

Very shallow S-wave seismic reflection survey across the surface rupture of 2014 Naganoken-hokubu earthquake, central Japan

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The Nagano-ken-hokubu earthquake (Mw 6.2) occurred on 22 November 2014. Along the pre-existing trace of the Kamishiro fault, a 9.2-km-long surface rupture emerged from Shiojima in Hakuba village of Nagano prefecture to Higashi-sano. In the northern part of the surface rupture zone, east-dipping reverse faults were identified as a master fault considered from distribution of surface rupture, amount of the vertical/horizontal displacement, ground deformation, morphological style, and deformation of artificial structure. On the other hand, buckled steel handrail and drainage gutter were observed in the southern part of the surface rupture zone, which suggest the low angle fault at shallow depth. Also, low angle thrust fault observed in the trenching survey (Okumura et al., 1998, J Seismol. Soc. Japan 2nd ser. Zisin, 50, 35-51).

In this survey, to reveal the subsurface structure of the northern part of the surface rupture, we conducted very shallow S-wave seismic reflection survey from November 21 to 23, 2016 at Oide in Hakuba village, Nagano prefecture. The length of seismic reflection survey line was 300 m from west to east across the 2014 surface rupture. To generate SH-waves in a direction perpendicular to seismic line, we hit a sidewall of square wooden log (0.2 x 0.4 x 1.0 m, 28 kg, pine wood) with a sledgehammer as a source in this survey. The receiver was GS-32CT (natural frequency, 10 Hz), and sampling rate is 1 ms during 2 sec of recording time. The source and receiver spacing was 1 m with 96 ch geophones used for each recording. We selected the DSS-12 (Suncohort consultants co. Ltd.) for the recording system. In this presentation, we demonstrate the very shallow S-wave seismic reflection survey across the 2014 surface rupture along the Kamishiro fault in Oide of Hakuba village, Nagano prefecture.

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Keywords: very shallow S-wave seismic reflection survey, 2014 Nagano-ken-hokubu earthquake, Kamishiro fault, Itoigawa-Shizuoka tectonic line active fault zone