

Deep seismic reflection survey in the north of the source region of the 2003 Miyagiken-Hokubu Earthquake

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In cases of seismic reflection survey, faults are generally recognized by gaps of layers. On the other hand, it is not easy to identify the phase originated by faults because velocity contrast between hanging and foot walls are too small, and faults are too thin. However, Yokokura et al. (2004) executed a reflection survey at the source region of the 2003 Miyagiken-Hokubu Earthquake, and identified the phase originated by the fault. It means that the velocity contrast may be large and the fault may be thick enough to be identified.

In September 2005, we executed a seismic reflection survey at Nango (currently Misato) in the north of the source region of the 2003 Miyagiken-Hokubu Earthquake, in order to identify heterogeneity of phases originated by the fault. Receivers were installed along NS-Line and EW-Line (2 km, 192 points). We used two vibrators (IVI Y-2400) of JGI, Inc. We hit the ground surface 8 times every 10 meters along the NS-Line, and did 80 to 120 times at around the ends and the cross point of both lines. Sweep lengths, record lengths, and sweep frequencies are 25 s, 15 s, and 8 to 50 Hz, respectively.

Several strong phases are seen from 2 to 6 s in two-way travel time after ordinary 2-D reflection analysis for the NS-Line. It is difficult to deduce the origin of these phases because they are flat along the line. We also tried to process the 2-D reflection analysis along the EW-Line even there are only three shot points along the line, and we found a west dipping phase at 3.5 to 4 s. The phase can be seen clearly also in the NS-Line. Considering the results of Yokokura et al. (2004), the phase is originated by the fault.

In future, we are going to investigate the detailed spatial distribution of the phase, and compare it with the distributions of slip and aftershocks of the 2003 Miyagiken-Hokubu Earthquake.