Succession of Lava Flows of Úhošt’ Hill in Relation to the History of Magma Reservoir

Vladislav RAPPRICH
Czech Geological Survey, Klárov 3, 118 21 Praha 1, Czech Republic
Institute of Petrology and Structural Geology, Charles University, Albertov 6, Praha 2, Czech Republic

A detailed study of petrology, geochemistry and volcanology was made at the locality of Úhošt’ near Kadaň on the NE margin of the Doupovské hory volcanic complex (Rapprich, 2003). Doupovské hory volcanic complex belongs to the Central European alkaline volcanic suite and its genesis is associated with the Eger Graben (Kopecký, 1987). The Doupovské hory
volcanic complex is currently divided into two lithostratigraphic units (formations): lower – predominantly explosive, and upper – predominantly effusive (Hradecký, 1997; Hradecký in Hradecký et al., 2000; Hradecký and Rapprich, 2002). Úhoště Hill belongs to the upper formation. The locality of Úhoště Hill was formerly presented as a typical example of a “stratovolcano type” of the Doupovské hory volcanic complex (Zartner, 1938; Kopecký, 1987; Krutský, 1992). Beds of clastic material between compact lavas are now interpreted as autoclastic facies of lava flows (Hradecký in Hradecký et al., 2000; Rapprich, 2003). The linear-shaped feeder of the Úhoště lavas is believed to be situated in the Donínský potok valley and is currently represented by an erosional relict of the chimney breccia with xenoliths of crystalline rocks exceeding 1 m in diameter. At Úhoště, nine lava flows were distinguished and grouped into three petrographic groups: tephrites/basanites, olivine basalts to picrobasalts and basalts s.s. (the groups are presented chronologically from the oldest to the youngest). The values of differentiation index (DI) were counted for all analysed rocks. An increase in DI value corresponds to a decrease in Cr, Ni, Mg#, and CaO and to an increase in Al₂O₃ and Na₂O + K₂O. Based on these values, it was possible to constitute the hierarchy of differentiation in the studied rocks. The most primitive magmas (picrobasalts) erupted over more differentiated (tephrites/basanites). The most evolved magmas are the youngest. This fact can be explained by the possible existence of a two-level magma reservoir. In the shallower part, the magma was zoned due to crystallization of olivine and clinopyroxene and their deposition on the bottom of the chamber. With the onset of volcanic activity, the magma chamber was being depleted from the top to the bottom, where phenocrysts of olivine and clinopyroxene were accumulated (the tephrites/basanites are fine-grained to glassy while the picrobasalts are coarse-grained and rich in phenocrysts). The tephrite/basalite and picrobasalt magma was later supplied by more differentiated basalts s.s. from a deeper level of the reservoir. This succession and model of genesis were described for the locality of Úhoště and cannot be extrapolated for the whole Doupovské hory volcanic complex.

References


