

## Shallow seismic reflection profiling across the western marginal faults of Shizukuishi basin, northeast Japan

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The western marginal faults of Shizukuishi basin, northeast Japan, run along the topographic boundary between the Ou Backbone Range and Shizukuishi basin. The Iwate-ken Nairiku-Hokubu earthquake of September 3, 1998, caused surface rupture on the northern part of the faults (named the Shinozaki Fault). The faults are mainly composed of low angle reverse faults dipping to west. This study is aimed at revealing the geometrical relationship between these faults and estimating total displacement on the faults, by shallow seismic reflection profiling and geological survey.

The seismic exploration experiment was carried out across the faults. The specifications for the experiment are as follows: experimental line, 4.8km in length; vibrator, T-15000 (IVI Inc.); sweep length, 15sec.; sweep frequency, 10 to 100Hz; the number of stack, 5 stacks at each shot point; interval between shot points, 10m; total number of shots, 480 shots; recording system, GDAPS-4 ( JGI Inc.); recording length, 4sec.; sampling rate, 2msec.; the number of channels, 180 channels. The data processing is standard one, including automatic gain control, band-pass filtering, deconvolution, refraction analysis, static correction, velocity analysis, CMP stack, and migration. From the result of the refraction analysis, the velocity of the basement is ranging from 2000m/sec in the mountain side to 2300m/sec in the basin. The slower velocity of 2000m/sec corresponds to Pleistocene dacitic tuff (the Hashiba formation, 1.1 to 1.2Ma), which is unconsolidated or weakly consolidated.

The geological structure around the experimental line is characterized by three faults (called F4, F3 and F1 faults from west to east) and fault-associated folds. F4 and F1 faults are thrusts dipping to west, and F3 is a thrust dipping to east. The formations are strongly folded as anticline at western part of F4 fault, while small syncline and small anticline develop between F4 and F3 faults, and between F3 and F1 faults, respectively. The seismic reflection profiling suggests that F4 fault is major and dips 30 degree to west, and that F1 fault is a branch of F4 fault. It is also presumed that F3 fault is a back thrust associated with F1 fault. Total displacement on these faults is estimated to be about 1800m from west to east. The faults have been active at least since before the deposition of the Hashiba formation, because it unconformably overlies the folded formations.

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