

Trench excavation survey across the 2014 rupture zone along Kamishiro fault, Itoigawa-Shizuoka Tectonic Line

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The Mw=6.2 Nagano-ken-hokubu earthquake, central Japan, on November 22, 2014 was accompanied by an ~9-km-long NS-trending surface rupture zone along the pre-existing scarp of the Kamishiro fault, a part of the Itoigawa-Shizuoka Tectonic Line active fault system. This earthquake was the first surface-breaking earthquake to have occurred on one of the 110 major inland active faults prioritized for evaluation by the Headquarters for Earthquake Research Promotion that was launched in 1995 after the 1995 Kobe earthquake. To furnish more paleoseismic data to retrospectively evaluate the seismic hazard and to validate pervasive characteristic earthquake model, we excavated paleoseismic trenches across the 2014 rupture zone at two sites, Oide (northern site) and Iida (southern site). Trench walls at both sites exposed evidence for the penultimate surface-rupturing event that had occurred sometime between ~400 cal. B.P. and present. Together with the documented local damages similar to the ones in 2014, we interpret that the 1714 Otari earthquake of M 6 1/4 would have been the penultimate surface-breaking earthquake along the Kamishiro fault. At Oide, we found three or four paleoseismic events during the past 15 ka whose movements accumulated four-to-six-meter high hill-facing fault scarp. The penultimate event, possibly at the Otari earthquake, could have formed larger coseismic vertical separation comparing to < 1m ground tilt at the 2014 earthquake. At Iida, despite a paucity of sediments and unique deformation as a transverse fault, we found five paleoseismic events during the past 53 ka, which is roughly consistent with the result reported by Okumura et al. (1998), except the penultimate event occurred sometime after about 1700 A.D. that is well constrained from an earthenware fragment yielded from a younger unit. Acknowledgements: This study was performed as a part of "Additional surveys of the comprehensive study of the Itoigawa-Shizuoka Tectonic Line active fault system, Ministry of Education, Culture, Sports, Science and Technology (MEXT)".

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