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Petrography, geochemistry, and radiometric dating U-Pb SHRIMP II of the tonalite complexes of the Lok-Karabakh, Lesser Caucasus (Azerbaijan)

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Lok-Karabakh tectonomagmatic zone is one of major structures in the Lesser Caucasus. It represents a complex fold-block structure composed of an echelon anticlinal and synclinal structures. In plan view, the system forms a northward convex arc 350-400 km long and 30-40 km wide. In the northwest, among the Mesozoic volcanic rocks, pre-Alpine basement rocks are outcropping. The zone is mainly composed of polychronous volcanic and plutonic formations combined in a series of comagmatic volcanic and plutonic complexes [1].

The most ancient Mesozoic intrusions in the Lok-Karabakh tectonomagmatic zone are Middle Jurassic plagiogranites (Atabek - 80 km², Gilanbir - 16 km²) and other minor intrusions assembled in the Bajocian plagiogranite formation accomplishing the Upper Bajocian magmatism; it is associated with numerous copper, iron, nickel, and gold occurrences [2].

The authors have studied mineral, petrochemical, geological, and isotopic composition of rocks in the tonalite complexes of the Lok-Karabakh, which as a result makes it possible to refer its rocks to low alkaline sodium series of plagiogranite and leucoplagiogranite composition. Rock crystallization occurred in hypabyssal conditions of island arc environments during the Middle Jurassic [3].

The set of data including zircon U-Pb (SHRIMP II) isotope dating is indicating that rocks were formed in two stages. The first or early injection phase is presented by medium-coarse-grained biotite porphyritic plagiogranite, characterized by crystallization age of 180 Ma. The second or later injection phase is represented by leucocratic leucoplagiogranite crystallized at 170 Ma, which, in turn, does not disagree with the age determined by K-Ar method in the 1970-ies and with the stratigraphic presentation of the region based on the definitions of fauna from volcanic-sedimentary rocks.

References:

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