



Paleogene nannofossil assemblages from the Krupište site in Kočani valley, Republic of Macedonia

Палеогенски нанофосилни асоциации от района на Крупище в Кочанската долина, Република Македонија

Violeta Stojanova, Goše Petrov
Виолета Стоянова, Гоше Петров

University “Goce Delcev”, Faculty of Natural and Technical Sciences, Štip, Republic of Macedonia;
 E-mails: violeta.stojanova@ugd.edu.mk; gose.petrov@ugd.edu.mk

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Introduction

The Krupište site belongs to the Ovče Pole Basin, which is a large Paleogene sedimentary mass with NW-SE trend that is superimposed on varied rocks from the eastern part of the Vardar Zone in the territory of the Republic of Macedonia. The age of the sediments (Late Eocene–Early Oligocene), as well as their lithology, thickness and spatial relationships, were discussed in several works (Stojanova, 2008; Stojanova et al., 2012; Valchev et al., 2013; Stojanova, Petrov, 2014, 2016).

This paper aims to represent the nannofossil research in the Paleogene sediments established in K-1 and K-2 drill holes. Exploration drilling was conducted in the period 1980–1983 in the area of Kočani valley in order to evaluate the possibility of utilization of the thermal water at the locality of Krupište (Verbovšek et al., 1983). The two studied drill holes are located at approximately 900 m NE of the village of Krupište, NE of the town of Štip (Rakičević et al., 1976) (Fig. 1).

The drilling penetrated the following units: the Quaternary (0–83 m) and Paleogene (83–630 m) sedimentary complexes and Paleozoic crystalline rocks (630–793 m). The Quaternary includes large-scale gravel, sand and silt. The Paleogene complex comprises greenish calcareous clay layers alternating with sandstone beds and marly clays with thickness up to several meters, and the Paleozoic rocks are represented by mica shists and gneisses.

Five samples picked up from the section of K-1 hole (the interval from 83 m to 547 m) were analyzed for calcareous nannofossils in the laboratory of the Institute of Paleontology at the University of Ljubljana (Fig. 2).

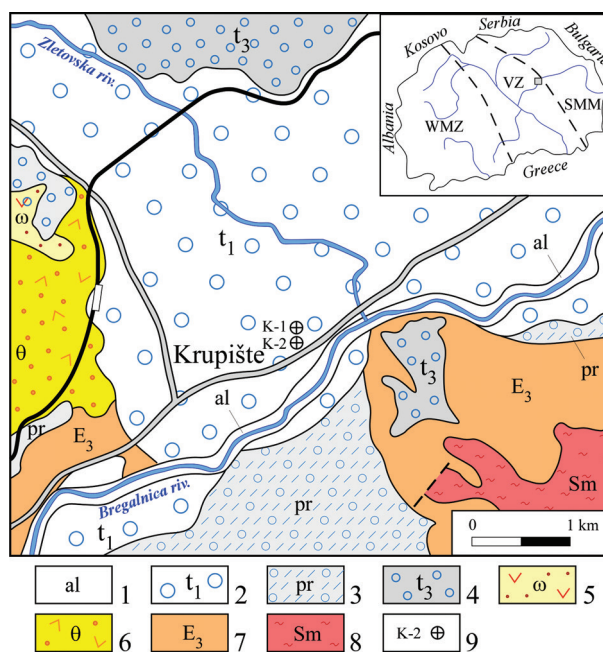


Fig. 1. Geological map of the locality Krupište: 1, alluvium; 2, lower river terrace; 3, proluvium; 4, old river terrace; 5, andesite breccia; 6, andesitic tuff; 7, Upper Eocene: upper flysch lithozone; 8, mica schists; 9, drill holes

Results and discussion

Nannofossil research revealed that the samples contain well preserved specimens of 19 species including: *Cyclicargolithus floridanus* (Roth et Hay), *Cyclicargolithus abisectus* (Müller), *Dictyococcites bisectus* (Hay, Mohler et Wade), *Lanternithus minutus*

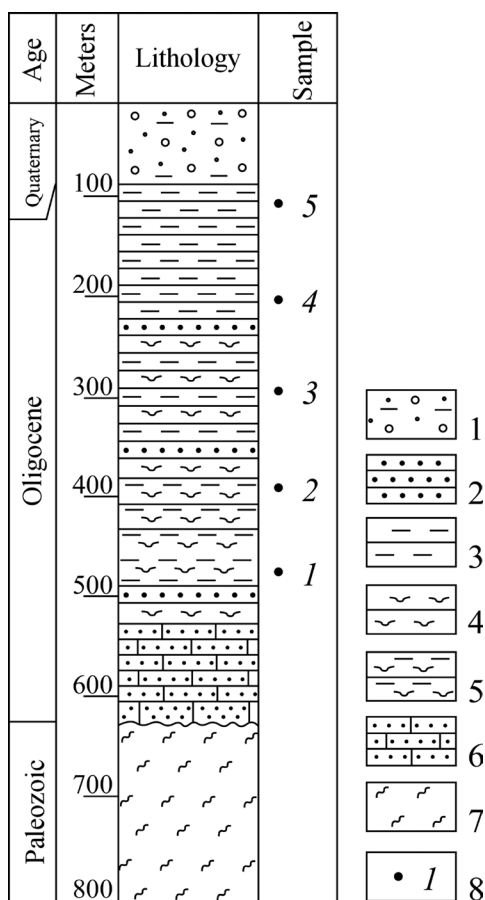


Fig. 2. Lithological column of the K-1 drill hole: 1, alluvial sediments; 2, sandstones; 3, marls; 4, clays; 5, marly-clayey sediments; 6, sandy limestones; 7, mica shists and gneisses; 8, samples

Stradner, *Braarudosphaera bigelowi* (Gran et Braarud), *Sphenolithus predistentus* Bramlette et Wilcoxon, *Sphenolithus distentus* Martini, *Reticulofenestra umbilica* (Levin), *Reticulofenestra sp.*, *Ericsonia subdisticha* (Roth et Hay), *Coccolithus pelagicus*

(Wallich), *Zygrabolithus bijugatus* Deflandre, *Pontosphaera sp.*, *Sphenolithus moriformis* (Brönnimann et Stradner), *Helicopontosphaera compacta* (Bramlette et Wilcoxon), *Reticulofenestra lockeri* Müller, *Ericsonia eopelagica* (Bramlette et Riedel), *Cyclococcolithus formosus* Kamptner, *Sphenolithus radians* Deflandre. This nannofossil assemblage is characteristic for NP22 to NP23 zones (upper part of the Lower Oligocene) (Martini, 1971).

The presence of species like *Lanternithus minutus* Stradner and *Braarudosphaera bigelowii* (Gran et Braarud), as well as the absence of representatives of genus *Discoaster* Tan, indicates a shallow water environment of sedimentation.

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