

Seismic cycle of the Kamishiro fault (northern part of the Itoigawa-Shizuoka Tectonic Line active fault system) revealed by tectonic geomorphology at Warabidaira, Hakuba Village, central Japan

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An Mj=6.7 (Mw=6.2) earthquake occurred the northern part of the Itoigawa-Shizuoka Tectonic line active fault system. The surface rupture appeared in association with the earthquake along the previously mapped Kamishiro fault. The maximum vertical displacement of the surface rupture is about 1 m. Long-term Kamishiro fault slip rate estimated of 3-4 mm/yr by drilling survey and tectonic geomorphology. It has believed that recurrence interval of the Kamishiro fault estimates of 1,250 to 1,500 years for the large quakes by trench survey. In this case, average vertical displacement per event estimates of 3 to 4 m.

The magnitude of the 2014 event is smaller than predicted magnitude along the Kamishiro fault. Our aim is to clarify the crustal deformation system in Kamishiro area and therefore investigated it to clarify paleoseismology and the tectonic geomorphology on the surface rupture at Warabidaira in Hakuba village.

We defined five Holocene terraces as Lc2 terrace, Lc1 terrace, Lb2 terrace, Lb1 terrace, La terrace in order of young on the landform classification. The amounts of vertical offset of the Lc2, Lc1, Lb2, Lb1, and La terrace surface are 0.3-0.4m, 0.5m, 1.1m, 1.6m, and 1.5m respectively. The amounts of left-lateral offset of Lc1/Lc2 terrace, Lb2/Lc1 terrace, Lb1/Lb2 terrace, and La/Lb1 terrace are about 1.0m, 1.0m, 5.0m, and 7.5m, respectively. The Lc2, Lc1, Lb2, Lb1 and La terrace emerged at modern, modern, 1695-1535 Cal.BP, 1530-1355 Cal.BP and 2055-1900 Cal.BP, respectively. The vertical and left lateral average slip rate is calculated to be 0.8mm/yr, and 3.5mm/yr, respectively. The average recurrence interval is 586-880 year.

Keywords: 2014 Kamishiro fault earthquake, surface rupture, trench excavation, left-lateral offset