

The geochemical argumentation of the geodynamic control scheme of the Neogene volcanism in the Ukrainian Carpathians

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The volcanic centers of the Transcarpathian region groups in two lines: the south-western Chop line and the north-eastern Vygortat-Huta ridge. The location of the effusive rocks in the central and western part of the Vygortat-Huta ridge is controlled by the tectonic evolution of the Transcarpathian deep fault. The Poprichyi, Antalovskiy, Syniak and Boryliv Dil volcanic tracts are characterized with andesite-basalt—andesite—andesite-dacite—dacite—liparite-dacite compositions. The Velykyi Sholes tract is composed of andesite-basalt—andesite—dacite—liparite volcanic rocks. The formation of this tract is closely associated with a submeridional fault that formed on the border of the Chopska and the Solotvynska depressions (Merich & Spitkovskaja, 1974).

Tolstoi *et al.* (1976) have considered that Pliocene volcanic rocks of the Vygortat-Huta ridge formed in a petrochemically consecutive line. That fact can be interpreted as an evidence of their common formation. But, in spite of the common petrographical and chemical characteristics of Vygortat-Huta volcanic rocks, there is some lateral differentiation in their composition:

- the compositions of the volcanic rocks of Oash and Velykyi Sholes are more alkaline than the compositions of volcanic rocks of Poprichyi, Antalovskiy and Syniak tracts, that are related to the Transcarpathian deep fault;

- basalts and andesite-basalts of Oash and Velykyi Sholes volcanic tracts are characterized with enriched Na₂O and slightly depleted MgO content;

- in all kinds of plagioclases, the Ab-component is higher in Oash and Velykyi Sholes volcanic rocks than in rocks of Poprichyi and Syniak tracts;

- the volcanic rocks of Oash and Velykyi Sholes tracts are more ferruginous, than the other volcanic rocks of the Vygortat-Huta ridge;

- the Ti/Mn proportion, that is considered as the depth indicator of volcanic rocks formation (Abramovich & Vysokoostrovskaja, 1964), rises from 3.0-4.5 in Syniak volcanic tract to 10.5 in Oash and Velykyi Sholes volcanic tracts.

These features of the different parts of the Vygortat-Huta ridge demonstrate the relation between the chemical composition of igneous rocks and their relation to the definite faults on research area. These geochemical data with preliminary structural-paragenetic

analysis of the Transcarpathian faults grid, as well as magmatic center distribution data, permit to suggest a new dynamo-kinematical scheme for the Neogene volcanism in the Ukrainian Carpathians.

According to this scheme, the general submeridional compression process of the Carpathian fold system caused the right-side split zone in Transcarpathia.

The split zone is restricted on the north by the Transcarpathian deep fault, which is characterized by a north-western strike and a subvertical decline. The southern boundary is not that clear. It includes the territory between the Samozh (Somezh) fault and the Pannonian deep fault, where dislocation movements were complicated, probably, by shifting of the tectonic blocks. The split zone, stated above, is joined by the "S"-like Vygortat-Huta volcanic ridge. The central section of Vygortat-Huta is oriented with an angle of 50° to the Transcarpathian deep fault zone. The Preshiv volcanic ridge has almost the same orientation.

The split zone and the active magmatic structures of dilatation form the flaw structural paragenesis, which is complicated by faults of higher degree (synthetic R- splits and antithetic R'-splits). On some geological maps, faults with ancillary P-splits can be also found. Intensification of noncoaxial movements in the split zone activates the turning of the break structures (which causes their extension) and Riedel splits.

The suggested geodynamic control scheme of Neogene volcanism in the Ukrainian Carpathians offers a perspective both in theoretical and research prospects with further substantiation of this scheme.

Abramovich, I., Vysokoostrovskaja, E. (1964): *Geochem*, 7: 23-37. (in Russian)

Merich, M., Spitkovskaja, S (1974): The problems of tectonics and magmatism of deep faults, Lvov: Vyscha Shkola: pp. 172. (in Russian)

Tolstoi, M., Gasanov, U., Moliavko, V., Ostafiychuk, I., Prodaivoda, D., Serga, A., Sukhorada, A. (1976): The geochemistry, petrophysics and genesis of young volcanoes in Soviet Carpathians, Kyiv: Vyscha Shkola: pp. 192. (in Russian)