

**Fifth Polish Sedimentological Conference – POKOS V':  
Deep-sea flysch deposits – sedimentological aspects of the Carpathian basins history**  
May 16–19, 2013, Żywiec, Poland  
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## PREFACE

This set of papers has resulted from the national sedimentological Conference POKOS V' which was held in May 2013 in Żywiec, southern Poland. The conference was devoted mainly to diverse aspects of flysch-type deep-sea sedimentation in the Outer Flysch Carpathian basins. Its mechanisms attracted Polish geologists already in the first half of the 20th century. Over the course of time they created the “Polish school” of examinations of the flysch, which greatly influenced the evolution of views on its genesis. The Polish Flysch Carpathians, as one of the largest flysch regions of Alpine Europe, have been a classical area of research of “flysch geology”. Micropalaeontological investigations and biostratigraphic analyses have enabled identification of the spatial relationships between numerous lithostratigraphic units. In this way, a lithostratigraphical scheme of the Flysch Carpathians has been consolidated more and more precisely, facilitating also reconstruction of the evolution of the Carpathian basins in space and time. Additionally, however, the results of both palaeoecological and geochemical analyses complement this image as regards both the history of the western Tethys and global palaeoceanographical events. Handing this volume over to your hands we want together to think about the fascinating story of the Carpathian basins, especially the results of sedimentological investigations, al-



**Participants of the POKOS V' Conference; Kozy Quarry, post-Conference field trip (18.05.2013)  
– thin-bedded Lgota Formation (Albian) of the Silesian Nappe, behind the group**



**Discussion on the Istebna Formation (Late Cretaceous–Early Paleogene)  
of the Silesian Unit; Kamesznica–Janoszka Stream**

though not forgetting the above-mentioned fields. Therefore, trying to present the current knowledge about the Flysch Carpathian basins in this regard, we propose concurrently to think about a wider, especially palaeogeographical context of their development.

During our Conference, 26 oral presentations and 19 posters have been presented, which were concentrated mainly on siliciclastic sediments of the Outer Flysch Carpathians and Carpathian Foredeep from both Poland and surrounding regions. On the other hand, some of them were focused even on areas far from Poland, such as northern Thailand, Ukraine (Crimea) and Antarctica. After two days (May 16th and 17th) of presentations and hot discussions from time to time, we spent two active days in the field (May 18th and 19th) and visited a wide range of various flysch deposits represented for example by the Lower Cretaceous oil-source rocks of the Veřovice Formation (Silesian Nappe). In spectacular outcrops of the Wieprzówka Cascade (Rzyki village), we observed a long and very well available section allowing to familiarize with the development of shaly-mudstone beds and fossilization processes responsible for high accumulation of organic matter due to anoxic sedimentary conditions. We also examined thin-bedded flysch deposits of the Upper Cretaceous Lgota Formation in the abandoned Kozy Quarry, represented by the distal part of outer turbiditic lobes with characteristic sedimentary features of Bouma sequence and deep-marine trace fossils. However, in the Poniwiec abandoned quarry we studied the Upper Cretaceous Godula Formation represented by both thick- and thin-bedded turbidites of channel and lobe facies, respectively. One of the oldest Carpathian deposits has been visited in the Cisownica Stream – the Cisownica Shale Member of the Hradište Formation (Valanginian–Hauterivian), representing outer fans of turbiditic lobes. Finally, we inspected the Istebna Formation (Upper Cretaceous–Paleocene) in the Janoszka Stream with typical debris flows within conglomerates and coarse-grained sandstones of a channel system, and the Paleogene (Eocene) Beloveža Formation excellently outcropping in a picturesque small waterfall at the village of Milówka.

The current issue is dedicated as the Proceedings of the POKOS V' 2013 Conference, and can be characterized in brief as follows:

First, Zbigniew Buła, Monika Jachowicz-Zdanowska and Jerzy Żaba describe the Precambrian basement and the Lower Paleozoic sedimentary cover of the Brunovistulicum (Upper Silesian Block), which are known only in boreholes. Their facies development and palaeogeographic and palaeotectonic reconstructions are discussed and compared with the neighbouring region – so-called Małopolska Block. The Early and Middle Cambrian is represented by clastic sediments and the most interesting is the Neoproterozoic anchimetamorphic flysch sequence and its relation to the source area. The authors present the most likely model of sedimentation, tectonics and origin of the geological structure of the Early Paleozoic sedimentary cover in the Upper Silesian Block, and suggest the optimal location for new boreholes to solve the basic research problems.

