

PETROGENESIS OF THE TARNICA COMPLEX OF THE DITRĂU (DITRÓ) SYENITE MASSIF, TRANSYLVANIA, ROMANIA

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On the basis of field work and macroscopic, microscopic, mineral geochemical, thermobarometrical, petrogenetic studies as well as major and trace element analyses, I stated that rocks (hornblendites, diorites) of the Tarnica Complex (PÁL MOLNÁR, 1998) are characteristic products of the mixing boundary zone occurring between the solid ultrabasic body of mantle origin and the crustal syenites.

The petrogenetic model can be summarised as it follows:

1. Formation of the Tarnica Complex can be connected with tectonomagmatism of the activated platform (continental) areas (continental autonomous magmatic activation).
2. In the dissected continental platform areas, which were adjacent to aulacogens (tectonic depressions), the magmatic processes started from a slightly undersaturated to slightly oversaturated ultrabasic parental magma, the composition of which was a primitive melt of the upper mantle, and similar to the olivine-pyroxene hornblendites.
3. Hornblendites, nepheline syenites and granites are co-genetic and co-magmatic rocks. Developments of the ultrabasic magma is ended by an increase of SiO₂ and alkalis in the granite-nepheline syenite final system. The hornblendite → nepheline syenite and the hornblendite → granite developments are fractionated and AFC (fractionation + assimilation) magma developments, respectively. According to K/Ar data, this process happened in the Middle Triassic–Lower Jurassic period.
4. On the basis of K/Ar data, syenites are younger than hornblendites, nepheline syenites and granites. Syenites were formed under similar conditions to those of hornblendites, nepheline syenites and granites, however, it is possible that they come from a different magma source.
5. Mineral composition, textural and structural pattern, and K/Ar data of meladiorites and diorites indicate mixed rocks. They are hybridisation products of the hornblendites coming from the mantle and the syenites coming from the crust. The hybridisation process is synchronous with the syenite intrusion.
6. In fact the rock phase of the “host rock–boundary zone–magmatite” system, called hornblendite, is a slightly altered product of the original ultrabasic differentiate (“hornblendites after assimilation”).

The alkali feldspar syenites penetrate hornblendites, diorites and even syenites as veins. They represent the latest Lower Cretaceous magmatic phase related to the syenites.

References

- PÁL MOLNÁR, E. (1998). The geologic structure and petrology of the Ditrău syenite massif, with special regard to the formation of hornblendites and diorites. I–II. PhD Thesis, JATE, Szeged. [in Hungarian]