



Cenozoic fluid-magmatic centers, geodynamics and volcanism in Northern Caucasus

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The central segment of Alpine mobile folded system of the Greater Caucasus is characterized by complex crossing of the active faults of different structural directions. On the crossings of disjunctive knots of Caucasian WNW and Trans-Caucasian NS faults the two Cenozoic fluid-magmatic centers are located featuring dormant yet not extinct volcanoes of Elbrus and Kazbek. Mentioned centers are known as the Elbrus volcano-plutonic center, the Kazbek volcano-plutonic center, they are outlined according to the results of geological, geomorphological and geophysical studies.

Geodynamic position of the Elbrus volcano within the Transcaucasia uplift is considered with respect to evolution of volcanic processes and possible resumption of volcanic activity in this region. In order to carry out the multidisciplinary study of geological and geophysical processes in the vicinity of the volcanic dome it is essential to obtain reliable information about basic parameters of local magmatic structures.

The satellite imagery processing carried out according to original technology based on determination of surface lineaments and consequent transition to analysis of the field of tectonic disintegration of the lithosphere may allow one to obtain independent knowledge about deep subsurface structures for the given territory. As a result, the 3D model of tectonic disintegration field under the Elbrus volcano has been constructed. The two anomalous domains have been outlined and they were associated with local deep magmatic source and peripheral magmatic chamber of the Elbrus volcano. Comparative analysis of experimental geophysical data obtained by means of microgravity studies over the same territory, magneto-telluric profiling and search for thermal anomalies has shown appropriate correlation in terms of shape, size and position of magmatic structures in the vicinity of the Elbrus volcanic center. Thus, the position and size of the magmatic chamber and the deep magmatic source of the Elbrus volcano have been determined as well as possible pathways of migration of fluids of deep origin. The map of modern fluid permeability of the Earth's crust for the territory of Northern Caucasus has been produced.