Geochemistry and crystal preferred orientation of upper mantle peridotite xenoliths from the Nógrád-Gömör Volcanic Field (Northern Pannonian Basin)

N. LIPTAI[1]*, L. PATKÓ[1], L. E. ARADI[1], CS. SZABÓ[1], I. J. KOVÁCS[2], K. HIDAS[3], GY. FALUS[2], O. VASELLI[4], A. TOMMASI[5] AND F. BAROU[5]

[1]Lithosphere Fluid Research Lab, Eötvös University, Budapest, Hungary (*correspondence: n.liptai.elte@gmail.com)
[2]Geological and Geophysical Institute of Hungary
[3]Instituto Andaluz de Ciencias de la Tierra, Consejo Superior de Investigaciones Científicas, Granada, Spain
[4]Department of Earth Sciences, Florence, Italy
[5]Geosciences Montpellier, University of Montpellier, Montpellier, France

Information on the physical and chemical properties of the subcontinental lithospheric mantle can be obtained by the study of mantle rocks outcropped on the surface mostly as xenoliths or massive peridotite bodies. The Nógrád-Gömör Volcanic Field (NGVF) is one of the five occurrences in the Carpathian-Pannonian region where Plio-Pleistocene alkali basalts host upper mantle peridotite xenoliths. There is only a limited number of publications that provide basic petrographic and geochemical data about xenoliths in the area [e.g. 1, 2], and none of these contains analyses of crystal preferred orientation (CPO), which can be an important key to gain insight into the rheological conditions of the given mantle domain, and thus, the evolution of the Pannonian Basin.

Here we present major and trace element contents and CPO data of representative lherzolite xenoliths collected from different parts of the NGVF. The major goal is to depict an overall picture of CPO in olivines in the studied area and look into geochemical data to see if there is any link between them. Our results show that the xenoliths are geochemically similar, however, three types of olivine CPO can be distinguished, which correlate with localities, xenolith fabrics, and calculated equilibrium temperatures. This suggests that the studied xenoliths recorded the presence of various types of deformation events in the upper mantle beneath the NGVF, which occurred most probably during the Neogene evolution of the Pannonian Basin.

[1] Szabó *et al*.. (1992) *Tectonophysics*, **208**, 243–256.
[2] Konečný *et al*.. (1995) *Acta Vulcanologica*, **7**, 241–247.

Chemical composition of apatite as a tool for modeling composite-pluton evolution using Polytopic Vector Analysis (PVA)

LISOWIEC K.[1], SŁABY E.[1], FÖRSTER H.-J.[2], GÖTZE J.[3] AND MICHALAK P.P.[3]

[1]ING PAN, Warsaw, PL *klisowiec@twarda.pan.pl*
[2]GFZ, Potsdam, DE, forhj@gfz-potsdam.de
[3]TUBAF, Freiberg, DE, *goetze@mineral.tu-freiberg.de*

Composite plutons are common constituents of the continental crust, therefore identification of their evolution path is crucial. Polytopic Vector Analysis (PVA) is used to define the number and composition of end-members from a data set representing a system formed by mixing of several different components. This approach is routinely applied to study whole-rock composition. We verified its applicability for mineral compositions. Apatite grains from a composite granitic pluton were studied with FE-EPMA and CL. The pluton formed by mixing of mantle- and crust-derived melts influenced by late-magmatic fluids, thus being a suitable example for a heterogeneous system. Apatites exhibit complex zoning in BSE and CL, pointing to rapid changes in melt composition. Variation in trace-element content demonstrates distinct trends that changed over time of formation of the pluton.

Polytopic Vector Analysis was applied to the whole rock and apatite major and trace-element compositions, in order to verify the record of a common differentiation path. The results of the PVA study performed for the whole rock are consistent with previous studies employing other modeling approaches and are in accord with the supposed magma-mixing model. Apatite composition does not reflect operation of this mixing model, especially in the case of REEs which exhibit chaotic distribution, likely resulting from local saturation of the melt. The results of the PVA of apatites from every stage of magma differentiation will be presented and the advantages and limitations of this approach will be shown.

DOI:10.1180/minmag.2013.077.5.12