

# The Middle Devonian Kačák Event in the Barrandian area

Petr BUDIL

Czech Geological Survey, Klárov 3, 118 21, Praha 1, e-mail: budil@cgu.cz

**ABSTRACT.** Two faunal assemblages are distinguished in the uppermost Choteč Limestone: one linked to deeper sedimentary environments and the other related to down-slope redeposited carbonate material. After the onset of the Kačák Shale, some benthic elements were strongly reduced. Whereas the trilobites and articulate brachiopods are almost missing in the Kačák Member, sponge spicules and dactyloconarid tentaculites dominate these shales. Nevertheless, the fauna redeposited by limestone tempestites and turbidites intercalated with the Kačák Shale displays many similar features to the underlying limestone member. The analysis of faunal assemblages indicates the existence of shallow water areas which were in the neighbourhood of deeper seas of the Prague Basin.

**KEYWORDS:** Kačák Event, Middle Devonian, Barrandian, faunal assemblages.

## Introduction

The Kačák-otomari Event is one of the important Lower Palaeozoic bio-crisis. It is stratigraphically correlated with the uppermost Eifelian (Middle Devonian). This event is classically developed and well documented in the Barrandian area (Chlupáč 1960, Chlupáč and Kukul 1986, 1989, Budil 1995). It is typically represented by the onset of greyish – black shales of the Kačák Member (Srbsko Formation) over the underlying grey biomicritic and pelbiodeutral limestones of the Choteč Formation. Possibly, a shallow-water equivalent of the Kačák Member (or Kačák Shale) is developed in the Koněprusy area (Hladil et al. 1992). The aim of this paper is to describe the general characteristics of the faunal assemblages of the uppermost part of the Choteč Limestone together with the base of the Kačák Shale. The area between Prague and Tobolka has been investigated (Fig. 1) because the Kačák Event is developed here with the most visible features.

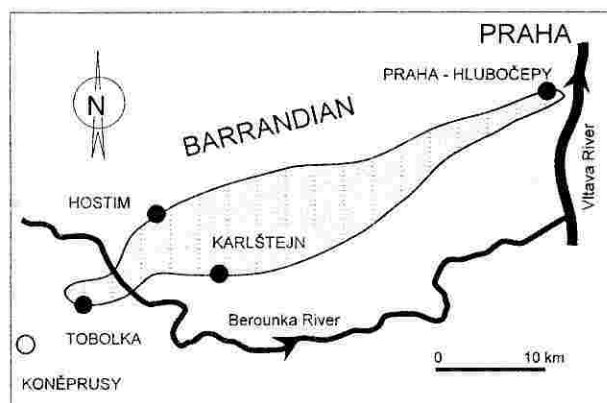


Figure 1. A sketch map of the distribution of the Kačák Member in the Barrandian area (after Chlupáč 1960 and Budil 1995).

## Descriptions of faunal assemblages

In the Choteč Limestone, two faunal assemblages can be distinguished:

(A) The first faunal assemblage is linked to the beds of biomicritic limestone. It represents deeper parts of the Barrandian basin but a paraautochthonous origin of this faunal assemblage is highly probable. The assemblage is dominated by organisms of planktonic [dactyloconarid tentaculites with index species

*Nowakia (Cepanowakia) chlupaciana* Alberti, abundant radiolarians, some conodonts], epiplanktonic (inarticulate brachiopods) and nektonic (orthoconic cephalopods) modes of life. Benthic elements are represented by phacopid, odontopleurid and proetid trilobites; sponge spicules were occasionally accumulated in structures resembling the sponge bodies. Articulate brachiopods are abundant, and numerous ichnofossils of *Chondrites*- and *Zoophycos*-type have been found as well.

(B) The second faunal assemblage is lithologically linked to the intervals of (intra-)pelbiodeutral limestones and its composition indicates an allochthonous origin. It consists mostly of fragments of shallow marine benthic organisms (crinoid columnals, fragments of anthozoans and stromatoporoids, algal mats, calcispheres and pelletoids). Bioclasts show characteristics of transportation, they are mostly rounded and sorted. However, the representatives of the first faunal assemblage (A – deep water background) are abundant, too.

In the Kačák Shale, the benthic elements of the first assemblage (A) are strongly restricted.

(C) In this assemblage, the trilobites and articulate brachiopods are missing; the ichnofossils of the *Chondrites* – type are restricted exclusively to thin intercalations similar to the “piped zones” by Savrda and Bottjer (1989) which indicate short-term interruptions in dominant anoxic regime on the sea bottom. On the contrary, the sponge spicules are very abundant and the “shale” intervals of the Kačák Member are largely represented by spiculite. Pelagic [dactyloconarid tentaculites with index species *Nowakia (Nowakia) otomari* Prantl et Bouček and radiolarians], epiplanktonic (inarticulate brachiopods) and nektonic (abundant small orthoconic nautiloids and goniatites) organisms prevail among the fauna.

(D) The second Kačák assemblage which is restricted to thin intercalations of pelbiodeutral limestones, is very similar to the assemblage (B) from the Choteč Limestone (without the deep – water benthic elements, of course). This fauna was probably redeposited by limestone turbidites intercalated with the Kačák Shale. The analysis of faunal assemblages indicates the existence of shallow water areas which were in the neighbourhood of these deeper seas of the Prague Basin.

Remains of terrestrial plants (*Rellimia*, *Krejciella*, *Protolepidodendron*, *Drepanophycus*, *Pseudosporoch-*

nus etc.) are also frequent in both last mentioned assemblages (C and D).

## Acknowledgements

The author appreciates several improvements of the language provided by J. Čurda, J. Hladil and J. Ebert. They have increased the understandibility of this brief contribution.

