

High-resolution seismic profiles in the Shonai plain and Yamagata basin, northern Honshu, Japan

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Understanding the relationship between active fault and seismic source fault with more detailed structural data on source faults is crucial to estimate seismic hazards. For this purpose, we carried out seismic reflection profiling to illuminate geometry of blind thrusts in the Shonai plain and Yamagata basin, Northeast Japan. Three seismic lines (Yuza, Nakanomata and Amarume) are located across the central to eastern margin of the Shonai plain to image underlying blind thrust structures, and Sagae line crosscuts the western margin of Yamagata plain to image fault-related folds above a west-dipping thrust. The length of seismic line is 6-12 km. In seismic data collection, we used vibrator trucks as a seismic source and deployed 10 Hz geophones at 10 m interval covering whole seismic line. Seismic shots with sweep frequencies of 5-100Hz were provided at all midpoints of receivers and corresponding seismic signals were recorded by fixed 600-1000 channels of seismic recorders. The obtained seismic data were processed using conventional common midpoint (CMP) reflection methods. All of seismic sections successfully illuminate subsurface images down to 2 seconds in two-way travel time, and depth converted seismic sections show detailed structures of fault-related folds above blind thrust faults and east-dipping reflectors in 1.5km depth in the Amarume and Nakanomata seismic line.