NEW LITHOSTRATIGRAPHIC AND STRUCTURAL ASPECTS IN THE SOUTHERN PART OF THE BIHOR MASSIF (APUSENI MOUNTAINS)

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ABSTRACT. The Muncel Series (Ionescu, 1962), from the Bihor massif can be included in the Permian Pâiuşeni Lithogroup, because it consists predominantly from weak metamorphosed granites and porphyres. In this idea, the Highiş Nappe correlates with the Muncel Nappe and does not with the Poiana Nappe. Consequently, the down to up succession of the Biharia Nappe System becomes: the Gârda Nappe; The Raviceştii scale; the Poiana Nappe; the Piatra Grăţioare scale; the Biharia nappe; the Highiş-Muncel Nappe; the Baia de Arieş Nappe.

KEYWORDS: Muncel Nappe, Muncel Series, Highiş Nappe, Pâ iuşeni Lithogroup.

I. INTRODUCTION

According to Bordea et al., (1988), the Biharia massif is formed from the Moma - Arieseni, Poiana, Biharia with its lower Piatra Grăţioare scale, and Muncel nappes, which have among their components the following metamorphosed lithostratigraphic units: the Moma - Arieseni Nappe, the Lower Carboniferous Arieseni Series greenschists; the Poiana Nappe, the Upper Carboniferous Poiana Series; the Biharia Nappe, the Devonian - Lower Carboniferous Pâ iuşeni series and the Vendian - Lower Cambrian Biharia Series; the Muncel Nappe, the Lower Cambrian - Ordovician (?) Muncel Series.

Balintoni (1994), included the Arieseni Nappe in the Biharia Nappe System and put together the Poiana Nappe, Piatra Grăţioare Scale and Biharia Nappe into the Alpine Biharia Nappe, separating them each other by pre-Alpine thrusts. This author also considered the Muncel Nappe as a western prolongation of the Baia de Arieş Nappe. Lithostratigraphically, Balintoni (1994), divided the Muncel Series in a lower part compared with the Biharia Series (the Necşestii Formation according to Bordea et al., 1988), and an upper part paralleled with the Baia de Arieş Series. Between them has been traced a pre-Alpine tectonic plan.

Balintoni (1997), brought together the Arieseni, Poiana and Pâ iuşeni Series as the Pâ iuşeni Lithogroup, metamorphosed during the Variscan orogeny.

In 1998, the same author, renounced to the pre-Alpine thrust and separated in the Bihor Massif the Alpine Arieseni Nappe, Highiş-Poiana Nappe, Piatra Grăţioare Scale, Biharia Nappe, Muncel Scale and Baia de Arieş Nappe. He kept the lithostratigraphy unchanged, but hypothesized a Lower Permian age for the Pâ iuşeni Lithogroup.

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Pană (1998), proved by zircon U/Pb isotopic dating the Permian age of the Păuleseni Lithogroup, and the Uppermost Cambrian - Lowermost Ordovician age of the Biharia Lithogroup. Balintoni et al., (2002), found that the red Permian deposits from the Arieseni Nappe belong to the Moma Nappe and the Arieseni Lithozone is structurally situated in the same context as the Poiana Lithozone. Consequently, the Arieseni Nappe disappears, and the Arieseni Lithozone becomes a component part of the Poiana Nappe. Thus the Poiana Nappe surface is increasing and its content enriches. Further on this paper refers to the Muncel Nappe according to Bordea et al., (1988), or to the Muncel Scaul and the Baia de Aries Nappe according to Balintoni (1998).

II. The Muncel Nappe, concept evolution

The Muncel Nappe appears on a cross section published by Rozlozsnik (1935), named "mylonit decke". Giușcă (1937), perfectly drawn the Muncel Nappe, separating "schistes chloriteux à porphiroblastes d'albite" or "le cristallin de Biharea" beneath a "complexe de phyllites et épigranites". These two lithologies formed the "Biharia Series" and the "Muncelu Series" according to Ionescu, (1962). But the name "Muncelu Series" was already used by Bleahu and Dimitrescu (1957). Ianovici et al., (1976), and Bordea et al., (1988), included the Biharia Series in the Muncel Series, as the Necșești Formation. Balintoni (1985), shown that the Muncel (-Lupșa) Series differentiated by Dimitrescu et al., (1974, 1977), along the Aries Valley, partially belongs to Biharia Lithogroup and partially to Baia de Aries Lithogroup. In 1994, Balintoni applied the same rule for the Bihor Massif. But if the Necșești Formation truly belongs to Biharia Lithogroup as already saw Giușcă (1937), the rest of the Muncel Series does not represent the prolongation of the Baia de Arieș Lithogroup or Nappe.

