

**COMMENTS OF J. DON AND J. WOJEWODA TO
THE FOLLOWING PAPERS PUBLISHED
IN ACTA MONTANA, SERIES A GEODYNAMICS
IN 2002 AND 2003**

Badura, J., Przybylski, B., Krzyszkowski, D., Zuchiewicz, W., Farbisz, J. and Sroka, J.: 2002, MORPHOTECTONIC PROPERTIES OF THE SUDETIC MARGINAL FAULT AND KŁODZKO BASIN FAULTS, SW POLAND IN THE LIGHT OF GEOELECTRICAL RESISTIVITY STUDIES. ACTA MONTANA, SER. A, 20(124), 57-65.

Badura, J., Jamroz, O. and Zuchiewicz, W.: 2003, RECENT CRUSTAL MOBILITY OF THE UPPER NYSA KŁODZKA GRABEN, SW POLAND. ACTA MONTANA, SER. A, 24(131), 65-71.

TECTONICS OF THE UPPER NYSA KŁODZKA GRABEN: CONTENTIOUS ISSUES

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ABSTRACT

This paper is a critical comment on two articles published in the *Acta Montana* (Badura et al., 2002, Badura et al., 2003), in which the on-sided collected geophysical data as well as their interpretation constituted a base for quite new and very controversial interpretations of the well documented and known since a long time regional tectonic structures – the Idzików Brachysyncline and eastern flexure of the Upper Nysa Kłodzka Trough.

KEYWORDS: Sudetes, Upper Nysa Kłodzka Graben, sedimentary basin, tectonics, Cretaceous, discussion

INTRODUCTION

Three new controversial names, i.e. the “Idzików Brachyantycline”, the “(Waliszów) Kamienna Graben” and the “Długopole Zdrój Horst” have been recently introduced to the literature for the well known regional tectonic units (Badura et al., 2002; Badura et al., 2003). Authors of these names had based on their own interpretation of research results of recent tectonic activity in the area of the Upper Nysa Kłodzka Graben (UNKG). The first name relates to a synclinal tectonic unit discovered in the early 20th century by Leppla (1900) and later investigated and named by Don (Don & Don, 1960) as **Idzików Brachysyncline**. The second name relates to newly postulated tectonic structure which is equal to the **Eastern Flexure** (Don & Don, 1960) developed close to the eastern marginal fault of the UNKG (“Wilkanów Fault” in Badura et al., 2003). The third one relates to an anticlinal tectonic unit in the axial part of the UNKG, which is also known since early 20th and named traditionally as **Długopole Brachyantycline**.

GENERAL REMARKS

Publications concerning the Sudetes area basing on interpretations of aerial pictures, satellite images, detailed and repeated geodetic measurements, analyses of monitoring of microseismicity and using numerical methods of processing of morphometric data have become more numerous. These methods aim first of all at discovering Mesozoic and Cainozoic “neotectonics” and particularly Quaternary and contemporary tectonic activity in the Sudetes. Due to lack of Cainozoic sediments in the mountainous part of the

Sudetes using such methods is definitely reasonable. Nevertheless, results obtained in such a way are not always compared with the geology of the investigated area previously well recognized with classical mapping methods. An example could be a publication about “dystrophic blocks” that were told to be slumped away from the crystalline frames into the UNKG (after J. Šebesta, in Batik et al., 1996 – Fig. 2/4), but whose existence had not been recognised by earlier geological research, nor confirmed by detailed mapping (Don 2003).

Both the stratigraphy and architecture of the upper Cretaceous UNKG have been known for over hundred years (e.g. Geinitz 1843; Leppla 1900; Rode 1936). A more comprehensive research began in the 50's, when a programme of detailed geological map with the scale of 1:25,000 was started – for the first time covering the area of the UNKG. Together with the mapping project a detailed stratigraphic-facial and sedimentological as well as structural-tectonic research was done. In the area of the UNKG the mapping project, comprising also an edition of related descriptions, were finished in the 80's. However, some specific topics are being worked on and results published. The major tectonic features of the north-eastern and northern parts of the UNKG were well documented in the papers published so far. This is why it is even more surprising that it has been tried to introduce to the geological literature new regional names as mentioned at the beginning of the article (Badura et al., 2002, Badura et al. 2003), without even a reference to previous research and publications, which were summarised the most broadly by Radwański (1975).

