

Evolution of fault zone architecture during the exhumation of the Median Tectonic Line in SW Japan

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Behavior of fault is controlled by the deformation of fault rocks at different physical conditions. The structure of fault zone along the Median Tectonic Line (MTL) has evolved through a series of faulting events at various temperatures. The analysis of structures in the fault zone, therefore, helps to understand how fault rocks deform at different physical conditions. We present detailed observations of the MTL at a large outcrop exposed at Awano-Tabiki in the eastern Kii Peninsula, Japan.

At the Awano-Tabiki outcrop, the MTL juxtaposes the Sanbagawa metamorphic rocks to the south against sedimentary rocks corresponding to the Izumi group to the north. The lithological boundary strikes almost E-W and dips to the north. The Sanbagawa metamorphic rocks were variably damaged to the south by faulting for the distance more than 20 m from the lithological boundary. The fault rocks are strongly comminuted within a distance of a few meters from the lithological boundary forming the fault core region. There is a sharp fault gouge zone with the width less than 20 cm in the fault core region forming the principal slip zone.

The detailed analysis of the structures within the outcrop revealed the evolution of the fault zone during the exhumation. In the hanging wall of the principal slip zone, asymmetric composite planar fabrics are well developed, indicating dextral sense of shear. These structures were cut by the principal slip zone. In the principal slip zone slipped as a normal fault with dextral sense of shear. The principal slip zone has been moved as a normal fault with sinistral sense of shear and then a dip slip normal fault after the normal faulting with dextral sense of shear.

Keywords: fault zone architecture, fault gouge, fault striation, Normal Fault