

Active structures in the margins of the Kumano Trough revealed by deep-tow subbottom profiler

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The Nankai Trough is a convergent margin at which the Philippine Sea plate is subducting to the northwest beneath the Eurasian plate at a rate of about 4 cm/yr. The area off Kumano is characterized by a well-developed forearc basin called the Kumano Trough and a NE-SW trending continuous outer ridge. Multichannel seismic survey data demonstrate that megasplay faults branch from the master decollement ~50 km landward of the accretionary prism toe to form an outer ridge. A NE-SW elongated depression is developed between the outer ridge and the forearc basin. The deep-towed sidescan sonar WADATSUMI revealed a strong NE-SW lineament on the basin floor of the depression and a swarm of normal faults at the southern margin of the forearc basin. Bacterial mats, tubeworms and carbonate crusts are also observed at landward slopes of the depression where the forearc basin strata are partly exposed. Bathymetric map off Kii Peninsula suggests a dextral displacement of the axis of Shionomisaki Canyon. In order to know the deformation at the southern margin of the Kumano Trough, we carried out deep-tow subbottom survey and pinpoint core sampling by ROV NSS (Navigable Sampling System) during Hakuho-maru KH-11-9 cruise. We introduced a chirp subbottom profiling system of EdgeTech DW-106 for high resolution mapping of shallow structures on this study. The profile crossing the elongated basin does not reveal a fault plane itself but clearly indicates complex geometry of the sedimentary strata. The zone where the sidescan sonar imagery shows a distinct lineament correspond to a small ridge morphology and exhibits sudden dip changes of the strata. Existence of the continuous ridge and deformation of shallow formation suggest recent strike slip displacement along this lineament.

Keywords: forearc basin, active fault, strike slip, cold seep, accretionary prism