# Characteristics of the fault zone with only the recent slips in the Atera Fault

Atsushi Nishida[1], *Tomoyuki Ohtani[1], Takuya Niimi[1], Jun'ichi Tsubaki[1], Keiichi Ueta[2]

1. Department of Civil Engineering, Gifu University, 2. CRIEPI

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 to develop the new method which assesses the fault activity from the fault rocks in the basement rocks. As the recent slip zone in the active fault exposure is displaced not only in the recent slip event but also the other previous events, the recent slip zone may record many slip experiences. This suggests that the characteristics of the latest slip zone reflect not only the recent slips near surface but also the other older slips in the deeper part. The fault zone with only the recent slips should be studied to understand the phenomenon that occurred in the recent slips near surface. The purpose of this study is to clarify the characteristics of the fault zone with only the recent 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. The upper and lower faults are located in the granite and at the boundary of the sediments and granite, respectively. The upper 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 several seismic events.

The detailed observation of the fault structure, thin section observation, the powder X-ray diffraction (XRD) and the X-ray fluorescence analysis (XRF) were performed using the samples collected along the upper fault. The detailed observation of the fault structure revealed that the upper fault consists of A1 and A2 fault zone and their branch point is consistent with that of the upper and lower faults. The brown fault gouges distributes in the recent slip zone from the branch point of A1 and A2 to 4 m away from the branch point, and the light gray fault gouge far from 4 m. The latest slip occurred in the A1 fault zone based on the radiocarbon dating (Toda et al., 1994), and the cumulative amount of A1 displacement is 2.5 m from the upper plane of the granite. These fault zones involve the fragments of the surrounding weathered granite. The XRD results show that smectite appears within 1 m from the branch point. The XRF results show that Mn-rich zones are within 4 m and 3 m, respectively.
The lower fault zone had been displaced before the upper fault zone was formed, and the brown fault gouge, smectite and Mn-rich zone are included in the lower fault zone. This indicates that some of them in the upper fault zone should be displaced from the lower zone. The distribution of brown fault gouge and Mn-rich zone in the upper zone, however, cannot be explained only the fault displacement. This suggests that the recent Mn concentration would be occurred in the upper fault zone within recent several thousand years.

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