CRUSTAL SECTION ACROSS THE HIDAKA COLLISION ZONE, HOKKAIDO, AS INFERRED FROM 1999-2000 SEISMIC REFRACTION/REFLECTION PROFILING

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The Hidaka collision zone, central part of the Hokkaido Island, Japan, is known as an ongoing collision zone between Kuril Forearc(KA) and the Northeast Japan Arc (NJA) since middle Miocene. A multidisciplinary project of Hokkaido Transect in 1998-2000 revealed various scale structural heterogeneity across this collision zone by seismic refraction/reflection profiling and very dense earthquake observation. A 227-km long refraction profile was undertaken to determine the whole crustal structure from NJA to KA. A series of seismic reflection lines, whose total length is 138 km, were concentrated in the central part of the refraction line to get a clear image of crustal deformation associated with the collision.

The data obtained elucidated a complicated collision structure. In the eastern part of the profile, KA is covered with 0.3-4km thick highly deformed sedimentary layer, beneath which two eastward dipping reflectors are imaged in a depth range of 10-20 km, probably representing obducting middle of lower curst of KA. Actually its outcropped part has a relatively higher velocity and Vp/Vs than those of the surrounding part. Beneath these reflectors, another flat and westward dipping reflectors are situated at 25 and 25-27 km depths respectively. The obtained layer geometry forms wedge-like (crocodile) patterns, probably expressing that the crust of KA is delaminated into two or three segments beneath the Hidaka Mountains. The western part of the profile (NJA), which belongs to the fold-and-thrust belt of the collision zone, is characterized by a very thick (more than 5-10 km) sedimentary package including two or more velocity reversals. Beneath this package, the crystalline crust of NJA is traced with a slight eastward dip down to 20-25 km.