Shallow structures and tectonic geomorphology of active blind thrusts imaged by new hi-resolution seismic reflection profiling, Hokkaido, Northern Japan

*Tatsuya Ishiyama[1], Naoko Kato[1], Hiroshi Sato[1], Taro Koike[2], Katsuya Noda[2]

1. Earthquake Research Institute, University of Tokyo, 2. Geosys, Inc.

Active structures of central Hokkaido are characterized by north-striking active thrusts along the western flanks of the Hidaka Mountains and eastern flanks of the Kabato Mountains. Whereas structural styles and positions of active thrusts along the Umaoi and Kurisawa Hills are clearly related to frontal Hidaka fold-and-thrust belt, structural relations between east-facing folded fluvial terraces along the eastern flanks of the Kabato Mountains and pre-Neogene basement-cored folds remain poorly understood. In addition, geomorphic expression of active faults/folds along the northern Yubari Mountains is quite insufficiently recognized in contrast to both their northern southern extension. To define these unsolved questions, we collected new seismic reflection data from the eastern flank of the Kabato Mountains, through alluvial plain of the Ishikari River to the western flank of the northern Yubari Mountains, by use of both ca. 14.5 km long array of seismic recorders at 20 m intervals and a vibroseis truck as seismic sources at 10 m intervals. Our processed seismic profile based on standard CMP stacking and its preliminary interpretation suggest the eastern flank of the Kabato Mountains is underlain by a tight, east-vergent, asymmetric anticline that deforms Paleogene to Pliocene sediments. Synclinal and anticlinal axial surfaces newly identified on folded, middle to late Pleistocene fluvial terraces on the eastern flank of the Kabato Mountains are apparently consistent with those recognized in the seismic section. This may suggest recent growth of the fault-related anticline and activities of underling west-dipping blind thrusts imaged in this experiment. In contrast to the east-vergent asymmetric anticline beneath the eastern flank of the Kabato Mountains, structural styles beneath the western flank of the northern Yubari Mountains in the eastern half of the section include more gentle westerly dipping Pliocene-Pleistocene (?) sedimentary units with steeper dip panels, possibly suggesting an east-dipping blind thrust fault. Previously unrecognized, very subtle, west facing scarps on alluvial plain and late Pleistocene fluvial terraces are consistent with these underlying thrusts and may indicate their recent fault activities.

Keywords: Active fault, Ishikari Lowland, Seismic reflection profile, Blind thrust, Hokkaido

