FACIES ARCHITECTURE AND PETROLOGY OF A BADENIAN SHALLOW SUBVOLCANIC RHYOLITE BODY, MULATÓ HILL AT LŐRINCI, MÁTRA MTS. (HUNGARY)

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The 207-m high rhyolite body of the Mulató Hill is the last elevation at the gradually decreasing southwestern side of the Mátra Mountains. Acidic volcanic rocks appear very rarely in the essentially andesitic stratovolcanic sequence of the Mátra Mountains. The uniqueness of the hill has been attracting scientists since the early period of Hungarian petrography in the 19th century (SZTERÉNYI, 1881; MAURITZ, 1909). The stratigraphic setting was made clear by the geological mapping of the Mátra Mountains after the 2nd World War. The Mulató Hill rhyolite belongs to the Gyöngyössolymos Rhyolite Formation but its age is younger (14.83±0.5 Ma) than that of the rocks in the denominative outcrop at Gyöngyössolymos (15.9±0.5 Ma).

The rhyolite rock is quarried in a still operating, multi-level quarry, which exposes nearly the whole sequence of the sill-like body in 250 m length and in 35 m thickness. The melt came from a shallow and small magma chamber; the acidic character was caused by near-surface differentiation and contamination processes. The positions and dimensions of the facies zones verify the shallow subvolcanic character contrary to the formerly proposed subareal lava flow origin (VARGA *et al*., 1975). The rock facies was influenced by unequal distribution of volatile content, features of moving and cooling of the body and postvolcanic effects. In 2005 the mining exposed the lower brecciated border zone and made clear the emplacement conditions. The partly degassed melt penetrated into andesitic agglomerate-hyaloclastite rocks with very small extrusion rate. The margins cooled very quickly and the continuous extrusion broke the solidifying lower zone, but the upper side was unbroken. The slow moving of the melt on a gentle slope caused laminar shearing, which subsided and joined the vesicles (up to dm) and promoted gas migration to the higher levels. The accumulation of the gas content at the top of the body resulted in a vesicular rock type. Highly vesicular and compact bands alternate in the samples as a result of the large viscosity.

In the central zone there is a red, vesicular, fluidal rhyolite with columnar joints becoming thin-bedded towards the outer areas. The most characteristic facies is a black globular rhyolite (vitrophyre) with 1.5-2 m thickness, formed at the volatile-poor, quickly cooling margins. Brownish-black coloured globular structures (5-8 mm in diameter) with yellowish grey centre are scattered in the black, glassy matrix. Their distribution is variable, if their proportion is high enough and the globules touch each other, the spherical form became deformed and seems to be angular. Under microscope the matrix and the spheres consist of the same material; the spheres probably formed by quick devitrification during uneven cooling. The postvolcanic alterations caused kaolinization, fading of the rocks, depending on the primary porosity rate. Along the joints of the rock, clayey, limonitic coatings have been formed.

On the basis of the geochemical data, the rocks belong to the high-K part of the calc-alkaline series. The Mulató Hill rhyolite has a sanidine microlitic-trachytic texture type, unique among Hungarian acid lavas. The phenocrystal content is generally low, there are acidic plagioclase feldspars in the limonitic groundmass. High amount of sanidine microlites is due to lower viscosity and slow ascending rate in the vent. Mafic component is opacitic biotite. The red colour is caused by hematite and limonite patches in the groundmass.

References

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