tion. In the last decades not only the potential filed geophysical database has expanded, but the methodology of data evaluation has also extensively improved. Thus, reprocessing the expanded data may considerably contribute to the understanding of some important problems of the Pannonian Basin.

Besides geophysical methods, geochemical and microstructural analyses of xenoliths carrying direct information on the deep crust and upper mantle also play an important role in the complex understanding of lithospheric evolution. These analyses provide further independent reliable results concerning the studied portions of the basin. These results in the paper are interpreted together with tha data produced by geophysical methods.

Based on the analysis of the 3-D tomographic velocity field the Rába and Balaton Line should be interpreted as significant shear zones, which occur along the full depth range of the crust. Along-section force field measurements indicate these structural zones as density and susceptibility contrasts running from the base of the Pre-Tertiary to lower crustal depths. This result supports the interpretation of the zones being deep shear zones. Magnetic and gravity maps also indicate the Rába and Balaton Line as deep structural zones in accordance with the geological information. Furthermore, the force field measurements imply that the Zágráb-Zemplén Line could also be interpreted as a deep shear zone, moreover, the existence of several other deep structural zones is foreseen. Since the volcanic bodies indicated by the magnetic maps represent processes occurring at deep crustal or even mantle depth these data also support that the structures may run down to greater depth

Based on the coincidence of geophysical data, the interpretation of the analysis of the 3-D tomographic velocity fields can be confirmed. Thus, the Rába and Balaton Lines are deep shear zones cutting through the whole crust, whereas the TCR unit occurs on the result-section as an "individual body", suggestibly in autochthonous position, different from its environment in the full vertical thickness. Geochemical and microstructural analysis of mantle xenoliths not only supports these interpretations but expands them to the upper mantle. Therefore, the TCR can be inferred as an individual lithospheric scale unit, which is bounded on the North by the Rába-(Diósjenő-Hurbanovo) Line and from the South by the Balaton Line being shearzones running down to upper mantle depth. It still a matter of debate whether the TCR should be interpreted as a lithospheric fragment or a microcontinent. Shear zones with the suggested scale are mainly formed along horizontal displacement zones.

The tomographic sections do not indicate the Zágráb-Zemplén Line as a sharp feature. However, regarding force field geophysical and geological data this line is still inferred as a first order structural zone. Further, more detailed processing of the tomographic data (e.g., ray tracing inversion) could facilitate a more accurate imaging of the structural zone.

# New Occurrence of Variscan Micaschists within the Jurassic Meliata Unite, Western Carpathians

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PT conditions of the middle Jurassic metamorphism in the Meliata rocks, exposed on surface, range from very low-grade through high-pressure greenschist to blueschist facies. Amphibolite facies rocks (garnet-hornblende gneiss and amphibolite from Rudnik and micaschist from Zadiel) occurring in the eastern part of the Meliata are interpreted as fragments of older basement unit that were dragged down along the subduction zone. Variscan age of these rocks was confirmed by $Ar^{39}$-$Ar^{40}$ data (Faryad and Henjes-Kunst 1997) in muscovite from micaschists in Zadiel. Both amphibolite with gneiss and micaschist reveal clear evidence of blueschist facies overprint.

The micaschists studied here come from the western part of the Meliata unit and occur between Nižná Slaná and Hanková. They are characterized by the presence of large (up to 5 cm) columnar crystals that have random orientation in the rock. The spectacular large crystals are formed either by pseudomorphs of chlorite with relicts of hornblende or by glaucophane. The rock with hornblende has relatively high amounts (10 vol%) of epidote, which mostly form inclusions in white mica. All analyzed Ca-amphiboles are tschermakite near to pargasite with Si = 6.3 a.p.f.u., where A sit is occupied by near 0.5 a.p.f.u. and $X_{Na} = 0.23-0.27$. White mica is muscovite (Si ~ 3.15 a.p.f.u.) with high paragonite solid solution ($X_{Na} = 0.14-0.17$).

The samples with glaucophane have high amounts of quartz and contain idiobalstic garnet. Some garnet grains are enclosed by glaucophane. The large glaucophane crystals with fine-grained inclusions of epidote seem to be pseudomorphs after hornblende that might associated with garnet. Both micaschist varieties contain large (up to 1 mm) rutile crystals. Beside muscovite with relatively high paragonite solid solution, this rocks additionally has phengite (Si = 3.45 a.p.f.u.) with $X_{Na} = 0.04$. Garnet is rich in Fe and Ca with low Mn content ($Alm_{62}$, $Grs_{23}$, $Py_9$, $Sps_5$).