## References

- BUDIL P. 1995. Demonstrations of the Kačák event (Middle Devonian, uppermost Eifelian) at some Barrandian localities. *Věstník Českého geologického Ústavu*, 70, 4, 1–24.
- ČEJCHAN P. 1987. Radiolarians from the Middle Devonian of the Barrandian, Czechoslovakia. *Miscellanea Micropalaeontologica* II/1, *Knihovnička zemního plynu a nafty*, 6a, 49–70. Hodonín.
- CHLUPÁČ I. 1960. Stratigrafická studie o vrstvách srbských (givet) ve středoevropském devonu. *Sborník Ústředního ústavu geologického, Geologie*, 26 (1), 143–185.
- CHLUPÁČ I. and KUKAL Z. 1986. Reflection to the possible global Devonian events in the Barrandian area, CSSR. *Lecture Notes in Earth Sciences*, 8, *Global Bioevents*. Springer, Berlin.
- CHLUPÁČ I. and KUKAL Z. 1988. Possible global events and the stratigraphy of the Palaeozoic of the Barrandian (Cambrian-Middle Devonian, Czechoslovakia). *Sborník geologických Věd, Geologie*, 43, 83–146.
- HLADIL J. et al. 1992. Temné vápencové vrstvy při stropu akantopygových vápenců u Koněprus otomari-Kačák event. *Zprávy geologického výzkumu v roce 1991*, 6 (1), 1–4. Praha.
- SAVRDA Ch.E. and BOTJER D. 1989. Anatomy and implications of bioturbated beds in black shale sequences: Examples from Jurassic Possidonienschiefer (South Germany). *The Society of Economical Paleontologists and Mineralogists, Pacific section, Research reports*, 54, 330–341. Tulsa.

SPECIES	CHOTEČ Fm.			KAČÁK Mbr.	
	1	2	3	1	2
<i>Polygnathus linguiformis</i> Hinde			X		X
<i>Polygnathus</i> ex gr. <i>eiffius</i> Bisch. et Ziegl.			X		
<i>Polygnathus</i> sp.		X	X		X
<i>Belodella</i> sp.			X		
<i>Nowakia chlapaciana</i> Alberti	?	X	X		
<i>Nowakia</i> (N.) <i>otomari</i> Ptl. et Bouč.				X	?
<i>Styliolina</i> sp.	X	X	X	X	?
<i>Viriatellina</i> sp.		X		X	
<i>Homoctenus</i> sp.			X		
" <i>Posidonia</i> " sp.				X	
<i>Buchiola</i> sp.				X	
Bivalvia indet. (juv.)		?	X		
Gastropoda ? indet. (juv.)			X		
" <i>Orthoceras</i> " spp.	?	X	X	X	
<i>Agoniatites costulatus</i> Arch. et Vern.				X	
<i>Agoniatites</i> sp.				X	
<i>Cabrioceras crispiforme</i> (Kayser)				X	
<i>Chotecops</i> cf. <i>auspex</i> Chl.	?	X	X		
Proetidae ? indet.			X		
Odontopleuridae indet.			X		
<i>Cupressinocrinus</i> sp.			X		X
Gasterocommidae indet.			X		
Platycrididae indet.					X
Cyclidii indet.			X		
Holothuroidea indet.					X
Ophiuroidea indet.					X
<i>Holynetes</i> sp.		X			
<i>Plectodontella</i> sp.			X		
<i>Caplinopia</i> sp.			X		
Strophomenida indet.	X	X			
Lissatrypididae indet.			X		
Chonetida indet.	X	X			
<i>Wadiglossa</i> sp.	?	X			
<i>Orbiculoidea</i> indet.	?	X		X	
Bryozoa indet.			X		X
Rugosa indet.			X		?
Tabulata indet.			X		?
Stromatoporoidea indet.			X		X
<i>Pyrtonema</i> sp.	?	X	X	X	X
Siticipongii indet.	X	X	X	X	X
Calcispongii indet.		X			
<i>Jinonicella</i> sp.n.		X			
<i>Entactinia</i> cf. <i>additiva</i> For.		X	X		
<i>Entactinia</i> spp.		X	X		
? <i>Entactinosphaera</i> cf. <i>polyacanthina</i> For.		X			
<i>Entactinosphaera</i> sp. 1		X	X		
<i>Entactinosphaera</i> sp. 2			X		
<i>Astroentactinia paronae</i> (Hinde)		X	?		
<i>Astroentactinia</i> cf. <i>stellata</i> Nazarov		X			
? <i>Spongientactinella</i> sp.		X			
? <i>Helioentactinia</i> sp.			X		
<i>Ceratoikiscum</i> sp. 2 sensu Čejchan (1987)		X	X		
<i>Ceratoikiscum</i> sp. 5 sensu Čejchan (1987)		X			
<i>Palaeoscleridium cladophorum</i> Delf.		X	X		
Radiolaria indet.		X	X	X	X
<i>Chondrites</i> ichnosp.	?	X		X	
<i>Pascichnia</i> ? ichnosp.		X	?		
<i>Zoophycos</i> ichnosp.		X			
<i>Protolapidodendron scharyianum</i> (Krej.)				X	
<i>Rellimia</i> sp.				X	?
<i>Dichotomium</i> ? sp.				X	
<i>Drepanophycus</i> sp.				X	
<i>Pseudosporochnus</i> sp.				X	

Table 1. A review of fossils from the uppermost Choteč Limestone and the Lower Kačák Shale (after Budil 1995). Column 1 gives the occurrence in the black-grey shales and calcareous shales, column 2 the occurrence in biomicritic limestones, column 3 the occurrence in pelbiodeutral limestones.