

## **Biotite from Contact-Metamorphosed Rocks of the Dizi Series of the Greater Caucasus**

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**Abstract :** The Caucasus is a component of the Mediterranean collision belt. The Dizi series is situated within the Greater Caucasian region of the Caucasus and crops out in the core of the Svaneti anticlinorium. The series was formed in the continental slope conditions on the southern passive margin of the small ocean basin. The Dizi series crops out on about 560 square km with the thickness 2000-2200 m. The rocks are faunally dated from the Devonian to the Triassic inclusive. The series is composed of terrigenous phyllitic schists, sandstones, quartzite aleurolites and lenses and interlayers of marbleized limestones. During the early Cimmerian orogeny, they underwent regional metamorphism of chlorite-sericite subfacies of greenschist facies. Typical minerals of metapelites are chlorite, sericite, augite, quartz, and tourmaline, but of basic rocks - actinolite, fibrolite, prehnite, calcite, and chlorite are developed. Into the Dizi series, polyphase intrusions of gabbros, diorites, quartz-diorites, syenite-diorites, syenites, and granitoids are intruded. Their K-Ar age dating (176-165Ma) points out that their formation corresponds to the Bathonian orogeny. The Dizi series is well-studied geologically, but very complicated processes of its regional and contact metamorphisms are insufficiently investigated. The aim of the authors was a detailed study of contact metamorphism processes of the series rocks. Investigations were accomplished applying the following methodologies: finding of key sections, a collection of material, microscopic study of samples, microprobe and structural analysis of minerals and X-ray determination of elements. The Dizi series rocks formed under the influence of the Bathonian magmatites on metapelites and carbonate-enriched rocks. They are represented by quartz, biotite, sericite, graphite, andalusite, muscovite, plagioclase, corundum, cordierite, clinopyroxene, hornblende, cummingtonite, actinolite, and tremolite bearing hornfels, marbles, and skarns. The contact metamorphism aureole reaches 350 meters. Biotite is developed only in contact-metamorphosed rocks and is a rather informative index mineral. In metapelites, biotite is formed as a result of the reaction between phengite, chlorite, and leucoxene, but in basites, it replaces actinolite or actinolite-hornblende. To study the compositional regularities of biotites, they were investigated from both - metapelites and metabasites. In total, biotite from the basites is characterized by an increased of titanium in contrast to biotite from metapelites. Biotites from metapelites are distinguished by an increased amount of aluminum. In biotites an increased amount of titanium and aluminum is observed as they approximate the contact, while their magnesia content decreases. Metapelite biotites are characterized by an increased amount of alumina in aluminum octahedrals, in contrast to biotite of the basites. In biotites of metapelites, the amount of tetrahedral aluminum is 28-34%, octahedral - 15-26%, and in basites tetrahedral aluminum is 28-33%, and octahedral 7-21%. As a result of the study of minerals, including biotite, from the contact-metamorphosed rocks of the Dizi series three exocontact zones with corresponding mineral assemblages were identified. It was established that contact metamorphism in the aureole of the Dizi series intrusions is going on at a significantly higher temperature and lower pressure than the regional metamorphism preceding the contact metamorphism.

**Keywords :** biotite, contact metamorphism, Dizi series, the Greater Caucasus

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