

Orogenic wedging and basin formation in the Central Western Carpathians: New insights from Súľov–Domaníža and Žilina–Rajec basins

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The Súľov–Domaníža Basin (SDB) belongs to wedge-top basins developed on the CWC orogenic wedge. Late Paleocene–Early Eocene transgression of the SDB led to development of thrust-top carbonate platforms (Kambübel Fm, Alveolina Lms) and calciclastic fans, which unconformably overlapped frontal CWC nappes and Peri-Klippen units. Synsedimentary tectonics of the SDB started in the late Thanetian–early Ypresian by normal faulting and disintegration of the orogenic wedge margin. The basin was supplied by continental margin deposystems, and filled with submarine landslides, fault-scarp breccias, base-of-slope aprons, cohesive debris flows and finally also diluted-flow deposits. Thick conglomerate lithosomes were accumulated from late Thanetian to early Lutetian. They are intercalated by claystone interbeds with rich planktonic and agglutinated microfauna, implying deep-water environments of gravity-flow deposition. The rapid subsidence was accelerated by gravitational collapse and subcrustal tectonic erosion of the CWC plate, which probably resulted from a super-critical taper of orogenic wedge due to subduction and underthrusting of the Oravic ribbon continent.

During the late Ypresian–Lutetian, the SDB merged with adjoining Paleogene basins of the Mid-Slovakian weakness zone (MSWZ) under conditions of bathyal up to abyssal deposition. Lutetian formations are formed by hemipelagic marls and turbiditic sequences, non-calcareous red claystones with *Reticulophragmium amplexans* and various deep-water deposits (Domaníža Fm., Žilina Fm., Hájik Mb., etc.).

Basin deepening was enhanced by Lutetian transgression, which

enabled a marine connection with the Magura Ocean. Southern basin of MSWZ in the Horná Nitra Depression is akin to the Krappfeld-type succession with basal reddish terrestrial sediments followed by Late Paleocene/Early Eocene shallow-marine formations and Lutetian deep-water marls. This implies a southward connection of MSWZ with the Carinthian embayment of the Mediterranean Tethys and northward connection with Alpine Tethys. Lutetian sea also flooded the Central-Carpathian Paleogene fore-arc basin (CCPB) by accommodation of carbonate ramps (Borové Fm).

Since the Lutetian, a deep-water basins were accommodated a weakening zone (MSWZ) between north-westward growing orogenic wedge and the north-eastward moving crustal fragments of the CWC (Fig. 1). Therefore, the common feature of the MSWZ is a superposition of wedge-top and fore-arc basins like this in Žilina, Rajec, Domaníža, Pružina, Horná Nitra, and Turiec depressions (Fig. 2).

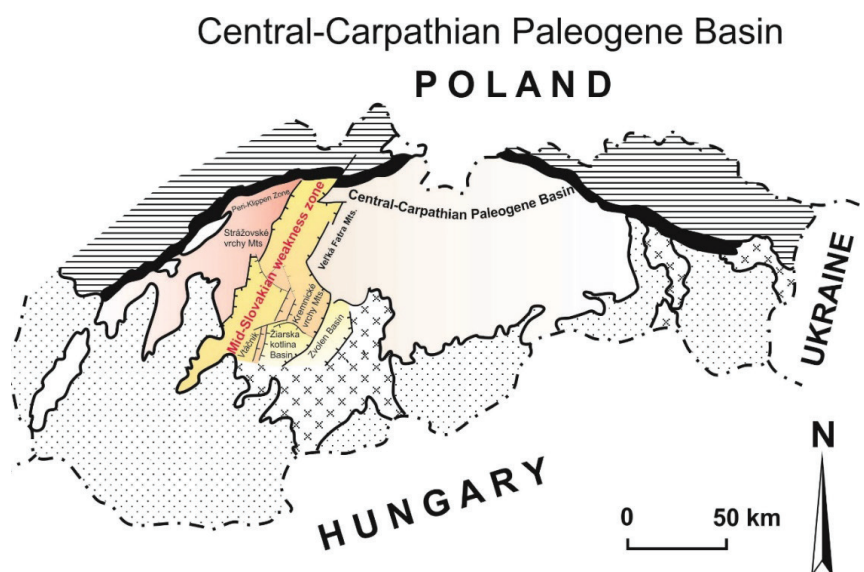


Fig.1. Mid-Slovakian weakness zone between wedge-top and fore-arc basins of the Central Western Carpathians.

