considered.

As results, it has been understood that (1) The methane hydrate reservoirs in the Eastern Nankai Trough were considered as to be distributed in the turbidite sand formations in the submarine fans. (2) The methane hydrate distributions in the formation have had many types of occurrences. One was concentrated in the turbidite sand or silt layers, the other was concentrated in the thin sand layers which were interleaved with the muddy formations. The dissociation of methane hydrate in the sand layers also could be seen.(3) The boundary of high amplitude BSR was located between high concentration of methane hydrate-bearing sand and water-bearing sand which was suggested the lower limit depth of methane hydrate stability zone. Moreover, the Low saturated gas-bearing sands have been recognized under the depth of BSR in some wells.(4) On the other hand, BSRs were recorded also in the continuous muddy formations which could not be recognized any methane hydrate-bearing layers.

These results are useful for the presumption of high methane hydrate-bearing formation distributions in the Eastern Nankai Trough and clarification of the methane hydrate accumulation mechanisms.

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