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CALCAREOUS NANNOFOSSIL BIOSTRATIGRAPHY OF THE UPPER CRETACEOUS OF GEORGIA

CONTENTS

Key words: Calcareous nannofossil, Biostratigraphy, Upper Cretaceous, Georgia SSR.

ABSTRACT

Detailed studies of calcareous nannofossils from Upper Cretaceous limestones of Georgia, in particular from the Trialetian folded system and the Central and Northern parts of the Georgian Block, allow to distinguish eight nannofossil zones from the Cenomanian through the Maastrichtian.

RIASSUNTO

Dettagliati studi sui nannofossili calcarei del Cretaceo superiore della Georgia, in particolare del sistema a pieghe di Trialeti e della parte centrale e settentrionale del blocco georgiano, consentono di distinguere otto zone a nannofossili dal Cenomaniano al Maastrichtiano.

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INTRODUCTION

Georgia is situated in the north-western part of the Transcaucasus; it is bordered in the north by the Black Sea. Special interest toward Georgia is due to its complex geological structure.

As shown on the geological map of Georgia (Fig. 1), the deposits from paleozoic granitoids up to Quaternary sediments are developped on its territory.

The Upper Cretaceous deposits are represented in all four main tectonic units of Georgia: on the Southern slope of the Great Caucasus there are basically flysch formations; on the Georgian Block carbonate facies are developed; the Adjara-Trialetian folded system, a part of the Lesser Caucasus, includes carbonate formations as well as volcanogenic ones; as for the Artvino-Bolnisi Block, three series are distinguished: volcanogenic-carbonate (Cenomanian), volcanogenic (Turonian-Lower Campanian) and carbonate (Upper Campanian - Maastrichtian).

So far, Cretaceous calcareous nannofossils have been studied from the Trialeti folded system and from the central part of the Georgian Block and its northern periphery. Here, 8 nannofossil zones could be distinguished based on the first occurrence (FO) of characteristic marker species.

CALCAREOUS NANNOFOSSIL ZONES OF GEORGIA (Fig. 2)

ZONE of *Lithraphidites alatus* : Interval between the FO of *L. alatus* and the FO of *Microrhabdulus decoratus*.

