

NEOTECTONICS, MORPHOTECTONICS, SEISMOTECTONICS – STATE OF RESEARCH AND PERSPECTIVES FOR THE FUTURE: INTRODUCTION

Witold ZUCHIEWICZ

A b s t r a c t. The papers presented in this volume of *Folia Quaternaria* constitute an important part of proceedings of the IV Conference “Neotectonics of Poland” which was organized in 2001 in Kraków by the Neotectonics Commission, Committee for Quaternary Research, Polish Academy of Sciences. The basic theme of the conference, repeated in the title of this contribution, was to explore possibilities of a summary of neotectonic, morphotectonic, and seismotectonic studies hitherto conducted in different structural units of Poland. It is a good opportunity at this moment to give a short review of basic definitions used by the above disciplines, which cross the borders between structural geology, geophysics, and geomorphology.

Author's address: Department of Geological Mapping and Tectonics, Institute of Geological Sciences, Jagiellonian University, Oleandry 2A, 30-063 Kraków, Poland; E-mail: witold@ing.uj.edu.pl

SYMPTOMS OF QUATERNARY TECTONIC VERTICAL MOVEMENTS IN NW POLAND

Marcin KURZAWA

A b s t r a c t. The analysis of drilling, lithostratigraphic, geophysical and geodetic data indicate reduction in thickness and stratigraphic log of the Pleistocene cover over uplifted tectonic blocks in NW Poland, as opposed to downthrown areas. Pleistocene vertical displacements affected individual blocks of various order, and not the whole Permo-Mesozoic regional tectonic units. Manifestations of block movements were, supposedly, overshadowed by mobile salt structures which exerted decisive influence on the development of the Pleistocene complex in large parts of the study area.

Tectonic engagement of regional units is marked by reactivation of the intervening fault zones: escarpments or elongate depressions within the sub-Quaternary and sub-Cenozoic surfaces, connected with characteristic variations of the Pleistocene cover. The Pleistocene vertical block and salt structures displacements were most intensive during the Podlasian (Cromerian) and Masovian (Holsteinian) interglacials. Velocities of recent vertical movements among tectonic local elements and regional units were estimated owing to repeated levelling surveys at 0.3–2.0 mm/yr.

Author's address: Pomeranian Branch, Polish Geological Institute, ul. Wieniawskiego 20, 71-130 Szczecin, Poland; E-mail: geom@post.pl

RECENT CRUSTAL MOVEMENTS IN LATE TERTIARY TECTONIC ZONES OF THE SUDETES AND NORTHERN SUDETIC FORELAND, SW POLAND

Stefan CACON and Stanisław DYJOR

A b s t r a c t. The Sudetes and Northern Sudetic Foreland area, together with the Bohemian Massif formed a frame region for the folding Alpides. As a result of intensive thrusting during the late Alpine orogenic movements, it was broken into several, separate tectonic blocks. The blocks are separated by NW-trending fault systems and are characterised by large amplitudes of movements. Dislocations extend throughout the entire rigid earth crust, reaching the Moho discontinuity.

In the Polish part of the Sudetes and Fore-Sudetic Block three major fault zones have been identified: the Sudetic Marginal Fault, the Mid-Sudetic Fault, and the Middle Odra Fault System. Tectonic activity, which reached its climax in the late Tertiary, has also continued throughout the early Quaternary and until recent times. Young fault scarps, occurrences of thermal and mineral waters, and historical records of earthquakes, which are still registered today, testify to the Quaternary tectonic activity.

During the past decade intensive geodynamic investigations have been initiated. Geodynamic profiles and geodynamic polygons have been established on the confirmed tectonic zones, active in Neogene times. A regional geodynamic network combined with the Czech "SILESIA" network has been set up within the framework of the "GEOSUD" Project. Satellite GPS, geodetic and gravimetric observations are carried out in annual cycles. Research results confirm recent mobility of the main tectonic zones in the Sudetes and Fore-Sudetic Block. The greatest changes in gravity values and horizontal and vertical displacements are registered on research benchmarks in the Paczków Graben, near the Nysa Dam.

Investigations of recent tectonic movements in the Sudetes and northern Sudetic Foreland are both of cognitive and practical significance. Several water dams have been constructed and more are planned in zones of recent tectonic activity. Underground and surface mining of minerals takes place there and large urban and industrial agglomerations are also located in the area. The results of geodynamic studies will be used for preparation of risk forecasts for these objects.

Authors' addresses: Stefan CACON, Department of Geodesy and Photogrammetry, Wrocław Agricultural University, ul. Grunwaldzka 53, 50-357 Wrocław, Poland; E-mail: cacon@kgf.ar.wroc.pl; Stanisław DYJOR, ul. Skierniewicka 6a, 53-117 Wrocław, Poland

DETERMINATION OF GEOLOGICAL CONDITIONS OF SHAFT DEFORMATIONS IN THE WIELICZKA SALT MINE, SOUTH POLAND

Zbigniew SZCZERBOWSKI and Mieczysław JÓŻWIK

A b s t r a c t. The paper analyses changes of rock mass observed in the “*Kinga*” and “*Daniłowicz*” shafts in the Wieliczka Salt Mine. These changes should be explained by geodynamic factors. The main aim of this work is to prove that in non-typical rock mass, like that of Wieliczka, a full description of horizontal, apart from vertical, displacements is necessary.

