with the fault systems of the same direction in the western part of the Czech part of the USCB and continues as a Jeseníky Marginal Fault as far as to Opava town. The intrusions of neovolcanites and the occurrence of mineral water rich in CO_2 (Dopita et al. 1997) along this tectonic zone are an evidence of the Neoidic geodynamic activities.

Results of comparative morphotectonic analysis confirm also Alpine reactivation of many other Variscan structures (Michálkovice Structure, Orlová Fold-Fault Structure, Albrecht Fault, Olše Fault, Těšín Fault, Stonava Fault, Bludovice Tectonic Zone, etc.). The second main direction of rose diagram No. 3 (NNE-SSW) corresponds with direction of imprinted Michálkovice Structur and Orlová Fold-Fault Structure (Fig. 1). Rose diagrams No. 4 and No. 5 show main direction of drainage system (NW-SE) identical with Těšín Fault and Olše Fault. The Těšín Fault is part of the Jablunkov Tectonic Zone which is noticeable also in DTM of paleorelief of the Brunovistulicum with its Paleozoic cover (Jelínek and Grygar 2002).

Described Variscan structures reactivated by Alpine orogeny could be potential natural zones of methane's escape. The project has significant asset not only for localisation of natural zones of methane's escape but also for morphotectonic methodology. Developed ArcGIS extensions supplemented methods of morphotectonic and structure-tectonic study in GIS environment.

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Deformation Pattern Related to an Orogen Parallel Extension Event Recorded in the Vepor Unit, West Carpathians

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The Vepor unit composed of pre-Alpine basement and Late Palaeozoic to Mesozoic cover sequences is one of the major crustal segments incorporated into the Alpine structure of the Central West Carpathians. In this contribution we discuss deformation pattern related to Creataceous orogen parallel extension event recorded in the Vepor basement. The studied deformation heterogeneously affects late Variscan granitoids as well as Variscan high grade orthogneiss, migmatites and paragneiss. Cretaceous reworking of steeply inclined E-W trending Variscan fabric is characterized by the development of sub-horizontal mylonitic fabric in area of about 800 km^2 large. The mylonite foliation bears E-W trending stretching lineation, which is parallel to hinges of isoclinal folds preserved in low strain domains. The development of mylonitic fabric is associated with a prograde metamorphic mineral assemblage, which by using thermodynamic modelling in Perple_X indicates metamorphic P-T conditions 430–590 °C and 5–8 kbar. The distribution of P-T data in the central part of the Vepor Unit indicates an E-W metamorphic field gradient showing higher grade metamorphic conditions towards structural footwall in the west. This observation is in a good agreement with micro-structural analyses in this area showing higher temperature micro-structural features and bigger recrystallized quartz grain size in the west. Following

our P-T profile, the mean quartz grain size shows an increase from 63 to 95 microns towards the west. Such grain size variations were also recognised in other parts of the Vepor Unit proposing an existence of similar metamorphic field gradients across the whole studied domain. As a common feature the grain size generally decreases towards the meta-sedimentary cover indicating lower metamorphic conditions in the cover. In selected samples the quartz lattice preferred orientation (LPO) was determined by using electron back-scattered diffraction and computer integration polarization microscopy methods. Both the methods indicate activity of basal a, rhomb and prism a slip systems during the recrystallization, which is in a good agreement with calculated P-T range. The LPO determination revealed single and crossed girdle rotation patterns showing conflicting westward or eastward shear senses detected even in the same thin section. The absence of uniform shear sense during the deformation suggests a pure shear dominated process of ductile thinning operated in the Vepor basement. To explain structural and metamorphic evolution of above described horizontal crustal scale shear zone, we propose that the studied deformation is related to the overthrusting of the southern Gemer Unit upon the Vepor Unit resulting in an orogen parallel extension within the Vepor basement.

Tectonic Control and Basin Evolution of the Northern Transdanubian Eocene Basins (Vértes Hills, Central Hungary)

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The Transdanubian Palaeogene Basin was situated behind the active Carpathian thrust front (Tari et al. 1993). Due to the overprinting Neogene tectonic phases and the poor outcrop conditions, the origin of this basin was long-time debated; suggestions include extensional, compressional, and strike-slip settings (Báldi-Beke and Báldi 1985, Fodor et al. 1992, Tari et al. 1993). We used surface mapping, structural measurements, tectono-sedimentary observations and borehole analyses to describe Eocene sediment pattern around the Vértes Hills (northern Transdanubian Range) and to better understand basin evolution.

After Mesozoic carbonate sedimentation, a long period of late Cretaceous to early Eocene terrestrial denudation resulted in a sub-horizontal peneplain and the occurrence of bauxite lenses. The Eocene (late Lutetian–Bartonian) sequence started with a lagunal-marine coal-bearing clastic unit. It is covered with shallow marine marl, than open marine claystone. Sedimentation on basin margins were characterized by the Szőc Limestone Fm. deposited on low-angle, relatively narrow carbonate ramps. The inner ramp is represented by 4 microfacies types, extraclast rudstone to extraclast-bioclast floatstone (basal beds of Szőc Limestone), bioturbated Foraminiferal-Molluscan-Echinoiderm packstone/grainstone (interpreted as sea-grass meadows), skeletal grainstone (bioclastic sand shoals), and Nummulites perforatus rudstone/packstone (Nummulites banks). Mid-ramp is characterized by the predominance of larger Foraminifera under the influence of occasional storms. On the outer ramp glauconitic bioclastic grainstone composed of mainly larger foraminifera, red algae, and bryozoa deposited in current agitated high-energy conditions. The main influencing paleoecological factors were depth, light intensity, hydrodynamic energy, substrate, nutrient content, and sedimentation rates. The inner ramp was characterized by high energy well-lit conditions with the highest nutrient content and highest sedimentation rates. The mid ramp records oligotrophic environment with moderate/low energy and light conditions. The outer ramp is characterized by high hydrodynamic energy with low light intensity and low sedimentation rate (Pálfalvi 2004).

Sediment pattern was determined by two NE striking elevated ridges, (the Dad and Vértes ridges) and two parallel depressions. The development of the Eocene sequence is different on the NW versus SE side of the southerly located Vértes ridge. Thickness is smaller in the NW (Oroszlány depression) than in the SE (Kincses-Magyaralmás depression). The latter was characterized by the deposition of alternating molluscan, Miliolina or Nummulites marl and limestone (Kopek 1980) in a restricted/open lagunal to open marine environments in permanently shallow water conditions.

The Vértes ridge was dissected by NW to W trending syn-sedimentary monoclines, which are frequently breached by syn-sedimentary faults. Major cross-structures include the north–eastern and southern boundary fault of the Tatabánya depression, the Gesztes fault, the Zámoly-Bükk fault, which all have a strike-slip character. The north–eastern margin of the Csákberény trough, and the Nagyegyháza depression seem to be bounded by normal faults. The surface-rupturing faults were mantled with fault-bounded breccia or conglomerate bodies (Bada et al. 1996). Abrasion frequently rounded clasts derived from these scarps. The fault planes themselves or the abrasional gravels on the fault scarps are frequently bioperforated (Kercsmár 2005). The scarp-related limestones were frequently deformed during the diagenesis, due movement of underlying faults. The syn-diagenetic structures include boudinage, intraformational breccias and sedimentary dikes. Sedimentary dikes also occur along major structures. Seismic activity related to faults could induce redeposition of shallow water sediments toward basin centres in form of different cohesive gravity flows and was generated distally