

LOWER EOCENE TUFFITES IN THE ŻEGOCINA ZONE (POLISH FLYSCH CARPATHIANS)

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Abstract: Two exposures of bentonitized tuffites were localized in the Żegocina zone (Polish Flysch Carpathians). The tuffite sediments are enclosed in Lower Paleogene shales of the Subsilesian Unit. The Early Eocene age of their deposition has been estimated from the assemblages of agglutinating foraminifers (*Glomospira* div. sp. and *Saccamminoides carpathicus* zones). Tuffites can be correlated with similar sediments from the western parts of Subsilesian Unit area.

Key words: Subsilesian unit; Żegocina zone; Early Eocene; tuffites; foraminifera.

Localization of tuffites exposures

In the Polish Flysch Carpathians the Żegocina zone forms a narrow belt which comprises folded together strata of the Subsilesian and Silesian units (Skoczylas-Ciszewska, 1960). Two exposures of bentonitized tuffites were found in the western part of this zone occupied by the Subsilesian unit, in the Pluskawka streambed (Nowe Rybie village).

The A exposure is located in the left bank of a Pluskawka Creek tributary, about 260 meters upstream from the confluence with the Pluskawka Creek (Fig. 1). Tuffites form here 3 layers enclosed within the mottled (red-green) clayey shales (Fig. 2). The B exposure was encountered in the scarp of the main Pluskawka Creek, some 60 meters upstream from the same confluence. The ash-grey clayey shales host 5 tuffite layers.

The bentonitized tuffites form closely spaced, irregular, white or pinkish layers, 0.5 to 3.9 centimeters thick. Both the top and bottom surfaces are somewhat obliterated.

Biostratigraphy

For biostratigraphic studies 3 samples were collected from the A exposure and 1 sample from the B one (Fig. 2). The microfauna assemblages are represented by numerous, well-preserved agglutinating foraminifers and less common, calcareous benthic ones. The planktonic foraminifers are rare and poorly preserved. Among the agglutinating species encountered at the A exposure particularly common were *Glomospira charoides* (Jones et Parker) and *Glomospira gordialis* (Jones et Parker) which constitute from 30% to 40% of all foraminifers identified in the assemblage. Relatively common were also: *Gerochammina conversa* (Grzybowski), *Recurvoides* div. sp. and *Rhabdammina cylindrica* Glaessner. Other more important species were: *Glomospirella biedai* Samuel, *Haplophragmoides kirki* Wickenden, *Reophax elongatus* Grzybowski and *Reophax pilulifer* Brady (Tab. 1). Calcareous benthic foraminifers were represented by *Absammina poagi* Schnitker et Tjalsma, *Abysammina quadrata* Schnitker et Tjalsma, *Eponides* cf. *subcandidulus* (Grzybowski), *Eponides umbonatus* (Reuss), *Nuttallides truempyi* (Nuttall), *Osangularia plummerae* Brotzen and *Quadriformina profunda* Schnitker et Tjalsma. The foraminifers assemblage points to the Early Eocene *Glomospira* div. sp. zone (according to Olszewska, 1997).

In a single sample from B exposure the agglutinating foraminifers were represented by most common *Glomospira charoides* (Jones et Parker), *Gerochammina conversa* (Grzybowski), *Gerochammina lenis* (Grzybowski), *Recurvoides* div. sp., and tubular forms: *Rhabdammina* and *Nothia*. Other species were: *Ammodiscus* div. sp., *Arenobulimina dorbignyi* (Reuss), *Reticulophragmium amplexans* (Grzybowski), *Rophax duplex* Grzybowski and *Saccamminoides carpathicus* Geroch (Tab. 1). Benthic calcareous foraminifers belonged to *Anomalina acuta* Plummer, *Eponides umbonatus* (Reuss) and *Ellipsoglandulina* sp. Such assemblage is of Early Eocene age which is confirmed by numerous members of *Glomospira* genus as well as the presence of *Saccamminoides carpathicus* Geroch and *Reticulophragmium amplexans* (Grzybowski) which appear for the first time in the Early Eocene (Olszewska, 1997). This assemblage was ascribed to *Saccamminoides carpathicus* zone (after Olszewska, 1997).

Summery

Up to now the sediments described from the Żegocina zone were pyroclastics of mostly Cretaceous or Paleocene ages (Skoczylas-Ciszewska, 1956; 1960). Tuffites of similar characteristics and estimated Lower Eocene deposition age are known from more western parts of Subsilesian unit area, i.e. from the Wiśniowa tectonic window (Burtan, 1978; Salata *et al.*, 2001), from the Lanckorona zone (Wieser, 1952) and from the Żywiec tectonic window (Leśniak &

Waškowska-Oliwa, 2001). It seems reasonable to suggest that studied bentonitized tuffites from the Żegocina zone can be correlated with tuffites from the western parts of the Subsilesian unit area.

