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^{40}AR/^{39}AR AMPHIBOLE DATING OF ROMANIAN BANATITES: PRELIMINARY RESULTS

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Eleven new ^{40}Ar/^{39}Ar amphibole ages have been obtaind from the late Cretaceous belt, named by von Cotta (1864) as "Banatites" associated by Berza et al., 1998 into "Late Cretaceous Banatitic Magmatic and Metallogenic Belt" – (BMMB). The Banatite belt stretches from Romania, Serbia to Bulgaria. Here we report results from two regions in Romania – the South Carpathians and the Apuseni Mountains (Fig. 1).

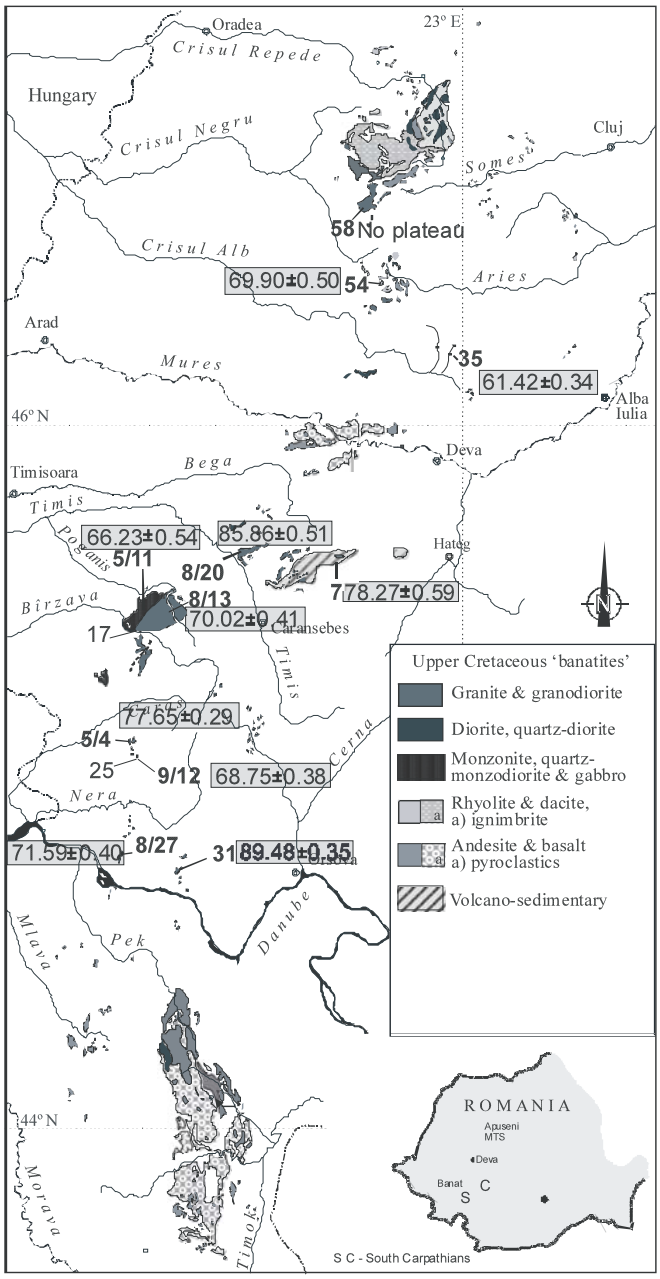

Fig. 1: Simplified map of the BMMB showing samples localities and results

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Banatite magmatism occurred after early late Cretaceous orogeny associated with orogenic collapse and Gosau sedimentation.

This Cretaceous orogen was formed during an independent orogenic cycle due to consumption of oceanic tracts and subsequently early Late Cretaceous collision of continental blocks. The assembled terrane collage was heavily modified by Tertiary collision of continental, extrusional and oroclinal processes during incorporation of these units into the Carpathian arc and the indentation of the Moesian Block as the present-day arcuate mountain belt formed. Characteristic of this Cretaceous orogenic belt is a significant variation in intrusion ages along strike and from east to west. Romanian and Serbian banatites appear to be younger than the Bulgarian ones. That characteristic feature is underlined by our new data.

The Apuseni Mts. Province is a non-porphyry environment related to more evolved (granodioritic-granitic) magmatism. It is subdivided into three zones: Vladeasa, Gilau-Bihor and South Apuseni.

For our first patch of $^{40}Ar/^{39}Ar$ dating, volcanic and plutonic samples were chosen from selected sample locations in the Apuseni Mts and South Carpathians Province (Fig. 1). Samples were prepared for stepwise heating experiments of amphiboles and biotites.

Two of our $^{40}Ar/^{39}Ar$ dating results are displayed in Figure, 2-3. Low temperature release yielded highly variable ages indicating extraneous argon. Figure 2 shows the results of a gabbroic intrusion near Ciclova (sample 9/12), which gave an Amphibole plateau age of 68.75 ± 0.38 Ma. Figure 3 shows an amphibole spectrum of the Tincova intrusion (sample 8/20) with a plateau age of 85.86 ± 0.51 Ma.

