

## Distribution and activity of a branch fault (Yahatadani fault) of the Ashiya fault, eastern Rokko Mountains, Japan

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The Rokko Mountains is located on the northern side of the Kinki Triangle area. Within the mountains, there are many NE-striking active faults. One of them, Ashiya fault, distributes windingly from the north to south in the eastern part of the mountains. This feature is what makes the Ashiya fault distinctive among the other NE-striking faults in the mountains. Accordingly, we investigated geologically the western area of the Ashiya fault, and found a branch fault (Yahatadani fault) of the Ashiya fault. The ground-penetrating radar (GPR) surveys were furthermore carried out along the southwestern extension of the Yahatadani fault, as the hidden fault was detected by a seismic reflection survey after the 1995 Hyogoken-Nanbu Earthquake.

The Yahatadani fault has at least a length of 6.3 km from Hyogo Prefectural Nishinomiya- Kabutoyama High School, through Gorogoro-dake, to Okamoto (eastern Kobe). Its fault exposes at seven localities in the mountains. This fault has a strike of N30-50°E, and nearly vertical dip. It has a fault core (soft fault gouge of ~3 cm wide and fault breccia of 20-50 cm wide), and the damage zone of ~6 m wide. This fault cuts the higher terrace deposit, composed mainly of the reddish-yellowish coarse-grain sands at the southwest of the Gorogoro-dake. We estimated the vertical displacement of 20 m based on the difference in between two heights of terrace surfaces along the fault.

On the other hand, we used a 100 MHz frequency antenna for GPR measurement. The GPR data were processed to accentuate geologic features by high pass filtering, low pass filtering and migration. We made the following observations based on our GPR imagery: (1) An anomalous zone of reflectors was found in all eight sites. (2) This anomaly is characterized by deformation of multiple sub-horizontal reflectors with either a reflector-bend-mode or a reflector-break-mode. (3) The fine veneer (paleosol) on the coarse-grained layer including AT ash (25,000 yBP) discontinue at the anomalous zone.

Judging from these observations, it can be pointed out that the Yahatadani fault has been active with vertical displacement of 20 m at least after the formation of high terrace. The Yahatadani fault, branching away from the Ashiya fault, is thought to extend to the southwest in the Rokko Mountains and beneath the urban area of Kobe.