# MINERAL CHEMISTRY OF THE PLEISTOCENE CIOMADUL VOLCANIC ROCKS, EAST CARPATHIANS

VINKLER, A. P.[1], HARANGI, SZ.[2], NTAFLOS, T.[3] & SZAKÁCS, S.[4]
[1] Department of Mineralogy, Babeş-Bolyai University, Kogălniceanu, 1, Cluj-Napoca, Romania
E-mail: vapaula@freemail.hu
[2] Department of Petrology and Geochemistry, Eötvös Loránd University, Pázmány Péter sétány 1/C, H-1117 Budapest, Hungary
[3] Institute of Earth Sciences, University of Vienna, Althanstrasse 14, Vienna, Austria
[4] Department of Environmental Sciences, Sapientia Hungarian University of Transylvania, Deva 10, Cluj-Napoca, Romania

The Ciomadul volcano is the site of the latest volcanic eruption occurred in the Carpathian–Pannonian region. The dacitic lava dome complex of the Ciomadul volcano is situated at the southern edge of the South Harghita Mountain, which belongs to the Călimani-Gurghiu-Harghita Neogene volcanic chain. The activity of the volcano began ca. 1 Ma and continued at 600-500 ka with a lava dome building phase. After about 200 kyr quiescence, two subplinian explosive eruptions occurred inside the lava dome complex through the Mohos and the younger St. Anna craters. The St. Anna eruption took place 10-30 ka. In order to constrain the possible renewal of the volcanism it is important to understand the magmagenesis of the last activities.

The bulk composition of the lava dome rocks and pumices shows a striking similarity and a fairly restricted range. They are classifies as high-K dacites. Chemical composition of the mineral phases provides information on the condition of the crystallization and possible open system processes. The main mineral phases of these rocks are amphibole, plagioclase and biotite. Some of the lava dome rocks contain also clinopyroxene phenocrysts and quartz xenocrysts. The most common accessory minerals are the apatite and sphene.

The amphiboles are mainly magnesiohornblende and magnesiohastingsite. They show wide compositional variation in $Al_2O_3$ ranging from 6 wt% to 14 wt%. The Al content correlates with the Ti and the total alkali concentration. These features are consistent with crystallization of various pressure and temperature. Formation of amphibole started at relatively high pressure, presumably at lower crustal levels. The high pressure crystallization is supported also by the composition of the clinopyroxene phenocrysts. A peculiar feature of the Ciomadul rocks is the occurrence of high MgO minerals such as olivine, orthopyroxene and clinopyroxene in the core of amphibole phenocrysts. These minerals could be either xenocrysts deriving directly from the upper mantle or can represent early formed mineral assemblage from a primitive mafic magma. The textural feature clearly indicates a change in the crystallization processes toward an increase of water content of the magma.

The high-MgO minerals clearly suggest the role of mafic mantle-derived magmas in the genesis of the Ciomadul rocks. Since these features are common both in the lava dome rocks and the subsequent explosive volcanic products, we infer a long-lived reservoir beneath the Ciomadul volcano. The volcanic eruptions might be triggered by episodic arrival of fresh primitive mafic magmas into this plumbing system. This could have an important implication for possible future eruption.