

## Paleoseismic investigations on the un-ruptured section during the 2014 earthquake along the Kamishiro fault, ISTL active fault zone, Central Japan

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We performed paleoseismological investigations on the un-ruptured fault section along the Kamishiro fault, ISTL active fault zone, central Japan. The un-ruptured section extends for about 15 km, consisting of the southernmost section of the Kamishiro fault. The northernmost section have activated during the 2014 Nagano-ken Hokubu earthquake, Mj 6.7. Near Lake Nakatsuna, the Kamishiro fault forms tectonic geomorphic features such as fault scarp on the lacustrine terrace and fluvial terrace, monoclinical scarp on the lowland. Beside the eastern side of Lake Nakatsuna, we obtained two bore holes in order to estimate vertical slip rate based on lacustrine terrace deposits at hanging-wall side and fine sediments at foot-wall side. We estimated about 1.0 mm/yr of vertical slip rate as the minimum value. The fault exposure at the depth of -29 m in the borehole core at the foot-wall side implies that thrust front is located at the west of the borehole site. It indicates that the slip rate at present is the minimum estimation. 350 meter south of this site, we obtained several Geoslicer across the fault scarp. The scarp height is about 2 m. Based on geomorphic and geological section, we identified two paleoseismic events after the deposition of alluvial fan deposits. At this moment, we estimated that the most recent event occurred after 664 A.D. More carbon dating samples will allow us to constrain the timing of paleoseismic events. Near the southernmost termination of the Kamishiro fault, south of Lake Kizaki, we re-investigated timing and slip per event during 5-6 paleoseismic events. Here, 2-3 events have been identified based on the shallow geological section up to 6 m deep revealed by Geoslicer technique. We added four borehole cores to identify thrust structures and older events. At present, fine sediments and carbon dating results yield 1.0 mm/yr of vertical slip rate after 1.2 ka. More dating results will provide high-resolution chronology of past events and slip per events, that will help us to discuss the occurrence of past multi-segment earthquakes.

Keywords: active fault, paleoseismology, ISTL active fault zone