

Abstract

The palaeogeographic and tectonic evolution of geological units comprising the terminal parts of the North Sudetic and Intra-Sudetic synclinoriums (SW Poland, Sudetes): the Wleń Graben and the Krzeszów Brachysyncline with the Łączna Elevation, respectively, have been reconstructed in the PhD thesis. These geological units are composed mainly of sedimentary and in minor igneous and volcanic rocks, representing various chronostratigraphic stages of the upper Carboniferous, Permian, Triassic and Upper Cretaceous. They constitute the present-day relics of the sedimentary-volcanic basin-fill rocks of the North Sudetic and Intra-Sudetic basins.

The studies performed in the PhD thesis included detailed mapping surveys, coupled with sedimentological and structural analyses, which have enabled the reconstruction of the development of the analyzed units. Although they constitute tectonic units, the sedimentary record points to their earlier, multi-stage development. These areas must have been repeatedly connected with one another, being fragments of other continental or marine sedimentation areas. In the late Carboniferous or in the early Permian, the area of the present-day Wleń Graben was a narrow intramontane tectonic trough drained by braided rivers towards the west and north-west. At that time, the present-day Krzeszów Brachysyncline area constituted an independent depositional area dominated by terrigenous sedimentation within the Intra-Sudetic Basin formed probably in the early Carboniferous. In the late Permian, the area of Wleń Graben was flooded by the Zechstein Sea, which formed here a shallow-marine bay. This is confirmed by the first in the history of investigations, new findings of faunal remains and clastic fills of halite crystals. The Zechstein Sea did not reach the area of the Krzeszów Brachysyncline located more to the south. In the Early Triassic the study areas were probably interconnected and constituted a vast alluvial plain drained towards the north and north-west by braided rivers. In the Krzeszów Brachysyncline area, this plain evolved during the late Early Triassic or in the Middle Triassic into an area dominated by small, shallow ponds and ephemeral “terminal” lakes. The stratigraphic gap encompassing an interval between the Middle Triassic and the Lower Cretaceous does not allow to reconstruct the depositional history of the study areas at that time. In the Late Cretaceous the areas were subsequently flooded by a shallow epicontinental sea and became interconnected by a narrow strait where storms and tides prevailed. During the maximum marine transgression (late Cenomanian–Turonian), pelagic sedimentation was omnipresent and source areas were

located at far distances from each other. The Cretaceous sedimentary record of the study areas terminated with lower Coniacian sand deposits.

The conducted mapping surveys coupled with analysis of brittle structures, including joints and faults, allowed for the reconstruction of the youngest, Late Cretaceous (post-Santonian(?)) and post-Cretaceous tectonic evolution of the study areas. In the Wleń Graben a series of minor tectonic subunits is distinguished, and four stages of the main graben structure formation is postulated. They included: (1) the initial, extensional phase of the main graben development (Late Cretaceous, Santonian (?)); (2) a compressional event (Late Cretaceous–early Paleogene); (3) a next phase of strike-slip, mainly sinistral movements of NE-SW-oriented faults (late Paleogene–Neogene(?)); and (4) the last, extensional phase of “gravitational collapse” (Neogene–Quaternary). The Krzeszów Brachysyncline was formed due to extensional and transtensional movements. This unit is bounded from the south by the Łączna Elevation, which constituted a horst-like, intra-basinal high linked with the propagation of dextral strike-slip and normal faults and fault zones.

The investigations performed during the PhD studies shed new light on the sedimentological, tectonic and palaeogeographic interpretations in the terminal areas of the North Sudetic and Intra-Sudetic synclinoriums. Such complex studies based on detailed geological mapping, facies and structural analysis, coupled with interpretation of borehole data, have not been conducted so far in the study areas.

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