

# Seismic Reflection Survey at West Aizu Basin Fault Zone, Northeast Japan

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Aizu Basin in northeast Japan is an inner structural basin with 30 km length and 13 km width that is surrounded by two reverse faults: West Aizu Basin Fault zone and East Aizu Basin Fault zone. West Aizu Basin Fault zone that extends about 35 km with a strike of north-south direction is divided into Toudera, Niitsuru, and Sensakibara segment according to the geometry of the surface structure. The alluvium, Holocene fan deposits and terrace are distributed in the Aizu basin, whereas Late Miocene to Early Pleistocene fluvial strata deposited to the west of the basin (Fukushima Pref, 2000; Yamamoto et al, 2005). Historical records suggest that the earthquake with magnitude of 6.9 that hit Aizu Basin in 1611 occurred along West Aizu Basin Fault zone (Sangawa, 1987). There are several complicated small sub-segments of fault in the gap area between Toudera and Niitsuru segments with a length of about 2 km in east-west direction, where Sagase River that flows from a southwest direction forms fan delta. A seismic reflection image across the northern edge of Niitsuru segment identified flexure zones at 300 m to the east of the western boundary of the basin, suggesting the idea that the fault lines predicted by surface topography represents denudation (Fukushima Pref, 2000). The purpose of this study is to gain more insight into the spatial distribution of West Aizu Basin fault zone at a gap region between Toudera and Niitsuru segments by a shallow reflection imaging. We conducted S-wave reflection survey along three lines (Line 1, 2, and 3) that cross the fault zone. Sweep signals were produced by portable vibrator EIViS III (GEOSYM) with a sweep length of 7 seconds and frequencies between 20 and 160 Hz, and received signals were recorded on 10 Hz GS-32CT horizontal geophones (Geospace). The repeat counts of sweeps at each shot point are from 3 to 10 and both shot and receiver intervals are set to be 2 m. Geophones with 96-channels spread moved laterally along each survey line in step of 48-channels and a total number of shot and receiver points at Line 1, 2, and 3 is 219, 260 and 96, respectively. Correlated shot gathers with sweep signals show high signal-to-noise ratio at all survey lines. CMP stacking with NMO corrections using 0.4 km/s for S-wave velocity reveals the reflections at about 0.3 second in a time profile. These phases are consistent with the seismic reflector found at a depth of about 100 m below the northern end of Niitsuru segment (Fukushima Pref, 2000). Reflections at 0.3 second have different slopes between the western and eastern part, suggesting a deformation structure related to fault activities. To clarify this denudation, further analyses need to be executed and the comparison with the drill core data near Line 1 must have key information.

Keywords: seismic reflection survey, West Aizu Basin Fault Zone