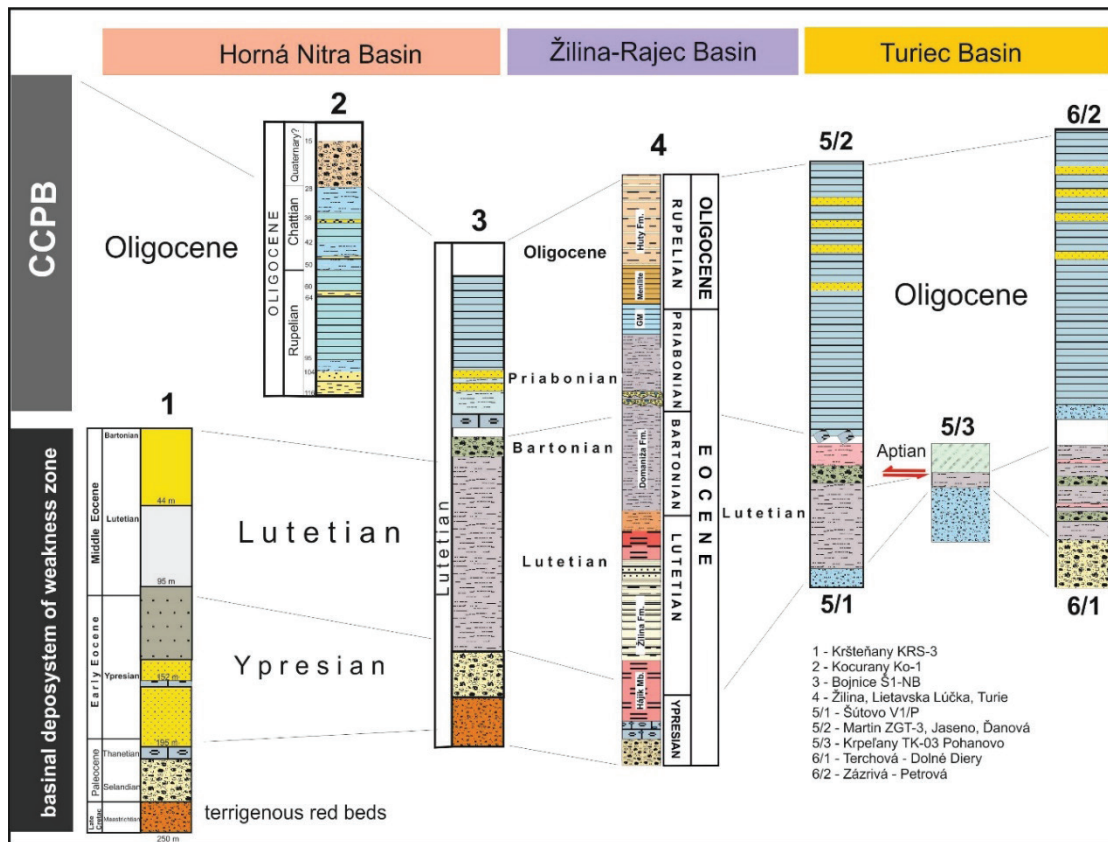


Fig. 2. Correlation scheme of the Paleogene formations within the Mid-Slovakian weakness zone (Horná Nitra, Žilina–Rajec and Turiec basins).

Post-Lutetian basin inversion and orogenic wedging in western part of the CWC was accompanied by eastward lateral migration of the Late Eocene–Oligocene depocentres of the Central Carpathian Paleogene Basin (CCPB). Late Eocene formations of the MSWZ are composed of gray and dark-grey weakly calcareous claystones. They still reveal a deep-water deposition with agglutinated and planktonic foraminifers, which differ from coeval claystone formations of the CCPB (Huty Fm.). Early Oligocene claystones and menilite

shales of the MWZ progressed from Late Eocene formation with correlative conformity to highstand formations of Globigerina Marls in the CCPB. Late Oligocene formations of the MSWZ are formed by turbiditic and sandy-rich facies of submarine fan deposystems of the CCPB.

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