

## 3D seismic features of BSRs at the Daini-Atsumi Knoll

# Sadao Nagakubo[1]; Takao Inamori[1]

[1] JOGMEC

3D seismic surveys were conducted for a resource assessment of methane hydrates at the three areas named 'Tokai-Oki', 'Daini-Atsumi Kaikyu (Knoll)' and 'Kumano-Nada' in the eastern Nankai Trough. We here introduce the features of BSRs (Bottom Simulating Reflectors) at the Daini-Atsumi Knoll.

BSRs at the Daini-Atsumi Knoll are extending intermittently. This feature is not recognized at the Tokai-Oki and the Kumano-Nada. It was confirmed by the METI Exploratory Wells 'Tokai-Oki to Kumano-Nada' that methane hydrates exist as a pore-filling type in sandy sediments in the Daini-Atsumi Knoll. It is expected that sandy sediments with methane hydrates are crossing the bottom of hydrate stability zone (BHSZ) at clear BSRs, and muddy sediments with no or few methane hydrates are crossing the BHSZ at no BSR. Inclination of shallow sediments generated by uplift of Daini-Atsumi Knoll enhances the feature.

We constructed 'anomaly map of BSR depths' by differences of Expected BSR and Calculated BSR depths. Expected BSR depths were estimated by water depth, expected seafloor temperature and thermal gradient with existing dissociation conditions measured in laboratories. Calculated BSR depths were estimated by average seismic velocity from seafloor to BSRs calculated by the results of the METI Exploratory Wells 'Tokai-Oki to Kumano-Nada' with two-way-time of seismic waves.

Significant shallow anomalies of BSR depths were recognized at the southern summit of the Daini-Atsumi Knoll. Though the anomaly was already reported by Ashi et. al.,(2004) with interpretations of 2D seismic data, the three-dimensional structures of the anomalies were identified by this study. Seismic images of the geological structure below seafloor are not obvious because the topography of seafloor is complex, however, it is expected that local uplift of warmer basement below the southern summit of the Daini-Atsumi Knoll forms thermally the shallow anomalies.

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### Reference

J. Ashi, K. Aoike, Y. Nakamura, S. Saito, S. Kuramoto, M. Kinoshita, S. Morita, U. Tsunogai, S. Kojima, P. Henry, 2004, Geological Structure and Cold Seep at the Daini-Atsumi Knoll off Enshu-Nada, JAMSTEC Journal of Deep Sea Research, No.24, 1-11.