DETAILED REMARKS

The authors of the publications criticised by us did not present their own geological map of the discussed area, nor even a simplified geologic cross-section, which would show their view on the postulated tectonic structures. On the numerical morphological model of the north-eastern part of the UNKG (Badura et al., 2003 - Fig. 2) there are no structural measurements, not even of strata orientation. In this figure, however, there are visible linearly extended strips, which relate to cropped out layers of various weathering resistivity that led to formation of steep slopes along the limbs of the Idzików Brachysyncline. Three dimensional interpretation basing on the intersection of strips bends in the transverse valleys both for east and south-west limbs indicates an inclination of layers toward the centre of this unit, what unambiguously proves its synclinal character, as had been earlier documented by mapping (Fig. 1). Unfortunately, this fact was not commented by the authors of the model presented in the criticised papers. There is visible an approx. 600-meter wide morphologic depression, parallel to the UNKG eastern marginal fault between Idzików and Nowy Waliszów, which developed in the weathered heterolites, predominantly consisting of calcareous mudstones (so-called "Idzików claystone member" or "Idzików lower beds" after Jerzykiewicz (1970 and 1971)). Formerly, this heterolitic succession had been recognised as belonging to Lower Coniacian (Radwańska 1960 b), however, a recent investigation by Kędzierski (2002) rather indicates its Middle Coniacian age. The above quoted morphologic depression was firstly defined by the authors of the criticised publications as the "Waliszów Graben" (2002) and a year later as the "Kamienna Graben".

From the west side the depression is bordered by a crest being formed of coarse grained sediments of the Idzików conglomerate member of upper Coniacian-to-Santonian age (Kędzierski, 2002; Don & Don, 1960) that picturesquely exposes in the Pasterskie Skalki northward of Idzików (Fig. 2). Toward the west the conglomerates gradually pass into greywacke sandstones, which farther are replaced by mudstones. This lithological assemblage forms a turbidite association, interpreted by Jerzykiewicz (1970, 1971) as a "flysh-like complex" and environmentally recognised as a tempestite succession by Valečka (1984) (see also Wojewoda 1997). Conglomerate units contain mostly pebbles of metamorphic rocks of the Śnieżnik Massif (Don & Don, 1960; Radwański 1961; Wojewoda 1997). In the wide-spread zone of the UNKG eastern marginal flexure both conglomerate units and calcareous mudstones lying below deep vertically. Close to the eastern marginal fault a vertical position and parallel to the fault line also show so-called "clinking marls" of upper Turonian age (Radwańska 1960 a) as well as quartz-arenite sandstone of postulated middle

Turonian age (Don & Don, 1960; see also Wojewoda 1997). A vertical position of the above mentioned sedimentary rock series is documented both by field measurements and geoelectric profiles presented in the criticised publication (Badura et al. 2002).

In the opinion of the authors of criticised publications the main argument for existence of the "(Waliszów) Kamienna Graben", except for the morphologic criterion, may have been an occurrence of gneisses (?) right below the crest built of the conglomerate of the Idzików Member. Such an interpretation bases on a similarity of geoelectric measurements results in the basement just below the conglomerate and those in the neighbouring gneisses of the Śnieżnik Massif to the east (Badura et al. 2002). The authors of the criticised publications postulate that the gneisses beneath the conglomerate of the Idzików Member form an uplifted basement (horst) of the Cenomanian age.

We find such an interpretation wrong because of two reasons. First of all, the rocks of the UNKG crystalline basement crop out exclusively in the axial part of the graben in the central part of the Długopole Brachyantycline nearby Długopole Zdrój. At this location, in a deep gorge of the Nysa Kłodzka river, the basement overlies practically non-deformed sediments of the Cenomanian-to-Turonian age. Similarly, in almost the same lithologic succession, the crystalline basement was drilled in the depth of about 100 meters with numerous boreholes in the axial zone of the Bystrzyca Brachyantycline (Komuda & Don, 1964; Radwański 1975). Moreover, in other places of the UNKG area crystalline basement of the Cretaceous succession was reached in boreholes up to 1000 meters deep (Radwański 1975; Don 2003). Secondly, the above mentioned similarity of geoelectric features of the rock measured may be satisfactorily explained by the petrographic composition of conglomerates, in which gneissic pebbles overdominate. This similarity is increased by undoubtedly steep inclination of conglomerate layers in the eastern limb of the Idzików Brachysyncline, as it appears in the Pasterskie Skalki rock site (Don & Don, 1960 - Fig. 2).

