

Structural features revealed by seismic reflection profiles off Kumano area

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Off Kumano is a possible site of the seismogenic zone drilling in IODP. The Kumano Basin, southeast off Kii Peninsula, is one of the forearc basins in the Nankai trough, where mud volcanoes and biological communities related with the cold seepage were observed by sidescan sonar surveys and submersible dives. We present seismic profiles recently obtained in Kumano area.

A seismic survey was conducted to obtain the structural information around the mud volcanoes recognized in the Kumano basin in March 2002. R/V Tansei maru fired the 255 in³ GI gun and acquired the reflection data with a 600m-long 24-channel streamer cable. The high resolution seismic profiles down to 1-2 km depth were obtained by conventional post stack time migration technique. Beneath the uppermost unit (Unit A) which has nearly flat reflectors, another highly deformed unit (Unit B) was observed. The basement of the Kumano basin (Unit C) is also highly deformed showing fold structure. The seismic section running N-S in the Kumano basin showed that Unit A in the north of the No.5 and No.6 Kumano knolls has different stratigraphic features from the south of the knolls. Unit A in the north of the knolls is characterized by landward dipping reflectors and the dip is the larger as the depth is the greater. On the other hand Unit A in the south does not show such a feature and has nearly flat reflectors. This observation suggests that the faults imaged near No.5 and No.6 Kumano knolls have been active. Units B and C showed the folded structure and the mud volcanoes were formed above the anticline of these units. The BSR is scattered in the Units B and C ~0.5 s TWT below the seafloor.

JAMSTEC CDEX newly conducted a seismic survey in the Kumano area in 2003 to obtain the fine image of the subducting oceanic basement and the splay fault reported by Park et al (2002). The sounding source was a tuned air-gun array with 4240 in³, and seismic data was acquired with 6km-long 480-channel streamer cable. Pre-stack depth migration was applied to obtain accurate depth profiles. Obtained depth profiles show the uppermost part of the subducting oceanic plate and a low angle fault which is probably the splay fault. The splay fault takes off the top of the oceanic plate at the depth of 10km beneath the Kumano basin, and seems to reach the seafloor seaward of the outer ridge.