Authors' address: Faculty of Mining Geodesy and Environmental Engineering, University of Mining and Metallurgy, Al. Mickiewicza 30; 30-059 Kraków, Poland; E-mail: szczermo@galaxy.uci.agh.edu.pl

GEOLOGICAL CONTROL ON THE ROCKY LANDSLIDES IN THE POLISH FLYSCH CARPATHIANS

Włodzimierz MARGIELEWSKI

A b s t r a c t. Structural conditions of landslide development in the Carpathians are connected with tectonic anisotropy of rock massifs which became extended during the development of relief and neotectonic movements. Initiation of rock landslides as a result of propagation of dilatation cracks in tectonically disintegrated rock massifs leads to slow separation of those fragments of the massif that are being gradually prepared to gravitational shift by two surfaces: the cutting surface and the shearing zone. The cutting surface developed as dilatational crack is formed for a long time. It will map only the structural discontinuity surfaces occurring in the massif. Its remnant is the rocky niche being the upper side of the dilatation crack which, in relation to the landslide, may be of residual character. The sliding surface of the landslide is in its final shape formed *ad hoc* during gravitational transport of rock masses. Only in shallow landslides it will have purely structural foundations. In deep-seated landslides it will be a combined surface, composed of structural sections mapping the directions of tectonic and shearing anisotropy. The depth of original dilatation crack in the massif causes flattening of theoretically circular shearing zone (circular failure). In the Carpathians this process leads to common occurrence of the landslide complex of mixed types of shifts (rotational-translational-topple).

Author's address: Institute of Nature Conservation, Polish Academy of Sciences, Al. Mickiewicza 33, 31-120 Kraków; E-mail: margielewski@iop.krakow.pl

MORPHOTECTONICS OF THE GORCE MOUNTAINS, WESTERN OUTER CARPATHIANS

Andrzej FORMA and Witold ZUCHIEWICZ

A b s t r a c t. The Gorce Mts., situated in the medial segment of the Polish Outer West Carpathians, comprise two submeridional and one subparallel neotectonic elevations. Morphological features of the highest mountain ranges show properties of advanced maturity, whereas the radial pattern of deeply-cut V-shaped valleys of high and strongly diversified gradients, as well as convex and convex-concave slope profiles, together with the presence of overhanging valleys testify to young uplift. Drainage basins of the 4th order show basin elongation ratios typical for intensely uplifted regions, similarly as the stream length-gradient indices (SL), whilst the thickness of the belt of no erosion is moderate and does not exceed 80 m.

Authors' address: Department of Geological Mapping and Tectonics, Institute of Geological Sciences, Jagiellonian University, Oleandry 2A, 30-063 Kraków, Poland; E-mail: witold@ing.uj.edu.pl

SEISMICITY OF POLAND

Zofia Maria MORTIMER

A b s t r a c t. Earthquakes occurring on the territory of Poland release relatively small amounts of energy. Epicentres of these earthquakes cluster along fault zones in the Sudetes, in the Carpathian Mountains in the region of Cieszyn, Pieniny Klippen Belt, Zakopane and Krynica, as well as along the Teisseyre-Tornquist Zone. In the last decade a dozen or so weak events have been marked. For the reference of neotectonic processes, seismological information has some limitation, the fundamental of which is the low quality of the evaluation of focal depth.

Author's address: Department of Geophysics, University of Mining and Metallurgy, Al. Mickiewicza 30, 30-059 Kraków, Poland; E-mail: mortimer@geol.agh.edu.pl

SEISMICITY AND SEISMIC HAZARD IN POLAND

Barbara GUTERCH and Hanna LEWANDOWSKA-MARCINIAK

A b s t r a c t. The catalogue of earthquakes in Poland, based on the 1999 common catalogue for the Czech Republic, Poland, and Slovakia, and the recently supplemented version of the national catalogue of earthquakes in Poland, is presented. Seismicity maps of Poland for different periods are discussed at large, alongside with the spatial and temporal distribution of earthquakes. Earthquake hazard maps for the return period of 1000 years, in terms of intensities *sensu* SCHENK et al. (2000) are presented and discussed.

Authors' address: Institute of Geophysics, Polish Academy of Sciences, Ks. Janusza 64, 01-452 Warszawa, Poland; E-mail: bguterch @igf.edu.pl

DIFFERENTIATION OF SUBFOSSIL POPULATIONS OF SNAILS FROM VISTULIAN LOESSES OF SOUTHERN POLAND

Małgorzata ŁOPUSZYŃSKA

A b s t r a c t. Mollusc shells are commonly noted from loesses and loess-like deposits. The typical feature of loessial malaconecrocoenozes is their abundance with relatively low number of species. The strength of specimens, which are different by their nature themselves, has allocated many low-level taxons within particular species. In many cases, the bases for such allocation are metric features of shells. The author has tried to decide the taxonomic question of the most important and the most frequent species which occur in loess deposits i.e., *Succinea oblonga*, *Pupilla muscorum*, *Pupilla loessica*, *Trichia hispida*, and *Arianta arbustorum*.

Author's address: University of Mining and Metallurgy, Faculty of Geology, Geophysics and Environmental Protection, Al. Mickiewicza 30, 30-059 Kraków, Poland; E-mail: mlopuszynska@poczta.onet.pl