VARISCAN VS. ALPINE TECTONOTHERMAL EVOLUTION WITHIN THE EASTERN ALPS AND WESTERN CARPATHIANS, AUSTRIA – SLOVAKIA

R.D. DALLMEYER[1], F. NEUBAUER[2], H. FRITZ[3], M. PUTIS[4]

[1] *Dept. of Geology, University of Georgia, Athens, GA 30602, USA.*

[2] *Dept. of Geology and Paleontology, University, Hellbrunnerstr. 34, A–5020 Salzbu;rg, Austria.*

[3] *Dept. of Geology and Paleontology, University, Heinrichstr. 26, A–8010 Graz, Austria.*

[4] *Dept. of Mineralogy, University, Mlynska dolina 17, 84215 Bratislava, Slovakia.*

$^{40}Ar/^{39}Ar$ dating has been completed along a traverse across the Inner Western Carpathians (IWC) to compare timing and succession of pre–Alpine and Alpine tectonothermal events with those recorded in the Eastern Alps (EA).

A preliminary data set include the following results from the hangingwall to footwall units within the IWC (Figure 1) : Four phengite concentrates of the Meliata unit display internally consistent ages of 150.5±0.2 Ma, 150.5±0.1 Ma, 158.5±0.2 Ma, 160.0±0.1 Ma (not shown in Fig.1). Whole rock phyllite within the Permian cover on the Gemeric basement yielded a plateau age of 105.8±0.3 Ma, that within the Veporic cover 85.2±0.2 Ma and 86.4±0.2 Ma. Muscovite records plateau ages of 86.9±0.2 Ma (Permian sequences) and 83.9±0.4 Ma (mylonitic granite of the Pohorela line within the Veporic

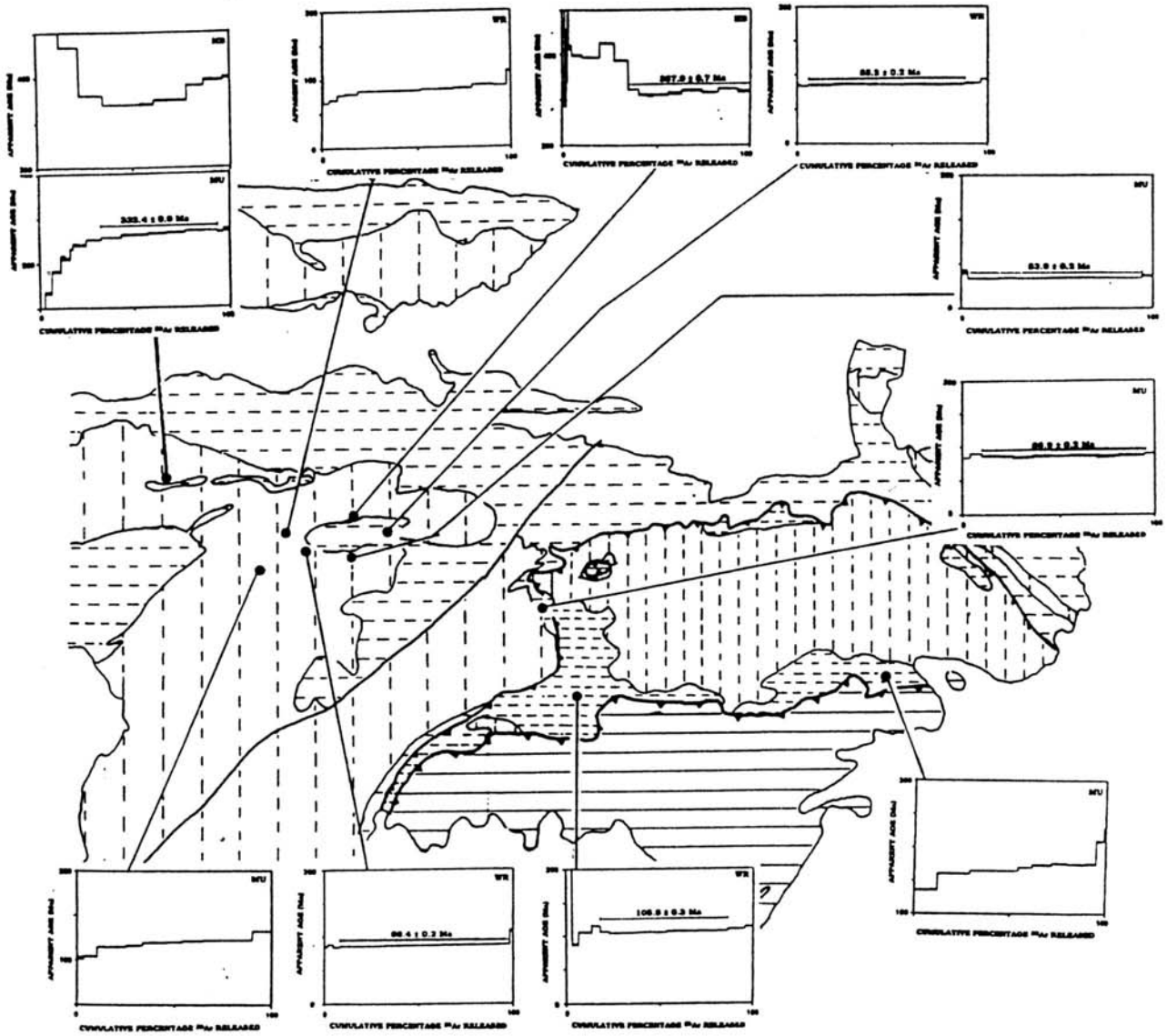

Figure 1: Simplified geological map of the Inner Western Carpathians with argon release spectra of muscovite (MU) and hornblende (HB) concentrates and whole–rock phyllite samples (WR).

