THE MOLDANUBIAN–BARRANDIAN BOUNDARY: ISOTOPIC INVESTIGATIONS ON SAMPLES FROM THE RITTSTEIG DRILLING (NE BAVARIA, GERMANY)

C. IHLENFELD[1], J. ROHRMÜLLER[2], H. KÖHLER[1]

[1]*Institut für Mineralogie, Petrologie und Geochemie, Theresienstr. 41, 80333 München, Germany*
[2]*Bayerisches Geologisches Landesamt, Außenstelle, Concordiastr. 28, 96050 Bamberg, Germany*

The site of the Rittsteig drilling is located in the western part of the Bohemian Massif at the Moldanubian–Barrandian boundary. The Moldanubian and Barrandian zones constitute two different tectonometamorphic units of the Variscan basement. The Barrandian is regarded by many authors as an equivalent of the ZEV and the Münchberger Gneismasse. In the target area of the drilling the Barrandian is represented by mafic to intermediate intrusives of the Gabbroamphibolitmasse von Neukirchen–Kdyně and rocks of the Domažlice crystalline complex, the Moldanubicum by rocks of the "Bunte Gruppe". According to lithological observations the drilled profile is divided into three sections (Fig. 1). The investigation presented here is an attempt to subdivide the profile of the Rittsteig drilling based on isotopical results. Ten whole-rock, ten mica and four garnet samples from the total range of the drill hole were analyzed for Rb–Sr and Sm–Nd isotope composition.

Seven of the eight metapelite samples define a Rb–Sr isochron yielding an age of 451 ± 86 Ma with an initial $^{87}Sr/^{86}Sr$ of 0.7114 ± 24 (2σ). This age value is consistent with previous results and indicates a pre-Variscan event. It can be interpreted as the time of a low-grade metamorphism or the approximate time of sedimentation. Neodymium model ages of metapelite samples range from 1.5 Ga to 1.9 Ga and are significantly higher than those of metapelites from the ZEV tectonic unit. The former sediments were derived from at least two different source terranes, one having a minimum mean crustal residence age of 1.9 Ga, the other having a maximum mean crustal residence age of 1.5 Ga. The model ages do not display any systematic change with depth. In a Sr–Nd isotope correlation diagram calculated back to 380 Ma B.P., the approximate age of Variscan medium pressure metamorphism, metapelite samples cover a narrow range in the field of Moldanubian and Saxothuringian paragneisses but well outside the field of ZEV paragneisses. Beside mica cooling ages around 320 Ma, early-Variscan Rb–Sr muscovite and biotite ages around 375 Ma are preserved in some of the rocks (Fig. 1). They indicate the activity of Devonian medium-pressure metamorphism in both the Moldanubian and the Barrandian units. Following this event rocks were overprinted by the Variscan low-pressure metamorphism, which in most cases caused total resetting of the Rb–Sr system of biotite and only partial resetting of the Rb–Sr system of muscovite. Sm–Nd garnet ages are significantly younger than Devonian medium-pressure metamorphism. As in the case of model ages, no systematic change of mineral ages with depth is discernible. With respect to their Nd and Sr isotopic characteristics, all sampled metapelites can be assigned to one unit displaying similarities with Moldanubian paragneisses but significant differences from the ZEV paragneisses. From these data we conclude that the profile cannot be subdivided based on isotopic criteria. Alternatively, we suggest that all investigated rocks belong to the Moldanubian unit. Mica cooling ages around 375 Ma give a hint at activity of Devonian medium-pressure metamorphism in parts of the Moldanubian unit.

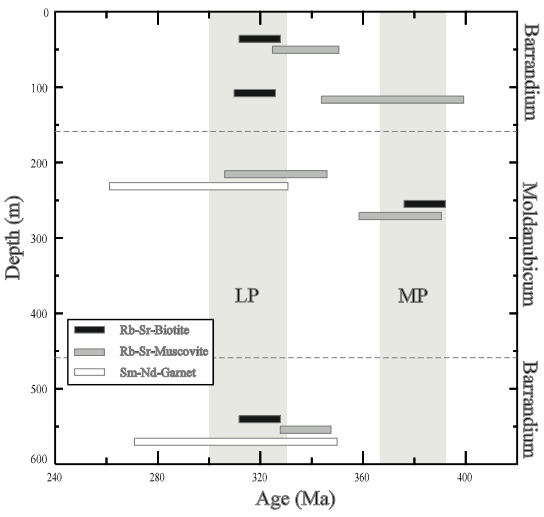

Fig. **Chyba! Neznámý argument přepínače.**: Variation of mineral ages with depth (Error bars = 95 % conf.) Ranges of Variscan medium- (MP), low-pressure (LP) metamorphism and lithological subdivision of the profile are shown for reference.