

Rb-Sr ISOTOPIC EVIDENCE FOR POLYMETAMORPHISM IN THE DOMAŽLICE CRYSTALLINE COMPLEX FROM A STUDY OF MICA-FELDSPAR PAIRS IN A SEGREGATION PEGMATITE NEAR STRÁŽ, WESTERN BOHEMIA

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An Rb-Sr isotopic study of muscovite plagioclase and biotite plagioclase pairs in coarse-grained segregation pegmatite whose crude foliation is continuous with the dominant foliation in the host psammitic-semipelitic schists gives evidence of two thermal events separated by more than 100 Ma. Two pairs of muscovite porphyroblasts (books 4 - 5 cm across aligned within the foliation) and matrix plagioclase give ages of 501 ± 4 and 492 ± 3 Ma. The biotite porphyroblasts, which are up to 6 cm across, are variably disposed, some within the foliation and some randomly. One biotite-plagioclase pair gives an age of 373 ± 3 Ma.

Low Rb contents in both the pegmatite (35 ppm) and the host rock (90 ppm) and their complementary REE patterns are consistent with formation as the result of metamorphic segregation rather than intrusion and crystallization of LILE-rich melt. On the basis that the foliation in the pegmatite formed at the same time as that in the host rocks, the age of the dominant foliation-forming phase of deformation in the metasedimentary schists that are in the regionally-expressed garnet zone 4 km S of Domažlice is interpreted as being Tremadoc (earliest Ordovician). The mid-late Devonian biotite-plagioclase age is interpreted as giving the time of a thermal event during which there was isotopic re-equilibration between these two minerals, associated with the growth of some biotite across the foliation. On the assumption that the composition of the large muscovites did not change during this later and lower temperature event the Sr isotopic composition of the plagioclase constrains any reduction of the true muscovite-plagioclase age due to isotopic equilibration between plagioclase and early-formed biotite to less than 10 Ma.

The data available do not permit ready integration of this new geochronological information into the regional geology. The early Ordovician (496 ± 1 Ma) U-Pb zircon age recorded from the Mariánské Lázně complex 60 km to the N relates to the magmatic crystallization of a gabbro pegmatite in an ophiolitic assemblage (BOWES & AFTALION, 1991) and not to a tectonothermal regime like that in which the early Ordovician Stráž segregation pegmatite developed. In addition, the occurrence of these ophiolitic rocks with other lithological units, including eclogites, in an allochthonous tectonic stack (BOWES et al., 1992) means that the original positions relative to one another before Hercynian tectonic activity of the two very different lower Ordovician lithological assemblages are not known. It is possible that the Stráž rocks themselves are part of a tectonic slice thrust into the Domažlice crystalline complex as the Teplá-Barrandian assemblage, which includes the

Domažlice complex, was metamorphosed and deformed before the deposition of lower Cambrian sediments in the Barrandian basin. Even if this was as late as 530 Ma (cf. PATCHETT et al., 1980), and there is no unanimity about the early Cambrian time-scale, it pre-dates by at least 20 Ma the age of the Stráž segregation pegmatite determined from the Rb-Sr isotopic systems of the muscovite-plagioclase pairs. Also to be taken into account is the lack of expression in the Rb-Sr isotopic system of the biotite-plagioclase pair of the early Carboniferous tectono-thermal event(s) so prominently expressed in other parts of the Bohemian Massif (cf. AFTALION et al., 1989).

Generally coeval with the products of the mid-late Devonian reheating shown in the Stráž rocks are granitoid rocks, formed in an arc-type environment, and now seen as the Staré Sedlo and Mirovice gneisses in central Bohemia (U-Pb zircon data; KOŠLER et al., 1993), and eclogites in the eastern Bohemian Massif (Sm-Nd data; BRUECKNER et al., 1991) indicative of plate tectonic activity. Whether the 380 - 370 Ma K-Ar mineral ages for the northwestern part of the Massif (KREUZER et al., 1989) represent corresponding activity and what relationship generally coeval events in the Polish segment bear to the events in the main part of the Massif are matters requiring further investigation. The same is the case for the significance in the development of the Bohemian Massif of the new Rb-Sr data presented here. With a multi-episodic history that reflects the operation of polymetamorphism, polyphase deformation including many phases of thrusting, and multiple igneous injection, not only is much more isotopic data needed, but data that can be linked, without ambiguity, to geological events.

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THE PRE-ALPINE CRUST IN THE ROMANIAN CARPATHIANS

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Reconstructions of the Alpine sedimentation domains by retrotranslation of nappe transport suggest that the Variscan basement included in the Alpine tectonic units