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Table 1. Distribution of foraminiferal species.

Number of samples →	A exposure			B exposure
	11/430	12/428	13/439	20/433
<i>Abysammina poagi</i> Schnitker et Tjalsma	X		X	
<i>Abysammina quadrata</i> Schnitker et Tjalsma			X	
<i>Abysammina</i> sp.	X		X	
<i>Acarinina</i> sp.				X
<i>Ammodiscus cretaceus</i> (Reuss)	X		X	X
<i>Ammodiscus peruvianus</i> Berry	X	X		
<i>Ammodiscus planus</i> Loeblich	X	X		X
<i>Ammodiscus tenuissimus</i> Grzybowski	X			
<i>Ammodiscus</i> sp.	X		X	
<i>Ammolagena clavata</i> (Jones et Parker)	X			X
<i>Ammosphaeroidina pseudopauciloculata</i> (Mjatiuk)	X	X	X	X
<i>Anomalina acuta</i> Plummer				X
<i>Anomalina</i> sp.				X
<i>Arenobulimina dorbignyi</i> (Reuss)			X	X
<i>Arenobulimina</i> sp.			X	X
<i>Aschemocella carpathica</i> (Neagu)	X			
<i>Aschemocella</i> sp.	X			
<i>Bathisiphon</i> sp.	X			
<i>Cibicides</i> sp.			X	
<i>Cystamina</i> cf. <i>sveni</i> Gradstein et Kaminski	X	X	X	X
<i>Ellipsoglandulina</i> sp.			X	X
<i>Eponides</i> cf. <i>subcandidulus</i> (Grzybowski)			X	
<i>Eponides umbonatus</i> (Reuss)	X	X	X	X
<i>Eponides</i> cf. <i>umbonatus</i> (Reuss)	X		X	
<i>Eponides</i> sp.			X	X
<i>Gavelinella</i> sp.	X			
<i>Gerochammina conversa</i> (Grzybowski)	X	X	X	X
<i>Gerochammina lenis</i> (Grzybowski)	X		X	X
<i>Gerochammina</i> sp.	X	X	X	X
<i>Globocassidulina</i> sp.			X	
<i>Glomospira charoides</i> (Jones et Parker)	X	X	X	X
<i>Glomospira glomerata</i> (Grzybowski)				X
<i>Glomospira gordialis</i> (Jones et Parker)	X	X	X	X
<i>Glomospira irregularis</i> (Grzybowski)	X	X		X
<i>Glomospira</i> sp.	X	X	X	X
<i>Glomospirella biedai</i> Samuel	X			
<i>Glomospirella</i> sp.				X
<i>Haplophragmoides kirki</i> Wickenden	X		X	
<i>Haplophragmoides</i> cf. <i>kirki</i> Wickenden	X			
<i>Haplophragmoides walteri</i> (Grzybowski)			X	
<i>Haplophragmoides</i> sp.	X		X	
<i>Hormosina ovulum</i> (Grzybowski)	X			
<i>Hormosina velascoensis</i> (Cushman)	X			
<i>Hormosina</i> sp.		X		X
<i>Hyperammina elongata</i> Brady				X
<i>Hyperammina</i> sp.	X	X		X
<i>Kalamopsis grzybowskii</i> (Dylązanka)		X		

<i>Nodosaria</i> sp.	X		X	
<i>Nonion</i> sp.				
<i>Nothia</i> div. sp.	X	X	X	X
<i>Nuttallides truempyi</i> (Nuttall)	X		X	
<i>Nuttallides</i> sp.				
<i>Osangularia plummerae</i> Brotzen			X	
<i>Paratrochamminoides contortus</i> (Grzybowski)	X		X	X
<i>Paratrochamminoides heteromorphus</i> (Grzybowski)			X	
<i>Paratrochamminoides irregularis</i> (White)	X		X	
<i>Paratrochamminoides mitratus</i> (Grzybowski)				
<i>Paratrochamminoides olszewskii</i> (Grzybowski)	X		X	X
<i>Paratrochamminoides</i> sp.	X			X
<i>Phenacophragma</i> sp.			X	
<i>Quadrimorphina profunda</i> Schnitker et Tjalsma	X	X	X	
<i>Quadrimorphina</i> sp.	X			
<i>Recurvoides</i> div. sp.	X	X	X	X
<i>Rophax duplex</i> Grzybowski				X
<i>Reophax elongatus</i> Grzybowski	X			
<i>Reophax nodulosus</i> Brady	X			
<i>Reophax pilulifer</i> Brady	X		X	
<i>Reophax</i> sp.	X		X	X
<i>Reticulophragmium amplexans</i> (Grzybowski)				X
<i>Rhabdammina cylindrica</i> Glaessner	X	X	X	X
<i>Rhabdammina discreta</i> Brady	X			X
<i>Rhabdammina</i> sp.	X	X	X	X
<i>Rhizammina</i> sp.	X		X	X
<i>Saccammina placenta</i> (Grzybowski)	X		X	X
<i>Saccammina</i> sp.	X		X	X
<i>Saccamminodes carpathicus</i> Ggeroch				X
<i>Subbotina</i> sp.	X			
<i>Thalmannammina subturbinata</i> (Grzybowski)	X	X	X	X
<i>Trochammina globigeriniformis</i> (Jones et Parker)	X			
<i>Trochamminoides coronatus</i> (Brady)	X			
<i>Trochamminoides proteus</i> (Karrer)				X

