NEW U–Pb DATING AND Hf-ISOTOPE COMPOSITION OF THE GORNJANE GRANITOIDS (SOUTH CARPATHIANS, EAST SERBIA)

VASKOVIĆ, N.[1]*, BELOUSOVA, E.[2], O'REILLY, S.Y.[2], GRIFFIN, W.L.[2], SREĆKOVIĆ-BATOĆANIN, D.[1], CHRISTOFIDES, G.[3] & KORONEOS, A.[3]
[1] Faculty of Mining and Geology, University of Belgrade, Belgrade, Serbia
[2] ARC Centre of Excellence for Core to Crust Fluid Systems and GEMOC, Macquarie University, Sydney, Australia
[3] Aristotle University of Thessaloniki, Greece
* E-mail: nada.vaskovic@rgf.bg.ac.rs

The main feature of the South Carpathian geotectonic framework is the Getic and Danubian nappes (generated during the Cretaceous Alpine crustal convergence and shortening). Their Neoproterozoic-Paleozoic (Cambrian to Early Carboniferous) basement is intruded by Late Variscan granitoids, mostly of Pennsylvanian to Early Permian age. Within the Getic nappe, these granitoids define one N-SE alignment (up to 150 km length) that can be traced from Romania (Sichevita-Poniasca) to Eastern Serbia (Brnjica, Neresnica, Gornjane). Although the Romanian granitoids are relatively well-studied (DUCHESNE *et al.,* 2008) the investigation of the East Serbian ones is still in progress (cf. VASKOVIĆ *et al.,* 2004).

The present study provides the first U-Pb and Hf isotope results obtained on zircons from the main rock types of the Gornjane pluton (GP): porphyritic monzogranite [MG], fine-grained granite [FG], medium-grained granodiorite [GD] and fine-grained diorite [FD]. The analyzed zircons are zoned and some of them are older inherited zircons. U-Pb and Hf isotope analyses were done in the GEMOC Key Center (Macquarie University, Sydney) using LA-ICP-MS (Model HP 4500, Series 300) and a Merchantek EO LUV LA microprobe, attached to a Nu Plasma multi-collector ICP-MS. The U-Pb ages obtained for the MG (307.1 ± 4.5 Ma), FG (307.6 ± 2.5 Ma and 323.3 ± 2.6 Ma), GD (307.1 ± 2.9 Ma) and FD (305.8 ± 3.6 Ma) confirm the emplacement and magmatic crystallization of the GP during Late Variscan events. The ages of inherited zircons from all rock types confirm the involvement of Neoproterozoic (701–672 Ma) and Paleozoic material of Cambrian (502–407 Ma) and Devonian-Early Carboniferous (378–342 Ma) age in the magma genesis. The initial $^{176}Hf/^{177}Hf$ ratios in zircons from all rock types range from 0.282443 to 0.282690 and lie close to CHUR (Fig. 1). Most of the analyzed zircons show moderately juvenile Hf-isotope composition (ε_{Hf} is from +2 to +5), with some negative values (mainly in fine-grained granites, ε_{Hf} down to -5). The mean crustal model age (which assumes a source with the mean crustal Lu/Hf) is ca 1.1 Ga and a maximum crustal model age is ca 1.5 Ga (Fig. 1). Therefore, the GP magmas can be interpreted as being largely derived by remelting of Neoproterozoic to Mesoproterozoic lower crust.

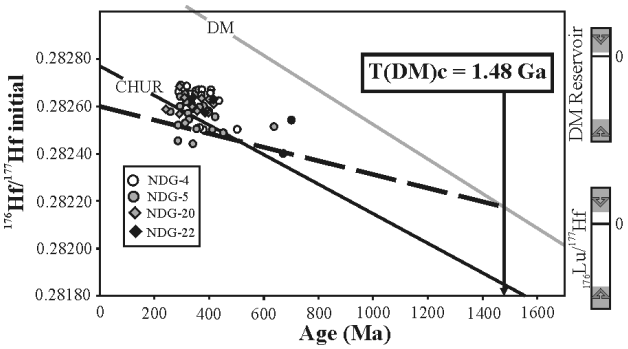

Fig. 1. *Hf-isotope data for the Gornjane pluton: NDG-4 = porphyritic monzogranite, NDG-5 = fine grained granite, NDG-20 = medium grained granodiorite, NDG-22 = fine grained diorite.*

The ages for the GP fit well the results obtained for the Romanian Sichevita-Poniasca pluton (311 ± 2 Ma; DUCHESNE *et al.,* 2008) as well as the late Variscan granites distributed throughout the Danubian nappe (e.g. San Nikola 311.9 ± 4.1 Ma) and the Balkan terrane (e.g. Petrohan 304.6 ± 4.0 Ma; Smilovene 304.1 ± 5.5 Ma; Hisara 303.5 ± 3.3 Ma; Koprivshtitza 312.0 ± 5.4 Ma; CARRIGAN *et al.*, 2005). If we take into consideration an older phase found in FG (sample NDG5 with 323 ± 2.6 Ma age) we can deduce that these granitic magmas were created within a relatively short time span, probably < 20 Ma.

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References

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