

# Evolution of the Pieniny Klippen Belt Basin — some evidence from subsidence analysis

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The Pieniny Klippen Belt (PKB) is developed as a narrow zone and separates two major structural parts of the Carpathian range: the Inner and Outer Carpathians. It corre-

sponds structurally to one of the main discontinuity lines within the Earth's crust in the Carpathians, along which the Moho surface suddenly dips northwards.

PKB is composed of strongly deformed Mesozoic and Palaeogene rocks. The Mesozoic rocks include various types of limestones, radiolarites, shales and siliciclastic turbidites, deposited in a separate (Alpine–Carpathian) branch of the Northern Tethys. The Pieniny Klippen Belt Basin (PKBB) is characterised in the palinspastic reconstruction by latitu-

dinal facial zones (called successions) and those, in turn correspond to ridges and troughs in the basin.

Several synthetic pre-orogenic 1-D sections of individual zones of the PKBB were reconstructed basing on the Polish part of the PKB. The profiles represent Czorsztyń-, Czertezik-, Niedzica- and Branisko-Pieniny successions, and cover Pliensbachian — Early Campanian basin history. There was subsidence analysis technique applied for analysing pre-orogenic history of tectonic vertical movements of the basin original basement, what included quantitative balancing of thicknesses, absolute ages, bathymetry and lithological data for individual cross-sections. The most important parameter with the major control on results was bathymetry, estimated on the base of lithofacial analysis, CCD and ACD or faunistic indicators.

The results show relatively slow subsidence for Pliensbachian–Bajocian, accelerated during the Bathonian. The Callovian–Oxfordian are characterised by very rapid subsi-

dence, what might be attributed to a tectonic event taking place across the basin. The subsidence is interpreted to result from extension or transtension. The second option is supported by high rate of subsidence, its short live span and sudden extinction, and the lack of thermal cooling.

By the end of Oxfordian rapid uplift started and lasted until Berriasian, ceasing with time, being interpreted as a result of major modification of stress regime (possibly to transpressional). For the Branisko and Pieniny successions another scenario is possible, depending on estimations of the CCD level at this time. In general, the uplift is followed by Early Cretaceous major hiatuses across the PKBB.

During Albian–Cenomanian time slow subsidence renewed, and since the Turonian started to increase in rate, creating a compressional type of curve. The Late Cretaceous subsidence is coeval with the Turonian folding of the Inner Carpathians to the south of PKBB, thus might be referred to flexural bending of their foreland.