GEOCHEMISTRY AND Sr, Nd, Pb ISOTOPES OF MIOCENE AND PLIO-PLEISTOCENE VOLCANIC ROCKS FROM TWO NEOGENE SUB-BASINS OF THE PANNONIAN SYSTEM (STYRIA AND CARINTHIA): GEODYNAMIC IMPLICATIONS

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During the Neogene, the Carpatho-Pannonian Region underwent major tectonic and magmatic events due to the combined effects of roll-back subduction of the European Plate under the Carpathians and the N-S shortening between the Adriatic and European Plates, to the west. There is a general consensus that volcanic activity took place in three phases (Downes, 1996; Mason et al., 1996; Downes and Vaselli eds., 1995): 1) widespread, but poorly studied acid volcanism began around 19 Ma ago in various sectors of the Pannonian Basin (s.l.) and was followed by 2) the formation of a calc-alkaline volcanic arc, active along the Western Carpathians and the northern part of the Eastern Carpathians from about 16 to 10 Ma ago; then the volcanism continued up to 0.2 Ma, shifting progressively southward along the Eastern Carpathian arc whose origin is generally considered to be related to the Miocene subduction followed by detachment of the oceanic crust of the European Plate; 3) an "extension"-related Na-alkali basaltic volcanism which took place sporadically in the Pannonian Basin (s.l.), from about 11-9 Ma up to the Pleistocene.

The volcanism changed the petrogenetic affinity from orogenic-type in the Miocene -the Styrian and Lavanttal Basins- (Karpatian/Early Badenian-Middle Badenian; K/Ar ages: 16.3-14.0 Ma) to anorogenic-type in the Late Pliocene-Early Pleistocene -Styrian Basin- (K/Ar ages: 3.8-1.7 Ma).

The orogenic-type rocks of the Styrian and Lavanttal Basins (high-K calc-alkaline and shoshonitic series) are geochemically distinguishable from those (calc-alkaline and high-K calc-alkaline series) of the Western and Eastern Carpathian arcs, generally considered as the result of active oceanic subduction. In the more primitive lavas of Styrian and Lavanttal Basins, combined analyses of incompatible elements and Sr, Nd and Pb isotopes indicate that, by contrast with the East Carpathians, there is no evidence of a component derived from the dehydration of the oceanic crust. Instead, the data indicate the presence of a component derived from subducted continental crust material in their mantle source. This is compatible with their genesis by partial melting of a lithospheric mantle variably enriched by components derived from continental crust material of the European lithosphere subducted/incorporated in the mantle during the Paleogene N-S subduction/collision which characterized the Eastern Alps/Westernmost Carpathian transept. Such a delayed melting of a recently enriched lithospheric mantle is considered to be activated by the Miocene extensional collapse of the Eastern Alpine chain leading to the formation of the Pannonian Basin (s.l.).

The Plio-Pleistocene volcanics are strongly silica-undersaturated (nephelinites, basanites and tephrites) and have a Na-alkaline affinity. Trace element and isotopic ratios of these rocks are well within the range of ocean island basalts. There is no evidence at all of the presence of a subducted component in their mantle source nor of crustal contamination during their ascent to the surface. All these data are compatible with a derivation from low degrees of partial melting of a typical asthenospheric source.

REFERENCES

Downes, H. (1996): *Mitt. Ges. Geol. Bergbaustud. Österr.*, **41**, 104-105.

Downes, H. & Vaselli, O. Eds. (1995): *Acta Vulcanologica*, 7 (2).

Mason, P.R.D., Downes, H., Thirlwall, M.F., Seghedi, I., Szakács, A., Lowry, D., Mattey, D. (1996): *J. Petrol*, 37, 4, 927-959.