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MIDDLE DEVONIAN BIOTA AND ENVIRONMENTS OF THE ŁYSOGÓRY REGION (POLAND): INTRODUCTION

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The Middle Givetian Taghanic Event, a significant biotic crisis in the history of the Devonian biosphere, is currently the subject of many studies all over the world. A replacement of brachiopod faunas (demise of the Hamilton / Upper Tully fauna) was documented in New York State (Brett *et al.*, 2009). Preliminary data were indicative of such a replacement not having taken place in the Holy Cross Mountains (central Poland; Halamski, 2018). A research programme involving a detailed re-assessment of both the pre-Taghanic and post-Taghanic brachiopod biota of the Łysogóry Region (= northern region of the Holy Cross Mts.) therefore was scheduled in order to elucidate the precise course of bioevents on the Polish part of the Southern Laurussian shelf during the Middle Devonian.

The pre-Taghanic brachiopod biota was studied at Miłoszów, a poorly known, but promising Givetian site. The strata cropping out at Miłoszów mostly belong to the Skały Formation, a fossil-rich lithostratigraphic unit studied in detail through a series of contributions, mostly limited to the single Grzegorzowice–Skały section and often focused on the lower (Eifelian) part of this lithostratigraphic unit. The significance of the present studies thus were meant to be both global (a contribution to the knowledge of bioevents) and regional (a detailed description of the less known upper part of the Skały Formation). The studies in the present thematic issue are based on the material collected at three sites (Grzegorzowice–Skały section, Pokrzywianka, Miłoszów), situated within a distance of less than three kilometres from one another (Fig. 1).

The fieldwork at Miłoszów started in 2017 and was completed in 2022 (Fig. 2). It was revealed that the fossil biota is much richer than initially had been believed. Accordingly, the decision was made to proceed with a general analysis of the biota present, a most interesting situation for those involved and an enterprise hopefully beneficial for science, even if administratively somewhat difficult for those obliged to keep a scientific project on several taxonomic groups and including over 20 collaborators within a particular timespan and a budget initially provided for a brachiopod study. The present volume, entitled "Middle Devonian biota and environments of the Łysogóry Region (Poland)", summarises the results of the above-mentioned studies, and consists of the following seven contributions, five of which deal with the pre-Taghanic biota and environment investigated in the Miłoszów sections, whereas the two others consider either slightly older or slightly younger faunas:

a. a general paper on the Miłoszów sections, covering the history of research, regional and local geology (including descriptions of outcrops), litho- and biostratigraphy, and providing a summary of all fossil taxa present as well as a palaeoecological reconstruction (Halamski *et al.*, 2022);
b. stratigraphic paper, containing a formal description of the Skały Formation (Racki *et al.*, 2022) with a stratotype of the lower boundary at Skały and a hypostratotype of the upper boundary at Miłoszów;
c. two palaeozoological papers, one on brachiopods, the major fossil group at Miłoszów (Baliński and Halamski, in press), the other on foraminifers, the sections at Miłoszów having yielded exceptional material for this group (Gajewska, 2022);
d. a geochemical and microfacies paper on the Miłoszów sections (Pisarzowska *et al.*, 2022), employing multiproxy data to reconstruct benthic environments and living conditions in the Łysogóry carbonate ramp facies;
e. two palaeoecological papers, one dealing with brachiopod assemblages in the Upper Eifelian brachiopod shale at Skały (approximately coeval to the Kačák event; the lowest part of the Skały Formation; Woźniak *et al.*, 2022), the other with epibiont assemblages from the Middle Givetian Pokrzywianka beds at Skały (thus a post-Taghanic fauna), including comparison of assemblages of episkeletobionts of rugosan corals at Skały and at Miłoszów (Zatoń *et al*., 2022).

For technical reasons, the present thematic issue is printed in two parts, with the brachiopod paper by Baliński and Halamski (in press) intended for the second part, *Annales Societatis Geologorum Poloniae*, vol. 93 (1), and all the remaining papers for the first part (this issue).