basement). A similar, but slightly discordant spectra (total gas age: 84.6±0.3 Ma) is recorded by a whole rock phyllite of the Permian cover from the (Supra–)Tatric unit.

The Alpine metamorphic overprint did not exceed greenschist facies conditions throughout most portions of the IWC. A muscovite concentrate from a mylonitic orthogneiss within a regional important, pre–Alpine high temperature thrust zone in the Tatric basement yielded a plateau age of 332.4±0.6 Ma and records c.10% argon loss in low temperature increments as a result of an Alpine metamorphic overprint. This is confirmed by an isotope correlation age with a 357±0.7 Ma in high temperature portions of a hornblende concentrate.

Comparison with previous data from the EA we conclude: (1) mineral data from the Tatric basement record Early Carboniferous cooling after pre–Carboniferous thrusting (not observed in the corresponding basement units of the EA); (2) the Meliata oceanic suture was closed during late Jurassic as revealed by the phengite data; and (3) the Middle to Late Cretaceous data record loading of Meliata suture onto the Austroalpine unit and younging of thrusting from hangingwall to footwall units within a time interval similar to the Eastern Alps. The ca. 85 Ma ages from the Veporic cover are significantly younger than those within corresponding Middle Austroalpine units in the Eastern Alps (ca. 100 – 93 Ma) suggesting diachronism within respectively dissimilar crustal levels during Alpine nappe emplacement.

In contrast to previous models, the data sets from EA and IWC record a footwall propagation of thrusting within a thick–skinned tectonic wedge from hangingwall to footwall units beneath an ophiolite–bearing suture zone (Meliata zone of IWC). The $^{40}Ar/^{39}Ar$ mineral data reveal the early Alpine succession of thrusting and subsequent extension of the overthickenned orogenic wedge. Furthermore, the new mineral data do not record any tectonothermal overprint of the Austroalpine/IWC units during late Alpine (early Cenozoic) emplacement onto the Penninic units during collision with the European foreland.

VARISCAN VS. CADOMIAN TECTONOTHERMAL EVOLUTION WITHIN THE TEPLÁ–BARRANDIAN ZONE, BOHEMIAN MASSIF, CZECH REPUBLIC: EVIDENCE FROM $^{40}Ar/^{39}Ar$ MINERAL AND WHOLE–ROCK SLATE/PHYLLITE AGES

R.D. DALLMEYER[1], M. URBAN[2]

[1] *Department of Geology, University of Georgia, Athens, Georgia, U.S.A.*

[2] *Department of Geology, Charles University,128 43 Praha 2, Albertov 6, Czech Republic*

Slate/phyllite derived from Late Proterozoic flyschoid protoliths near the first appearance of prograde chlorite in southeastern of the Teplá–Barrandian Zone (location 9, Fig. 1) displays an internally discordant, whole–rock 40Ar/39Ar release spectrum which reflects extensive Early Variscan rejuvenation (c. 380 Ma) of constituent, very fine–graded white micas which initially crystallized concomitant with penetrative fabric development at c. 500 Ma. Whole–rock slate/phyllite near the first appearance of prograde biotite (location 7) records a plateau age of c. 376 Ma which reflects complete Early Variscan rejuvenation.

Muscovite from five schist/gneiss samples collected across the Tepla–Barrandian metamorphic gradient (locations 2,3,5,6,10) record plateau ages which range between c. 362 Ma and 375 Ma. These date diachronous cooling following culmination of Early Variscan tectonothermal activity. Hornblende from amphibolite interlayered with higher grade metasedimentary sequences (location 4) records a post–metamorphic cooling age of c. 383 Ma.

Muscovite from deformed Tis Granite near the first appearance of prograde biotite in host metasedimentry units (location 8) displays an internally discordant spectrum which reflects extensive Early Variscan (c. 375 Ma) rejuvenation of intracrystalline argon systems which had initially cooled through post–magmatic closure temperatures prior to c. 500 Ma. Hornblende from undeformed diorite within the Kdyně Basic Complex (exposed near the prograde chlorite isograd developed in host metasedimentary rocks: location 11) defines a plateau age of c. 516 Ma which dates post–magmatic cooling through appropriate argon retention temperatues. Hornblende from metagabbro in the Mariánské Lázně Complex (exposed within the garnet–staurolite zone: location 1) records a well–defined plateau age of c. 372 Ma which dates cooling following culmination of Early Variscan metamorphism.