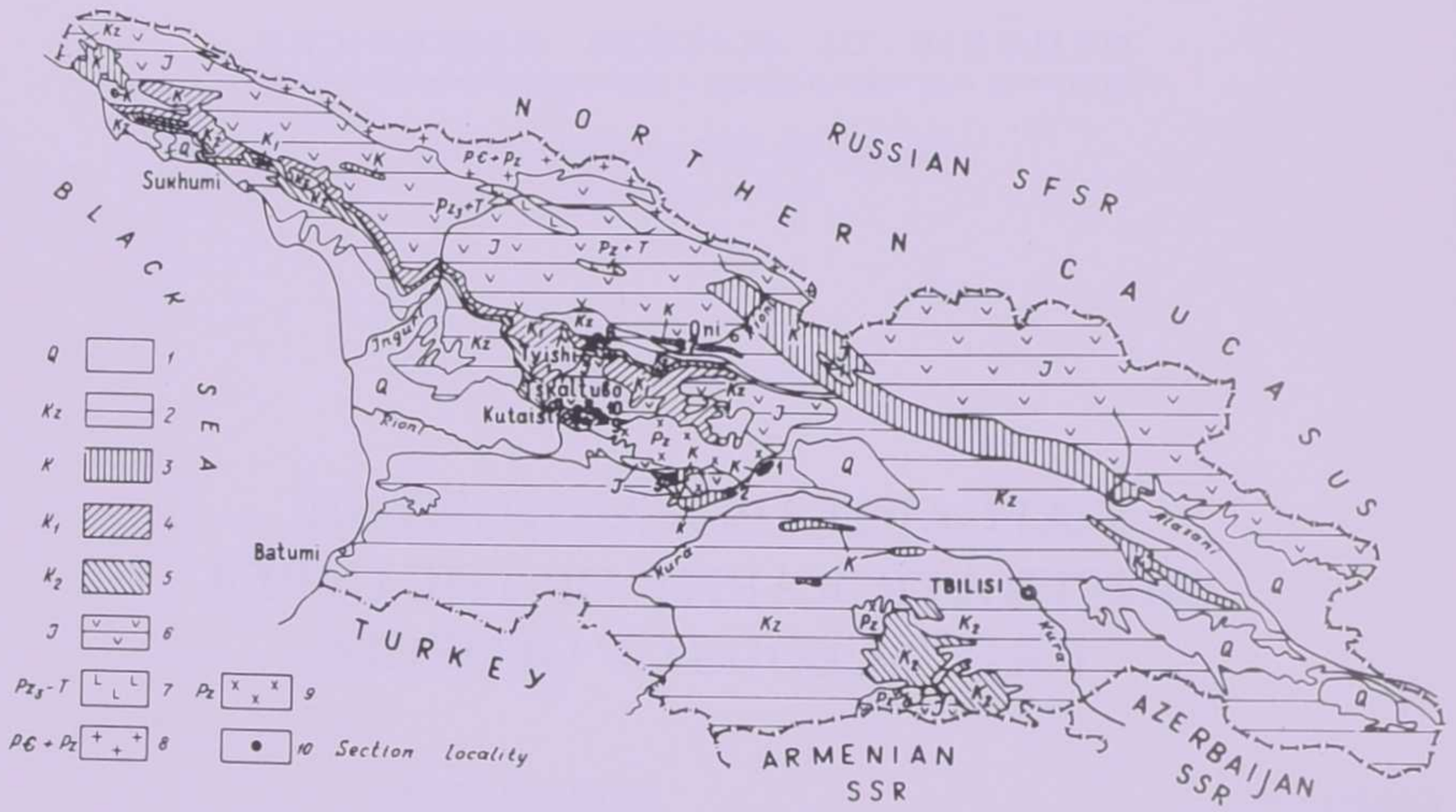

FIG. 1 - Geological map of Georgia. 1, Quaternary; 2, Tertiary; 3, Cretaceous; 4, Lower Cretaceous; 5, Upper Cretaceous; 6, Jurassic; 7, Upper Paleozoic - Triassic; 8, Precambrian + Paleozoic; 9, Paleozoic; 10, Section locality.

ASSEMBLAGE : *Tranolithus salillus, Parhabdolithus asper, Eiffellithus turriseiffelii, Parhabdolithus angustus* and other species.

AGE & DISTRIBUTION : Cenomanian; northern periphery of the Georgian Block.

ZONE of *Microrhabdulus decoratus* : Interval between the FO of *M. decoratus* and the FO of *Tetralithus pyramidus*.

ASSEMBLAGE : *Tetralithus obscurus, Cretarhabdus crenulatus, C. conicus, C. ingens, E. turriseiffelii, E. eximius, Lucianorhabdus cayeuxii, L. maleformis, Lithraphidites carniolensis, Zygodiscus diplogrammus, Lithastrinus grillii.*

AGE & DISTRIBUTION : Early Turonian; northwestern periphery and central part of the Georgian Block and in the Adjara-Trialetian folded system.

ZONE of *Tetralithus pyramidus* : Interval between the FO of *T. pyramidus* and the FO of *Arkhangelskiella cymbiformis*.

ASSEMBLAGE : *Kamptnerius magnificus, Rucinolithus hayi, Microrhabdulus belgicus, Zygodiscus acanthus, Z. compactus, Z. biperforatus, Tranolithus phacelosus* have their FO in this interval.

AGE & DISTRIBUTION : Late Turonian; central part of the Georgian Block and on its northern periphery and in the Adjara-Trialetian folded system.

Beds with of *Arkhangelskiella cymbiformis* : Interval between the FO of *A. cymbiformis* and the FO of *Ceratolithoides aculeus*.

FIG. 2 - Upper Cretaceous calcareous nannofossil zonation.

