

# Geological Sciences at the University of Warsaw

## PREFACE

On the 19<sup>th</sup> of November, 2016, the University of Warsaw will celebrate its 200<sup>th</sup> anniversary. This Jubilee Volume of *Acta Geologica Polonica* is the contribution of the academic community of the Faculty of Geology to this ceremony. Fifteen papers prepared by the research groups and individuals of the Faculty present their current activities and research fields. The Geological Sciences at the Faculty cover a wide spectrum of disciplines, ranging between various fields of basic and applied geology. The volume is not uniform in its presentations, varying from original scientific papers to review articles, but it offers a broad overview of activity at the Faculty of Geology of the University of Warsaw, Anno Domini 2016.

The scientific activity comprises four main areas: Basic Geology; Geochemistry, Mineralogy, and Petrology; Hydrogeology and Engineering Geology; and finally Environmental Geology. These four areas are well reflected in the subdivision of the Faculty into Institutes and one independent Department.

The introductory paper, by Michał **Szulczewski**, presents a brief history of Geological Sciences at the University of Warsaw. He outlines the pros and cons of the uneasy years of the University interspersed in the complicated history of the country and the birth of modern Geology in the post-war political situation and its transformation after 1989.

The Institute of (Basic) Geology comprises wide aspects of geological sciences: Palaeontology, Sedimentology, Stratigraphy, Historical Geology, Climatic Geology, and Tectonics. The projects cover most of the stratigraphic column and range geographically throughout Europe and externally.

The systematic presentation of the current activity of the Faculty opens with Jerzy **Trammer's** original paper on the estimates on genus-level vs. species-level extinction rates as inferred from the palaeontological record. The paper represents the

mathematical palaeontology, as developed in the Faculty by the author.

The Paleozoic of the Holy Cross Mts., central Poland, was always one of the key topics of regional-stratigraphical studies in the Faculty. Zbigniew **Szczepanik** and Anna **Żylińska** present new biostratigraphic dates on the Czarna Shale Formation, near Kotuszów, proving their Cambrian (Terreneuvian) age. These shales have long been regarded as the oldest rocks in the Holy Cross Mts., with dates ranging down even into the pre-Cambrian.

The paper by Piotr **Łuczyński** *et al.* presents an overview of the results of a recent study of the Silurian of western Ukraine, by a team from the Faculty of Geology of the University of Warsaw. Western Ukraine is one of the key aims of various research groups of the Faculty, covering the entire Phanerozoic succession, which is accessible in this area. The studies demonstrate the cyclic pattern in the Silurian succession, connected with a relatively shallow-water environment and with high-energy phenomena, some of which are interpreted as tsunami induced. An outline of further studies is briefly discussed.

Michał **Ginter** discusses further aspects of his globally-aimed studies of chondrichthyan microremains. This time he reports on euselachian sharks from the Pennsylvanian of Nebraska, U.S.A.

An integrated biostratigraphy of the upper Upper Cretaceous of extra-Carpathian Poland is presented by Ireneusz **Walaszczyk** *et al.* This is a notably extensive overview paper, which aims to provide the most recent and up-to-date understanding of foraminiferal, ammonite, belemnite, inoceramid, and echinoid biostratigraphies in the area, and their potential use in the chronostratigraphic interpretation of the Santonian through the Maastrichtian. The data presented may potentially contribute to a general improvement to the standard chronostratigraphic subdivision.

In their review paper, Anna **Wysocka** *et al.* present a wide spectrum of research done by the staff of the Faculty on the Miocene successions of the Fore-Carpathian Basin in SE Poland and western Ukraine. The studies comprise biostratigraphy, lithostratigraphy, facies analysis, basin evolution, and a wide range of palaeontological surveys devoted to various fossil groups richly represented in these fossiliferous and variable sequences. A new discussion of some basic regional questions is also included.

A recent summary of the Quaternary stratigraphy and palaeogeography of Poland is provided by Leszek **Marks** *et al.* The presentation of updated palaeogeographical maps and of the sequence of glacial/interglacial periods is preceded by short descriptions of research methods. The correlations with sequences in western Europe and to the chronostratigraphic standard are contained. The paper also provides a discussion of the climate evolution and of the environmental changes during the Quaternary of Poland.

