

## Deformation history and tectonic movement of upper sequence of Hidaka metamorphic belt in the Satsunai-gawa river region

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Various kinds of rock-structures and mineral textures are found in the upper sequence of the Hidaka metamorphic belt in the upper reaches of Satsunai-gawa river, Hokkaido, Japan. The deformation history of metamorphic rocks from this area is divided into ten stages(D0-D9) based on the nature and sequence of deformation.

D0 involved sedimentation of the original rocks of the upper sequence. The metamorphism of the upper sequence has started from D1 stage. During D2 stage, top-to-the north displacement and sinistral shearing caused map-scale en-echelon folding. Deformation of D4 stage was layer-normal shortening. D3 veins parallel to S4 were boudinaged, and those highly-oblique to S4 were folding. As metamorphic grade increases, degree of the D4-layer-normal shortening is higher. Subsequently, top-to-the south displacement and dextral shearing took place during D5 stage. During D6 stage, tonalite magma was intruded and many sheet-like bodies were formed with N-S to NNW-SSE trend. Many asymmetric magmatic-flow structures and shear zones filled by tonalite veins occur in and along the D6 tonalite intrusions. The asymmetry and spatial distribution of magmatic-flow structures show that the intrusion probably took place by laminar flow and not by tectonic shearing. Asymmetry and geometry of the shear zones filled by tonalite veins resulted from N-S trending extensional and E-W trending compressional conditions during the D6 stage. This deformation conditions have not been attributed to the N-S trending compressional tectonics operating during the intrusion of basal to lower tonalities. After the D6 stage, N-S-NW-SE trending dextral mylonite zones and NE-SW trending sinistral mylonite zones resulted from D7 dextral shear deformation under retrograde metamorphic conditions. During D8 stage, NW-SE trending sinistral shear deformation took place. Transverse faults with pseudotachylyte are the product of the last stage(D9) of the deformation history in the study area. The lower sequence of the Hidaka metamorphic belt has locally deformed together with the upper sequence during the D8 to D9 stages.