# Tertiary Tectonics and Paleostress Reconstruction in the Central Carpathian Paleogene Basin (Orava Region)

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The studied area is situated in the Orava River valley and its vicinity. In term of orographic classification, the studied area appertain to the Chočské vrchy Mts., Podtatranská brázda depression, Skorušinské vrchy Mts., Oravská vrchovina Mts., and the south part of the Orava Basin. The most expressive elevation structure are Chočské vrchy Mts. (Veľký Choč hill 1661 m. n. m) and Skorušinské vrchy Mts. (Skorušiná hill 1314 m. n. m.). In the north, the studied area is limited by the strong morphological mountain range of the Oravská Magura Mts. The river belong to the Váh drainage area, from that predominantly to the local Orava drainage area.

The aims of this work was fault and fold deformation of the Paleogene sedimentary sequence of the Subtatras Group and the Neogene sedimentary sequence of the Orava – Novy Targ Basin. The main works were oriented to the fault – slip analysis and paleostress reconstruction during the Oligocene to Quaternary period.

The area of the southern and eastern Orava has complicated geological structure because is situated near contact zone between the Inner and Outer Western Carpathians. The area is affected by strong strike – slip deformation along the Peripieniny Lineament. Five basic tectonic superunits are present in the area of interest. In the direction from the south to the north, they are. (a) The area of the Chočské vrchy Mts., that composed of the Mesozoic complexes of the Tatric, Fatric and Hronic Nappe Units. The mountains is strictly limited by the Choč-Subtatric fault in the south. (b) The Subtatric Group formed by Paleogene sediments, situated between the Chočské vrchy Mts. and the Pieniny Klippen Belt. (c) The Pieniny Klippen Belt, a tectonically composite structure with the development of the Kysuce, Czorsztyn, Orava and Klape successions, formed by the Jurassic–Cretaceous rocks. In the north, the Pieniny Klippen Belt is limited by the Cretaceous and Paleogene rocks of the Outer Carpathians. (d) Neogene sediments, that belong to the Orava–Nový Targ Basin. (e) Quarternary sediments, belonging to several genetic types.

The fault-slip data has been computed by the TENSOR software package (Delvaux 1993, Delvaux and Sperner 2001) using right dihedra and inversion methods for the paleostress reconstructions. In this work, deformational fault and fold structures occurring in the Paleogene (the Borové, Huty, Zuberec, and Biely Potok Formations) and Neogene sediments in the Orava region were analysed. The Orava region was affected by a paleostress field which changed several times. The studied area was also strongly influenced by a NW-SE compressive tectonic regime which formed a NE-SW syncline structure. The chronology of the Neogene paleostress stages in this area is very complex because younger sediments than the Paleogene age are not preserved in the Orava region, except the Pliocene sediments of the Orava – Nowy Targ Basin. The deformational stages were separated on the basis of the relationship between sedimentary sequences and deformational structures, and the successive relationship between faults at the outcrop, as well. It was also detected by the paleostress reconstruction. The chronology of the determined tectonic regimes is as follows:

- The youngest deformational stage is characterized by the pure W-E extensive tectonic regime. This regime was identified in the Pliocene sediments of the Orava–Nowy Targ Depression and it was dated at the Upper Pliocene to Quaternary Period.
- The second deformational stage was developed during the pure NW-SE compressive tectonic regime and has been tenuously dated at the Upper Badenian to Sarmatian Period. This deformational stage is dominant over all studied localities.
- The third deformational stage was activated during the Upper Karpathian–Lower Badenian on the basis of its relationship with the previous stage. The pure NW-SE extensional tectonic regime activated this deformational stage and the evolution of normal faulting in this area.
- The fourth generation faults were formed during the pure NE-SW extensive tectonic regime. This deformational stage has been tenuously dated at the Otnangian–Lower Karpatian Period.
- The fifth deformational stage is characterised by the strike-slip tectonic regime generated during NNW-SSE compression and WNW-ESE extension. This stage was activated from the Egenburgian till to the Otnangian Period.
- The fault and fold structures of the sixth deformational stage were activated during the Upper Eocene to the Oligocene Period. This stage is characterised by the E-W compressive strike-slip tectonic regime.

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## References

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