2000年鳥取県西部地震余震域における断層系の発達過程と古応力場の解明

Fault development process and paleostress fields in the 2000 Western Tottori Earthquake

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Fault topography in aftershock area of the 2000 Western Tottori Earthquake was poorly recognized. There are little information of earthquake in the poor topographic region and paleo fault activity may help to the sesmic evalustion. It is important to understand deformation process of fault systems in the poor fault topography for mitigation of geological hazard.

In this study, we discuss the paleostress fields and fault ages around aftershock area of the 2000 Western Tottori Earthquake. We adopted Hough transform inverse method to estimate the paleostress fields because of using incomplete fault-slip data (Sato, 2006) and we determined K-Ar dating of fault gouges in the aftershock area. The fault gouge contains auhigenic illite related to fault activity. It is difficult to separate the only authigenic illite from fault gouge with muscovite and detrital mica. Therefore, we conducted illite polytype analysis by the XRD patterns and evaluated mixure rate of muscovite and detrital mica. The 100% authigenic illite is considered as timing of fault activity in this study.

The Kawai and the Kuri formations (19-15Ma) and the Omori Formation (16-13Ma) is distributed in the northern area. The granitic rocks (65Ma) called ‘Neu Granitc Pulton’ is widely exposed around the central and southern area.

As a result of the paleostress analysis, we detected reverse faulting stress regime with NNW-SSE $\sigma 1$ and high ratio in the northern area. This stress state is dominant after 13Ma and consistent with the stress field of formation of the Shinji Folded Zone. Two stress states, one is stress states Strike-slip stress regime with E-W σ_1, N-S σ_3 and intermediate stress ratio and the other is Strike-slip stress regime with N-S σ_1, E-W σ_3 and intermediate and high stress ratio in the Neu granite was also detected. The former is concordant with the contemporary stress in a whole Chugoku region (Kawanishi et al., 2009). And the latter is consistent with the stress regime which formed NE-SW trending geological faults distributed in Chugoku region (Kanaori, 1990). The stress change from N-S σ_1, E-W σ_3 to E-W σ_1, N-S σ_3 which was revealed from cutting-relationships between the dikes of the Yokota monogenetic volcanoes origin and faults considered to be caused when volcanic activity of the Yokota monogenetic volcano was occurred. We constrained the timing of the authigenic illite in the fault gouge is approximately 22.8Ma from K-Ar age dating and XRD patterns. In the presentation, we discuss relationship between the timing of fault activities and palaestress fields.

キーワード：断層発達史、古応力場、断層K-Ar年代
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