Strike-slip fault stress detected by paleostress analysis in paleoforearc basin: an example of the Miocene Tanabe Group, Southwest Japan

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The Miocene plate configuration along southwest Japan arc has been controversial as follows. According to Hall (1996), the Pacific Plate subducted dextrally against the Eurasia Plate before 15 Ma, whereas Seno and Maruyama (1984) suggested the Philippines Sea Plate subducted sinistrally. The shear sense of oblique subduction is possibly recorded as the deformation of forearc basin fill. This study performed a series of paleostress analyses by using outcrop-scale structures in the Miocene Tanabe Group to examine whether strike-slip fault stress conditions were detected or not and which sense of shear is expected along trench-parallel faults.

The study area extends roughly 10 km along the coastal area of the Shirahama Formation, the upper part of the Tanabe Group, Kii Peninsula, southwest Japan. The measured structures consist of outcrop-scale faults and veins. Fault displacements range from about several mm to 1 m. The thicknesses of veins are about several mm. In total, 245 faults and 245 veins were observed. They were analyzed by the stress inversion methods (Sato, 2006; Yamaji and Sato, 2011), which can detect multiple stress conditions from a dataset.

As the result, normal fault stresses were dominant in the whole Tanabe Group. The horizontal extension directions was spatially variable. It trends roughly N-S in southern area and E-W in northern area. This spatial variation is consistent with the report from the present-day forearc basin offshore the Kii Peninsula (Lin et al., 2010). In several areas, strike-slip fault stresses were detected. In these area, some map-scale faults subparallel to the ENE-WSW trending present-day trench were reported (Tanabe Research Group, 1984). Detected strike-slip fault stresses can induce dextral shear deformations on these map-scale faults, which is consistent with the dextral oblique subduction model of the Pacific Plate.

Lin, W., M. L. Doan, J. C. Moore, L. McNeill, T. B. Byrne, T. Ito, D. Saffer, M. Conin, M. Kinoshita, Y. Sanada and others, 2010. Present-day principal horizontal stress orientations in the Kumano
forearc basin of the southwest Japan subduction zone determined from IODP NanTroSEIZE drilling Site C0009. *Geophysical Research Letters*, **37**.


