

Impact of Magmatism on the Geodynamic Evolution of Southern Georgia on the Example of the Lesser Caucasus Artvin-Bolnisi Block.

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The Georgian region occupies the central part of the collisional zone between the Eurasian and Africa-Arabian continents and is actually a collage of lithospheric fragments of the Tethyan Ocean and its northern and southern continental margins.

Magmatic evolution is an important event in the formation and development of the geological structure of Southern Georgia, where several reliably dated volcanogenic and volcanogenic-sedimentary formations are established. The region represents a modern analogue of continental collision zone, where subduction-related volcanic activity lasted from Paleozoic to the end of Paleogene. After the period of dormancy in the Early-Middle Miocene starting from the Late Miocene and as far as the end of the Pleistocene, primarily subaerial volcanic eruptions followed by formation of volcanic highlands and plateaus occurred in the region. The Upper Miocene to Holocene volcanic rocks are related to the transverse Van–Transcaucasian uplift and belong to post-collisional calc-alkaline basalt–andesite–dacite–rhyolite series.

A system of island arc and intra-arc rift basins (Artvin-Bolnisi and Achara-Trialeti) have been interpreted as characteristic of the pre-collisional stage of the region development, while syn- post-collisional geodynamic events have been attributed to intracontinental stage. Outcrops of the postcollisional magmatic rocks are exposed along the boundaries of the major tectonic units of the region.

The Artvin-Bolnisi unit forms the northwestern part of the Lesser Caucasus and represents an island arc domain of so called the Somkheto-Karabakh Island Arc or Baiburt-Garabagh-Kapan belt. It was formed mainly during the Jurassic-Eocene time interval on the southern margin of the Eurasian plate by north-dipping subduction of the Neotethys Ocean and subsequent collision to the Anatolia-Iranian continental plate.

The Artvin-Bolnisi unit, including the Bolnisi district, was developing as a relatively uplifted island arc-type unit with suprasubduction extrusive and intrusive events. Volcanogenic complexes are characterized by variable lateral and vertical regional stratigraphic relationships and are subdivided into several formations, dominated by volcanic rocks: basalts, andesites, dacites, and rhyolites of calc-alkaline-subalkaline series. Volcanic rocks are of shallow-marine to subaerial type.

The peculiarities of magmatic activity and geodynamic development of the region stipulated synchronous formation of significant base and precious metals deposits of the Bolnisi ore district.