

Some remarks on a new model of the Outer Carpathians presented during *Structural and Sequence Stratigraphic Workshop: Polish Carpathians*

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Structural and Sequence Stratigraphic Workshop: Polish Carpathians was organized by MEDUSA OIL (Poland) and GEONAF TA in Gorlice (Southern Poland) from 25th to 27th May 1998. The Workshop was co-ordinated by Piotr Dziadzio (Geonaf ta), Mark Enfield and Mathew Watkinson (Medusa Oil — Poland) and consisted of two day field trip and seminars.

The main Workshop objectives were as follows:

- Present new models for structural and stratigraphic development of the Western Polish Carpathians, and test their validity against regional data,

- Review new and old models in the light of evidence from fieldwork, seismic data, well data, regional geology of Poland and Czech Republic,

- Discuss implications of Medusa's exploration programme for regional geological models and Carpathian potential.

A very interesting *Field Trip Guide* contains, besides the very short descriptions of visited localities (few sentences for each locality) with interpretation, also new ideas on geology of the central part of the Polish Carpathians. The field trips have been illustrated by the topographic and geological maps. It is not clear whether geological maps were specially prepared for this project or the organizers used archival maps. The new ideas on the geological structure of this part of the Polish Outer Carpathians are presented in the following figures: 1. *Regional Structural Geology (map)* of Nowy Sącz and Gorlice areas; 2. *Chronostratigraphic Diagram of Silesian Nappe* — showing sequence stratigraphic framework and correlation to lithostratigraphic scheme; 3. *Balanced Cross-Sections* in four transects; 4. *Pictures of Important Outcrops* showing sedimentary and tectonic structures and oil seeps, supplemented with sedimentary/lithological logs of the typical Upper Cretaceous–Oligocene deposits of the investigated area of the Silesian Unit; 5. *Lithostratigraphic Frameworks* of the Silesian, Dukla and Magura nappes.

The organizers have also prepared a volume of *Seminar Notes* which contains broad reprints from several fundamental text-books dealing with thrust and inversion tectonics, foreland stratigraphy, deep-sea sediment gravity flows, deep sea depositional models and sequence stratigraphy. Only a few sentences of *Seminar Notes* are connected with investigated part of the Polish Carpathians.

The presented new ideas and conclusions ought to be regarded with a special interest, however, strong objections have raised due to the Author's approach to more than 100 years of detailed geological research in this region. Lack of any citation of the previously published papers can serve as an example of such an ignorance, though presented lithostratigraphic frameworks and maps have been based on the already printed data by other authors.

From the presented materials it looks that all data for geology of the Carpathians have been collected and interpreted by the Authors of the *Field Trip Guide only*, and a few existing older data are incorrect according to them.

Probably lack of good knowledge of previously published and unpublished data has caused that several presented opinions are not consistent with well established facts, moreover the same data presented by the Authors in different plates are not compatible between themselves.

Some examples of ignorance of the existing data as well as of presentation of the new ideas without sufficient proofs are presented below:

1. On the map of *Regional Structural Geology*, the shape and position of the „Menchina” and Grybów tectonic windows are far from reality. The „Slona Thrust Sheet” (a new Authors' invention) is put in completely different place comparing with the Transects 2, 3, 4. The occurrence of Early Cretaceous strata in the core of the Jastrzębia Anticline has been unknown up to now, in reality there are Godula Beds (Senonian) in that place. The Jankowa Anticline on the surface has two limbs with the Menilite Beds and the Lower Krosno Sandstones in both limbs, and the axis of this anticline does not prolongate into the Raca Thrust. In that very place, where geological structures from the Silesian Unit, according to the Authors, ought to pass into the Magura Nappe, there are exposures of the deposits of the Magura Nappe which cut obliquely the structures of the Silesian Nappe. Thus, the western prolongation of the Jankowa Thrust cannot pass into the Magura Nappe. The Authors have introduced the important thrusts without any documentation and also, these thrusts are partly in unconformity with the information given by the Authors in the plate „Grybów Tectonic Window”.

2. In the *Chronostratigraphic Diagram* of the Silesian Nappe the Magdalena Sandstones are situated in the NE part, whereas in reality they are connected with the southern part of that nappe. Moreover, an implication that these sandstones are shallow water, basing only on some sedimentary structures, is not convincing. Similar hammock cross stratification structures are observed also in the Ciężkowice Sandstones which are intercalated by the red shales containing lower bathial or abyssal foraminifera. Such sedimentary structures are also known from present-day, deep water sediments. Massive turbidites, like the Lower and Upper Istebna Beds and Ciężkowice Sandstones show no hiatuses in sedimentation, but in the northern direction are laterally replaced by the variegated, deep water shales.

