Plutonic Magmatism of of the Greater Caucasus Svaneti Segment: Zircon U-Pb Geochronology, Petrochemistry and Geodynamic setting of formation

Irakli Gamkrelidze[1], Avtandil Okrostsvaridze[2], Yuan-His Lee[3], Daniel Tormey[4], Giorgi Boichenko[2], Salome Gogoladze[2]

[1]*A. Janelidze Institute of Geology of I. Javakhishvili Tbilisi State University, Tbilisi, Georgia*
[2]*Institute of Earth Sciences, Ilia state University, Tbilisi, Georgia*
[3]*National Chung-Cheng University, Chiayi 2018, Taiwan*
[4]*Catalyst Environmental Solutions, Santa Monica, California, USA*

The Greater Caucasian fold-and-thrust belt is part of the Alpine-Himalayan collisional orogenic belt. It experienced complex polycyclic development during the Late Precambrian and throughout the Phanerozoic (Gamkrelidze, Shengelia, 2005; Okrostsvridze, Tormey, 2011). This abstract discusses new U-Pb LA-ICP-MS U-Pb geochronology and petrochemistry data on zircons from the plutons of the Svaneti segment (Georgia) of this orogen. U-Pb geochronological data indicate three main stages of deep magmatic activity: 1- Ordovician, 2- Upper Carboniferous, and 3- Middle Jurassic (Aalenian-Bajocian) At the first stage, Ordovician biotite orthogneisses (~488-475 Ma) was formed during the Caledonian orogeny in supra-subduction conditions. At the second stage, during the Late Variscan Orogeny the Upper Carboniferous granodiorite–granite massifs (~320–310 Ma) were formed during the Late Variscan Orogeny also in supra-subduction conditions while Middle Jurassic plutons were formed in post-accretional ones. At the end of the Late Triassic, during the Early Cimmerian (Indosinian) orogeny, the oceanic basin of the Southern slope of the Greater Caucasus closed. Then, at the beginning of the Jurassic, the process of stretching of the Earth's crust began, during which in the Middle Jurassic (in the Aalenian-Bajocian) stage predominantly the monzosyenitic of pluton formation took place. The age of these plutons gradually decreases from north to south (~177, ~168, ~164 Ma). This apparently indicates the spread of the process of crustal extensional from north to south. The formation of the plutons of the Main Range zone of the Greater Caucasus (island arc) took place in supra-subduction conditions on of the active margin of the back-arc small oceanic basin of its Southern slope, while the monzodiorites, monzosyenite and monzinite plutons, located in the Paleozoic-Triassic Dizi series and Lower Jurassic black shales, were formed on the passive margin of this basin, in the conditions of continental slope and foot, which has a thin sub-oceanic Earth's crust.

References

Gamkrelidze, I. P., Shengelia D. M., 2005. The Precambrian-Palaeozoic regional metamorphism, magmatism and geodynamics of the Caucasus. Scientific World, Moscow, 458 p.

Okrostsvaridze, A., Tormey, D., 2011. Evolution of the Variscan orogenic plutonic magmatizm: The Greater Caucasus. Journal of Nepal geological society, v. 43, pp. 45-52.