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# Alpine and Variscan Orogenic Belts Interaction – an Example of the Morphostructural Analysis (Moravosilesian Region of the Bohemian Massif)

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Morphostructural analysis of the Moravosilesian region is based on comparison of the digital elevation models (DEM) with structural maps and structural field mapping, as for paleostress and brittle deformation analysis.

The DEM models of the studied area, based on the detailed digitisation of the topographic maps 1:25,000, were created using Surfer 7.0 and Arc View GIS 3D visualisation capability (Fig. 1). This was done for the Variscan foredeep (Nízký Jeseník Mts.) with coal-bearing molasse (Upper Silesian Basin) and Alpine Outer Carpathian Belt. The DEM of the buried pre-Alpine autochthon relief (so-called "Carboniferous Buried Mountains") based on results of drilling and mining (Aust in Dopita et al. 1997) was also compiled. This one was merged with Carboniferous relief of the Nízký Jeseník Mts. uncovered westward to obtain complex DEM of the pre-Alpine foreland. This complex DEM displays, among others, significant penplanisation of the uncovered area of the foreland since the Miocene in comparison to buried Outer Carpathian autochthon buried by Outer Carpathian Nappes.

It is obvious that morphostructures of the autochthon induced dynamic and kinematic development of the Subsilesian and Silesian nappes. Also the Brunovistulian Epihercynian basement was simultaneously modified owing to tectonic loading by the Alpine nappes. Complex morphostructural analysis offers much evidence for structural framework of both the above mentioned units. Tectonic ramps striking W-E are very impor-

tant structural features of the pre-Alpine foreland basement. They correspond to old Variscan fault systems (however, Cadomian origin cannot be excluded), reactivated by the Alpine tectogeny. The Dětmárovice shear zone (Grygar et al. 1989) is the most significant one. Outer Jeseník Fault with significant neotectonic reactivation represents an internal structure of the above mentioned shear zone. It is also interesting that only this one can be followed W to the area of Variscan foredeep of the Nízký Jeseník Mts. All others terminate at the Morava Gate furrow in the west. The system of the Sub-Beskydy faults displays a very special pattern. We traced this fault system more westward in the Maliník horst structure to the Upper Morava depression. All W-E-striking tectonic zones represent typical hinge faults terminated in the west.

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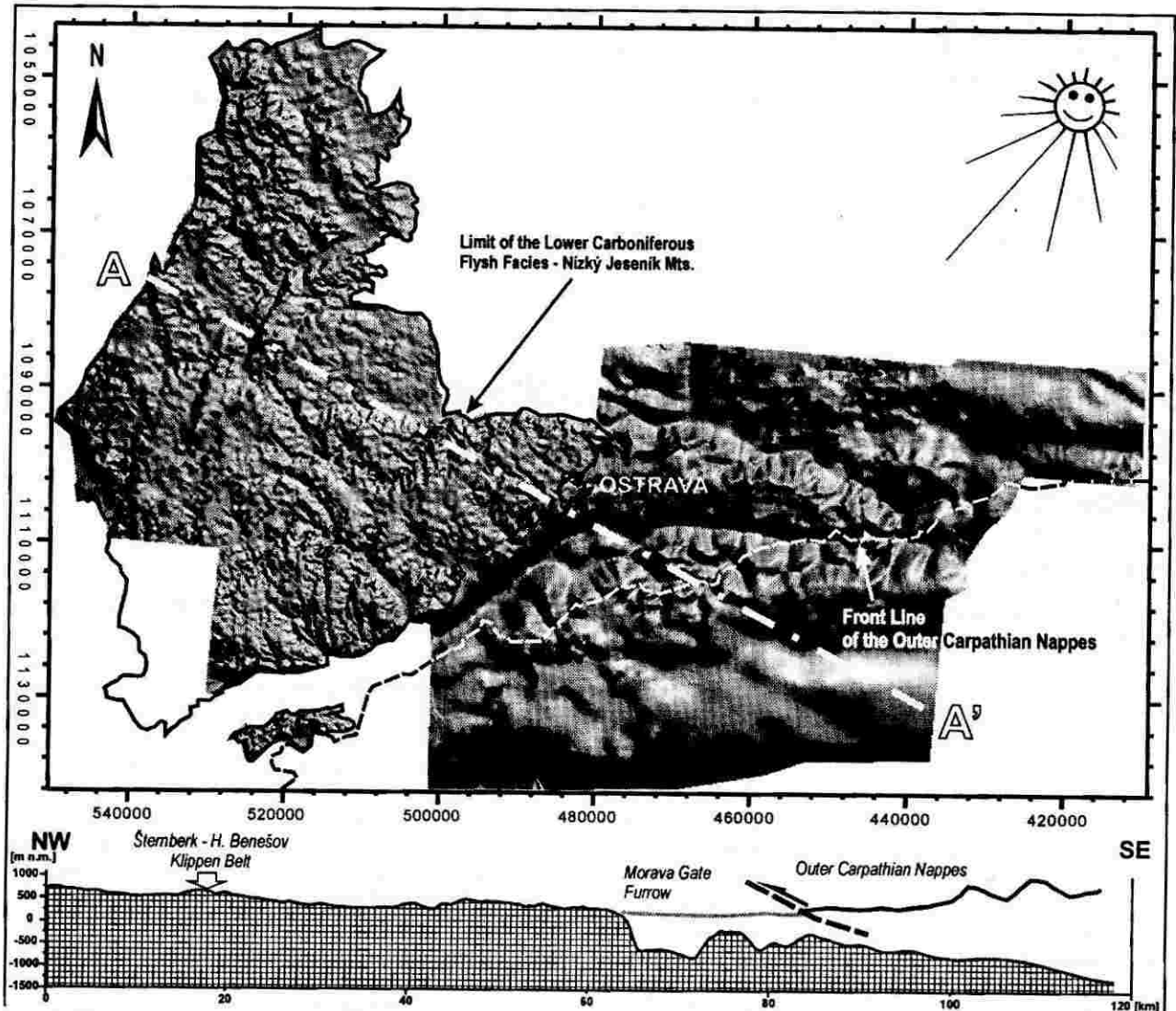


Fig. 1. Digital elevation model – shaded relief – illuminated from the northeast. Both uncovered areas (Nizký Jeseník Mts. area) and areas of the Alpine foreland buried beneath Outer Carpathian nappes (Beskydy Mts.) are displayed. Dominant role of the subequatorial morphostructures, intimately related to Variscan tectonic zones of the Brunovistulicum and its Paleozoic cover, is evident in the buried area. Morphostructural cross-section (lower figure) corresponds to section A–A' on the DEM.

## Fault-propagation Folds and Thrust Structures of the Apical Domain of the Variscan Accretionary Wedge (Moravosilesian Zone, Bohemian Massif)

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Complex structural and paleostress studies along eastern apical domain of the Moravosilesian Zone in the flysch foredeep (Hradec-Kyjovice Formation) and coal-bearing molasse of the Upper Silesian Basin were carried out. We also continue in com-

parative field structural mapping on the Devonian limestone facies in area of the Maliník Horst.

Three progressive deformational stages can be defined:

1. Intraformational bedding slip and detachment thrusting pro-