

The property of fault zone and fault activity of the Shionohira Fault, Fukushima Prefecture, Japan

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Co-seismic surface ruptures trending NNE-SSW direction were formed from Tabiuto-Nameishi to northwestern Ishizumi-Tsunaki in Tabito-cho, Iwaki City, Fukushima Prefecture, by the April 11, 2011 Fukushima-ken Hamadori Earthquake. This earthquake was characterized by the westward dipping normal slip faulting, and the maximum displacement was about 2 m (e.g., Kurosawa et al., 2012). These surface ruptures were newly named the Shionohira Fault by Ishiyama et al. (2011).

Before the 4.11 earthquake, the N-S trending several faults were described in this area as the Itozawa Fault in Active Faults in Japan, New Edition (The Research Group for Active Faults of Japan, ed., 2011). The surface ruptures of 4.11 earthquake are corresponding to a part of the Itozawa Fault (western trace of the Itozawa Fault by Tsutsumi and Toda, 2012). The geomorphological features of active faults were not found in the northward of the Gozaisyo highway. On the other hand, the N-S trending lineament are recognized from the south of the Tabiuto-Nameishi to the boundary between the Fukushima and Ibaraki Prefectures, though surface ruptures did not appear in this area. The authors study the differences of active and non-active sections by the 4.11 earthquake, and here the authors show the results of observation of fault outcrops along the Shionohira Fault.

A lot of new fault outcrops were formed by the 4.11 earthquake, however most of them are composed of foot-wall with fault plane, and the structures of hanging-wall are difficult to observe. Only a few outcrops have basement rocks of the hanging-wall and hoot-wall with fault plane. Three of these outcrops (Kyodo-gawa, Shionohira and Betto) were selected to investigation. In addition, a fault outcrop (Nameishi-minami) located in about 300 m south to the southern tip of the surface ruptures was investigated. We carried out observations of outcrops, polished slabs and thin sections, and X-ray diffraction (XRD) to the fault materials.

As a result, the fault zones originated from schists were investigated at Kyodo-gawa and Betto. The thick fault gouge is cut by a fault plane by 4.11 earthquake in each outcrops. The fault materials originated from schists are fault bounded with (possibly Neogene) weakly deformed sandstone at Shionohira. The thin fault gouge is found along the fault plane by 4.11 earthquak. A small-scale fault zone with thin fault gouge are observed in Nameishi-minami. According to XRD analysis, smectite was detected in the gouges from Kyodo-gawa, Shionohira and Betto, while it was not contained in the gouge from Nameishi-minami.

References

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