

Trenching study at Kudaritani site across the Magome-toge fault, southern part of the Kiso-sanmyaku-seien fault zone

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The Kiso-sanmyaku-seien fault zone, which extends for 60 km along the Kiso River, is composed of N-S to NE-SW trending echelon faults of the Agematsu fault, Seinaiji-toge fault and Magome-toge fault. To evaluate the faulting history and activity of the southern part of the fault zone, we conducted the two parallel trench excavations on the river terrace emerged at ca. 50 ka across the Magome-toge fault.

Observing the trench walls, we confirmed that terrace deposit and lower part of humic soil were deformed by several high-angle faults branching as flower structure. The humic soil can be divided into 3 units of upper, middle and lower on the basis of humic intensity and color. The lower unit and the bottom of middle unit radiocarbon dated at 11,800-7,100 cal BP have been displaced by the latest faulting event, whereas the faults are covered by the upper unit dated at younger than 3,700 cal BP. Two sequences of wedge shaped silt layer eroded by colluvial sheet in the terrace deposit are distributed on downthrown side of the faults. Branch faults cut these silt layer respectively, but are truncated by each colluvial sheet. These structures indicate that the two sequences are related to penultimate and antepenultimate faulting events respectively. Therefore, evidence of three faulting events can be recognized in the trenches.

Radiocarbon dates show the latest event has been occurred during 7,100-3,700 cal BP. This result is supported by the distribution of two tephra layers in the humic soil. The K-Ah tephra (7,300 cal BP) have been deformed and reworked by activity of the latest event, and the Kg tephra (3,150 cal BP) was not influenced by faulting. We also obtained some radiocarbon ages from the middle unit, which may have been displaced but not so clear. The youngest age of the probably faulted layer was estimated to be ca. 5,000 cal BP. In this case, the timing of the latest event is re-evaluated to be during ca. 5,000-3,700 cal BP.

Although there was no suitable sample for radiocarbon dating in the terrace deposit, tephra shows the approximate timing of former two faulting events. The upper silt layer contains the volcanic ash originated from AT tephra (25,000-27,000 cal BP), but the lower silt layer doesn't have any tephra. This fact suggests the penultimate event occurred later than 25,000-27,000 cal BP and before 11,800 cal BP, and the timing of the antepenultimate event is before air-fall deposition of the AT tephra.