

NEOTECTONICS OF POLAND: A STATE-OF-THE-ART REVIEW

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A b s t r a c t. Neotectonic studies in Poland concern mainly manifestations of those tectonic movements that have been active in Late Neogene and Quaternary times, as well as geodetically measured recent vertical crustal motions. Among problems of particular interest, the following should be listed: periodicity of neotectonic (mostly Quaternary) activity, estimating parameters of the neotectonic stress field, amplitudes and rates of Quaternary and recent movements, development of neotectonic troughs and young faults, mutual relationships among photolineaments, geologic structures and recent seismicity, manifestations of salt tectonics, as well as the role of tectonic reactivation of fault zones due to human activity. New research techniques have been developed, focusing chiefly on morphometric-statistical analysis of tectonically deformed landforms, reconstruction of compaction history of young basins, as well as hydrogeological studies within different neotectonic domains. Future investigations should put more emphasis on palaeoseismotectonic phenomena and practical application of neotectonic research.

QUATERNARY TECTONIC STRUCTURES OF THE MARGINS OF THE KUJAVIAN RIDGE, POLISH LOWLAND

Maria Danuta BARANIECKA

Abstract. The Quaternary tectonic processes in the Polish Lowland belong to the final part of the Alpine tectonic epoch and are represented by rigid, transitional and plastic deformations. The intensity of tectonic mobility gradually diminished throughout the Quaternary, being remarkably reduced during the Middle-Polish (Saalian) stage. .

YOUNG QUATERNARY AND RECENT CRUSTAL MOVEMENTS IN LOWER SILESIA, SW POLAND

Stanisław DYJOR

Abstract. Intensive young-Alpine orogenic movements led to the formation of numerous blocks in SW Poland, that are described best from the Sudeten and Fore-Sudetic Block. These movements occurred chiefly in Neogene times whereas the last, Valachian episode at the turn of the Miocene and Pliocene, has been responsible for the present-day orography of the Sudeten and their foreland. The Valachian movements, although of lesser intensity, persisted throughout the early Quaternary and even up to now. Their activity is documented by the studies of longitudinal profiles of fossil river valleys, disturbed by Quaternary faults of amplitudes ranging from 50 to 150 m. Diversified thicknesses of alluvia within river valleys and close to the fault scarps, as well as disturbed profiles of fluvial terraces point to tectonic activity after the last glaciation of this area. The amplitude of young faulting has been from 40 to 100 m. Recent mobility of tectonic blocks and fault zones is indicated as well by the records of historic seismicity, repeated geodetic measurements and reactivation of fault zones located beneath huge mines and other engineering constructions and industrial objects.

NEOTECTONIC AND RECENT CRUSTAL MOVEMENTS AS POTENTIAL HAZARD TO WATER DAMS IN LOWER SILESIA, SW POLAND

Stefan CACOŃ and Stanisław DYJOR

Abstract. In Lower Silesia, a dozen or so water dams have been built or are planned to be built. Their location is usually related to water-gap stretches of river valleys that truncate tectonically-active zones. Tectonic movements attained their climax in the Neogene, although some traces of remnant mobility are visible also now. Detailed engineering-geological studies concern selected water dams of this type. The most complicated geologic setting characterizes dams built upon the Nysa Kłodzka river, situated in the tectonic Paczków graben. The other dams, *i.e.* those on the Nysa Szalona river at Słup and on the Strzegomka river at Dobromierz are also situated upon active faults. Hence, besides standard geodetic measurements made by the water dam control service, the areas in question have been included into the GPS system, based on satellite and gravimetric geodynamic network established for Lower Silesia. Geodetic monitoring should also embrace not only water dam areas but also whole neotectonic structures. The results of such extensive research works would make it possible to monitor vertical movements of individual blocks and to estimate orogenic stresses that would lead to local earthquakes and cause serious threat to the water dams and downstream-located objects.

NEOTECTONIC QUATERNARY HISTORY OF THE SUDETIC MARGINAL FAULT, SW POLAND

Dariusz KRZYSZKOWSKI, Piotr MIGOŃ and Waldemar SROKA

Abstract. The paper presents some pieces of evidence for Quaternary tectonic activity along the Sudetic Marginal Fault (SMF) in SW Poland. Several approaches have been used to investigate Quaternary tectonic phenomena, including large-scale morphometric analyses, geomorphological mapping of the mountain front related to the SMF, and sedimentological and petrological analyses of alluvial sediments. Two distinct episodes of increasing tectonic instability can be recognised, at the turn of the Pliocene and early Pleistocene (3.0–1.5 Ma) and in the late Pleistocene (0.2–0.13 Ma), respectively. Fault scarps truncating river terraces, changing patterns of alluvial fan evolution, anomalous bedrock incisions, and rapid changes in thickness of alluvial fill are the most obvious consequences of Quaternary faulting. The causes of neotectonic movements are not clearly identified, although the component of isostatic rebound in the late Pleistocene episode is emphasised.