The studied micaschists occur adjacent to mafic blueschists, but their contact is not exposed. Minerals present in the blueschists are glaucophane, epidote, albite and chlorite. Some phyllites additionally contain quartz, phengite and rarely also paragonite and garnet. Comparing to micaschist, garnet in phyllite is strongly zoned with higher Mn and low Fe and Mg in core ($Alm_{33-62}$, $Grs_{21-35}$, $Sps_{6-33}$). PT conditions estimated based thermodynamic data of Berman (1988) and PTGIBS program of Brandelik and Massonne (2004) for the end-member reactions involving garnet, phengite, glaucophane, paragonite and quartz are 500 °C and 1.3 GPa.

$Ar^{39}$-$Ar^{40}$ dating from muscovite gave a well defined plateau age of 370 Ma which is similar to that in the Zadiel micaschists. Results of petrological study in combination with geochronological data indicate that amphibolite facies crustal rocks involved in the Jurassic subduction zone come from a basement unit that is not more exposed. Excepting garnet-amphibole gneiss and amphibolite from Rudnik that could be correlated with the Klatov group rocks, the micaschists differ from the underlying Gemericum by lithology, metamorphism and age. Remarkable information deduced from this observation is the preservation of textures (lack of younger deformation) and Variscan age, despite of heating up to 500 °C during high-pressure metamorphism.

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# Metamorphic PT Conditions Estimated for Eclogite and Garnet Peridotite from Spačice and Uhrov Localities, Bohemian Massif

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Several occurrences of eclogite bodies are known near Spačice and Uhrov (ca 80 km SE from Prague) for that pressures of 1.7–2.0 GPa and temperatures of 750–960 °C were calculated (Medaris et al. 1998). Higher pressure of 3.8 GPa at 1083 °C was obtained by these authors for garnet peridotite in Uhrov. We found mineral assemblages, indicating very high-pressure metamorphism in two eclogite bodies, one occurring in granulite near Spačice and other in serpentinized garnet peridotite from Uhrov. In the first case, eclogite forms up to ca 50 m long lens in granulite. It shows advanced degree of retrogression and partial equilibrium in granulite facies conditions. In the second case eclogite forms ca 20 cm thick and 2 m long layers (veins ?) that are partly deformed. In composition it corresponds to plagioclase-rich gabbro near to anorthosite. Both eclogites are formed by garnet, omphacite and kyanite. The eclogite from granulite contains two textural and compositional varieties of garnet and of clinopyroxene. The eclogite facies garnet – Gr I ($Py_{36}$, $Grs_{34}$, $Alm_{28}$) contains rutile inclusions and associates with omphacite Cpx-I ($Jd_{29}$). Some pyroxene analyses indicate ca 5 % Ca-eskola component. Garnet I is partly replaced by Al-rich clinopyroxene (Cpx II) and anorthite. A new Ca-rich garnet Gr-II ($Py_{10}$, $Grs_{65}$,$Alm_{23}$) that forms either individual grains or rims the coarse-grained eclogite facies garnet, indicate textural equilibrium with Al-rich clinopyroxene and plagioclase. There is a sharp compositional jump with a very weak diffusion profile between these two garnet varieties. Mn content is low in both garnet, but the Ca-rich garnet has relatively higher Mn, suggesting decomposition of older garnet. Small amount of tschermakitic amphibole replacing Ca-rich garnet is also present.

Metagabbro in garnet peridotite has relatively high-Mg garnet ($Py_{42}$, $Grs_{34}$, $Alm_{22}$) and omphacite with $Jd_{30}$. Similar to eclogite from granulite, garnet is replaced by Al-rich clinopyroxene and anorthite ± amphibole and kyanite by anorthite, spinel and locally. Garnet contains rutile needles that mostly have parallel orientation. Majorite content in garnet ranges between 0.6–1.3 mol%.

The surrounding garnet peridotite has relicts of olivine, orthopyroxene, clinopyroxene, spinel and rarely of amphibole. Chromium-rich spinel forms inclusions in garnet and in clinopyroxene. Compositional maps indicate progressive formation of garnet after spinel. Garnet is rich in Mg ($Py_{69}$,$Grs_{11}Alm_{18}$) and forsterite content in olivine is about 93 mol%. Clinopyroxene is diopside with $X_{Mg}$ = 0.9. Orthopyroxene with $X_{Mg}$ = 0.8 has $Al_2O_3$ about 1.7 wt.%. Spinel corresponds to Al-chromite with composition of $Mg_{0.54}Fe_{0.47}Al_{0.73-1.0}Cr_{0.8-1.19}O_8$.

Maximum PT conditions of ~4 GPa at 700 °C were calculated for eclogite. The garnet peridotite reveals pressure conditions similar to eclogite but at relatively high temperature of about 1000 °C. Textural relations and chemical composition, mainly the presence of Ca-rich garnet in eclogite suggest that decompression was followed by rapid cooling.

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