



Genetic interpretation of CSD for olivine through the dunite section of the Dovyren layered intrusion: linking with geochemistry and probable dynamics of the cumulate mush.

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The Yoko-Dovyren ultramafic-mafic intrusion (the northern Baikal region, Russia) has excellent outcropping as well as layering falls vertically. It's age is 728 Ma. Length of the main body is 26 km. The modal layering of its central part (~3 km thick) includes a basal reversal (from chilled rocks to plagiolherzolites) followed with Pl-bearing to adcumulate dunite, troctolite and gabbroic sequence.

Over the past 20 years, several sections of the massif have been studied in detail. (Ariskin et al 2018) have determined two major types of parental magmas recorded in the FeO vs MgO trends for the Ol cumulates through the first 500 m of the cross-section. These two geochemically similar magmas are consistent with equilibrium olivine Fo88 and Fo86 in the range of temperatures from 1290°C to ~1200°C.

We present the results of quantification of CSD of olivine from the dunite succession, which argue for two types of olivine grain populations differing for the more primitive and relatively evolved magma.

The slope of the log-linear CSD function in the lower-temperature magmas has a less steep as compared to the higher temperature ones. Both populations can be considered to represent intratelluric olivine crystallized at a pre-emplacment stage. At a stratigraphic level of 200 m from the lower contact, in some of the samples we observed changes in the CSD patterns, which evidence a coarsening of the populations within the Dovyren chamber. Starting from 350-400 m coarsening is noticeable everywhere, so that the CSD cease to be log-linear. In addition, in a narrow zone of 500-550 m dunite are found to display a pronounced bimodal (kinked) distribution of olivine. In a larger population, olivine has highest aspect ratio (up to 3-3.5) compared to other dunite samples. The origin of such dunite can be explained by the intrusion of hot portions of magma into the colder cumulus. In this case such elongated crystals may be due to the increased growth rate of the original olivine grains. The smaller population may be due to a new nucleation event after emplacements. CSD in cumulates above the «kinked dunites» demonstrate coarsening

of olivine, with the most coarse-grained populations typical of highly contaminated dunite.

Thus, a rather narrow zone is distinguished in dunite, where we can observe primary intratelluric CSD, which is not substantially altered neither by peritectic reactions in the loose cumulus of the reversal sequence, where the temperature drops rapidly, nor by coarsening during long history of temperature oscillations close to the primary magmas condition above this zone.

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