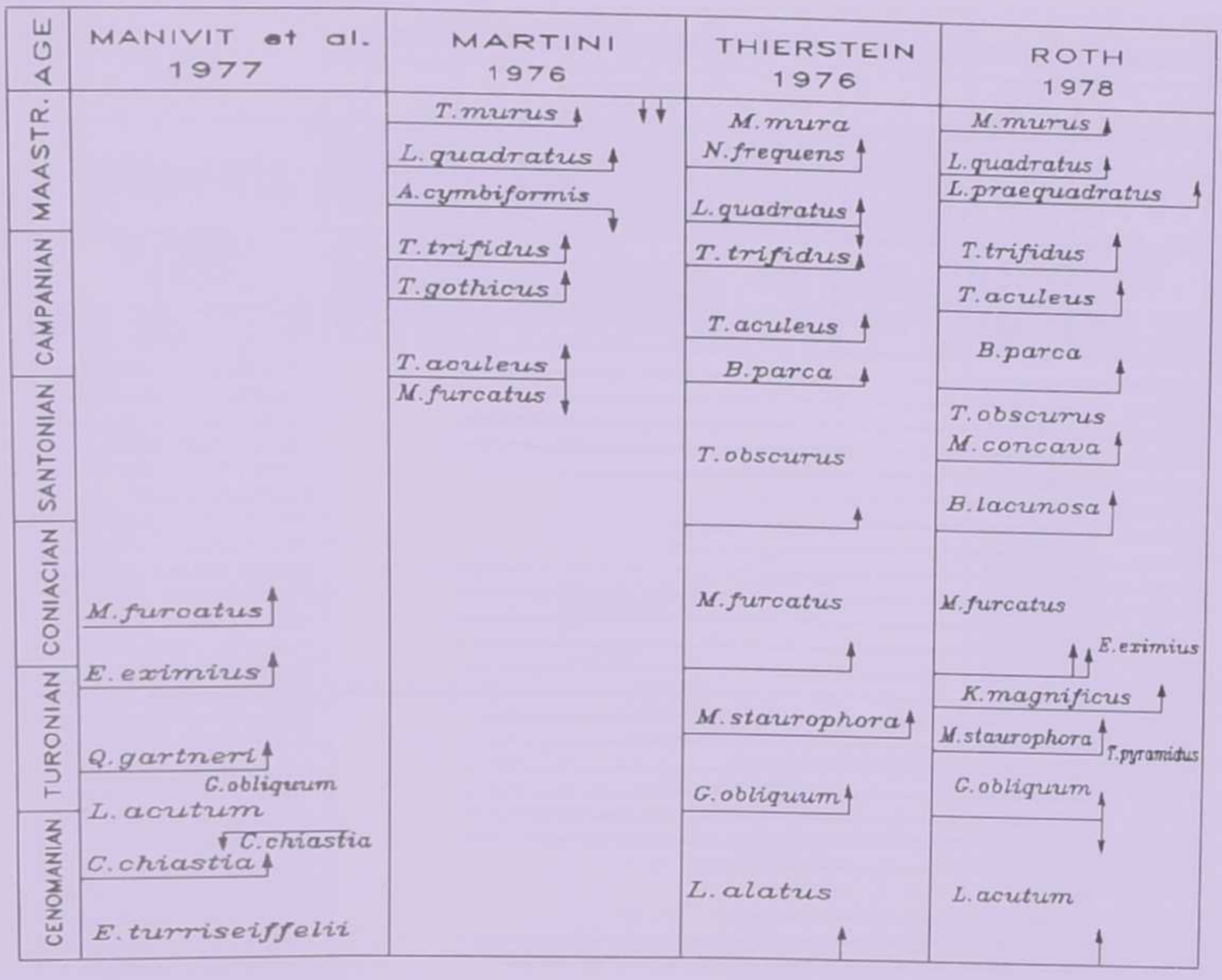

FIG. 3 - Comparison of Upper Cretaceous calcareous nannofossil zonation schemes.

