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Relationship of slip plane and element distribution in the inactive fault zone: an example of the Butsuzo Tectonic Line

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Mineralogical and geochemical studies of the recently slipped fault gouges might enable us to specify the recently slipped fault gouges in basement rocks. To understand the characteristics of their mineralogical and geochemical features, it is important to compare them with an inactive fault zone. The purpose of this study is to compare previous studies with the characteristic features of the fault gouge in the Butsuzo Tectonic Line based on field survey, XRD, XRF and SEM-EDX analyses.

The studied site is located in Taiki-cho, Mie prefecture, is reported by Kato and Saka (1995). The Butsuzo Tectonic Line is the boundary fault of the Chichibu and Shimanto Belts, and is not recognized as an active fault by Active Fault Research (1991). Attitude of the fault zone is N62W30N, and its thickness is 0.9 m. The hanging wall of the fault zone is the mudstone with sandstone blocks in the Chichibu Belt, and the footwall is the mudstone with sandstone blocks in the Shimanto Belt. The fault zone consists of the fault gouge zone in a thickness of a few cm and the fault breccia zone. The latter is divided into two zones based on their color; light gray fault breccia zone and dark gray fault breccia zone. A part of the light gray fault breccia zone shows light yellow color, and this part is connected to a fracture in the hanging wall. Both fault breccia zones include blocks with quartz and calcite veins.

The samples collected from the fault zone are analyzed by XRD, XRF and SEM-EDX. The results show that 1) dolomite is mainly included in the fault gouge and the light gray fault breccia zones, 2) siderite is mainly in the dark gray fault breccia zone, 3) no smectite in fault zone, 4) no concentration of Mn and 5) Fe concentrates in the light yellow part in the light gray fault breccia zone and goethite was detected. These results are not consistent with the previous studies on the active faults (e.g. Ohtani et al, 2012) whose results are 1) Mn is concentrated and oxidization have been occurred in the recently slipped fault gouge and 2) smectite is included. These differences might be clues to differentiate the recently slipped fault gouge in basement rocks from the others.

References

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