Dacian stages (5 Ma ago).The motion along the young Mur – Little Carpathian – Žilina tectonic zone notably contributed to the present – day orographic distinction of the Little Carpathians.

It was found that the genesis of the focal regions with occurrence of the strongest earthquakes is connected with several movement trends in last 5 Ma. Six more or less tectonically separate regional units were revealed. The earthquake epicenters often concentrate along the boundary lines of these neotectonic units.

U–PB ZIRCON DATA AND PB–SR–ND ISOTOPE GEOCHEMISTRY FROM META–GABBROS FROM THE KTB BORE HOLE

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Meta–gabbros of the continental deep drilling (KTB) from depths at 1240,1340, 3610, 3718, 3835, 4690, 6450 and 6550 m are analysed for major–, trace– and rare earth element data as well as for Rb/Sr–, U/Pb–, Sm/Nd– and Pb/Pb isotope data.

U/Pb analyses from different zircon fractions of the meta–gabbros point to protolith ages reflecting an extensional evolution of an oceanic micro–basin. Several discordias with upper intercept ages among 475 and 493 Ma reflect the magmatic evolution of a source material for the meta–gabbros (Fig.1).The zircons from the meta–gabbros at depths 4690 and 6450 m reflect a shift to "younger" ages.

The Pb_{rad} contents of the zircon fractions are varying from 23.9 to 67.54 ppm and the U contents are in a range from 265 to 798 ppm, which is in line with other mafic–ultramafc occurrences; the grain size of the analysed zircon (>250 μm) speaks for an intrusion of this mafic material. As most zircon fractions plot near the upper intercept, the U/Pb system remains closed within the high–pressure event at L'Devonian (~390 Ma) and the granite intrusions with their fluids cannot open the U/Pb system of the zircons. The zircon fractions show no inherited old Pb components excluding one example from a depth at 4688 m (53–75 μm) reflecting an $^{207}Pb/^{206}Pb$ age of 510 Ma. Sm/Nd whole rock–garnet pairs from sample VB 1340 (398±20 Ma) and VB 3718 (385±15 Ma) reflect the high–pressure event in L'Devonian time.

The L'Ordovician protolith age of the meta–gabbros from the Zone of Erbendorf–Vohenstrauss gives an additionally piece of the puzzle of the European Hercynides. Similar protolith ages from the Münchberg gneiss massif, from the Saxonian granulite massif (von Quadt,1993), from the Hohe Bogen as well as the Variscan basement of the Alps (Eastern Alps; von Quadt, 1992) point to an extensional scenario of the geological environment. At that time (500 Ma) no high pressure event is known.

REE pattern of meta–gabbros from KTB–VB and KTB–HB exclude an N–type source for the mafc/ultramafic rocks. The LREE of the mafic rocks are slightly enriched (10–25 chondritic), no Eu anomaly is observed and the trace element distribution shows an enriched alkali content

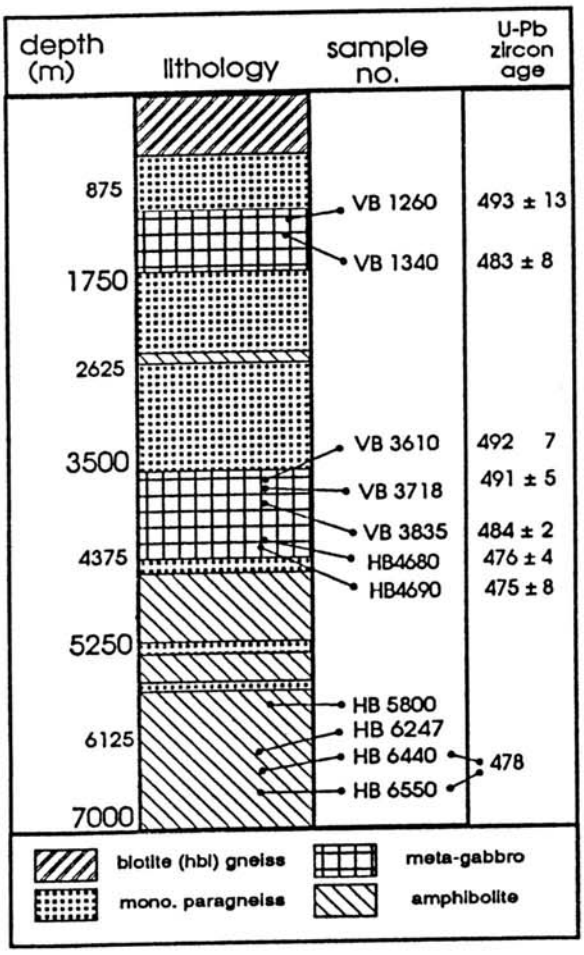

Fig. 1. Schematic profile of the KTB bore hole including the U–Pb zircon ages (upper intercept)

(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)

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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.