

The behavior of magma recorded in the "layering" of the mafic intrusion; in the Pankenushi Complex.

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The Pankenushi Gabbroic Complex is located in the part contrasted with the Lower Crust in the Hidaka Metamorphic Belt. This complex has well-developed "igneous layerings". A) "Bimodal type" consists of coarse-grain, more differentiated gabbro (CGM) and fine-grain, more primitive gabbro (FGM). Investigating the occurrence of blanched layers, CGMs are the sill. B) "CGM concentrating zone", which have relatively differentiated composition, show that the differentiated magma (CGM) injected into relatively primitive magma (FGM) originated from the same source. C) "Wide Range Cryptic Layering" has gentler slope of chemical composition. The width is more than 80m. The chemical compositions along the vertical direction in whole complex show saw-like pattern.

In the field where magma concentrates and solidifies, separations of crystals and melt, accompanied with crystallization, happen and the magma differentiates. Studying the ejecta at volcano, the total result of the differentiation can be understood well. On the other hand, observation of exposed volcanic intrusions can investigate the each process of magma activities such as dike intrusion or mixing.

The Pankenushi Gabbroic Complex is located in the level contrasted with the Lower Crust in the Hidaka Metamorphic Belt. This is valuable sample, which records the magma activities in the lower crust.

The greater part of this complex is composed of gabbroic rocks. The constituent crystals are plagioclase, olivine, clinopyroxene and orthopyroxene. The difference in mode and size of crystals form "layerings" which are parallel to the Metamorphic Belt. Generally, the strike and dip is NNW70W. Though most of the gabbroic rocks experienced some metamorphic stages and the crystal got equigranular shape, some igneous texture is remained in each crystal. So these "layerings" originated in some igneous activities.

There are some types of the layerings, which appear to be formed by the injections of magma. "Bimodal type layering": this type of layering consists of coarse-grain, more differentiated gabbro (CGM) and fine-grain, more primitive gabbro (FGM). The boundary between CGM and FGM is sharp. Though, generally, each layer of this type is uniform and the continuity is good, some CGM layers have blanch-texture in some places. These observations support CGM layers are sill intruded into FGM (Nishida, JEPSJM1999).

Although the chemical composition of crystals in CGM and FGM changed by re-equilibrium in subsolidus, some differentiated chemical compositions are observed around CGM concentrating zone. The width of these differentiated zones is several meter. Basing of the hypothesis that CGM is sill, these chemical composition reflect original composition of magma injected into FGM. The trend of chemical composition in CGM concentrating zone accord with the trend of whole area of the complex. Therefore, CGM magma didn't have different origin from FGM magma, but differentiated magma (CGM) injected into relatively primitive magma originated from the same source.

There are gentler chemical composition's slopes as background of CGM concentrating zone, named "Wide range cryptic layering". The width of these layers is 80-100m, estimated from the gradient and variation of chemical composition. Generally, the composition is differentiating upward.

The other type of layering is "gradual type", the mode and size of constituent crystal change gradually. The width of one layer is several meters. There is weak correlation between rock phase and chemical composition. In area developed these gradual layerings, the pattern of change in chemical composition is similar to WRCL. Particularly, the composition is mainly differentiating upward just like WRCL, and there are a few case that the composition differentiating downward. Considering WRCL and "gradual type layering" together, the chemical compositions along the vertical direction in whole complex show saw-like pattern.