

## Relationship between the tectonic relief and the shallow geological structure of the active strike-slip fault

# Ken-ichi Yasue[1], Daisuke Hirouchi[2]

[1] Toyama Univ., [2] Nagoya Univ.

A small-scale tectonic relief as the fault depression and mound, 10 m degree in scale, is distributed along the strike-slip fault. The active fault research has scarcely offered the relationship between the tectonic relief and the shallow geological structure in three dimensions. This study has showed the structure in three dimensions, and has clarified the tectonic formation process of the structure. This result, is important to clarify the geotectonic history around the active strike-slip fault, and also supports the elucidation of last event and net slip by the recognition of event layer and the precision measurement of landform. We have carried out an interpretation of aerial photograph, topographical and geological investigations, drawing up of detail counter maps, trenching and drilling surveys, and GPR (ground penetration radar) exploration. Study sites are Mimayano and Obayashi districts in the north-central part of the Atera fault system which is one of the prominent faults in central Japan.

Gero fault (Mimayano district): In trees on the western bank of the Takehara River of Mimayano district in Gero town, NW trending narrow swamp with a width of several meters and a length of 30 m is distributed along the Gero fault. The predominant strike of the main fault on the trench walls and the outcrop is between N50W and N70W, which deviate counterclockwise by 0 to 20 degrees from the general strike of the Gero fault. In addition, the GPR profiles showing the depression with 6 m in depth suggest existence of faults. The surface expression has the arrangement of small-scale linear scarps and other linear features in right-stepping en echelon with several meters step. Judging from the above, we think that the strike-slip displacement of the main fault of the Gero fault has formed the right-stepping en echelon arrangement as the Riedel shear in soft-sediment and surface.

Yugamine fault (Obayashi district): In trees on western Obayashi district in Gero town, the northwest trending narrow depression with a width of 10 m and a length of 40 m is distributed along the Yugamine fault. NW trending linear scarps with SW-side-up of 0.5-2 m and mounds of about 10 m in a diameter are same strike with the active fault trace. In the trench excavation intersected with the scarp, the boundary fault between black humic layer and basement rock dips 70NE. On the other hand, the scarp of the northeast side of depression has the same strike as the scarp of the southwestern side. The surface geometry of the scarp is indistinct, because of artificial partial changes. In addition, the black humic layer of thickness of about 3 m in the northeastern depression suggests existence of faults in the northeast margin of depression. The GPR profiles show the depression with 4-5 m in depth. The data of trenching and drilling surveys suggests that the upper part, 3 m in depth, is the black humic layer at least. Judging from the above, we think that the depression is distributed between the overlapping faults, and that the structure may have been formed with left-lateral strike-slip displacement of the fault.

This study has approached about the formation process of shallow geological structure and tectonic relief with displacement of strike-slip fault. The active strike-slip fault is apt to be recognized as single fault line in the small scale, but has complex traces corresponding to the structure model as the Riedel shear in the large scale. Data of underground by the trench, drilling, and GPR surveys show the shallow geological structure of strike-slip fault in three dimensions, and are useful for elucidation of the tectonic formation process. In future, we will carry out investigation as this study in other areas, and will want to clarify the geotectonic history around the strike-slip fault.