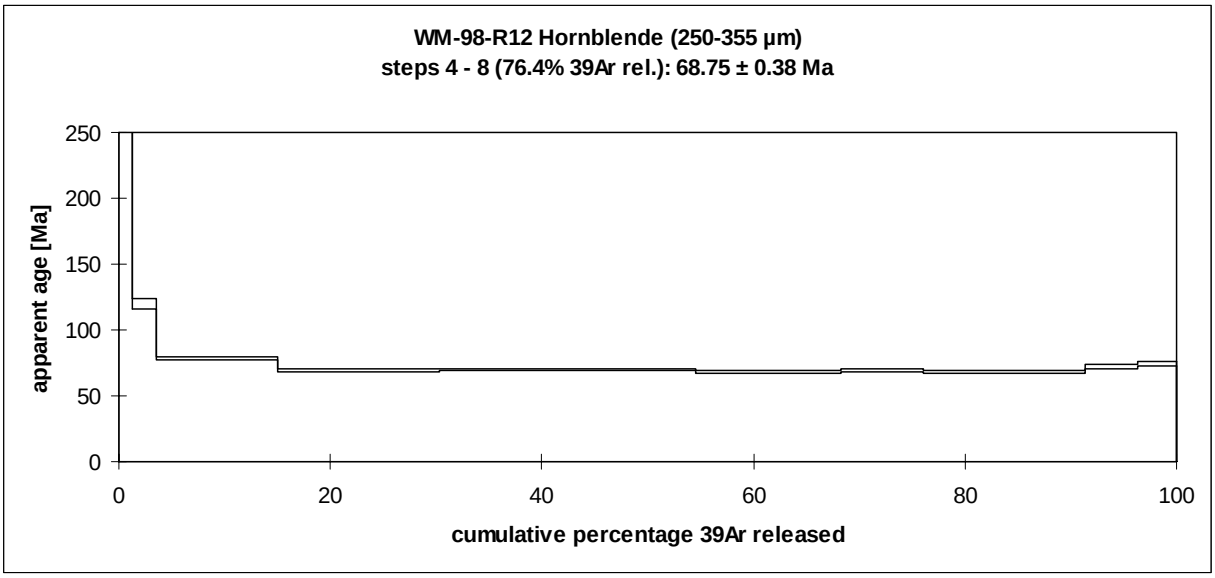

Fig. 2: $^{40}Ar/Ar^{39}$ results from Ciclova (sample nr. 9/12)

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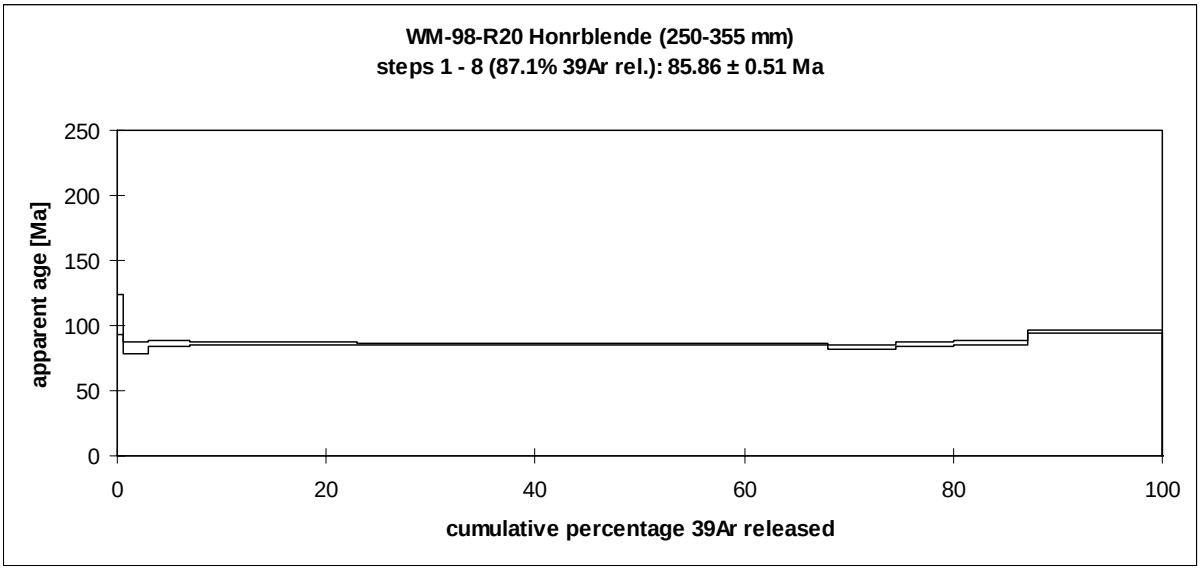

Fig. 3: $^{40}Ar/Ar^{39}$ results from Tincova (sample nr. 8/20)

All over all the data cluster in three different age groups. The youngest ages range from 61.42 ± 0.34 Ma to 71.59 ± 0.40 Ma, the second group of data set ranges from 77.65 ± 0.29 Ma to 78.27 ± 0.59 and an older age group from at 85.86 ± 0.51 Ma to 89.48 ± 0.35 Ma.
For the sample Ciclova (9/12) we calculated pressure and temperature from amphibole and plagioclase thermo-barometry. The Ciclova intrusion according to these results equilibrated at a pressure of 750 bar at around 700°C. Rim components underline a subsequent hydrothermal influence on the intrusion body.
Our new $^{40}Ar/^{39}Ar$ ages from banatitic magmatic intrusions, especially the young ages do not conform the data we know so far from the literature. They show a younging towards the Pannonian basin and an increase of ages from the outer, more eastern samples. They constrain three different geological events. One in Maastrichtian time, one during Campanian and the third one around Turonian – Santonian.

We can draw the following conclusions from our primarily studies:
-The new $^{40}Ar/^{39}Ar$ data show three different age groups: a young one around 61 – 72 Ma a second one around 78 Ma and an third one at 86 – 89 Ma.
- The younger ages occur in the inner alignment, as the older ages occur more in the eastern, external sample locations, consistent with recent results in Romania and Bulgaria.
- P-T estimates show a later hydrothermal imprint in regard to the low equilibration temperature of 700°C and a very low intrusion level of 750 bar.

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