# Fault distribution in the southern part of the small earthquake swerm zone along the Sanbe to Miyoshi, central Chugoku region, Japan

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NW-SE trending small earthquakes swarm are observed along a zone of the center part of Shimane Prefecture to the northern part of Hiroshima Prefecture. Direction of the small earthquakes swarm is almost parallel to the aftershock distribution of the 2000 Western Tottori Earthquake (October 2000, M 7.3). The aftershock area of the 2000 Western Tottori Earthquake has experienced the M5 earthquake 8 times from 1950 until the main shock. In a similar fashion, small earthquakes swarm zone from the Sanbe-Miyoshi swarm earthquake zone has also experienced the M5 earthquake 12 times from 1950 until present day.
These similarity implies existence of concealed active faults along the Sanbe-Miyoshi swarm earthquake zone. Although previous studies in the aftershock area of the 2000 Western Tottori Earthquake revealed development of more than 1000 NW trending faults, the Sanbe-Miyoshi swarm earthquake zone has never been studied.
The purpose of this study is to understand the fault distribution and clarify their features in the southern part of the Sanbe-Miyoshi swarm earthquake zone.
The study area is a 6 km square around Kimita town in Hiroshima Prefecture. The investigation method is to record the fault by field survey and make thin section from sampled fault rock and observed the microstructure.
In the study area, Cretaceous rhyolite-dacite tuff and granite-porphyry, Paleogene biotite granite and granite-porphyry and Neogene Bihoku group (mudstone, sandstone, conglomerate) is exposed.
Total of 366 faults were observed in the study area. The orientation of these faults were concentrated in the about N56°W trend and inclined at a high angle to the north and south direction. In addition, strike of the fault was concentrated in the Northeastern part of the study area about N60°W, and in the Southwestern part about N20°W. The fault rocks in the northeastern part of the study area were hardly consolidated, but most of those of southwestern part were unconsolidated. The cutting relation of the fault was confirmed in the northeastern part of the study area. The fault of the NE trend was often cut the fault of NW trend.
In the southwestern part of the study area, fresh fault gouge was observed in a NW trending fault. Cutting relationship of the faults in this area were hardly observed.
This fresh fault is specific to the NW trending fault in the southwestern part, and unidentified in the NE trending fault.
Occurrence of fault rock in this study area implies that the fault system in the northeastern part is older than the those of southwestern part because consolidated fault rocks is commonly formed at the deeper part than the fault gouge. Cutting relationship of the faults in the northeastern part of the study area indicates NE trending fault is developed later than the NW trending fault. In the southwestern part of the study area, fresh fault gouge was observed only in the NW trending fault implies the NW trending fault is formed later than the NE trending faults.
Orientation of faults in this study area was concentrated at about N 56°W. But the distribution direction of small earthquake swarm in this study area is concentrated on about N40°W. Deviation of orientation of faults and distribution aftershock is reported at the aftershock area of the Western Tottori Earthquake and the deviated faults is thought to be Riedel shear planes of Early stages of fault development. However, the trend of faults and fault rocks in this study area is slightly different from the aftershock area of the Western

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Tottori Earthquake. For example, most fault rocks in the northeastern part of the study area were consolidated (Most of the fault rocks in aftershock area of the Western Tottori Earthquake were unconsolidated ), and the faults in the southwestern part are concentrated in N20°W. From this fact, this study is thought to be faults related to aftershock distribution different from the study of previous research.

Keywords: microearthquake swarm, Sanin shear zone

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