Distribution of fault system around the epicenter area of the 2000 Western Tottori earthquake

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The 2000 Western Tottori earthquake (*M*:7.3, maximum seismic intensity: 6 upper) occurred in a place where no active fault was identified. The estimation of fault shape and crack distribution based on very high-density seismic observation of seismograph in 1000 point has been planned in this seismic aftershock area as one the Crustal Dynamics project. Comparison of this seismic observation with surface distribution and characters of fault rocks around aftershock area based on the field observation is also planned. This study is one of the field surveys. The objective of this study is to reveal the distribution and characters of fault rocks around the epicenter area of the 2000 Western Tottori earthquake.

The late Cretaceous to Paleogene granitic rocks which is called the Neu Granitic Pulton is widely exposed in the survey area. The granitic rocks mainly consist of coarse-grained biotite granites. Basalt-andesite dikes, rhyolite dikes, and aplite is intruded into the granitic rocks.

Fault planes in the survey area is generally N60°W and N60°E strike with high-angle dip. Orientation of dykes in the survey area is generally N60°W strike, high-angle dip, while joints in granites is N70°W strike, high-angle dip and N50°E strike, vertical dip. This orientation shows similar trend with faults. Cross cutting relationship of NW and NE trending faults were observed at several outcrop.

By thin section observation, cataclasites were recognized from 12 fault rocks. Previous study reported that cataclasites distributed in only aftershock area. However, cataclasites were recognized not only aftershock area but also outer aftershock area in this survey. The cataclasites in this survey are cataclasites with random fabrics and foliated cataclasites which includes highly plastically deformed biotite. Pulverized rock which is thought to be fractured rock by seismic shock wave was recognized in thin section observation of granite sample of near fault gouge of about 40 centimeter thick.

Cross cutting relationship of lineament of partially developed fault makes difficult to recognize. Fault system in this survey area had cut relation each other, and the relation makes the lineament with poor topographic manifest. Orientation of N60°W strike, high-angle dip of fault system which observed in the survey area is considered as the Riedel shear planes of N38ºW, 90ºmain seismic source fault (Horikawa et al.,2001). Occurrence of cataclastic fault rock indicates repetitive fault activity before this earthquake and the faults developed selectively along dikes than joints as weak planes. Fault activity has been continued after dike intrusion because dike is also fractured. Pulverized rocks observed in this survey area suggests fault activity with big seismic shock wave in shallow depth with low confining pressure.

Keywords: The 2000 Western Tottori earthquake, Cataclasite, Pulverized rock, Active fault