Katarzyna Górniak describes an origin of one of the oldest (uppermost Jurassic) Outer Carpathian deposits – so-called Golezów Marls of the Vendryně Shale Formation. Two lithologic components of this facies have been studied petrographically: calcareous shales, which are the principal constituent of the olistostrome matrix, and the rocks displaying field characteristics of marls, which occur as olistoliths. Detailed studies indicate that, genetically, marls from olistoliths reveal the presence of coccoliths in the groundmass, which are held together with overgrowth calcite. Such feature is eogenetic and therefore the presence of coccoliths appears to be a crucial factor that made possible early hardening of starting sediments for these rocks and their subsequent redeposition as lithic blocks.

Next, Oleh Hnylko, Michał Krobicki, Anna Feldman-Olszewska and Jolanta Iwańczuk present a volcanogenic-sedimentary sequence of the Jurassic–Cretaceous transition in the Ukrainian Carpathians, unique for the Outer Flysch Carpathians. The Kamyanyi Potik Unit (Nappe) is very well outcropped close to the highest peak of the Chyvchyn Mountains (Chyvchyn Mount – 1766 m a.s.l.). Geological mapping shows that the tectonic structure of this mount consists of four tectonic trust slices which represent a whole spectrum of volcano-sedimentary complex of marine mass-movement deposits from debris flows, through proximal to distal pyroclastic turbidites, to massive basaltic pillow lavas. Such rock types very well records volcanic activity during latest Jurassic/earliest Cretaceous times in the Outer Dacide-Severinide part of the Carpathian basins of the Western Tethys.

Edyta Puskarczyk, Jadwiga Jarzyna and Szczepan Porębski present application of multivariate statistical methods to characterize reservoir rocks of the Carpathian Foredeep Basin. These investigations are based on well-log data derived from heterolithic deposits, and use the PCA (Principal Component Analysis) and cluster analysis. The PCA was used to reduce data space preserving sufficient amounts of parameters for a differentiation between thin layers of sandstones and mudstones and between gas- and water-saturated horizons. The cluster analysis was used for classification and grouping of data according to natural petrophysical features of analysed rocks.

Krzysztof Starzec, Ewa Malata, Aneta Wronka and Luiza Malina studied the bordering zone between the Magura and Silesian nappes of the Polish Outer Carpathians, and concentrated especially on types of mélanges and broken formations in this region. These investigations are based on geological field mapping and analyses of boreholes with full biostratigraphical control of investigated units. Several levels of broken formations within the uppermost part of the Krosno Beds were formed as mass-transport deposits at the southern slope of the Silesian Basin. They may record tectonic pulses related to an advancing accretionary wedge within the Magura area, and directly predate the stage of the larger-scale sedimentary mélange formation at the front of the wedge. This process took place most probably in Early Miocene time within the Silesian Basin of the Outer Flysch Carpathians.

Piotr Strzeboński documents the Late Cretaceous-Early Paleogene sandy to gravel debris flows in the Silesian Basin of the Outer Carpathians represented by the Istebna Formation. Reconstruction of the depositional system architecture is based on detailed qualitative and quantitative studies of lithofacies, sedimentary processes and palaeoenvironment. The deposits include sandstone, gravelly sandstone, sandy conglomerate and conglomerate lithofacies formed by sediment gravity-flows such as submarine sandy to gravelly mass debris flows. Character and distribution of these lithofacies indicate temporarily increased diastrophic activity of the Silesian Ridge and its intense destruction. Directions of sedimentary palaeotransport suggest the accumulation domain was a linear apron depositional system developing in a deep-water sedimentary environment.

Andrzej Szydło, Małgorzata Jugowiec-Nazarkiewicz and Barbara Olszewska discuss foraminifera and calcareous nannoplankton, as well as other fossils from the Albian-Turonian deposits of the Polish Western Carpathians in relation to changes in depositional environments, which were controlled by geotectonic activity, sea level changes, and anoxic and biotic events: for example, Albian monogenic assemblages with the surficial epifauna (*Recurvoides*) corresponding to the organic influx and oxygen deficiency (OAE1b). On the other hand, during the Turonian, new niches were inhabited by deep dwelling agglutinated and planktonic (*Marginotrucana*) foraminifers.

Finally, Jurand Wojewoda, Slavomir Nehyba, Helena Gilíková and David Buriánek describe Devonian siliciclastic rocks of the Brunovistulicum (from Southern Moravia in the Czech Republic) and that is why we can return virtually to the first-mentioned paper by Zbigniew Buła and others. Wojewoda and co-authors present the results of sedimentological study and facies analysis based on spectacular outcrops in the Babí lom – Červený kopec Zone, which address several questions on depositional processes and environment, evolution of the depositional environment, and location and character of source areas. They interpret the deposits to have been accumulated in fluvial environments of both meandering and braided rivers, and in alluvial fans. High maturity of the sediments suggests that sedimentary material was derived from older deposits.

On behalf of POKOS V' 2013 Organizing Committee

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