Previously published papers, based entirely or in part on the fossil material from Miłoszów include:

f. palynological investigations (Kondas *et al.*, 2021; Kondas and Filipiak, 2022) ;
g. studies of foraminifera (Dubicka *et al*., 2021a, 2021b) ;
h. palaeoecological studies related to tabulate and rugose corals and their epibionts (epizoan communities of

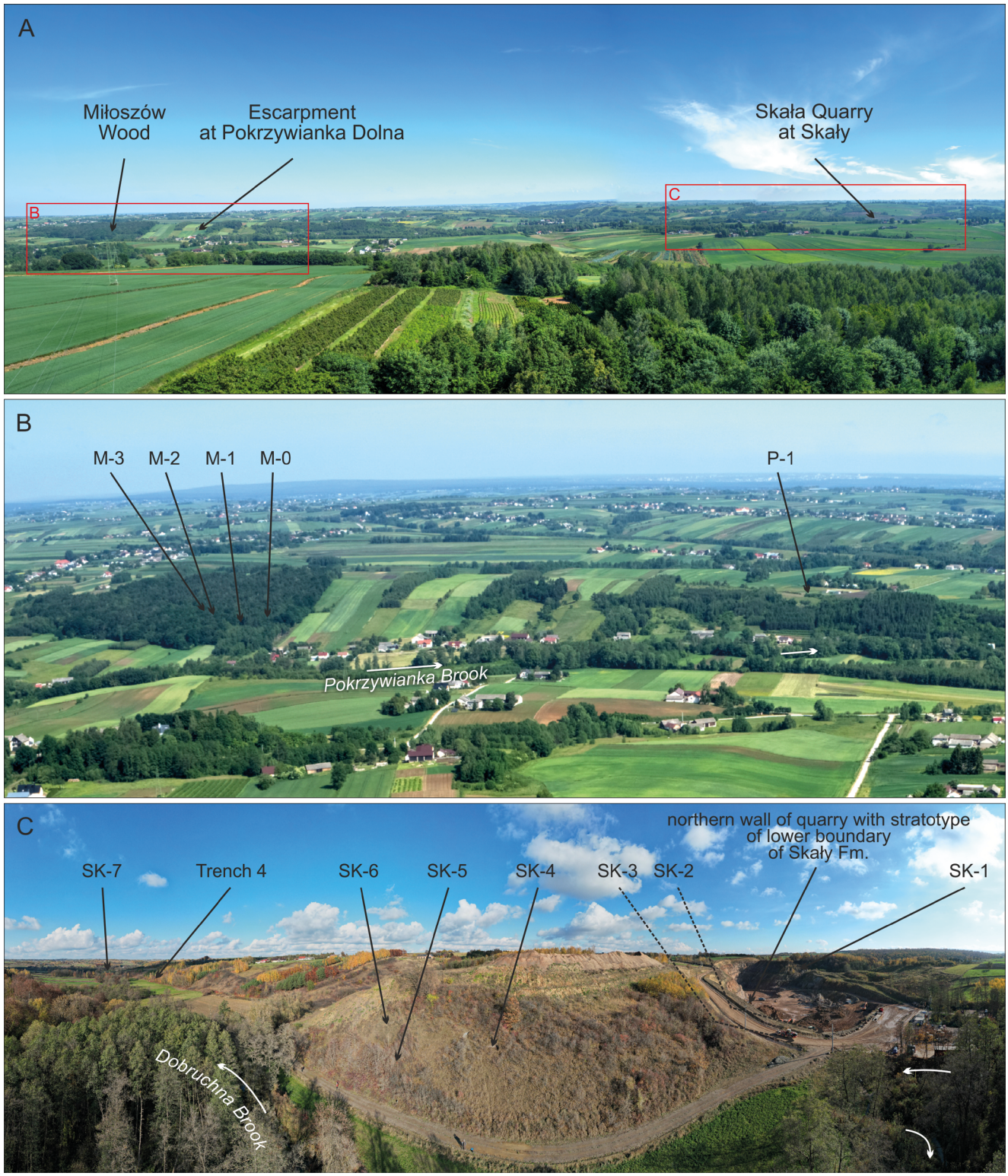

Fig. 1. Aerial photographs of the study area of the papers, printed in the present thematic issue. Numbering of outcrops after Malec and Turnau (1997), Halamski (2004, 2009) and Halamski *et al.* (2022). **A.** General view of the valleys of Pokrzywianka and Dobruchna brooks (camera facing northwards). **B.** View of the Pokrzywianka Valley with Miłoszów Wood and escarpment at Pokrzywianka Dolna (camera facing northwards). **C.** Spherical perspective of the Dobruchna Valley with the "Skała" Quarry at Skały and the escarpment in the right flank of the valley (camera facing north-eastwards; note the distortion resulting from the drone DJI Mavic Air 2S being close to the escarpment). Dotted lines indicate approximate locations of former outcrops, now destroyed by the extension of the quarry. Photographs A, B by Navidron (Kielce), taken 5th June 2022; photograph C by M. K. Zapalski, taken 26th October 2022.

Fig. 2. Fieldwork in Miłoszów Wood. **A, B, E.** Outcrop M1 (photos taken 11th April 2019). A – Southern part of trench M1N showing its junction with trench M1E (camera facing NNE); B – General view of the northern part of trench M1N showing Devonian shales (M1-II) in the foreground and Cenozoic colluvium (noted Cz) in the background (precise limit uncertain; camera facing N); E – Western part of trench M1E (camera facing E). **C.** Outcrop M2. A. T. Halamski sampling the trench (camera facing SE; photo taken 31st July 2020). **D.** Outcrop M3. A – Baliński sampling the fauna in a trench, dug parallel to the bedding (camera facing ESE; photo taken 1st August 2020). **F.