

## A Paleoecological analysis of the Late Cretaceous foraminiferids of the Wisniowa and Zegocina tectonic windows (Subsilesian Unit, Polish Outer Carpathians)

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**Abstract:** The age of the studied sections is the Turonian-Campanian (Krzyworzeka, Wisniowa tectonic window) and the Campanian-Maastrichtian (Nowe Rybie, Zegocina tectonic window). Morphogroup analysis have indicated the organic flux on the sea bottom, during Turonian-Campanian. Turonian assemblages are dominated by agglutinated species (Krzyworzeki section). Within the Late Coniacian-Early Campanian assemblages the number of calcareous benthic foraminifera increase. In the Campanian assemblages, more abundant calcareous benthic and planktonic foraminifera have been noted. During the Campanian-Maastrichtian calcareous benthic and planktonic foraminifera are dominant in the Nowe Rybie section.

**Key words:** Late Cretaceous, Polish Outer Carpathians, Subsilesian Unit, variegated marls, foraminiferids, palaeoecology,

Studied foraminiferids were collected from Krzyworzeka (Wisniowa tectonic window) and from the Nowe Rybie sections (Zegocina tectonic window). In general, the studied foraminiferal associations resemble assemblages described by Huss (1966; agglutinated foraminiferids predominate), but differ qualitatively and quantitatively from those previously described from the type locality of Weglowka (Gasinski, et al., 1999 a) as well as those from the Zegocina window sections (Gasinski et. al, 1999 b). The Weglowka type facies which extend westward from the Weglowka area are most probably, deposited under different palaeoenvironmental conditions.

The presented analysis indicated that the so called "Weglowka - type facies", established mainly on lithological features, contain quite diverse foraminiferal assemblages within the whole of the Subsilesian basin. Most samples from Wisniowa the section contain only agglutinated foraminiferids. The biostratigraphy has been established on agglutinated as well as on planktonic taxa.

The oldest recognized associations are in the Krzyworzeka section which were dated on the basis of presence of *Uvigerinammina jankoi* (Majzon) and the presence of *Goesella rugosa* (Hanzlikova) which belong to the *Uvigerinammina jankoi* and *Goesella rugosa* zones *sensu* Geroch & Nowak (1984; i.e. Turonian-early Campanian). Very rare planktonic taxa, mainly *Globotruncana arca* (Cushman) and *G. ex. gr. lapparenti* Brotzen, have confirmed the Campanian age in the upper part of the sections (Robaszyński & Caron, 1995). In the Nowe Rybie sections the presence of benthic calcareous foraminifera *Stensioeina cf. dictyon* Pokorný, *Stensioeina pommerana* Brotzen, *Gaudryina frankei* Brotzen, *Cribrella ovata* Gawor-Biedowa were dated as Campanian to

early Maastrichtian (Gawor - Biedowa, 1992). The samples from Nowe Rybie contain more planktonic forms, *Globotruncana arca* (Cushman), *Globotruncana gr. lapparenti*.

Quantitative analysis indicate that agglutinated taxa are predominant in the samples of the Turonian-Campanian age. Among them, agglutinated tubular forms (mainly *Rahabdammina* - *Dendrophrya* sp. sp.), which constitute an ecologically significant group. These tubular forms belong to the „suspension feeders“ morphogroup (Jones & Charnock, 1985). Their abundance probably indicate the increase of organic flux (OF) on the sea bottom. The observed sequence marks a regression episode influenced by global eustatic and / or local tectonic events (see Nagy, 1992; Gasinski, 1997). The relationship between the amount of „suspension feeders“ taxa and the abundance of calcareous benthic assemblages (mainly *Globorotalites*, *Pleurostomella*, *Lenticulina*, *Cibicides*, *Osangularia*) is significant for the estimation of sea-level and organic flux fluctuations. An increasing number of suspension feeders and a decreasing amount of calcareous /agglutinated benthic denotes the intensity of organic flux episodes in the studied basin.

Nodosariids are relatively abundant within the benthic calcareous foraminiferal. Planktonic foraminiferal assemblages are very scarce and non - keeled epipelagic taxa are predominated among them in the Krzyworzeki section. In the Nowe Rybie section the number of planktonic foraminifera (keeled species are dominated) clearly increase. The abundance of Radiolaria within some assemblages, dated as the Turonian, is probably related to Tethyan Oceanic Radiolarian flourishing, during the CTBE (Cenomanian/Turonian Boundary Event; see: cf.



Tethyan Oceanic Radiolarian flourishing, during the CTBE (Cenomanian/Turonian Boundary Event; see: cf. Gasinski, 1997). The blooming of Radiolaria is connected with the upwelling and indicates an increase of nutrients in the surface waters. Such an event occurred after oxygen deficiency episodes on the sea bottom.

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