of Devonian and Silurian rocks is called the Repechy Belt, and the famous locality is Stínava.

Black graptolitic shales and dark carbonates from the Stínava site contain tectonically deformed but still determinable Silurian macrofossils (graptolites, cephalopods, mollusks, ostracods and crinoids). A revision of graptolites and cephalopods has confirmed the presence of at least two Silurian stratigraphical levels at the locality of Stínava. The older one is associated with the upper Llandoverian – lower Wenlockian interval (spiralis Zone is clearly present, interval of griestonensis–crenulata to centrifugus–murchisoni zones is possibly present) and the younger one with the lower Ludlovian (nilssoni Zone is clearly present, interval up to the lower part of leintwardinensis is possibly present).

Samples representing the most common lithology of Silurian rocks were studied with the aim of finding organic-walled microfossils (OWM, such as spores and cryptospores, the Acritarcha group, Mazuelloida group and/or chitinozoans). No determinable OWM were found in slides (prepared by usual palynological methods). Tectonically deformed specimens of chitinozoans were observed in oriented thin sections prepared from non-calcareous black graptolite shale; taxonomical classification on species or genus levels is not possible because of the poor preservation of all observed specimens.

Gamma-ray activity of the Silurian (and Devonian) rocks was studied. Comparison between radioactivity (laboratory gamma-ray spectrometry analysis) of rocks from the Stínava locality and Barrandian Silurian rocks shows different contents of radioactive elements. Lower content of Ra and high Th/Ra ratio at Stínava can be explained by different sources.

The Devonian volcano-sedimentary ore mineralization (Lahn–Dill) contains an unusual ore association, with prevailing chlorite–siderite ores and low content of magnetite ores in deeper parts of the ore lens. The ore body was strongly affected by quartz metasomatism in the chlorite facies, causing siderite chloritization and silicification of the whole ore body. An unusual specimen of an oolitic phosphate from this locality was also described. The Stínava iron-ore deposit was exploited in several separate historical stages. The main period of mining in the 16th century is very well documented (written documentation, dated tools and dendrochronological datum – 1551).

Geophysical field research shows a very complicated tectonic pattern at the locality.

Based on structural data, the fold tectonics of the whole area seems to be subcylindrical. The pre-flysch sequence is situated in the axial depression(!) of the assumed large structure. Tectonics of the pre-flysch rocks was studied at three outcrops in deep valleys. It was found that the pre-flysch formation is, contrary to the previous views, situated in the core of a syncline or in the outer part of the Culm anticline. These settings correspond to the various parts of the folded thrust plane along which the pre-flysch sequence was thrust over the flysch complex. Devonian rocks form small tectonic sheets along the folded thrust plane.

General Remarks on Variscan Tectonics in the Sudetes Mts. and their Foreland

Michał MIERZEJEWSKI

Institute of Geological Sciences, University of Wrocław, pl. M.Borna 9, 50-204 Wrocław, Poland

In the last years, the Sudetic geology is under fire especially created by those investigators who deal mainly with geochemical analyses, problematic existence of subduction zones, the meaning of kinematic indicators and so on. Such activities bring a lot of new information and are fashionable; however, sombody may get an impression that the geology of the end of the 20th century rests in geochemistry.

Fortunately, a wealth of data from classical geology have been published till now. After some release of these data, a change of our understanding of the Variscan scenario of tectonic events in the Sudetes and its neighborhood is obvious. I would like to stress only some points.

In the Sudetes Mts. and also in larger areas of southern Poland, an existence of divergent imbrication structure is evident. This structure has its suture in the Niemcza Zone (Pin et al.1988 expressed another opinion that the Nowa Ruda ophiolite and Ślęża ophiolite are remnants of a suture between Saxothuringian and Moldanubian zones) with ophiolite bodies. To the east, this imbrication of large-scale geological units also involves the Upper Silesian Coal Basin with its basement inclined to the west. Similarly, the Devonian cover rocks of Małopolska Massif exhibit higher thickness in the western part than the eastern one. The imbrication structure in the Sudetes proper was descriebed and published years ago in Geologia Sudetica (Mierzejewski 1993) and therefore will not be portrayed here once again.

The imbrication process, which started in the Upper Devonian and proceeded till the Carboniferous, leads to large-scale horizontal and vertical movements It was the reason for rapid erosion of Sudetic blocks and for the formation of thick succession of Lower Carboniferous continental clastic cyclothems inside the Sudetes in Intra-Sudetic Basin. These cyclothems were extremely well described by Andrzej Teisseyre (1975). In the Sudetes proper, the Lower Carboniferous deposits were folded only in those units (Kaczawa Mts. – Haydukiewicz, pers. comm., and Bardo Mts. – Wajsprych 1986), which are suspected to be of allochtonous nature. An extended beld of Lower Carboniferous marine flyschoid deposits, situated outside the Sudetes and outside the Fore-Sudetic Block is also treated as the result of these vertical movement. This belt is an extension of the Rhenohercynian Zone in Germany.

