Characteristics of the fault zone slipped only in the near surface: an example of the Atera Fault

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The activity assessment of the active faults basically needs younger sediments. To understand the fault activity in the area with no younger sediments, it is desired that the new method is developed to study the fault activity from the fault rocks in the basement rocks. The latest slip zone in the active fault exposure is displaced not only in the latest slip event but also the other previous events, because the latest slip zone may has several slip experiences. This suggests that the characteristics of the latest slip zone reflect the several events and the previous events may occurred not only in the near surface but also the deeper part. The fault zone slipped only in the near-surface should be studied to understand the phenomenon that occurred in only the near-surface fault slips. For this purpose, the Atera Fault zone has studied to understand the above characteristics. The studied exposure of the Atera Fault is located at Tase, Tsukechi, Nakatsuawa in Gifu Prefecture. In this exposure, the fault is mainly a boundary between the Quaternary sedimentary layers and the Cretaceous granite. The fault is divided into two in the upper part of the exposure. Upper and lower faults are located in the granite and at the boundary of the sediments and granite, respectively. The lower fault contacts with the sand and gravel layer in the uppermost part. Toda *et al*. (1994) have clarified that the three seismic events are detected from the exposure and that the upper fault have displaced in recent one or two seismic events. The purpose of this study is to clarify the characteristics of the fault zone slipped only in the near-surface from the study of this upper fault.

The thin section observation, the powder X-ray diffraction (XRD) and the X-ray fluorescence analysis (XRF) were performed using the samples collected from this fault exposure. The XRD results show that vermiculite appears only in the sand and gravel layer, and no difference is recognized between the granite and the fault gouge, suggesting that the host rock of the fault gouge is the granite.. The thin section observation reveals that the grain size of quartz and biotite in the fault gouge is smaller than those in the granite, and that no difference of alteration is recognized between the granite and the fault gouge. The XRF results show no difference between the granite and the fault gouge.

These results indicate that only grain size reduction is recognized in the fault gouge slipped one or two times in the near-surface, and that no alteration and no chemical change is occurred. Alteration and chemical change would need more slip events or slip events in the deeper part.

Keywords: fault zone, Atera Fault, near-surface

