

# Tectonic evolution of the Central Carpathian Paleogene Basin and epigenetic PTS conditions recorded by mesoscale structures and fluid inclusions in mineral veins (Levočské Vrchy Mts and surroundings)

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The Central Carpathian Paleogene Basin (CCPB) was formed after the Middle-Upper Cretaceous thrusting and folding of Central Western Carpathians (internides) and covers tectonically already consolidated Mesozoic units. The basin occupies the northernmost part of the Central

Carpathian loop and is separated by a narrow zone of extreme deformation (shortening and shearing) — the Pieniny Klippen Belt (PKB) from the outer flysch basin (Outer Carpathians — externides). In spite of the proximity, age and lithofacial similarity of both basins, there are large differences in tectonic architecture between them. Contrary to the nearly undeformed CCPB (except for the Periklippen Šambron zone), the recent structure of the outer flysch basin represents accretionary collisional wedge composed of pile of thrust sheets. Different structural evolution of both basins resulted from different geotectonic position of CCPB (backarc basin) and outer flysch basin (forearc basin).

In addition to the structural data gained by field investigation and compilation of sedimentological and geological data, the fluid inclusions in quartz — calcite veins penetrating CCPB sediments were analysed to reconstruct PT conditions of their formation. This combination of research methods seems to be a very effective way to reconstruct epigenetic history of the basin. Structural research was focused on paleostress analysis from fault slip data. Several stages of compression and extension were distinguished, when mesoscopic shear faults, joints and veins were formed. These structures record epigenetic history of the CCPB.

After rapid subsidence (Middle Eocene — Oligocene) of the CCPB, probably caused by the "roll back" effect of

the subducted foreland slab pulling the Central Carpathian (CC) frontal edge, the basin inverted. Inversion resulted from the Miocene collision of CC and foreland rigid blocks. The CCPB basin was then disintegrated by block tilting during the continued inversion (15 Ma ago), when "half grabens" were created and Vysoké Tatry Mts uplifted. Meanwhile, the accretionary wedge was formed in the outer flysch zone. Packets of the Paleogene sediments slumped down (towards the north) along inclined slopes of tilted blocks in the CCPB area. This can be an alternative explanation of the origin of lithofacially and structurally (folded) strange Šambron zone. However, the dynamics of the PKB had to play an important role in deformation of this zone, too.

PT parameters calculated from fluid inclusions sampled from the Šambron zone (150°C, 1,5 kbar) and southern margin of the Levočské vrchy Mts (80°C, 0,01–0,05 kbar) show apparent differences in condition of vein crystallization within both areas. Veins from both localities were formed after the Oligocene, i. e. during the tectonic inversion of the basin, and are roughly coeval. Temperatures and pressures obtained may indicate original depths of sediments burial during vein formation. Therefore, the currently exhumed sediments with mineral veins in the Šambron zone had to be much more deeper than veins — bearing sediments in the southern margin of the CCPB in time of vein crystallization.