It should be mentioned that the Niemcza suture zone (with remains of oceanic crust) of that great imbrication edifice, is situated within the Saxothuringian Zone, and not at the border between ST and RH zones. Therefore, one can imagine, that during the first stage of the Wilson cycle, an old continental crust was divided into different blocks with oceanic crust in between. Then, after inversion of convection currents during the Upper Devonian, the blocks collided, rotated and were imbricated. In some places the blocks may have collided according to to the scheme theoretically worked out by Cloetingh and Banda (1992). They formulated an idea about interfigering of collided blocks, which may explain the presence of HP rocks in some horizons without subduction.

This succession of events is in accordance with the opinion expressed long ago by H. Teisseyre (1959), K. Dziedzic (1965) and J. Don (1961). According to these investigatores there are no signs of Sudetic Phase in the Sudetes. The above mentioned phenomena also explain the mosaic-like design in the Sudetes, and the generation of large amouts of granitic magmas, with different S_{ri} ratio, in an unusually thick crust after the collision. The different S_{ri} ratios are easily explained by partial fusion of blocks sandwiched with remnants of oceanic crust involved in the imbrication proccess.

The collision of the Sudetic blocks also explains the phenomena of three virgations situated in the corners of the Sowie Góry Mts. The western virgation has probably the nature of a syntax dividing the Kaczawa Mts. and also hidden under the Strzegom–Sobótka granite massif. This is only a working hypothesis and has to be elucidated by further investigations.

References

CLOETINGH S. and BANDA E., 1992. Mechanical structure. In: D. BLUNDEL, R. FREEMAN and S. MUELLER (Eds.), A continent revealed, the European Geotraverse. Cambridge, University Press, pp.80- 91.

DON J., 1961. Utwory młodopaleozoiczne okolic Nowej Rudy. Zesz.nauk.UWr. Ser.B. nr 6. Nauki o Ziemi. Wrocław.

DZIEDZIC K., 1965. Stosunek górnego karbonu do podłoża w północno-wschodniej części noworudzkiego rejonu węglowego. *Acta geol. Pol.*, 15: 2.

PIN CH., MAJEROWICZ A. and WOJCIECHOWSKA I., 1988. Upper Paleozoic oceanic crust in the Polish Sudetes: Nd–Sr isotope and trace element evidence. *Lithos*, 21: 195-209.

TEISSEYRE A.K., 1975 Sedimentology and paleogeography of the Kulm alluvial fans in the western Intrasudetic Basin (Central Sudetes, SW Poland). *Geol.Sudetica*, 9, (2): 1-132.

TEISSEYRE H., 1959. Zu dem Problem der Diskordanz zwischen den Waldenburger Schichten und dem Kulm in der Innersudetischen Mulde. *Geologie*, 8: 3-12.

WAJSPRYCH B., 1986. Sedimentary record of tectonic activity on a Devonian–Carboniferous continental margin, Sudetes. In: A.K.TEISSEYRE (Ed.), IAS, 7th European Regional Meeting Excursion Guidebook, Kraków–Poland. Ossolineum. Wrocław, pp.141-164.

Structural-Tectonic Study of Sedimentary Complex of the Chrudim Palaeozoic: An Example of the Prachovice Quarry (Železné hory Mts.)

Štěpánka MRÁZOVÁ and Stanislav ČECH

Czech Geological Survey, Klárov 3, 118 21 Praha 1, Czech Republic

Introduction

The Prachovice quarry in the Železné hory Mts., E Bohemia, is a supplier of raw material to one of the largest cement works in the Czech Republic. The study of its structural characteristics was focused on the black zones of the Silurian–Devonian sequence of the Prachovice Formation (black graphitic shales and dark grey limestones) and on the light grey Podol Limestone frequently occurring in all profiles of the quarry (Fig. 1).

The aim of the study was to document and measure structural elements originating from the processes of sedimentation and the modes of deformation of the above mentioned rock types.

Results

The Devonian Podol Limestone is several times overthrust by the black shales of the Prachovice Formation (Silurian and Lower Devonian) to the N direction. The latter form three dark E–W-trending belts in the ligth grey Podol Limestone.

Boundaries between the individual lithostratigraphic units, which are gradational in a normal stratigraphic succession, as well as the sharp contacts between the overthrust zones represent notable structural elements. Both types of boundaries plunge S at moderate to steep angles (35°–85°). The black shales are slightly folded with high wavelengths and low amplitudes. The axes of the folds are mostly very flat, trending E–W.

Characteristic lithofacies of the Prachovice Formation are the black graphitic shales with intercalated thin-bedded clayey limestones. Bioclastic limestones with cephalopods and disarticulated columnals of crinoids were observed in the middle and upper parts of the Prachovice Formation. Orthocone cephalopods are dominantly orientated by paleocurrents in the E–W direction.