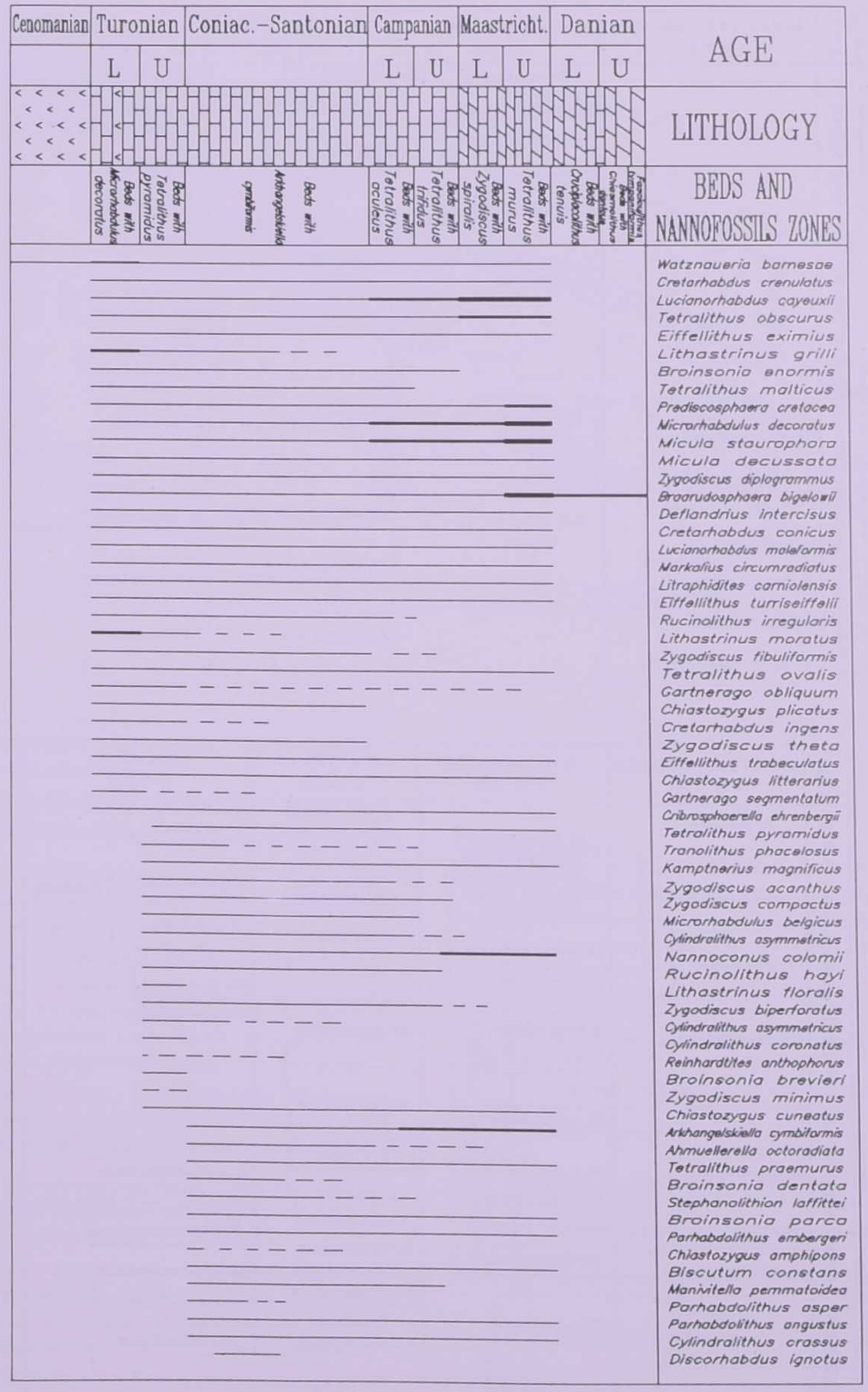

FIG. 4 - Ranges of Upper Cretaceous marker nannofossils.

