lithospheric domains. Careful isotopic study could constrain their ages and solve their history.

This research was financially supported in part by the Research Programme No. J13/98:113100005 of the Czech Ministry of Education and by the Grant Agency of the Czech Republic (Grant No. 205/98/K004 to K. Schulmann).

References

CANNING J.C., HENNEY P.J., MORRISON M.A., VAN CALSTEREN P.W.C., GASKARTH J.W. and SWARBRICK A., 1998. The Great Glen Fault: a major vertical lithospheric boundary. *J. Geol. Soc.*, 155 (3): 425-428.

HOLUB F.V., 2000. Geochemical signature of subduction-related processes in composition of Variscan intrusive rocks of the Bohemian Massif. *Geolines*, 10: 30-31.

HOLUB F.V., ROSSI PH. and COCHERIE A., 1997. Radiometric dating of granitic rocks from the Central Bohemian Plutonic Complex (Czech Republic): constraints on the chronology of thermal and tectonic events along the Moldanubian-Barrandian boundary. *C. R. Acad. Sci. Paris, Sci. terre planet.*, 325: 19-26.

ŽÁK K., VLAŠÍMSKÝ P. and SNEE L.W., 1998. Datování vybraných hornin příbramské rudní oblasti metodou Ar/Ar a otázka stáří polymetalické hydrotermální mineralizace. *Zpr. geol. Výzk. v R. 1997*, 172-173.

Neogene Deformations of the Core Mountains of the Central Western Carpathians as Indicated by Magnetic Anisotropy

František HROUDA[1,2], Dušan PLAŠIENKA[3] and Dagmar GREGOROVÁ[4]

[1] *AGICO Inc., Brno, Czech Republic*
[2] *Institute of Petrology and Structural Geology, Charles University, Praha, Czech Republic*
[3] *Geological Institute, Slovak Academy of Sciences, Bratislava, Slovak Republic*
[4] *Geophysical Institute, Slovak Academy of Sciences, Bratislava, Slovak Republic*

The Central Western Carpathians, unlike to the Alps and other mountain chains, do not create a continuous mountain range, but crop out as the so-called Core Mountains within the mostly unfolded Central Carpathian Palaeogene and Neogene cover rocks. In some Core Mountains, for example the Branisko and Čierna Hora Mts., Vysoké Tatry Mts., Veporské vrchy Mts., the magnetic fabric is deformational in origin, showing similar patterns in metamorphic, granitic and Cover Formation sedimentary rocks within each Core Mountains, but different orientations between the Core Mountains. This magnetic fabric is regarded as resulting from Alpine ductile deformation associated with metamorphism acting during Upper Cretaceous creation and motion of the Central West Carpathian nappes which strongly overprinted the older magnetic fabrics in all rock types. In other Core Mountains, for example the Strážovské vrchy Mts., Povážsky Inovec Mts. or the Malé Karpaty Mts., the effect of the ductile deformation is much weaker and the magnetic fabrics in different rock types are in general not coaxial.

The degree of AMS and the magnetic fabric shapes are relatively homogeneous in all the bodies investigated both in metamorphic and granitic rocks but the orientations of the magnetic fabrics are different. Consequently, it is very unlikely that the stress and strain fields controlling the formation of magnetic fabric had more or less the same magnitudes in all the Core Mountains but different orientations of the principal directions in each Core Mountains. It seems to us more probable that the orientation of magnetic fabric was rather homogeneous originally in each superunit and only later, during splitting the superunits (mainly the Tatric one) into rigid blocks under extensional regime, tilting and rigid body rotations of smaller segments took place, the magnetic fabric was differentiated in orientation as observed today. This idea is also supported by the AMS data from sediments of the Central Carpathian Palaeogene Basin. The magnetic fabric in marginal areas of the Central Carpathian Palaeogene Basin is partially to entirely deformational in origin which indicates an existence of Neogene ductile deformations within the Central West Carpathians. In the Neogene, when the Flysch Belt of the Western Carpathians was folded and thrust, the Central Western Carpathians experienced only less intense deformations. These deformations were represented by rigid body rotations in strong metamorphic and granitic rocks and ductile deformations in soft Central Carpathian Palaeogene rock.

The Magnetic Fabric in the Žulová Pluton and its Tectonic Implications

František HROUDA[1,2], Jaroslav AICHLER[3], Marta CHLUPÁČOVÁ[4] and Martin CHADIMA[5]

[1] *Institute of Petrology and Structural Geology, Charles University, 128 43 Praha, Czech Republic*
[2] *AGICO Inc., 621 00 Brno, Czech Republic*
[3] *Czech Geological Survey, Jeseník, Czech Republic*
[4] *PETRAMAG, Boháčova 4-866, 149 00 Praha, Czech Republic*
[5] *Department of Geology and Palaeontology, Masaryk University, Brno, Czech Republic*

The Žulová pluton outcrops as a triangle-shape body in the northern part of the Silesicum demarcated at SW by the Marginal Sudetic Fault. The pluton represents a late-Variscan polyphase intrusive complex affected by the assimilation processes during its intrusion into metamorphic series. The fine- to medium-grained biotite granite to granodiorite represents the prevailing rock of the pluton, the amphibol-biotite quartz diorite and younger porphyric muscovite pegmatitic granite to pegmatite occurr less frequently. The granite tectonics is well developed in the rocks of the pluton, the steep S-planes have the NW-SE trend and Q & L-planes are mostly perpendicular to them. The results of the recently published dating show the Lower Viséan age for the main intrusion (Rb-Sr whole rock ages) and its uppermost Carboniferous coolling one ($^{39}Ar/^{40}Ar$ ages). The intrusion comes after the main Variscan tectonic and metamorphic events and has been recently linked by some authors with the late Variscan extensional tectonic regime in the Silesicum.

