PREFACE

Results of recent studies on stratigraphy and sedimentology of Middle Miocene deposits from the northern part of Carpathian Foredeep in Poland, presented in first ten papers of this volume of the "Geological Quarterly", supplement and actualize the knowledge on geology of the Miocene succession, summarized in 1994 in the special issue of the "GQ" (see G. Czapowski, A. Gąsiewicz, 1994, Geol. Quart., 38 (3): 337–340). New data enabled a facies characteristics and environmental reconstructions of selected Miocene lithostratigraphic units (Baranów Beds, sulphates of evaporitic horizon, Machów Formation) and correlation of the investigated series with units of the Miocene stratigraphic scheme using bio- and magnetostratigraphic methods.

First two papers (by A. Wysocka and W. Studencki) described in details two main lithological varieties of Middle Miocene subevaporitic complex (see M. Jasionowski, 1997, Biul. Państw. Inst. Geol., 375: 43–60), distinguished at the Holy Cross Mountains margin as the Baranów Beds and assigned to the Lower Badenian (Moravian substage). First variety, composed of siliciclastics (paper by A. Wysocka), has developed initially within coastal marshes and later accumulated due to transgressive deepening in high-dynamic nearshore to low-energy offshore environments. Second variety, biogenic deposits traditionally called "lithothamnian limestones", was revised by W. Studencki, who proposed "red-algal limestones" as a general term and "rhodolith limestones" for deposits containing spheroidal red-algal growths. Basing on algal thalli morphology and major fossil groups several facies were distinguished, corresponding to different sedimentary environments (from high-energy intertidal-shallow subtial to open sea). Considered as a close analog of the Recent rhodalgal lithofacies the studied limestones suggest a temperate climate during Early Badenian, opposite to a common opinion on subtropical-tropical conditions as suggested by faunal evidence.

Next three papers present a depositional history of sulphate (gypsum) deposits being the main component of evaporitic complex, correlable within the whole Carpathian Foredeep. Traditionally they are ascribed to the Middle Badenian (Wielician substage) although new data (N. Oszczypko, 1996, Prz. Geol., 44 (10): 1007–1018; 1997, Prz. Geol., 45 (10): 1054–1063) suggested their younger — Late Badenian–Early Sarmatian — age. Two articles by M. Bąbel refer to the gypsum series occurring at the southwestern margin of Holy Cross Mts. First one includes an exhaustive characteristics of facies and subfacies, being a product of different settings controlled by a water depth (variation from 0 to 5 m), salinity and climate. Vertical facies succession has recorded (the second paper) the salinity and brine depth fluctuations as two shallowing-up cycles of increased salinity (up to halite precipitation). Each cycle ends with erosion of bottom-laid accumulates due to fresh marine or meteoritic waters input. Similar facies differentiation and cyclic development, resulting from depth and salinity fluctuations, was observed (paper by A. Kasprzyk) in the gypsum complex in almost whole northern part of the foredeep. This unit was formed on a morphologically differentiated platform, at a depth varying from a few to some tens of metres. Major sea-level fluctuations were responsible for drastic facies changes (transition between selenitic and clastic gypsum) and at the end of each evaporitic cycle.

Following four articles present application of selected fossils found in the Middle Miocene rocks to stratigraphy and environmental reconstructions. The role of bivalve fauna in division of Lower and Upper Badenian as well as the similarity of Polish Sarmatian representatives to the ones known from the Euxino-Caspian area is stressed by B. Studencka. Detailed study of dinocyst assemblages (paper by P. Gedl) from the Upper Badenian–Sarmatian succession documents variable basinal settings: from a shallow to deep open marine, as well as sea-level fluctuations accompanied by changes in salinity and terrestrial input. Analysis of pollen grains in the same profile (paper by A. Sadowska) indicates differentiated plant associations reflecting local habitats: from a coastal to upland ones but dominated by temperate representatives during the whole studied period. Possible connections between the Polish Carpathian Foredeep and Intra-Carpathian basins during Early Sarmatian were suggested by J. Paruch-Kulczycka as evidenced by the mixed assemblage (assigned to the Sarmatian and Pannonian) of forams and thecamoebians, found in the upper part of Sarmatian succession.

Magnetostratigraphic data reported in the final paper (by E. Król and M. Jeleńska) constrain to 11–7.5 Ma the age of the bottom part of Middle Miocene supraevaporitic complex, corresponding to the Tortonian stage. Consequently, the authors propose a younger radiometric age of the Lower Badenian or existence of a major hiatus comprising a part of the Lower Sarmatian.

The editor is very indebted to the contributors for their enthusiastic acceptance of proposed project of special volume. We hope that this common effort will enlarge our knowledge of geology of the Miocene sequence within the Polish part of Carpathian Foredeep. High facies variability and evolution of local fauna assemblages, invaded by forms migrating from various subbasins of Paratethys, demonstrated here on selected materials, as well as new age constraints of lithostratigraphic units illustrate the necessity of further complex studies of the Miocene succession. Only such researches will provide a reliable reconstruction of Miocene depositional history in the Polish Carpathian Foredeep.

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