

New age and re-evaluated whole rock geochemical data of the Szarvaskő magmatic unit (NE-Hungary): Back-arc basin or N-MORB-type magmatism?

Zoltán Kovács^{1,2}, Szilvia Kövér¹, László Fodor¹, Ralf Schuster³

¹ MTA-ELTE Geological, Geophysical and Space Science Research Group, Hungarian Academy of Sciences at Eötvös Loránd University, Hungary; e-mail: kozraat@gmail.com

² Lithosphere Fluid Research Lab, Department of Petrology and Geochemistry, Eötvös Loránd University, Hungary

³ Geologische Bundesanstalt, Wien, Austria

The main part of the Bükk Mts. are built up by sedimentary sequences of Dinaric affinity deposited on the western – south-western extended continental margin of the Neotethys Ocean during the Late Paleozoic–Late Jurassic interval. This margin was thrust over by the Dinaric Ophiolite nappe from the Late Jurassic. The Bükk nappe system is built up by 4 main nappe slices. The lowermost Bükk nappe represents the attenuated continental margin, the Mónosbél and Szarvaskő nappe consists of Middle–Late Jurassic sedimentary complexes, while the uppermost, Darnó nappe is a tectono-sedimentary mélange, but no ophiolite sheet is present in the area. Besides Jurassic fine grained siliciclastics and shale, the Szarvaskő nappe contains mafic magmatic rocks as well: gabbros and basalts together with plagiogranitic differentiates and ultramafic cumulates. We carried out Sm-Nd age dating on garnets from the contact of the gabbro and the plagiogranite, which yielded an age of 164.7 ± 1.6 Ma. This made a considerable refinement of the previously available K-Ar data (Árva-Soós *et al.*, 1987).

Based on whole rock geochemical data, previous authors concluded that these rocks have an N-MORB affinity (*e.g.*, Harangi *et al.*, 1996; Aigner-Torres and Koller, 1999), however subduction-related geochemical fingerprints were also hypothesized (Kiss *et al.*, 2011). Regardless of the geochemical differences, all authors placed the magmatic rocks to a back-arc basin environment. Here we present the same dataset (completed with some new measurements) plotted on several different geochemical classification systems to illustrate the complexity of geotectonic discrimination based on whole rock geochemical data.

As a result of the re-evaluation of the old dataset, an N-MORB-type origin of the mafic magmatic rocks is plausible without subduction-related components, which affects the geotectonic reconstruction of the area. The former, back-arc basin origin would automatically mean an upper plate position with respect to the subduction, while the new classification enables different paleogeographic interpretations.

Acknowledgements. This research was supported by the OTKA project 113013 led by László Fodor.

REFERENCES

- Aigner-Torres, M., Koller, F. 1999. Nature of the magma source of the Szarvaskő complex (NE Hungary). *Ofioliti* 24, 1–12.
- Árva-Sós, E., Balogh K., Ravasz-Baranyai, L. Ravasz Cs. 1987. K-Ar dates of Mesozoic igneous rocks in some areas of Hungary. *Magyar Állami Földtani Intézet évi jelentése* 1985, pp. 295–307 (in Hungarian, with English summary).
- Harangi, Sz., Szabó, Cs., Józsa, S., Szoldán Zs., Árva-Sós, E., Balla, M., Kubovics, I. 1996. Mesozoic igneous suites in Hungary: Implications for genesis and tectonic setting in the Northwestern part of Tethys. *International Geology Review* 38 (4), 336–360.
- Kiss, G., Molnár, F., Koller, F. Péntek, A. 2011. Triassic advanced rifting related and Jurassic ophiolite-like magmatic rocks in the Bükk unit, NE-Hungary – an overview. *Mitteilungen der Österreichische Mineralogische Gesellschaft* 157, 43–69.