Figure 1. Location of tuffites.

Figure 2. Lithological logs.

Fig. 1.

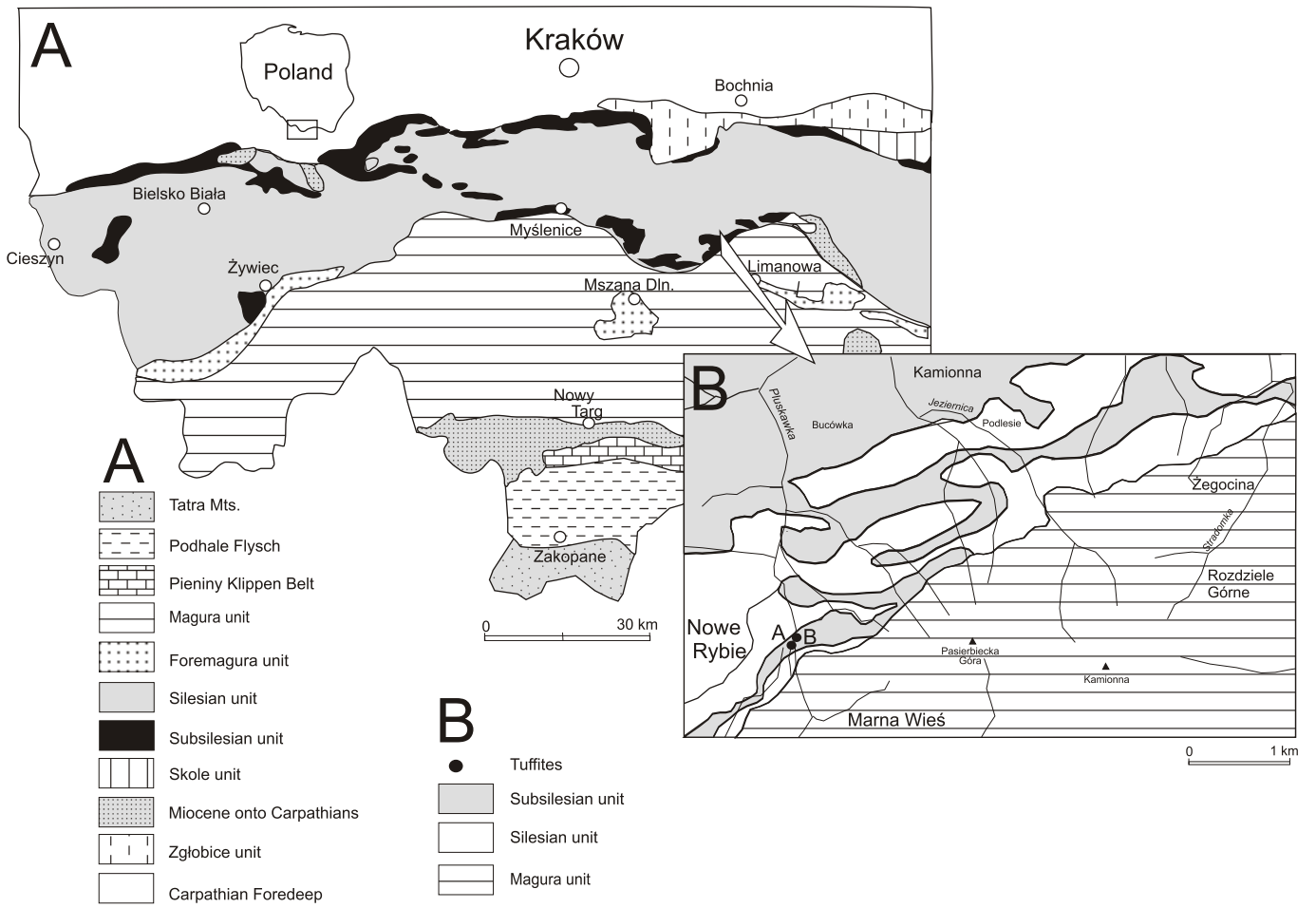


Fig. 2.

