Mukumoto Fault on the eastern margin of Nunobiki Mts., central Japan, especially on the significance of range-facing scarp

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Ichishi Fault System limits the eastern boundary of the Nunobiki Mts., trending north-south, in central Japan. Mukumoto Fault is a part of this fault system, and characterized by the main frontal fault scarp (MF1) and two range-facing fault scarps (MF2 and 3) behind it. They dislocate late Pleistocene fluvial terrace (M2 terrace). In order to evaluate this fault activity, we studied this fault as follows: 1) detailed mapping of fault morphology by air photo interpretation, boring across three faults, trenching at these faults as well as seismic refraction survey.

Results are as follows: 1) On the main fault (MF1), low-angle thrust fault with tilting of terrace deposits is found. In contrast, high-angle thrust faults were identified at two range-facing faults at range-facing fault scarps (MF2 and 3). 2) Identified faults exactly correspond to the location of the faults geomorphologically estimated. 3) Total vertical offset at MF1 is 13 m, but 4-4.5 m at MF2 and 3, supporting that range-facing scarps are subsidiary faults from the main fault.. 4) At MF2 and 3, three faulting events are identified from the presence of fine deposits, and their deformation, as well as the height difference of bedrock surface across the fault. The amount of displacement by single events is 1.2-1.5m. The latest activity was post 22,000 yr BP, but the exact timing was not determined. 5) It was difficult to find positive evidence of multiple activities from MF1.

A set of the main scarp and accompanied two range-facing scarps at the Mukumoto Fault represent characteristic deformation, which was formed under the strong E-W compressional stress field. Three faulting activities are recognized at subsidiary faults (MF2 and3). Thus, MF1 that has larger total offset than the subsidiary faults could be activated at least the same number of faulting with MF2 and 3, although it was difficult to separate each faulting at the main fault MF1. Therefore, we think that such a subsidiary range-facing faults are suitable sites for understanding the repeated faulting, of the main reverse fault.