** Photograph of the forest road with the two limestone beds M2ε and M2η (camera facing NW; photo taken 26th October 2022). All trenches and excavations shown here have been refilled after study. Red arrows and lettering: trenches and outcrops; yellow arrows and lettering: lithological sets; blue arrow: direction of the photograph, showing the limit between M1-I and M1-II (Halamski *et al.*, 2022, fig. 4B). Photographs by A. T. Halamski and A. Baliński.

rugosan corals: Zatoń and Wrzołek, 2020; coralliths of tabulate corals: Zapalski *et al.*, 2021).

Research in progress includes palaeontological studies of bryozoans from Miłoszów by Patrick N. Wyse Jackson and Andrej Ernst and of post-Taghanic brachiopods at Laskowa by Andrzej Baliński, Adam T. Halamski, and Grzegorz Racki.

It is my pleasure to thank all those, who participated in the investigation of the fossil biota at Miłoszów, Skały, and Pokrzywianka, its geological context, and its Recent analogues. The team included 32 persons from 12 institutions (some persons unaffiliated) in five countries:

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This series of papers devoted to the Middle Devonian of the Łysogóry Region of the Holy Cross Mountains hopefully will provide a sufficient number of data and quality of interpretations to serve Earth scientists in a similar manner to analogous synthetic volumes. Among them, especially worth noting is that devoted to the Kielce Region (= southern region of the Holy Cross Mountains; Boucot, 1992), of which the present volume is in a certain sense the counterpart. Other similar regional-scale studies include those on the Lower Devonian of Brittany (Morzadec *et al.*, 1981) and Morocco (Klug and Korn, 2018), and the Hamilton Group of New York (Brett, 1986; Landing and Brett, 1991; see also Baird, 2022 and references therein), to cite just a few. The authors of the present contributions are aware that if they were able to see more than their predecessors, it is because they were standing on the shoulders of giants.

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