(Na_2O, K_2O), Rb), Th and Pb and a depletion of HREE and Hf. The enrichment may be caused by hydrothermal alteration and the depletion of HREE and Hf supports a significant fractionation of zircon.

The Sm/Nd whole rock data are scattering and the ε-Nd_{T-500} values are varying from +0.5 to +8.5.

The ε-Nd values (T-500 Ma) reflect as well as the Sr-Nd-Pb isotope data an enrichment of a possible depleted source material. Sr-Nd-Pb isotope data for the meta-gabbros prefer a mixing between N-MORB and EM I (Nd-Sr) as well as EM II (Sr-Pb; Zindler and Hart, 1986). No sign for a participation of a HIMU source is given.

The U/Pb-isotope data of the whole rocks (meta-gabbro) with a Pb content varying between 2.77 and 4.72 ppm and a U content varying between 0.283 and 0.557 ppm is slightly enriched compared with the N-MORB data (Hofmann 1988). The $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$ and $^{208}Pb/^{204}Pb$ data are representing a mixture between the N-MORB and EM II field characteristics (Zindler and Hart,1986).

The μ-values ($^{238}U/^{204}Pb$) are very constant between 9.51 and 9.55 indicating a homogenous U/Pb distribution of the source material/ mixing process. The data points plot above the NHRL (Northern Hemisphere Reference Line) and below the crustal evolution line of Stacey & Kramers.

Conclusion: Meta-gabbros, occurring at different localities within the pilote bore hole (1240-6550m), belonging to the same geological unit based on structural and petrographical investigations as well as on U-Pb zircon results from the meta-gabbros. Sr-Nd-Pb isotope data and the trace element data (including REE) point to an enriched mantle source for the meta-gabbros; these isotope characteristics may be interpreted as a mixing process between a MORB- and EM I-type source.

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KINEMATICS AND TIMING OF THE DUCTILE TO BRITTLE TRANSITION IN MYLONITES FROM THE ELBE ZONE - ERZGEBIRGE BORDER SHEAR ZONE (MID-SAXONIAN FAULT, EASTERN SAXOTHURINGIAN)

H. RAUCHE

Institute of Geology, Ruhr-University Bochum, Universitätsstrasse 150, 44780 Bochum, Germany

The eastern margin of the Saxonian Erzgebirge is characterized by the juxtaposition of the high-grade metamorphics of the Erzgebirge Crystalline Complex and the low- to very low-grade Paleozoic rocks of the Elbe zone. Mineral assemblages of the high-grade gneisses and metabasites show evidence for a high pressure peak metamorphism followed by near isothermal decompression (e.g. Massone 1991). This area represents an important reduced metamorphic sequence in the Saxothuringian and can only be explained by post-collisional extension.

Mylonites of more than 500 m thickness occur between the high-grade gneisses and the phyllites. This NW striking shear zone is known from the Cretaceous sedimentary cover near the Bohemian border to the Permo-Carboniferous volcanic complex at the northern edge of the Saxonian Granulite Massif as Mid-Saxonian Fault (in German: *Mittelsächsische Störung*, PIETZSCH, 1917).

The mylonites were produced during two different strain stages (Rauche 1992): The first strain episode is documented by the subhorizontal stretching lineation and the mylonitic foliation. Quartz and plagioclase reacted by crystal plastic processes. Porphyroclast systems and crystallographic preferred orientation of quartz and micas indicate dextral simple shear. S-C mylonites formed in a later increment of this episode. The plagioclase deformed by cataclasis, while quartz and white mica still reacted by crystal plastic processes. For reconstruction of the kinematics of this ductile deformation it is necessary to account for post-Permian block tilting. The Permian sediments of the Döhlen through overlaying the mylonites show an average inclination of 20 to 30° to NW or N. After restoring these to the horizontal the stretching lineation of the mylonites is inclined with 10 to 30° to the SE and indicate dextral oblique slip with a normal component.

The second strain stage is represented by NE dipping shear bands which indicate a SW directed movement of their hanging wall. Only quartz reacted by crystal plastic processes. Inside the shear bands feldspar and micas are fractured. In the higher parts of stratigraphic column strain was localized in semiductile to brittle discrete thrusts which generate the imbrication of the Paleozoic rocks from different depositional environments (*Thuringian* and *Bavarian* facies; Kurze & Tröger,1991). The last pre–Permian deformation features are represented by brittle dextral normal faults. K/Ar ages for phengite, muscovite and biotite separated from the mylonites illustrate the cooling path for the Mid–Saxonian Fault. The mylonites cooled from more than 420 °C to less than 250 °C between 370 and 290 Ma. The paleo–300 °C isotherm, which controls the ductile to brittle transition in quartzo–feldspathic rocks, was passed between 350 and 320 Ma. The youngest ductile deformation (Fig. 1) – the dextral normal strike–slip at NE dipping planes – controlled the cooling of the high–grade metamorphic rocks through uplift occurred 320 Ma (Visean).

In the regional setting this process correlates with deposition of coarse–grained sediments and exogenic melanges in late Lower Carboniferous time. These sedimentary complexes indicate an steepening of the submarine relief, which is the result of the transtensional tectonics.

In general, the late Variscan uplift and exhumation of the deep– and mid–crustal rock complexes of the Saxothuringian was controlled by a set of ductile to brittle shear zones with both, strike and normal slip components.

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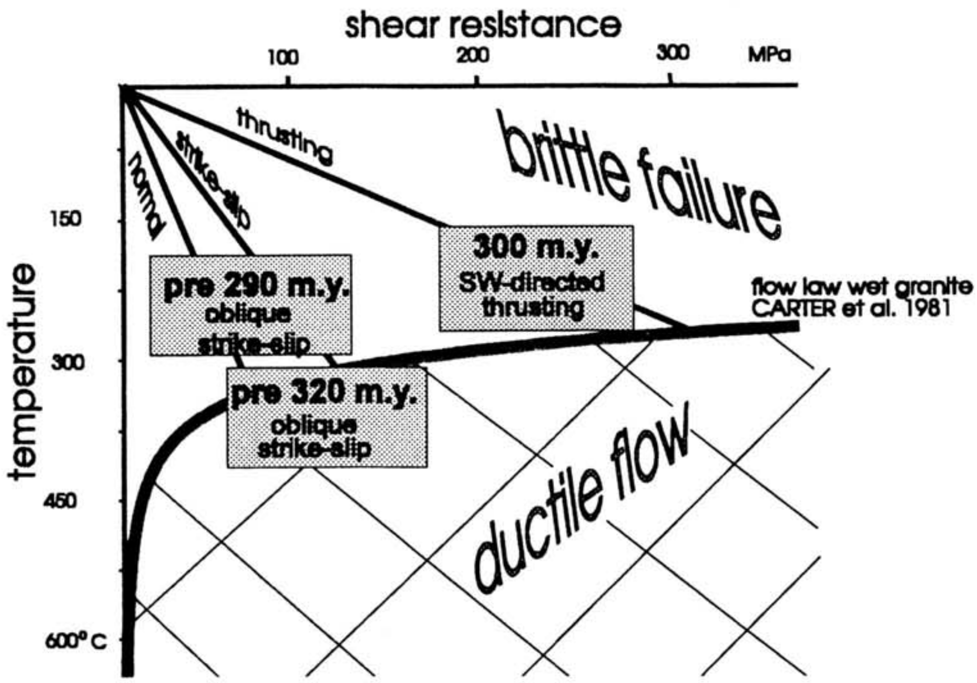

Fig. 1. Schematic diagram of Late Variscan strain history of the MidSaxonian Fault (Rauche 1992)