The bulk magnetic susceptibility of the Žulová pluton is relatively homogeneous and low, mostly ranging from the upper part of the order of 10^{-5} to the lower part of the order of 10^{-4} (in SI of units). This low susceptibility implies that the magnetic fabric is probably controlled by paramagnetic silicates (biotite), even though minor effects of magnetite cannot be excluded.

The anisotropy degree of the rocks of the Žulová pluton is relatively low, P <1.05 in the most specimens; only in a few specimens it reaches values up to 1.2. The magnetic fabric is very variable, ranging from clearly linear to clearly planar. The magnetic foliations of the most specimens are flat, only minor specimens show moderate dips and in rare specimens the dips are very steep up to upright. The magnetic lineations of the most specimens are sub-horizontal, in minor specimens they show moderate plunges and virtually none are vertical. The predominant orientation of the magnetic lineations is NW-SE.

The relatively low anisotropy degree and the magnetic fabric ranging from linear to planar imply that the magnetic fabric of the Žulová pluton is intrusive in origin. The magnetic foliations, being mostly flat, cannot contribute very much to solving the problem of the magnetic fabric origin. The magnetic lineations are virtually perpendicular to those in the neighbouring areas of the Rychlebské hory Mts. and the Hrubý Jeseník Mts. This implies that the magnetic fabric in the Žulová pluton was not affected by the tectonic movements that formed the structures of the above mountains.

A Model for the Mechanism of the Alpine Overprint of Magnetic fabric in the Late Variscan Vepor Pluton granitic rocks, Western Carpathians

František HROUDA[1,2], Marián PUTIŠ[3] and Ján MADARÁS[4]

[1] AGICO Inc., Box 90, CZ-321 00 Brno, Czech Republic
[2] Institute of Petrology and Structural Geology, Charles University, Albertov 6, CZ-128-43 Praha, Czech Republic
[3] Department of Mineralogy and Petrology, J.A. Comenius University, Bratislava, Slovak Republic
[4] Dionýz Štúr State Geological Survey, Mlynská dolina 1, Bratislava, Slovak Republic

In the Veporic unit of the Central Western Carpathians, the magnetic fabrics are roughly coaxial in metamorphic and granitic rocks of the basement and in sedimentary rocks covering the basement. This coaxiality can be most simply explained by assuming an effect of the ductile deformation, probably Alpine (Cretaceous) in age, on all the rock types and overprinting up to obliterating their magnetic fabrics. However, there is a problem of the temperature-pressure conditions under which the deformation took place. They should have been high enough to soften the strong metamorphic and granitic rocks sufficiently to be deformed ductilely, and low enough not to transform the soft sedimentary cover rocks into macroscopically identifiable metamorphic rocks.

In mylonitized granitic rocks, the primary magmatic minerals, among which Ti-rich biotite$_1$ preserving its flaky form with abundant small needles of rutile (sagenite) and leucoxene inclusions are the most conspicuous, are recrystallized into the newly--formed Alpine mylonitic/metamorphic mineral assemblage: quartz, albite, epidote, clinozoisite, chlorite, low-Ti biotite$_2$, sericite-phengite, titanite$_2$, leucoxene, ±calcite, garnet (grossular-rich) forming the mylonitic fabrics. Plagioclase and biotite$_1$ are substituted by finely-flaked aggregates of muscovite-phengite. Plagioclase and potasium-feldspars are replaced by albite with intergrowths of sericite and epidote-clinozoisite. In places, large titanite crystals are resorbed by magmatic plagioclase, thus indicating magmatic origin of at least a part of titanite, too. Part of gneisseous and migmatitic mantle of granitoids was changed to Alpine Cld-Grt(Alm with Grs rich rim) meta-schists. The temperatures of 450–480 °C were estimated on the basis of petrogenetic grid, mechanical behaviour of rock-forming minerals and measured CPO fabrics. The pressures of 800–900 MPa were estimated using Phe geobarometer in mylonitic rocks, where an association of phengite with biotite and potasium-feldspar is present.

The age of the intrusion of the Vepor pluton is Late Variscan (U-Pb ages on zircon are 295 ± 5 Ma for granites to granodiorites and 303 ± 2 Ma for tonalites, Bibikova et al. 1990). A muscovite-phengite concentrate of a granite mylonite was dated at 83.9 ± 0.4 Ma by the ^{40}Ar-^{39}Ar method (Dallmeyer et al. 1993, 1996). The ages of 93 ± 7 and 88 ± 4 Ma of the finely--flaked fraction (<0,3 mm) biotite$_2$ were obtained by the Rb-Sr method (Bibikova et al. 1990).

As the magnetic fabrics in metamorphic and granitic rocks are coaxial with the deformational magnetic fabrics of the Permian-Mesozoic sediments of the Cover Formation, it is likely that their formation took place during the above Alpine metamorphism. The originally strong metamorphic and granitic rocks were softened due to metamorphism and underwent ductile deformation which gave rise to coaxial magnetic fabrics in metamorphic, granitic and sedimentary rocks of the Cover Formation.