

Seismic reflection profiling across the Ichinoseki-Ishikoshi Flexure in Iwate Prefecture, Northeast Japan

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4 earthquakes occurred in northern Miyagi Prefecture in last 150 years. However, surface deformations caused by each of these earthquakes have not been revealed in this area. Meanwhile, NNE-SSW striking fold structures are developed there, and Ichinoseki-Ishikoshi Flexure is developed between folds and Kitakami Mountains in its east. The relation between these structures and past earthquakes is unclear. The purpose of this study is to reveal the activity of the Ichinoseki-Ishikoshi Flexure, and to discuss the relationship between the flexure and the seismicity of Northern Miyagi Prefecture.

Geomorphic surfaces in this area are classified into 9 groups, and there is a difference in the distribution of these surfaces between the hanging wall and the foot wall of the flexure. The research of the stratigraphy and the geological structure of the area, based on field work and previous studies, indicates steeply-inclined structure near the flexure, while the dips around the flexure are almost flat, which is less than 10 degrees.

The seismic reflection survey was conducted across the flexure in order to reveal the subsurface structure of the flexure, which provides comprehensive understanding of the relationship between the geomorphology and geology along the flexure. Geologic interpretation on the section is that the flexure is the structure related to inversion tectonics, Miocene normal fault reactivated as a reverse fault due to shortening deformation since the Pliocene.

There seems to be little association between the fault beneath the flexure found in this study and the earthquake source faults which caused Northern Miyagi earthquakes in 1900, 1962 and 2003, by considering relationship of their localities and geometries. It is supposed that frequently occurring fault earthquakes are resolving E-W striking strain distributed in this area.