The surrounding of Idzików, Kamienna, Nowy and Stary Waliszów, as well as Bystrzyca Kłodzka were mapped in the 60s (Don & Don, 1960; Radwański 1961; Komuda & Don, 1964), and then in the 80s (Wroński 1983; Cwojdzński 1983). In spite of some minor differences, the obtained images of regional tectonic structures are concordant. Also the cross-sections throughout north-eastern part of the UNKG, i.e. the Bystrzyca Kłodzka brachyantycline and the Idzików Brachysyncline reflect great similarities. They do not correspond in any aspect to "anticlinal" character of the Idzików unit nor to the "Kamienna (Waliszów) Graben", i.e. structures postulated by the authors of the criticised papers. Moreover, such an interpretation leads to a necessity to turn the lithostatigraphic scheme of upper Cretaceous succession upside down, in the place

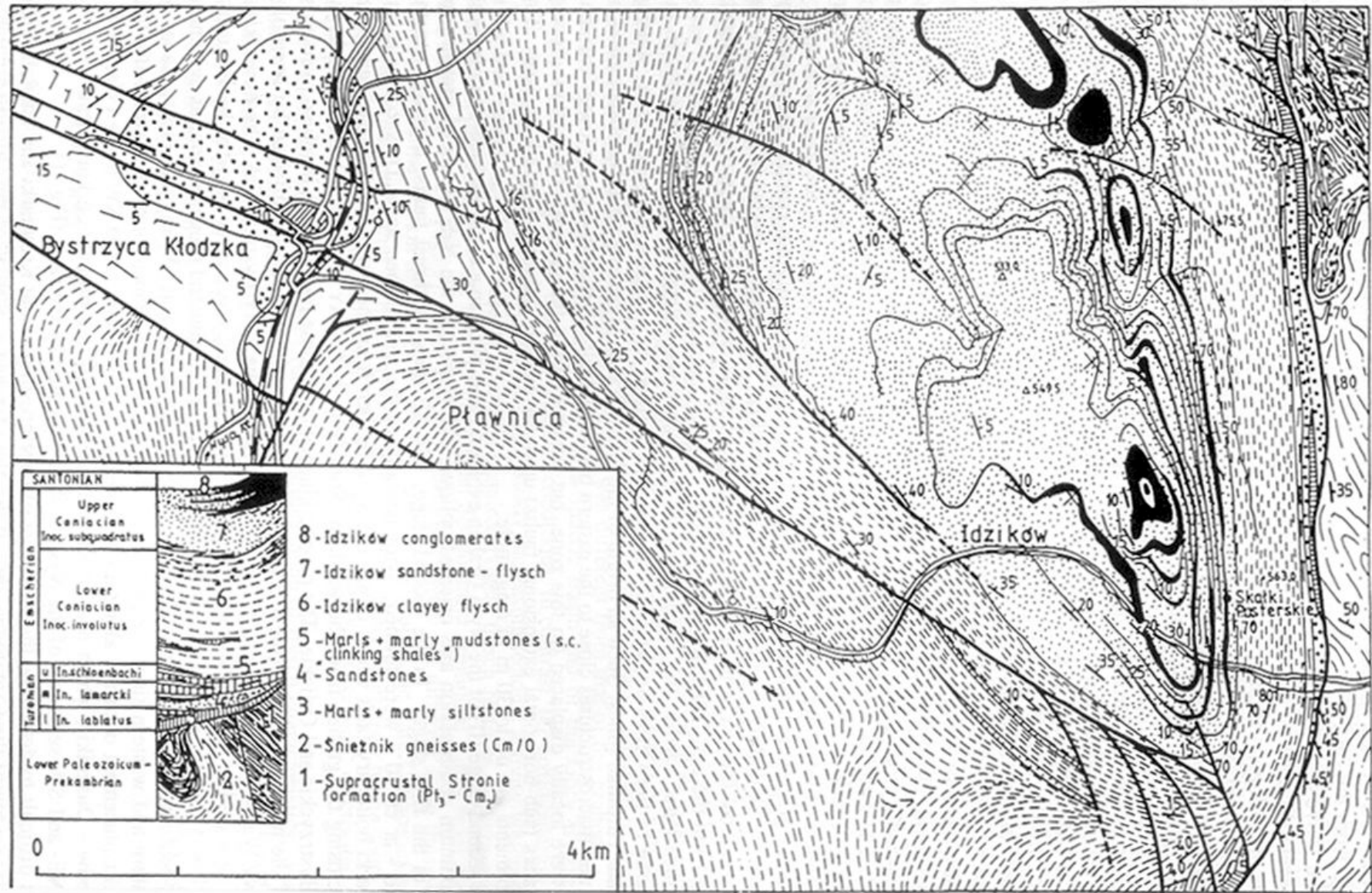


Fig. 1 Geological map of the Idzików Brachysyncline (after: Don & Don 1960, Komuda & Don 1964, Radwański 1965 and Don 1996)

