

Shallow Subsurface Structure in the Ishikari Lowland, Hokkaido, northern Japan

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Late Pleistocene - Holocene deposits (Chuseki-so) constitute a shallow part of the northern Ishikari Lowland where is heart-land of Hokkaido, northern Japan. The deposits mainly consist of unconsolidated fine-grained sediments of fluvial, estuary to shallow marine environments. An existence of active blind folds is inferred beneath the lowland, and the region will have high seismic risk potential.

We have started researches of 1) high resolution core analyzing (Kawakami, 2009, this session), 2) construction of subsurface geological database, and 3) 3-D geological modeling based on an integration of the results of core analyzing and the database. We have already collected 12,000 geologic columns of public boring cores drilled at and around Sapporo-city.

A distribution of basal gravel of Chuseki-so generally shows incised-valley geometry during the last glacial maximum. Preliminary reconstructed surface model of basal gravel in the Ishikari Lowland, however, shows dome- and basin-like topographic relief crossing a trend of inferred incised valley-axis. The depth of the basal gravel, in part, shows east-dipping valley slope opposite to the channel gradient of the modern Ishikari River, which suggests a later tectonic movement. Tertiary to Quaternary strata underlying the Ishikari Chuseki-so formed north-south trending fold-system of 6-10 km wavelength. The relief shown by the basal gravel corresponds with such fold-system, namely the shallower area on a depth of the basal gravel is situated above an anticlinal fold axis. The Ishikari River also shows increasing sinuosity at around the Barato anticline suggesting a tectonic control to the spatiotemporal distribution of the Ishikari Chuseki-so.

The blind fold-system in the Ishikari Lowland is thought to be formed as fault-related folds corresponding with an active blind thrust (Ohtsu and Tajika, 2003), which is notable for seismic risk assessment. There are at least time of paleoliquefaction features (including the 1834 Ishikari Earthquake) at many archeological sites in Sapporo. The causal relationship between the earthquake and the thrust activity is unclear. This study will contribute to elucidate an activity of blind thrust under the Ishikari Lowland.