

# Structural geology of Hidaka metamorphic belt in the Mt.Nozuka area, Hokkaido, Japan -Growth and formation process of the Cenozoic continental crust by island arc/arc join and its mechanism-

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The Hidaka Metamorphic Belt (HMB) in Hokkaido, northern Japan, consists of metamorphic and plutonic rocks, and is regarded as a crustal section of Tertiary immature parts of the Kurile island arc exposed along with collision to the NE Japan arc in the Miocene (Komatsu et al., 1982 etc.) . Metamorphic grade increases from very low-grade sediments in the east to granulite facies in the west. It was considered to be a single and coherent crustal section, however, Shimura et al. (2015) proposed that HMB is a composite of two crusts of 19 Ma and 37 Ma. This hypothesis should be tested by detailed field relationships of rocks of different ages. This paper presents deformation phase of metamorphic rock and plutonic rock and zircon U-Pb ages along the Niobetsu River route of the Nozuka dake area, southern HMB, and discusses on the mode of crustal evolution there.

In the study area, HMB consists mainly of S-Type tonalite (Grt Tonalite, Grt-Bt Tonalite), I-Type tonalite (Hbl-Bt tonalite), Diorite, Amphibolite, Gneiss.

Most of the rocks aligned with NW—SE trends except for a diorite intrusion with N—S margins. The diorite is accompanied with migmatite along its margins. Blocks of metamorphic rocks are included in I-Type tonalite and Diorite. Imbricated hornblende crystals in marginal parts of the diorite imply a normal fault-sense magmatic flow. Heterogeneous amphibolite on the southern margin of the diorite are severely folded and deformed with S-C fabric suggesting partial melting.

Mylonitization is observed in S-type tonalite near the Hidaka Main Thrust (HMT), the western margin of HMB. The mylonites show right lateral shear structures with or without normal-slip component. The mylonitization can be classified into 3 stages: 1<sup>st</sup> Mylonitization by shear deformation of normal dip-slip, 2<sup>nd</sup> Mylonitization by shear deformation of normal dip-slip ~ dextral shear, 3<sup>rd</sup> Mylonitization by shear deformation of dextral shear ~ reverse dip-slip.

We obtained zircon U-Pb ages from S-type tonalites, I-type tonalite, and Diorite.

S-type: about 45Ma, I-type: About 33Ma, Diorite: about 19Ma.

Heterogeneous amphibolite is considered as the boundary deformation zone between 19 Ma plutonic and metamorphic rocks and the older plutonic and metamorphic rocks, because Heterogeneous amphibolite is severely folded and deformed with partial melting. Diorite is penetration in a tensile field is expected. Because the asymmetric flow structure inside the diorite shows normal fault sense.

Zircon U - Pb ages suggest three magmatic stages (about 33 Ma, about 19 Ma and older than 33Ma ) in HMB of this area. Igneous rocks include migmatite and metamorphic rocks . So, it is suggested that the magmatism activities of 3 stages are accompanied by metamorphism. Therefore, it is considered that the Hidaka metamorphic belt was formed by three stage metamorphisms.

Keywords: Structural geology, Hidaka Metamorphic belt, Tectonics