3. The *Balanced Cross-Sections*: Transect 1 was constructed neglecting some important facts. The Skole Nappe does not exist where the Authors have put it. The Iwkowa-1 borehole, localised on the transect just north from the „Magura Sole Thrust”, proved that autochthonous Miocene deposits, which cover the North European Platform, are situated at the depth of 2,300 m and not at the depth of more than 6,000 m as it has been suggested by the Authors. Moreover, the true thickness of the Miocene (Lower Badenian) deposits is less than 200 m and no more than 1,500 m as it has been stated by the Authors. The similar depth of autochthonous platform and thickness of the Miocene deposits have been proved by more than ten deep boreholes situated in the neighbourhood. The Authors have also over-

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looked the fact that below the Lower Cretaceous deposits of the Silesian Unit there are about 150 meters of the Upper Cretaceous marls representing the Sub-Silesian Nappe, which is an independent nappe as the Silesian one and served as a kind of lubricant for the Silesian Nappe. The Jaworzna-1 borehole, situated two kilometers west from the Transect 1, proved that the Magura Sole Thrust is situated at the depth of 2,258 m only, and below that thrust there is no prolongation of the Jankowa Anticline and Silesian Unit, but there is, what the Authors have called „Dukla Duplex” with Grybów Marls unknown in the Jankowa Anticline. In preparation of the Transect 2, the Authors have omitted all data from the deep boreholes situated along this transect: a — Siekierzyna IG-1 — 4,807 m deep, with at least 800 m of the Lower Cretaceous deposits and not 250 m as it has been implied by the Authors and with Sub-Silesian Nappe pierced below the Silesian Nappe; b — Jastrzębia-1 — 4,194 m deep, where the autochthonous Miocene (Badenian) deposits were reached at the depth of 3,815 m and Malmian limestones at the depth of 4,021 m; just north from so called „Slona Thrust” the deep borehole Brzozowa-1 reached autochthonous Miocene at the depth of 2,990 m. In spite of these data, the Authors have stated that below the depth of 2,000 m, in the region of Siekierzyna, there are „Undefined Rock Volume probably comprising rocks of the Silesian Nappe” and that below so called „Slona Thrust” there are no data at all! Also in Transect 3 the Authors have not taken into consideration the results from deep boreholes (e.g. Jastrzębia-1, situated only ten kilometers west from the transect, where autochthonous substratum is at the depth of 3,815 m) and stated that autochthonous Miocene is at the depth of 8 km. Moreover, this transect is in discordance with geological data presented by the Authors themselves in the plate: „Grybów Tectonic Window” where all the anticlines have, at least a part of the northern limbs with the Menilite Beds preserved. Along the transect all the anticlines are thrust faulted without northern limbs. The last Transect 4 is similarly incorrect, e.g. just north from the „Jasło Trust Sheet” the deep borehole Kowalowy-1 reached the autochthonous Miocene at the depth of less than 4,000 m (not at the depth of about 8,000 m according to the Authors), and in the lowermost part of the Carpathians, just above the „Carpathian Sole Thrust”, this borehole pierced the variegated marls of the Sub-Silesian Nappe and not the Skole Nappe as it has been implied by the Authors. They also omitted the results of deep borehole Gorlice-13 which demonstrated the existence of a continuous deposits from the Krosno Beds to Istebna Beds in the limb of the anticline up to the depth of 4,959 m, thus, there are not two separate thrust sheets. The assumed, similar thickness of the Cretaceous and Paleogene deposits in the Silesian Nappe, into which the Authors included also the Sub-Silesian Nappe, is incorrect. Simple connection of the Silesian Nappe with the Dukla–Fore–Magura units is also inconsistent with well established facts. Both units display completely different development of the deposits of the Late Cretaceous and Paleocene. In that time the deposits within the Dukla and Fore–Magura units were similar to those in the Magura Unit. Moreover, distribution of facies and current directions of the Upper Cretaceous–Paleocene deposits show that in the Dukla–Fore–Magura units these deposits were derived from the north while the contemporaneous deposits of the Silesian Unit were derived from the south. Thus, at least during the Late Cretaceous and Paleocene both units were separated by a source area.

4. In the plate „Oil Seeps”, the Cergowa Sandstones from the Kłęczany–Limanowa tectonic window, exposed in a big

quarry (compare also locality 3a in the Fieldtrip Itinerary) are misidentified and are described by the Authors as the Magura Sandstones from the Magura Nappe.

5. Presented lithostratigraphic frameworks, partly based on the previous data, are misleading. The Authors have included some new information inconsistent with hitherto known facts. The position of the Silesian Ridge is strange. According to the Author’s interpretation the ridge is built up of variegated shales and unconformable covered by the Mszanka Sandstones, and underlain by the uppermost Jurassic–Lower Cretaceous deposits (Lower Cieszyn to Lgota Beds). In the Dukla Nappe the Authors have situated the Cisna and Cergowa Beds incorrectly. In the well exposed sections it is clearly visible that the Cergowa Beds were deposited partly in the same sedimentary area as the Cisna Beds. In the Magura Nappe, some sediments have been named incorrectly, e.g. „Szczawnica SSt”. There is no proof that Supramagura Beds are lying transgressively on the Magura Sandstones. The Sub-Silesian Nappe has been included into the Silesian Nappe but surface and borehole data show clearly that both nappes are now separated, though they were deposited in the same Carpathian sedimentary basin. In this manner the Skole Nappe should have been also included into the Silesian Nappe.

There are a lot of mistakes or absolutely unnecessary translations of the Polish geographic names which are also confusing, e.g.: Męcina has been changed into „Menchina”, Lipnica — „Lipnitca”, Biała — „Byala”, Ropa — „Ropia”, Ciężkowice — „Cheshkowice”, Gorlice — „Borlice”, Zadziele — „Zadzeile” and Krosno into „Krosnov”.

In summary the several basic discrepancies between material presented by the Authors and well established facts have raised doubts about reliability of interpretation and conclusions proposed by the Authors.

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