Fault rocks and paleostress fields in the San-in shear zone

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The San-in Region is far from subduction zones and has been considered to be received a relatively small strain rate. However, recent geodetic study revealed that the strain rate in the San-in Region is actually high and this active region of deformation is called ‘the San-in shear zone’. The San-in shear zone almost overlaps with the San-in seismic zone and the some inland earthquakes (the 1943 Tottori earthquake, the 2000 Western Tottori earthquake and the 2016 Central Tottori earthquake) occurred in the San-in shear zone. To understand the crustal deformation in the shear zone in detail, the Crustal Dynamics project has planned very high-density seismic observation of seismograph in 1000 point around aftershock area of the 2000 Western Tottori earthquake. On the other hand, it is important for us to reveal the distribution and characters of fault rocks around aftershock area and compare paleostress field in the past with that in the present day.
Recent geologic study around aftershock area of the 2000 Western Tottori earthquake revealed that the distribution of faults around aftershock area was concordant with the aftershock distribution and explained the relation between the geometry of the source fault and inactive fault.
In this study, We estimated paleostress fields formed inactive fault in granitic rocks around aftershock area by the Hough-transform-based stress tensor inversion method (Yamaji et al., 2006; Sato and Yamaji, 2006). First, I estimated paleostress fields of each faults having fault gouge or cataclasite as characters of fault rocks. As the result, two stress tensors were detected with strike-slip faulting regimes from faults having fault gouge. One is E-W trending $\sigma 1$-axis and N-S trending $\sigma 3$-axis, the other is N-S trending $\sigma 1$-axis and E-W trending $\sigma 3$-axis. The former is roughly consistent with the present stress field in SW Japan. On the other hand, three stress tensors were detected with reverse and normal faulting regimes from faults having cataclasite.
With respect to different paleostress fields, fault system around aftershock area was formed by stress fields with reverse and normal faulting regimes in the past seismogenic zone and by stress fields with strike-slip faulting regimes in shallow depth with low confining pressure.

Keywords: fault rocks, The 2000 Western Tottori earthquake, Paleostress analysis