

Two distinct crustal pieces are distinguished: (1) A Late Proterozoic terrane including the Moravian Nappe Complex and the Moldanubian Variegated and Monotonous Series and, (2) an Early Paleozoic terrane including Gföhl unit and granulite nappes (Gföhl terrane after FRANKE, 1989). The Raabs Serie is interpreted as an oceanic fragment separating these crustal blocks.

The Raabs Serie is defined by a highly metamorphosed meta-sedimentary sequence including metapsammities, metapelites and, to a lesser extent calcsilicates, marbles and quartzites which are closely connected with various types of amphibolites and serpentinites. The serpentinites derived from harzburgites and are extremely uniform in petrology and chemical composition. Al_2O_3 -CaO-MgO relations and petrology suggest metamorphic peridotites of oceanic or active margin origin.

Amphibolites differ in texture, mineral and chemical composition. Abundances of Rare Earth Elements (REE) normalized to average primitive mantle composition gave pattern subparallel to average E-type MOR-basalts for fine-grained plagioclase and garnet amphibolites (Fig. 1a). HFS element pattern normalized to N-type MORB are close to the unity line. Very coarse plagioclase amphibolites with gabbroic texture gave similar REE pattern but lower absolute abundances (Fig. 1b) and strong depletion of incompatible trace elements. Element patterns are explained by fractionation processes in gabbro respectively cumulate rocks.

A kinematic and geodynamic model which explains this situation includes: (1) The oceanic suture and hence the plate boundary is located within the Moldanubian Unit. Remnants of the suture are preserved in the Raabs and Letovice ophiolite bodies (MISAR et al., 1984). The Moldanubian/Moravian boundary is not a plate boundary but developed as a deep crustal decollement as an effect of continental underplating. (2) The Moldanubian Variegated Serie reflects an imbricated foreland unit and is comparable to the Moravo-Silesian Micaschist Complex.

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FLUID ACTIVITY DURING LATE STAGE OF VARISCAN DEFORMATION IN THE MORAVIAN NAPPE COMPLEX: PRELIMINARY RESULTS.

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The southeastern margin of the Bohemian Massif suffered polyphase deformation during late Variscan orogeny. Kinematic analyses indicate that NNE-directed thrusting is followed by extensional tectonics with partitioned displacement

directions (FRITZ & NEUBAUER, 1993). The deformation path started close to peak metamorphic conditions and progressed under retrograde metamorphic conditions whereas the deformation mechanisms changed progressively from ductile to brittle regime. The rheology during late Variscan retrogressive greenschist metamorphic conditions is characterized by brittle deformation of feldspar and ductily deformed quartz. Major portions of diffusional mass-transfer in mylonites with solution and precipitation processes are especially observed in highly strained rocks. This caused boudinage structures with quartz precipitation in extensional areas. We analysed fluid inclusions within these boudins in order to correlate P-T conditions and fluid regime with kinematics of these events (Fig. 1).

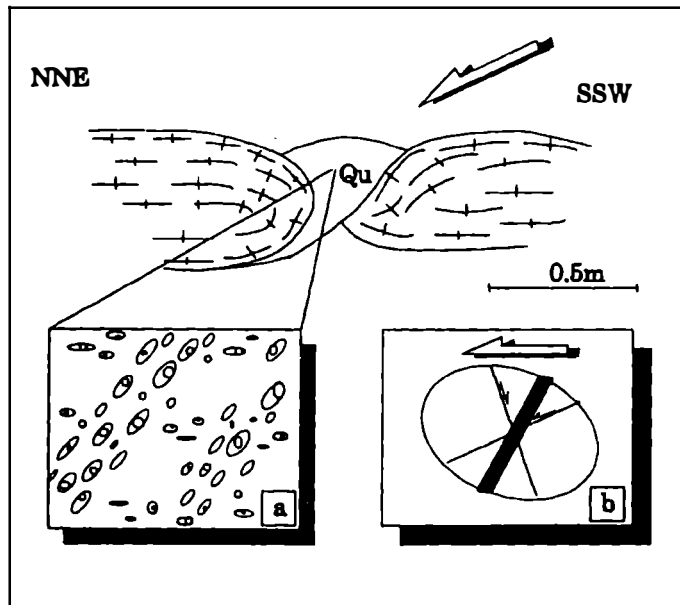


Fig. 1: Asymmetric boudin necks within the Bittesch Gneiss from the Hattey quarry and their kinematic interpretation (inset b). Orientation of inclusion trails are shown in inset a. Similar features occur in Weitersfeld Gneiss.

Syn- and antithetic microcracks as well as extension gashes developed within the boudin necks and along their margins and are used for kinematic interpretation. Fluid inclusion trails developed either parallel to the microcracks and hence are interpreted to reflect syntectonic trapping conditions (Fig. 1), or they are distributed randomly within the quartz grains. We analysed samples from the Moravian orthogneisses (Bittesch Gneiss, Weitersfeld Gneiss) and from Moravian marbles. Samples were taken from different structural levels and in a N-S section across different metamorphic isogrades (HÖCK et al., 1990).

- 1) Fluid inclusions from the Weikersfeld Gneiss at Weikersfeld: Dominant are 3 phase fluid inclusions which are parallel to shear- and extension cracks. Their composition is pure CO₂ gas and CO₂ liquid, and H₂O with salinity of approximately 7 - 8 wt%. A second type of H₂O fluids with approximately 7 wt% salinity is sub-parallel to the foliation and has a density of 0.95.
- 2) Fluids from the Bittesch Gneiss at Hattey quarry: CO₂ rich fluids have small portions of N₂ and/or CH₄, have low density and are oriented parallel to the foliation.
- 3) Fluids from the Bittesch Gneiss at Teichwiesenbachtal: First generation of H₂O rich fluids with 11 wt% salinity have densities in the range of 0.989 to 1.023. Second generation fluids with similar salinities have lower densities (0.891). Both types occur within recrystallized quartz grains.
- 4) Fluids from Moravian marbles at Waldschenke: CO₂ rich fluid trails are oriented parallel to shear- and extension veins.

Assuming coeval trapping of fluid types in the Weikersfeld Gneiss the isochores suggest P-T conditions of approximately 300 °C and 3,3 kb. Estimated temperatures fit very well the independent data from rheological behaviour of rock-forming minerals. Data from the southern portions of the Bittesch Gneiss (Teichwiesenbachtal) suggest two fluid-forming processes of high-density type followed by lower-density type. Microstructures and kinematic analyses from this area indicate polyphase evolution with HT-thrusting followed by LT-strike-slip displacement. The two fluid generations are interpreted to reflect this situation. The Bittesch Gneiss at Hattey quarry also suffered similar structural succession but only the LT features are preserved in the boudin necks where lower density fluids occur. Preliminary data suggest pressure decrease during progressive deformation.

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EUROPROBE - LITHOSPHERE RESEARCH ACROSS A UNITED EUROPE

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Europrobe was launched by the European Science Foundation in January 1992 and now involves several hundred geoscientists from twenty-two European countries. The programme includes a wide range of multidisciplinary (geological and geophysical) investigations, all devoted to a better understanding of the tectonic evolution of the European crust and mantle, and the dynamic processes that controlled this evolution. The very different character of the lithosphere in eastern