

Anomaly of BSR depths at the Ryuyo area in the Eastern Nankai Trough

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If BSRs (Bottom Simulating Reflectors) completely correspond to the base of hydrate stability zones, BSR depths mainly depend on water depth, hydrocarbon components of hydrates, seafloor temperature, thermal gradient and salinity of pore water. Conversely, if we have detailed information of above-mentioned parameters at the given area, we can estimate predicted BSR depths at the area using data of hydrate stability conditions acquired in laboratory experiments.

At the Ryuyo area, surrounded by Tenryu and Ryuyo submarine canyons, the above-mentioned parameters are comparatively known because 5 wells were drilled by the exploratory wells of METI (Ministry of Economy, Trade and Industry of JAPAN). As we also have detailed seismic velocity data from BSRs to seafloor at this area, we can calculate observed BSR depths.

Based on measured data by marine surveys and laboratory experiments, we calculated the differences between observed and predicted BSR depths in the Ryuyo area, and made an anomaly map of BSR depths.

The anomaly map shows a shallow anomaly area at the southern part and an extreme deep anomaly area at the northwestern part of the Ryuyo area.

On the seismic sections at the southern part of the Ryuyo area, gas migrating from deep formations is recognized below BSRs. It is considered that warmer gas from deep formations makes shallow BSRs thermally. It is suggested that deep anomaly at the northwestern part of the Ryuyo area cause cooling by seawater or infiltration of seawater from walls of submarine canyons.

Anomaly maps of BSR depths would contribute to interpret thermal and hydrological structures in methane hydrates areas.

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