NEOTECTONIC STRUCTURES IN THE RACIBÓRZ – OŚWIĘCIM BASIN, UPPER SILESIA, SOUTHERN POLAND

Józef LEWANDOWSKI

Abstract. In the Racibórz–Oświęcim Basin (Upper Silesia, Southern Poland), situated within the Neogene Carpathian Foredeep, numerous horsts and grabens of post-Miocene age occur. The depressions are filled with Pleistocene sediments, mostly of glacial origin, which show abnormal thicknesses. The horsts are characterized by Quaternary covers that display reduced thicknesses and strong relief produced by the early Pleistocene erosion. Neotectonic depressions cross pre-glacial river valleys which are usually independent of the late Pleistocene and recent hydrographic systems. The Pleistocene tectonic movements, reactivated by the glacioisostatic rebound are similar, if not identical, to the non-reversible (glaciotaphrogenetic) vertical deformations. The subsiding movements were probably associated with sedimentary compaction effects, which have been recorded in the zones of maximum thickness (400–700 m) of Badenian sediments. The conditions suitable for such deformations existed in the Carpathian Foredeep during the South-Polish (Elsterian) and Odranian (Saalian) glacial stages. Amplitudes of neotectonic movements after the cessation of relaxation rebound can be assumed to be as high as 40–60 m.

NEOTECTONIC AND GLACIAL CONTROL ON GEOMORPHIC DEVELOPMENT OF MIDDLE AND EASTERN PARTS OF THE SANDOMIERZ BASIN AND THE CARPATHIAN MARGIN

Wanda LASKOWSKA-WYSOCZAŃSKA

Abstract. The paper is a continuation of earlier studies of mutual relationships among Quaternary deposits, morphogenetic development and tectonic mobility of basement structures in the Sandomierz Basin and its surroundings. New research works focus on the NW margin of the Sandomierz Basin wherein a Quaternary tectonic depression, filled with thick Quaternary sediments, has been found. Petrographic studies of gravels of different origin have been underlined, since they enable one to reconstruct palaeotransport directions, as well as the drainage pattern during different stages of its evolution. The drainage pattern has not been stable and changed in Quaternary times, being controlled by reactivation of faults, associated with the still continuing underplating of the Carpathians by the Easteuropean Platform.

TECTONIC FEATURES OF YOUNG STRUCTURAL RELIEF OF THE WESTERN CARPATHIANS, SOUTH POLAND

Oleksa JAKUBSKA

Abstract. A taxonomic analysis of mutual relationships between the orientations of large landforms of the Beskid Średni and Beskid Wysoki Mts., Polish West Carpathians, and those of bedrock structures reveals that they are very much alike. The dominance of discordant landforms in the Beskid Wysoki Mts. is typical of a young relief, poorly adjusted to lithology and tectonics.

DIVERSITY OF NEOGENE AND QUATERNARY TECTONIC MOVEMENTS IN THE TATRA MOUNTAINS

Maria BAC-MOSZASZWILI

Abstract. The Neogene uplift of the Tatra massif was associated with faults that cut the Slovakian block (Inner Carpathians). The massif underwent the strongest uplift in its southern part, along the sub-Tatric Fault. Differentiation of tectonic movements must have been considerable in those parts of the massif which were separated by numerous transversal and longitudinal faults. Recent tectonic movements are probably most intense along the regional photolineaments.

SELECTED ASPECTS OF NEOTECTONICS OF THE POLISH CARPATHIANS

Witold ZUCHIEWICZ

Abstract. Neotectonic (Pliocene-Quaternary) mobility in the Polish sector of the West Carpathians has been relatively weak and resulted in minor uplift, subsidence, and faulting recorded in deformations of erosional surfaces and fluvial terraces, as well in changes of the drainage pattern. The results of classical geomorphic and morphometric-statistical studies suggest that the main driving forces of young tectonic deformations are those resulting from the relaxation of remnant horizontal stresses.