where the profile is the most complete, i.e. in the north-eastern part of the UNKG (Sturm 1900; Rode 1936; Pachucki 1959; Radwański 1960 a, b; Teisseyre 1975). Consequently, it would have to be acknowledged that conglomerates and sandstones of the Idzików Member are older than paleontologically well-documented Idzików mudstones of middle Coniacian age (Kędzierski 2002). Meanwhile, conglomerates and sandstones of the Upper Coniacian Idzików Member build Idzików highland, whereas the underlying mudstones crop out in the morphological depressions surrounding the highland (Don & Don, 1960). Toward the west, the westward inclination of the layers continuously decreases and then, closer to the Bystrzyca Kłodzka Brachysyncline, it inclines steeper again, but eastwards. That proves the synclinal character of the Idzików fold structure. Thus, both the structural-tectonic and stratigraphic data combine into a logic and simple model of the geological setting of the north-eastern part of the UNKG.

Another example of a wrong data interpretation is the region of Długopole Zdrój (Badura et al., 2002). The authors of the criticised paper present a “geo-electric profile” (see Fig. 4) of unknown location. From altitudes only it is possible to suppose that the profile is located in the North of Długopole Zdrój and transversely to the Nysa Kłodzka river valley. In the paper, the authors quote a not positioned “small quarry”, in which “above the gneisses vertically-dipping sandstones are exposed...”.

Both Długopole Zdrój and Długopole Górne are located in the axial part of the regional anticlinal structure – the Długopole Brachyantycline. This is an elliptic unit, approx. 6-kilometre long and 3-kilometre wide, whose longer axis is oriented 320°-130°, and constitutes a prolongation of the Góry Bystrzyckie unit, whose metamorphic rocks dip toward the south-east beneath the sedimentary cover of upper Cretaceous age. The area is built of sandstone unit and heterolithic succession of middle Turonian. The Długopole Brachyantycline is longitudinally cut across by Nysa Kłodzka river valley and, along this cut, from the eastern side of the valley, a continuous exhibition of the Cretaceous rocks and/or crystalline basement occur. Also on the west side of the valley, in the Poręba and Czarci Potok creeks, an almost continuous section of the sedimentary succession is exhibited. In the Nysa Kłodzka river gorge, beneath the northern railway tunnel entry, crop out the gneisses similar to those of Młynowiec Series, as known from the Śnieżnik Massif. Additionally, farther to the south in Długopole Górne, in a quarry of middle Turonian sandstone the architecture of upper Cretaceous rocks may be observed in three dimensions. In the whole area of the Długopole Brachyantycline inclination of sedimentary strata nowhere (!) exceeds 23° (!).

However, it should be noted that not all the sedimentary surfaces in the Cretaceous cover are so gently inclined or lie horizontally. For example, middle Turonian sandstones reflect a variety of

primary sedimentary structures, including facies of giant scale cross bedding (Gpt) almost identical to those formerly described from the Table Mountain area (Jerzykiewicz & Wojewoda, 1986; Wojewoda, 1986, 1997; Wojewoda et al. 1997). The Gpt facies crops out among other localities in the quarry in Długopole Górne (Fig. 3). This is a very “treacherous” facies, in which bedding may be mistaken even by experienced investigators with cross stratification (see: discussion Jerzykiewicz and Wojewoda, 1986), what may sometimes lead to grotesque interpretations of regional geologic setting (Radwański 1968 and 1975).

