Middle to Late Jurassic Island-arc magmatism from the Somkheto-Karabagh zone, Lesser Caucasus

GH. GALOYAN[1]*, L. ATAYAN[1], R. MELKONYAN[1], R. KHORENYAN[1], S.-L. CHUNG[2], Y.-H. LEE[3], S. AMIRAGHYAN[1]

[1] Institute of Geological Sciences, National Academy of Sciences of Armenia, Yerevan, Armenia (*correspondence: ghazar.galoyan@gmail.com)
[2]Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan
[3]Department of Earth and Environmental Sciences, National Chung Cheng University, Chia-Yi, Taiwan

In the Lesser Caucasus, Jurassic igneous rocks are widespread in the Somkheto-Karabagh (SK) and Spitak-Kapan tectono-magmatic zones [1]. This paper is based on field, petrologic and geochemical and zircon U-Pb data obtained from the SK zone. New U-Pb ages of plutonic rocks indicate that the arc magmatism lasted from Early-Middle Jurassic (~176 *Ma*, Berdadzor massif in Karabagh) to late Middle Jurassic (~165 *Ma*, Haghpat massif in N Armenia) for «plagiogranite» formation and Late Jurassic (~155-150 *Ma*, Chochkan and Shnogh-Koghb massifs in N Armenia; ~154-147*Ma*, Mehmana massif in Karabagh) for «tonalite and granodiorite» rocks. Investigated volcanic rocks are variably metamorphosed to prehnite-pumpellyite and lower greenschist facies, many of which are typical for seafloor alterations. They form a transitional series between tholeiitic and, in essence, calc-alkaline, and are dominated by basalt, basaltic andesite and andesite; while dacite and rhyolite compositions are typical for subvolcanic and/or pyroclastic facies. Normalized to N-MORB [2] trace element concentrations show enrichment in large ion lithophile elements and light rare earth elements (REE) relative to high field strength elements with the clear negative anomalies in Nb, Ta, P and Ti. Trace element distributions are characteristic of island-arc magmas generated in subduction zones. While the spectra of chondrite-normalized REE plots of Middle Jurassic volcanic and plutonic (plagiogranite) series are flat and parallel ($(La/Yb)_N$=0.4-2.4), the spectra of Upper Jurassic granitoids (diorite, tonalite, granite etc.) show huge enrichment of light REE relative to heavy REE ($(La/Yb)_N$=2.2-17.3). These differences of trace elements behavior between various aged two series support the idea that they are petrogenetically unrelated. According to our geochemical results the partial melting of the depleted mantle source, consisting of spinel lherzolite, is responsible for derivation of Lower-Middle Jurassic volcanic rocks, and the fractional crystallization of that melt leads to the formation of plagiogranite plutons.

[1] Galoyan *et al*. (2013) *Proceedings NAS RA* **66(1)**, 3-22.
[2] Sun and McDonough (1989) *GSL, SP* **42**, 313-345.