

Tectonics of the Klippen Belt and Magura Nappe in the eastern part of the Pieniny Mts. (western Carpathians, Poland and Slovakia) – new approaches and results

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The Pieniny Klippen Belt (PKB) is a suture zone, which separates the Central Carpathians from the Outer Carpathians. The PKB successions are built up of the Lower/Middle Jurassic to Upper Cretaceous, dominantly pelagic and flysch deposits. The traditional multi-stage tectonic model of the PKB assumes that during the Palaeocene, retro-thrusting followed by subsidence and deposition of the “Magura Autochthonous Palaeogene” took place. Recently, we have studied the structural relationship of these deposits in the PKB, and we came to the conclusion that they belong to two formations with different tectonic positions. The Kremná Formation (?Oligocene – Lower Burdigalian) belongs to the Magura succession and appears in a tectonic window, beneath the Grajcarek thrust-sheet and the Czorsztyn (Sub-Pieniny) Nappe, while position of the Złatne Beds, which occur inside the Pieniny Nappe, is not clear. In the Slovak part the calcareous flysch sediments of the Jarmuta-Proč Formation described earlier as a “klippen mantle” form the youngest sedimentary member of the lowermost tectonic unit of the PKB, named here as the Fakľovka Unit. These youngest deposits are involved in tectonics of the PKB and document that final folding and thrusting of the PKB took place in the late Early Miocene (after Eggenburgian), corresponding to folding and thrusting of the Magura Nappe.

Calcareous nannoplankton biostratigraphy of the terminal sediments of the Magura basin – a case study of the polish sector (outer western Carpathians)

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The Oligocene to Early Miocene closing of the northern sector of the Outer Carpathian sedimentary area is manifested by deposition of the Krosno synorogenic lithofacies in the Grybów-Dukla-Silesian/Sub-Silesian/Skole and Boryslav-Pokuttya basin system. The analogous Malcov synorogenic lithofacies is typical for the Pieniny Klippen Belt and Magura Basin. These lithofacies comprise the fining and thinning upwards sequences. Towards the top, the sedimentary sequences are dominated by marly pelites. In the Pieniny Klippen Belt, as well as in the Krynica and Rača zones of the Magura Basin, the deposition of the Malcov lithofacies was initiated during the NP24 and persisted to NP25 Zone. In the northern part of the Magura Basin (Siary Zone) the youngest deposits (so called Supra-Magura beds) belong to the NP24 Zone. The most important species to determine the NP24 zone in the region is *Cyclicargolithus abisectus*, and for NP25 – *Sphenolithus conicus*. During the Late Oligocene (NP25/NN1) the frontal part of Magura Nappe were thrust northwards onto the terminal Krosno flysch basin. The clastic material derived from eroded front of the Magura Nappe has been found in the Krosno shally facies of the Silesian Basin. The northwards thrusting of the Magura Nappe was also accompanied by formation of the piggy-back basin on the Magura Nappe, filled with synorogenic turbidites of the Zawada and Kremná formations – NN1 and NN2 zones. These nannofossil associations are characterised by the presence of *Sphenolithus*