Andrzej **Konon** *et al.* report on the newly recognized Mnin restraining stepover, in the Permo-Mesozoic cover of the western part of the Holy Cross Mountains Fold Belt (central Poland), which, the authors claim, provides evidence of significant Cretaceous-Cenozoic dextral strike-slip faulting along the Teisseyre-Tornquist Zone. The estimated values suggest a displacement of as much as several tens of kilometers.

The scientific projects followed in the Institute of Geochemistry, Mineralogy, and Petrology, are very often interdisciplinary studies, e.g., geochemistry with mineralogy; and both with petrology. This is best illustrated by the contributions contained in the present volume.

The paper by Andrzej **Kozłowski** *et al.* briefly reviews mineralogical studies carried out at the Faculty of Geology since the 1950s on the Karkonosze granite and its immediate surroundings, the results of research on melt and fluid inclusions characterizing the early stages of magma crystallization and the evolution of the post-magmatic fluids. New data on the Nb-Ta-REE accessory phases in pegmatites from the NE part of the pluton and, for the first time, rare Ag, Bi minerals, are provided. Reliable mineral proxies of the thermal impact of the granitoid body on amphibolites in its envelope through examples from hornfelsed zones located along northern and south-eastern border of the Karkonosze intrusion are also included.

Jan **Parafiniuk** *et al.* provide an overview and summary of the complex investigations carried out by the researchers of the Institute of the Geochemistry,

Mineralogy, and Petrology, of the mineralogy and geochemistry of the weathering zone of selected ore and mineral deposits in the Sudetes, SW Poland. The review is limited to the sulphate and arsenate mineral assemblages and demonstrates their potential use in the reconstruction of the formation environment of the weathering zones of ore deposits.

An attempt to understand how the REE are distributed in the rocks of the Earth's crust and the mechanisms which have led to their concentration is presented by Bogusław **Bagiński** *et al.* This paper provides data on the alteration of REE-bearing minerals and mobilization of these important elements. The authors also speculate on the role and composition of the fluids responsible for these alterations.

Hydrogeological, geological-engineering and environmental studies have been conducted in the Faculty of Geology since its inception. The methodological issues, based on modern modelling, geostatistical and laboratory methods, have always been the key topics.

Ewa **Krogulec** *et al.* discuss the Groundwater Dependent Ecosystem (GDE). The use of statistical and geostatistical tools has allowed them to define the regime of GDE areas in the central part of the Vistula valley (central Poland), to determine the spatial distribution of particular characteristic hydrodynamic levels. The analysis of characteristic groundwater levels is the key factor allowing the determination of the risk of an ecosystem threat in conditions of the non-availability of groundwater resources.

The presentation and use of spatial analysis and numerical methods to describe hydrodynamic and hydrochemical conditions in a groundwater system is a focus of the contribution by Tomasz **Gruszczyński** *et al.* A regional flow model was used to identify the groundwater discharge and discharge zones of particular aquifers. Presentation of the chemical reactions led to a determination of the origin of changes in the concentrations of individual components dissolved in groundwater, to verify the groundwater model.

Ewa **Falkowska** *et al.* present the results of studies carried out in the floodplain to confirm the relationship between the morphodynamics of the floodplain area of lowland river valleys and the geochemical characteristics of sediments. The results indicate that the main factors affecting the pattern of features in the floodplain are the highly dynamic flood flow in the narrow section of the gorge and the relief of the top surface of the sub-alluvial basement.

A review of research methods and a discussion of the selection of the Wartanian and Odranian till pa-

rameters, in relation to their spatial occurrence, grain size distribution, mineralogical composition, matric suction and other physical characteristics are presented by Anna **Bąkowska** *et al.* The applied program of advanced geological-engineering studies indicates that

the variability of structural and mechanical properties of soil is determined by natural and anthropogenic factors. The role of natural factors depends on the geological- structural and exogenous transformation of the upper part of the soil profile.

*Ewa Krogulec, Ray Macdonald and Ireneusz Walaszczyk*