

used to derive P-T-conditions applying multiequilibrium methods (TWEEQU according to BERMAN, 1991) and conventional geothermobarometers, resulting in 570 - 650 °C and 5.5 - 7 kbar. Nonequilibrium textures as (1) continuous chemical zoning of garnets, (2) the replacement of garnet by biotite and fibrolite and (3) the growth of porphyroblasts of andalusite including kyanite and fibrolite are typical and were used to constrain the P-T-path during P-release: Application of the Gibb's method (SPEAR, 1991) shows a prograde growth of garnet with decreasing P. Quantification of the garnet breakdown using the SGAM-geothermobarometer (McMULLIN, 1991) revealed temperatures of 550 - 600 °C and rather low pressures of about 4 kbar. Andalusite formation is thought to represent the final indication of the Variscan P-T-evolution.

In summary, the magmatic and metamorphic evolution of the western Ötztal basement is characterized by an emplacement of acid magmatic rocks followed by high temperature metamorphism leading partly to migmatization during the Caledonian event. The dominant metamorphic overprint occurred during the Variscan orogeny which is characterized by a P-T-evolution from eclogite- to amphibolite-facies conditions.

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- CHOWANETZ, E. (1990): Der Winnebachmigmatit (Ötztal/Tirol): Argumente für eine altpaläozoische Anatexis. - Unpubl. diploma thesis, University of Vienna.
- BERMAN, R. G. (1991): Thermobarometry using multi equilibrium calculations: A new technique with petrological applications. - *Can. Min.* **29**, 833 - 855.
- McMULLIN D. W. A. et al. (1991): Calibration of the SGAM thermobarometer for pelitic rocks using data from phase equilibrium experiments and natural assemblages. - *Can.Min.*, **29**, 889 - 908.
- SPEAR F.S. et al. (1991): Computer programs for petrologic P-T-t path calculations. - *Am. Min.*, **76**, 2009 - 2013.

MODELLING OF MAGNETIC ANOMALY SOURCES IN THE AREA OF LIEBENAU AND ITS IMPLICATIONS

HÜBL, G., SLAPANSKY, P., BELOCKY, R., SEIBERL, W. & HEINZ, H.

Geological Survey of Austria, Dept. of Geophysics, Vienna

The main target of this study has been the development and application of easily usable program packages to calculate source bodies of magnetic anomalies and more over to interpret the results in respect to geochemical and geological evidences. Close reference is made to the papers and posters by SLAPANSKY et al. (1994) and HEINZ & SEIBERL (1994). As a result the program MAGI has been deve-

loped which offers advantages such as several interactive functions due to established algorithms used in magnetic modelling and high resolution graphics.

Several cross sections across the magnetic macrostructure near Liebenau have been calculated. 2-D, 2½-D and 3-D models are available and point to an irregularly shaped body with its flanks marked by accumulations of magnetite. The source bodies of the magnetic anomalies are obviously due to fault systems like e.g. a lineament parallel to the Vitis fault or the Pfahl direction. The calculated susceptibility values are in good accordance with the measured values from the anomalous granite type "Karlstift".

The bottom depth distribution of these bodies and the Hirschenschlag structure, as well as the Nebelstein-area indicates a tilting of this part of the Bohemian Massif, which is supported by the results of isotopic and fluid inclusion studies.

FLUID INCLUSION STUDIES IN THE AUSTRIAN MOLDANUBIAN ZONE: IMPLICATIONS FOR A RETROGRESSIVE EVENT

JAWECKI, Ch.

Institute of Petrology, University of Vienna, Austria

The aim of this study is to correlate the results of fluid inclusions investigations with the metamorphic history of the Austrian Moldanubian Zone.

Geology: The Moldanubian Zone exhibits a nappe like structure striking NNE-SSW and dipping towards SE. It is intruded to W by the Southern Bohemian Pluton. The eastern boundary is a tectonic contact to the underthrust Moravian Zone. The Moldanubian nappe pile consists of three main units. These are from bottom to top, the Monotonous Group (MG), the Varied Group (VG) and the Gfoehl Unit (GU). The MG mainly consists of paragneisses, the VG of amphibolites, para- and orthogneisses, calc-silicate rocks and marbles, and the GU of amphibolites and orthogneisses, which are overlain by granulites. Reported peak metamorphic conditions are about 700 °C and 4.5 kbar (P_{\min}) for the MG (LINNER, 1994), 700 - 770 °C, 7- 9 kbar for the VG (PETRAKAKIS, 1986) and 750 °C, 8.5 - 9 kbar for the GU (PETRAKAKIS & RICHTER, 1991).

Description of the fluid inclusions: Fluid inclusions were investigated in samples of the VG and GU. The studied lithologies comprise (garnet)-amphibolites, ortho- and paragneisses, calc-silicate rocks and granulites. Most inclusions are hosted by quartz, very few by garnet. They are arranged in trails and clusters, thus their origin is regarded as secondary. The widespread occurrence of transposition phenomena indicated by irregular shapes of the inclusions and bimodal size distribution is a typical feature.