

The main features of the interaction of mantle magmas with granulite complexes of the lower crust and their relationship with granitic melts (exemplified by the Early Caledonides of the West Baikal Region, Russia)

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Granulite complexes occurring in the Early Caledonian southern folded framing of the Siberian Craton are deeply eroded fragments of the Vendian-Early Paleozoic accretionary prism, which is an indicator of the early stages of the Paleo-Asian Ocean (Gladkochub et al., 2010). The main feature of the granulite complexes is a wide development of gabbro-pyroxenites composing tectonic plates, synmetamorphic intrusive bodies, and numerous disintegrated fragments (boudins and enclaves), immersed in a metamorphic matrix. The volume of basites reaches 5-10 %, which allows us to consider mantle magmatism as a heat source for the granulite metamorphism. The most studied polygon is Chernorud granulite zone, which is a part of the Olkhon metamorphic terrane, West Baikal Region. Just this polygon was used for considering the problems of interaction of mantle magmas with lower crust granulite complexes and their relationship with granitic melts.

The Chernorud Zone is a typical example of the accretionary prism with a predominance of metabasalts (70-80 %), subordinate amounts of marbles, quartzites and metapelites that have been subjected to granulite facies metamorphism and viscoelastic flow of rock masses. Study of two-pyroxene granulites (metabasalts) and garnet-sillimanite gneisses (metapelites) allows us to estimate P-T metamorphic conditions ($P = 7.7-8.6$ kbar, $T = 770-820^{\circ}\text{C}$) and their U-Pb metamorphic age (530-500 Ma). Metabasalts correspond in their geochemistry to the island-arc tholeiitic series (Volkova et al., 2010; Gladkochub et al., 2010).

Sin-metamorphic gabbro-pyroxenites formed in two stages: 1) Chernorud complex – tectonic slices and body's exhumed from deep earth crust levels (10-12 kb) and composed of arc tholeiitic series rocks (age $T \geq 500$ Ma); 2) Ulan-Khargana complex – supply magmatic canals and fragmented tabular intrusions. This rocks composition corresponds to subalkaline petrochemical series (OIB) and U/Pb age is equal to 485 ± 10 Ma (Travin et al., 2009). Intrusion of basic magma at granulitic facies level promote to deep anatexis and formation of sin-metamorphic hypersthene plagiogranite (age 500-490 Ma, U/Pb data).

Chernorud granulitic zone is characterized by intense shear viscoplastic and brittle-ductile deformations accompanying metamorphic processes and processes of intrusion and formation of gabbro. It leads to fragmentation of basic chambers and formation of special class of tectonic structures – metamorphic magma-mingling. All tectonic and magmatic structures have been “sealed” by K-Na granites at regressive stage at amphibolites facies conditions at 470-460 Ma (U/Pb, $40\text{Ar}/39\text{Ar}$ data).

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