III. The Muncel Series lithology and metamorphism

The Muncel Series lithology was established by Giușcă (1937), Ionescu, (1962), and Bordea et al., (1988). It is important to say that the Muncel Series lithology in the Bihor massif differs of the Muncel (-Lupșa) lithology along the Aries Valley. Giușcă (1937), spoke about phyllites, epigranites and porphyroids. According to Ionescu (1962), it consists from sericite, sericite-chlorite and graphite-sericite phyllites, from cataclastic gneissic granites, from porphyroids, and from gray quartzites. The mylonitic aspect of the granites is also emphasized by Bordea et al., (1988), and we remember the "mylonite decke" figured by Rozlozsnik (1935). Several features can be stressed: (a) the metagranitoids - metaporphyres obvious association; (b) the mesoscopic identity between the Muncel Series metaporphyres and the red Permian quartz-porphyries or the metaporphyres of the Păuleseni Lithogroup from the northern part of the Highis massif; (c) the outcrop scale transition between weak deformed porphyres and porphyro-clastic phyllites.

The metamorphism of these rocks has been studied by Ionescu (1962). He described as metamorphic minerals, chlorite, sercite and albite. An important characteristic of the granites and porphyreis is the plenty of relic magmatic
minerals: plagioclase, orthose, biotite, muscovite. Biotite is partially chloritized and the plagioclase sericitized. The penetrative foliation is coarse one and the metamorphic recrystallisation of the granite minerals incipient. The cataclastic deformation predominates and the metamorphic alterations are depending on the crushing degree. The rocks rather appear as cataclasites and mylonites than metamorphics. This low grade metamorphism, dependent on the deformation intensity is characteristic for the Pâ iușeni Lithogroup rocks and it was well illustrated by Pană (1998), in the Highiș massif.

IV. Discussions

Because in the southern part of the Biharia massif the Muncel Series overlies Biharia Lithogroup rocks and its lithology and metamorphic degree are not compatible with those of the Baia de Arieș Lithogroup, we consider it as a part of the Pâ iușeni Lithogroup.

As we suggested, it is rather comparable with the Highiș Lithozone, than with the Pâ iușeni Lithogroup fragments located in the lower tectonic units. A north-south arrangement of the Pâ iușeni Lithogroup components shows in this way: Pâ iușeni - Poiana, Pâ iușeni - Piatra Grâioare, Pâ iușeni - Biharia, Pâ iușeni - Muncel and Pâ iușeni - Highiș Lithozones. The Pâ iușeni - Poiana, Pâ iușeni - Piatra Grâioare and Pâ iușeni - Biharia lithozones are especially dominated by metaconglomerates and they contain few metamagmatites. Instead, in the Pâ iușeni - Muncel and Pâ iușeni - Highiș lithozones abound the metamagmatites. This aspect suggests a closer initial location between the Pâ iușeni - Highiș and the Pâ iușeni – Muncel lithozones than between the Pâ iușeni – Highiș and any other more northern lithozone.

The inference has structural results: a correlation between Highiș and Muncel Nappes is much more probably than the current correlation between the Highiș and Poiana Nappes. If this hypothesis is correct, then the initial position of the Biharia Nappe has been northerly of the Highiș Nappe, what reduces the tectonic transport within the Biharia Nappe System.

In a synthetic manner, the main hypotheses proposed in this paper are: (a) the correlation between the Highiș and the Muncel Nappes; (b) the inclusion of the Muncel Series into the Pâ iușeni Lithogroup as the Muncel Lithozone. Therefore, the Biharia Nappe System consists down to up from: the Gârda Nappe, the Ravicești scale, The Poiana Nappe, the Piatra Grâioare scale, the Biharia Nappe, the Highiș - Muncel Nappe, the Baia de Arieș Nappe. Excepting the Gârda Nappe and Ravicești scale, the Upper Paleozoic and Mesozoic of the other tectonic units undergone an Alpine dynamo-thermal metamorphism during the nappe emplacement.

V. Conclusions

1. The Muncel Nappe from the Bihor massif, represents the prolongation of the Highiș Nappe. It consists from Biharia and Pâ iușeni Lithogroups rocks.
2. The Muncel granites and porphyries can be the oldest magmatic rocks of the Permian Pâ iușenii Lithogroup.

3. The uppermost graphite quartzites from the previous Muncel Series Ionescu, (1962), is possible to belong to the Baia de Arieș Lithogroup and Nappe.

4. It is not clear why the Muncel granites have not a hornfels aureole around them.

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REFERENCES


Fig. 1. Tectonics and lithostratigraphy of southern Bihor, Apuseni Mountains.  
Legend: Po, Poiana Nappe; PG, Piatra Graitoare Scale; Bi, Biharia Nappe; M, Highi-Muncel Nappe; (Bi), Biharia Lithogroup; (P), Piausuéni Lithogroup; S, Senonian sedimentary; Tr, Tertiary sedimentary.
Fig. 2 Structural Map of the Apuseni Mountains