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前弧海盆の横ずれを伴う活断層の浅部構造の解釈 - 東部南海トラフ遠州断層系の例 -

Shallow structure and evolution of active faults with strike-slip in a forearc basin, eastern Nankai Trough

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Accretionary prisms and forearc basins are developed in the Nankai Trough, SW Japan. Many active faults are recognized and classified into five fault systems in the eastern Nankai Trough. The Enshu Faults System, the most landward one, runs over 200 km along the northern edge of the Tokai, Enshu and Kumano forearc basins. Structural investigation of this area is important for earthquake disaster mitigation as well as understanding of oblique subduction tectonics. However, activity and distributions of faults has not been well clarified.

The Enshu Faults System has a general trend of ENE-WSW, on the basis of swath bathymetry and side-scan sonar imagery, and shows dextral strike slip inferred from displacement of the canyon axis across the landward-most fault. Seismic reflection profiles partly exhibit landward dipping faults. These observations suggest that this area is tectonically affected by oblique subduction of the Philippines Sea Plate.

We picked continuous reflectors and divided the formation into five units on the multichannel seismic profiles obtained by JOGMEC, and carefully studied thickness changes of the units across the faults, which reflect fault activities. Approximate positions of faults are estimated by discontinuities of seismic reflectors although fault planes are hardly recognized. Moreover, geometry of formations beneath the lineaments identified on the sidescan sonar imagery suggests existence of flower structures along fault zones. The formation thicknesses above the acoustic basement occasionally change across these fault zones. In most cases, the formation thickness seaward of the fault zones is thicker than that landward of them suggesting transpressive deformation. However, time and space distribution of unit thickness changes imply that fault displacements are not uniform along each fault zone. In order to know the recent fault activity, we carried out deep towed chirp subbottom profiler survey. In the base of the steep slope corresponding to the strong lineament, the shallow sedimentary sequence exhibits seaward divergent shape of reflectors. These depositional styles indicate recent activity of crustal movement by faulting although a fault plane is not recognized in the shallow sediment. In contrast, the dimmed seismic reflectors with tiny displacements were observed in the upper part of the slope. Shallow extension of the fault planes and existences of cold seep previously observed by a submersible survey suggest that these fault systems are still active at present.

キーワード: プレート斜め沈み込み, 横ずれ断層, 活断層, 撓曲
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