

Petrogenesis of the Hercynian Rkvia-Beretisa intrusion, Dzirula Massif, Georgia

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The geology of Georgia consists of two major thrust belts: the Great Caucasus and the Achara-Trialeti belt, separated by two foreland basins named Rioni and Kartli, with one intervening basement culmination, the Dziruli Massif. The Rkvia intrusion is located to the west of the Dziruli Massif. This intrusion was never studied before by modern analytical methods.

Based on field investigations, petrographic and petrochemical investigations, it was concluded that the Rkvia intrusion and outcrops of porphyry granites and pegmatites on the eastern edge of the intrusion (V.Beretisa) represent one genetic type. According to the petrographic characteristics of the rocks, their spatial distribution, petrochemical and geochemical features and their geodynamic position, these two bodies are considered as one intrusive complex called Rkvia-Beretisa.

Based on modern petrochemical, geochemical and isotope data, the magmatic source of the complex is interpreted as being generated within an island arc geodynamic regime and that it is of a collisional nature. Rocks of the main phase of the complex are normal granites. Their magmatic melt belongs to calc-alkaline series. The intrusive complex is an upper crustal anatectic S type (Initial $87\text{Sr}/86\text{Sr}=0.7083$; Epsilon Nd=-5.9517) with 5-25% of mantle material in the initial melt.

Based on microprobe analyzes of plagioclases, K-feldspars, biotites and muscovites and using different geothermobarometers, it is concluded that crystallization of the Rkvia-Beretisa magmatic system started under temperatures of 670-690⁰C and pressures of 7.5-8.5 kbars. The final crystallization stages took place at 400-450⁰C and 3.5-4.5 kbars.

$^{40}\text{Ar} / ^{39}\text{Ar}$ ages of the complex are 302±2 Ma.

The Rkvia – Beretisa intrusion is one of the largest granitic complexes in Georgia. It is valuable for Georgian industry as a building and facing materials. On the edge of the central part of the intrusion, silicified rocks of the main intrusive phase were recognized. In the canyon of the river Budja, a basic and ultrabasic young intrusive body (Buja intrusive) was discovered, which according to its decorative nature can replace gabbros imported to Georgia from Ukraine.