FINAL REMARKS

Among “small” we rate the mistakes noticed in the illustrations attached to both criticised papers. Namely, locations of mountain chains of the Góry Bystrzyckie and the Góry Orlickie as well as of villages Stary Waliszów and Nowy Waliszów were interchanged (Badura et al., 2003 - Fig. 1). An additional confusion was made due to introducing two different names for one and the same newly postulated tectonic structure: firstly the “Waliszów Graben” (2002 - p. 58, Fig. 3) and a year later the “Kamienna Graben” (2003 - p. 66, Fig. 2). Furthermore, in the figure 3 captions (Badura et al., 2002) rocks of the Kłodzko and Śnieżnik units as well as the Góry Bystrzyckie metamorphic unit wrongly situated on the map are described with a common term “sudetic rocks”, as if Mesozoic sediments of the UNKG and of the wrongly defined Kłodzko Basin (the name used in the title, text and drawing (2003 - fig. 3)) did not belong to the Sudetes!? As it is commonly known the sediments described as “Mesozoic deposits” of the “Kłodzko Basin” (2003 - Fig. 3) were deposited in the Intrasudetic Basin and not exclusively during the Mesozoic but already since the late Palaeozoic. The Lower Permian sediments beginning at the Czerwoniak Hill (397 m a. s. l.) south of Kłodzko crop successively wider north-westward out, i.e. toward the Intrasudetic Basin centre. On the area presented in the figure 3 (2002) they continuously separate upper Cretaceous sediments from the metamorphic rocks of the Kłodzko Unit (Cwojdzński, 1983).

SUMMARY

In spite of different interpretations of some geological data from the UNKG area the authors of here presented critics agree about **the priority of facts before interpretations**. We find recently increasing tendency to interpreting of results of various indirect methods of measurement as natural facts or facts equal to natural facts very worrying. In such situations not taking into account nor relating to results of field-collected data as well as superficial knowledge about an investigated geological object can lead to completely wrong interpretations. These, however, do not approach us to the reality, but rather do it more obscure.

The criticised papers were prepared as a result of a project sponsored by a government (KBN) grant and published in a newsletter of an international range. Thus, they were corrected and reviewed several times and therefore they should be a reliable source of information about details of the Upper Nysa Kłodzka Graben geological setting. Consequently, they might be cited in the further scientific literature. This is not an optimistic conclusion of our critics...

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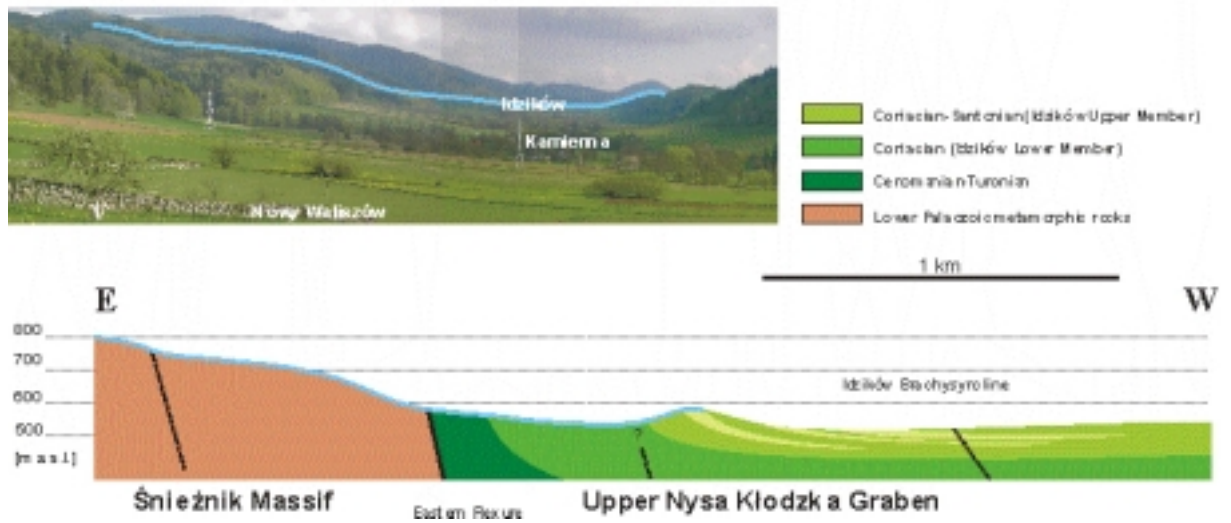


Fig. 2 The east-west oriented geological cross section trough the Idzików Brachysyncline



Fig. 3 Middle Touronian sandstone at Długopole Górne quarry (axial zone of the Długopole Brachyantycline). Note an inclination 210° - 230° of the cross strata in the giant scale cross-bedded sandstone (Gpt facies) and nearly horizontal boundary between Gpt and Lpt facies (large scale cross bedded sandstone).