Active fault survey in the fold-thrust belt --example in the Kuromatsunai-teichi fault zone in southwestern Hokkaido, Japan--

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In the backarc zone of the northern part of Japanese islands, Tertiary-Quaternary sedimentary rocks are thickly distributed and they have been deformed by folds and thrusts related to a compressional stress with E-W direction. Tectonic landforms generally represent those structures, but they are not consistent completely. For example, some active faults near ground surface, such as fold-related faults or bending-moment faults, have been newly generated related to the growth of the fold and others have sifted into the sedimentary basins as front migration of reverse faults. Furthermore there are many faults that couldn't reach to the ground surface and produce flexural scarps or anticlines with short wavelength. Because of the variety of deformed structures, we should carefully choose the most suitable methods for the survey of the active faults in the fold and thrust zone. In this presentation, we plans to report the example of the examinations in 2002 in the Kuromatsunai-teichi fault zone, southwestern Hokkaido, north Japan, as well as to discuss the methods of active faults in such areas.

The Kuromatsunai lowland zone is a narrow basin with N-S direction and it is filled with Plio-Pleistocene sedimentary rocks deformed by N-S trending folds and reverse faults. Tectonic landforms in the Kuromatsunai-teichi fault zone are represented as the fault scarps facing mountain-side, the anticlinal deformations, or the back tiltings on the Middle to Late Pleistocene terraces, and those distributions are consist with structure of sedimentary rocks. We surveyed the activities of the fault zone at two site (Shirozumi and Oshamanbe), where the fault scarps were clearly identified), in 2002.

Trench excavation and S-wave seismic reflection were chosen for the survey methods on the mountain-facing fault scarp with anticlinal deformation at the Shirozumi site. In that trench, the peat-silt layer in ca.40-50ka is tilted with 20 degrees to the east with consistence with topography and thin sediments in ca.150 yrs ago are overlain by Late-Pleistocene aeolian loams. Fault itself could be seen in that trench so that it is unclear if that tilting and the overlain-structure represents a deformation associated with faulting or not. S-wave seismic reflection shows that the structure in the shallow is deformed as parallel to the ground surface.

A trench was excavated on the foot of the flexural scarp on Late Pleistocene fluvial terrace at the Oshamanbe site. Peat-silt layers in ca.40-50 ka are tilting dipping with 20 degrees to the east and faulted by a small reverse fault. We also see the remnants of the liquefaction in the gravel layers deposited in ca.5 ka.

We didn't find the absolute facts of the previous faulting in the survey in 2002. But tilted layers and other structures suggest the possibilities of the previous activities of that fault zone. We will discuss on these result with additional data and the plans of survey in 2003 and 2004.