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From the Variscan to the Carpathians - crust and uppermost mantle structure along the refraction and wide-angle reflection S04 profile of the SUDETES 2003 experiment

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In the framework of the international seismic refraction experiment SUDETES 2003, the deep structure of the Bohemian Massif, the largest stable outcrop of the Variscan rocks in Central Europe, was studied along the S04 profile. This refraction and wide-angle reflection profile is 740 km long and traverses the massif in the NW-SE direction. It concentrates not only on the northern parts of the Bohemian Massif but also delimits its contact with the Carpathians. It starts at the north-western edge of the Bohemian Massif in the Saxothuringian, crosses the Krušné Hory Mts./Erzgebirge, and through northern rim of the Moldanubian and the Moravo-Silesian continues to the Carpathian Foredeep, the Carpathians and terminates in the Pannonian Basin. In its NW part it parallels the GRANU95-B profile.

For the interpretation, the tomographic inversion routines were used as a tool to determine preliminary seismic P-wave velocity distribution in the crust applying the first arrivals. The tomographic models were further improved by the trial-and-error forward modelling using the ray tracing algorithm. Velocity studies along this profile reveal complex structure especially in the contact zone with the Carpathian Foredeep and confirm previous measurements in the area. Position of the Moho discontinuity ranging from 23 km to 33 km and the reflectors within the crust complements the P-wave velocity distribution. The Moho is the deepest in the central part of the Bohemian Massif at the northern rim of the Moldanubian (33 km), and shallows to the Pannonian Basin (23 km), revealing a complicated structure at the contact of the Bohemian Massif with the Carpathians.