

Foraminiferal biostratigraphy of the Weglowka marls in a stratotype section (Subsilesian Unit, Polish Outer Carpathians)

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Abstract: A local zonation based on planktonic foraminifera has been established (from *Dicarinella asymetrica* to *Abathomphalus mayaroensis* zones) and calibrated with the local zonation based on agglutinated foraminifera (*Goesella rugosa* to *Hormosina gigantea* zone).

Key words: Late Cretaceous, Polish Flysch Carpathians, Subsilesian Unit, Węglówka Marls, foraminiferal zonation

Introduction

Variogated sediments (shales and marls) are well-known from all units of the Polish Outer Carpathians. In the Subsilesian Unit variogated deposits have the greatest range i.e. from the Turonian to the Eocene (Kozarski, 1985, Olszewska, 1997) The Upper Senonian variogated sediments in the Subsilesian Unit in Weglowka are known as the Weglowka Marls. The Subsilesian Unit has been a subject of many geological investigations since the early 50s.

During the Senonian, on the submarine ridge of the Subsilesian basin pelagic sediments were deposited (cf. Kozarski, 1985). This sedimentation took place above the local CCD level and outside of influence of turbiditic currents. According to Huss (1957, 1966) and Gasiński *et al* (1999), abundant planktonic as well as benthic calcareous and agglutinated foraminifera characterize the Weglowka Marls.

The standard foraminiferal zonation of the Polish Flysch Carpathians, proposed by Geroch and Nowak (1984) is based on agglutinated foraminifera. The calibration of Geroch and Nowak zonation with planktonic zonation has great importance. The deposits from the Weglowka stratotype sections, give such a possibility.

The presented analysis is an attempt to correlate the planktonic zonation according to Caron (1985) with the zonation by Geroch & Nowak (1984).

The problem of the K/T boundary in the Weglowka unit will be the subject of a separate study.

Biostratigraphy

The following planktonic zones *sencu* Caron (1985) have been recognized in the Weglowka section.

Dicarinella asymetrica Zone (Late Santonian)

Index taxon absent, lower boundary - the beginning of a section, upper boundary - the last appearance (LAD) of

Heterohelix reussi, whose LAD is similar as *D. Asymetrica*. *G. arca*, *G. lapparenti* is also present (sample WS2).

Globotruncana elevata Zone (Early Campanian)

Index species not found, lower boundary LAD of *H. reussi*, upper boundary FAD of *Schackoina multispinata*. Numerous planktonic foraminifera such as: *G. arca*, *G. lapparenti*, *G. linneiana*, *Archeoglobigerina cretacea* are also characteristic in this zone (samples WS3-WS8).

Globotruncana ventricosa Zone (higher part of Early Campanian and Middle Campanian)

Lower boundary: FAD of the index species, upper boundary FAD of *G. calcarata*. Index taxon is accompanied by numerous specimens of *G. arca* and *G. linneiana* (WW27).

Globotruncanella calcarata Zone (upper part of Late Campanian)

Total range zone of *G. calcarata* (WW30). Abundant *G. arca* accompanying by *G. stuartiformis*, *G. falsostuarti* are characteristic for this zone.

Globotruncanella havanensis Zone (Early Maastrichtian)

Lower boundary LAD: of *G. calcarata*, upper boundary: FAD of *G. aegyptiaca*. Interval with *G. havanensis* - index takson in (WS15, WS18, WS22). *G. arca* occurs in great number in WS22, WS23. In samples WS19, WS22 an occurrence of *G. stuartiformis* has been also observed.

Globotruncana aegyptiaca Zone (upper part of Early Maastrichtian)

Index species found in sample WW25. *G. arca*, *G. linneiana*, *G. bulloides*. *G. stuartiformis* are also present.

Gansserina gansseri Zone (Late Maastrichtian)

Index species appeared in sample WS26 together with *G. arca*. In sample WS27 *Racemiguembelina fructicosa* has been found whose FAD: is indicated within Gansserina gansseri zone

Abathomphalus mayaroensis Zone (latest Maastrichtian).

In the studied samples *A. mayaroensis* has not been found so far. However, this index species has been noted in samples from the Weglowka section (Gasiński et al. 1999).

Zonation based on agglutinated foraminifera according to Geroch & Nowak (1984).

Goessella rugosa zone (lower Campanian)

The lower limit of the zone - the beginning of the investigated section, upper limit - the first appearance of *Hormosina (Caudamina) gigantea*. Single specimen of the index taxon occur in samples WS2, WS3, WS8. *H. ovulum*, *Ammodiscus cretaceus*, *Ammosphaeroidina pseudopauciloculata*, *Gerochammina conversa*, *Saccamina placenta* are also common element of the assemblages.

Age: from the highest part of the Dicarinella asymetrica Zone (highest part Late Santonian)

Hormosina gigantea Zone (Campanian-Early Maastrichtian)

The lower limit - first appearance of *H. gigantea*, upper limit - FAD of *Rzehakina fissistomata*. Index taxon occur in samples WS 15, WS22, WS 23, DW4, together with *H. ovulum*, *H. excelsa*, *A. cretaceus*, *Gerochammina lenis*.

Age: from the Globotruncanella havanensis Zone

References

- Caron, M., 1985: Cretaceous planktonic foraminifera In: Bolli H. M., Saunders J. and Perch-Nielsen K. (eds.) Plankton stratigraphy. Cambridge University Press, Cambridge, 17-86.
- Gasiński, M. A., Jugowiec, M. and Ślaczka, A., 1999: Late Cretaceous foraminiferids and calcareous nannoplankton from the Węglówka Marls (Subsilesian unit, Outer Carpathians, Poland). *Geologica Carpathica*, 50; 63-73
- Geroch, S., Nowak, W., 1984: Proposal of Zonation for the late Tithonian - late Eocene, based upon arenaceous foraminifera from the outer Carpathians, Poland. In: Oerti H., Benthos'83; 2nd International Symposium on Benthic Foraminifera Pau (France), April 11-15, 1983, 225-239, Elf Aquitaine, ESSO REP and TOTAL CFP, Paul & Bourdeaux.
- Huss, F., 1957: Stratigraphy of the Węglówka unit in the light of its microfauna. *Acta Geol. Pol.* : 29-69.
- Huss, F., 1966: Les Foraminifères agglutinans de la série sous-silesienne de l'unité pétrolière de Węglówka (Karpates flischieuses polonaises). PAN Kraków, Kom. Nauk Geol. Prace Geol. 34: 76 pp.
- Koszarski, L., 1985: Klipen structure of the Żegocina tectonic zone with tectonic windows of Subsilesian and Skole Units deformed at the front of Magura Nappe. *Carpato-Balkan Geol. Ass.*, 13th Congr. Cracow, Poland 1985. Guide to exc. 3: 216-243.
- Leszczynski, S., Uchman, F., 1991: To the origin of variegated shales from flysch of the Polish Carpathians. *Geologica Carpath.*, 42,5, Bratislava.
- Olszewska, B., 1997: Foraminiferal biostratigraphy of the Outer Carpathians: A record of basin geohistory. *Annales Societatis Geologorum Poloniae.*, 67: 325-337