

Submersible Observations of OOST in the Nankai Accretionary Prism off Kumano

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The structural and hydrological features associated with the active faulting of the out-of-sequence thrust (OOST) off Kumano were examined using manned submersible SHINKAI 6500. In the seismic reflection profile, the OOST appears to be branched from the plate boundary decollement zone. The bathymetric map revealed that the OOST system off Kumano displays the en-echelon array of topographic highs presumably formed in association with right lateral shear component of faults. Submersible dives were performed along and across the northeast oriented fault scarp.

The accreted rocks strike northeast and dip moderately to steeply northward or southward. They mainly consist of sandstone and siltstone that are in places covered by slope sediments of relatively unconsolidated whitish siltstone. The active fluid venting is heterogeneously observed in the northern side of the fault scarp, presumably reflecting fluid flow along the permeable layer (e.g., sand layer) or fault zone. The fault zone is thought to be back thrust or normal fault associated with uplifting of the hanging wall of OOST. In contrast, active seepage commonly lack in the southern side of the fault scarp. This appears to reflect the collapse of slope toward southward due to seaward-directed faulting along the OOST. In the southern side of the fault scarp, siltstone is intensely brecciated along the sets of polished and slickenlined surfaces with their deformational features very similar to those of the brecciated zones at the toe of the accretionary prism.