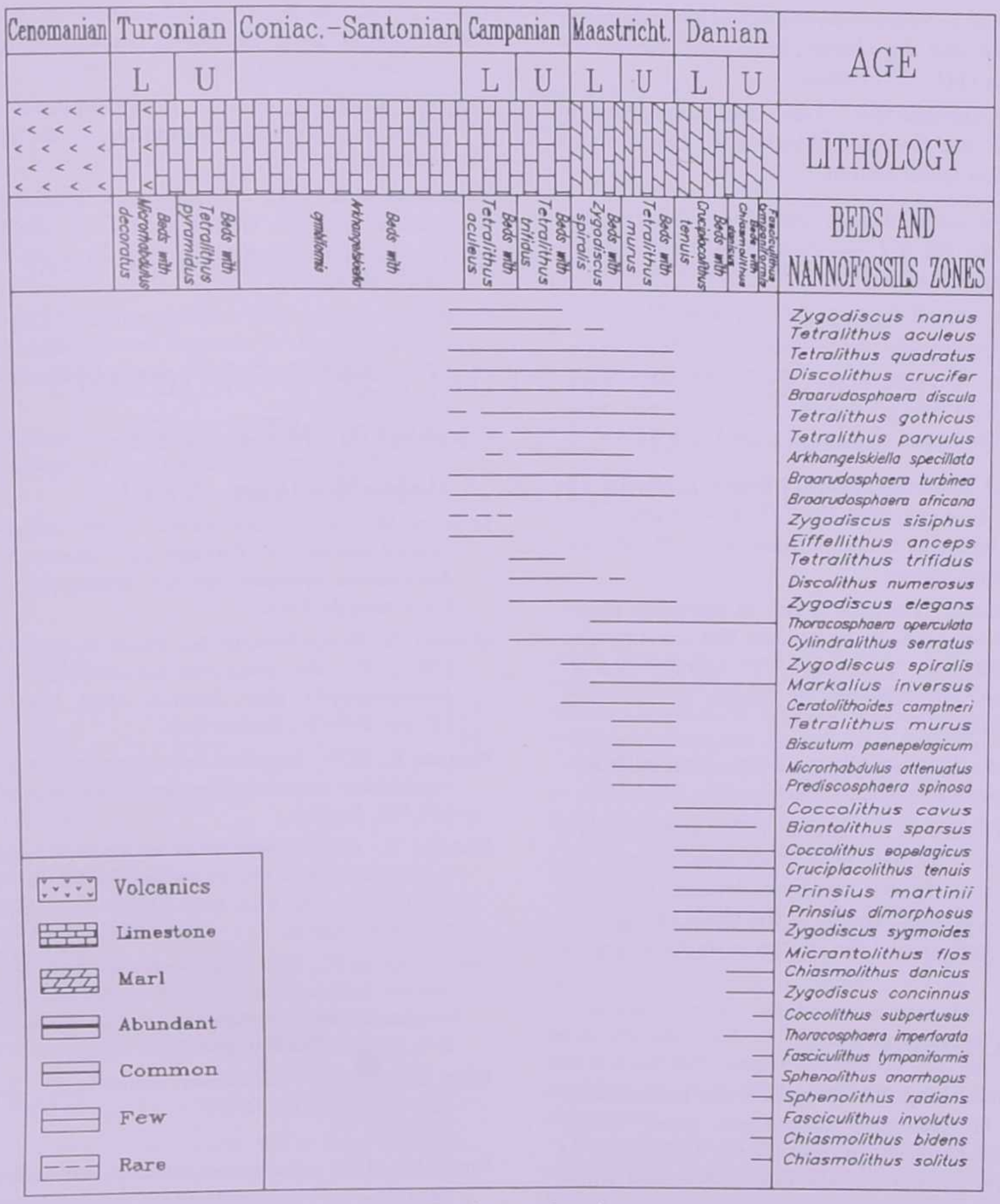

FIG. 4 - *(continued)*

ASSEMBLAGE : *L. grilli, L. moratus* and *C. ingens* disappear at the top of this zone. *Marthasterites furcatus,* the Coniacian-Santonian marker species, was not found so far in the Adjara-Trialetian system, but has recently been observed in the central part of the Georgian Block. Its extension is not yet known.

AGE & DISTRIBUTION : Coniacian-Santonian; Ajara-Trialetian folded system.

ZONE of *Ceratolithoides aculeus* : Interval between the FO of *C. aculeus* and the FO of *Tetralithus trifidus*.

ASSEMBLAGE : *Tetralithus quadratus, T. gothicus, T. parvulus, Arkhangelskiella specillata, Zygodiscus nanus, Z. sisyphus*. In this zone apper also *Cylindralithus serratus, C. gallicus* and the species *Braarudosphaera bigelowii* and *Micula staurophora* become common. *Zygodiscus fibuliformis* and *T. phacelosus* disapper at the top of this zone.

AGE & DISTRIBUTION : Early Campanian; central part of the Georgian Block and the Adjara-Trialetian folded system.

ZONE of *Tetralithus trifidus* : Interval between

the FO of *T. trifidus* and the FO of *Lithraphidites quadratus* and *Zygodiscus spiralis* and the last occurrence (LO) of *T. trifidus*.

AGE & DISTRIBUTION : Late Campanian; central part of the Georgian Block and The Adjara-Trialetian folded system.

ZONE of *Lithraphidites quadratus* : Interval between the FO of *L. quadratus* and the FO of *Tetralithus murus*.

ASSEMBLAGE : *B. bigelowii, L. cayeuxii, M. decoratus, Ahmuellerella octoradiata, A. cymbiformis*.

AGE & DISTRIBUTION : Early Maastrichtian; throughout Georgia, but the index species is missing in the Adjara-Trialetian folded system.

ZONE of *Tetralithus murus* : Interval between the FO of *T. murus* and the LO of *T. murus*. The upper boundary is also defined by the FO of typical Danian species.

ASSEMBLAGE : The zone is rich in *Markalius inversus, Thoracosphaera operculata* and contains also *Ceratolithoides kamptneri, Z. spiralis* and *L. cayeuxii*. The diversity of species is noticeably impoverished.

AGE & DISTRIBUTION : Late Maastrichtian; throughout Georgia.

The zones of KILASONIA (1986) and described above are correlated with other zonal systems representing Upper Cretaceous deposits from the USSR and other regions of the world in Figure 3. The distribution of the species is shown in Figure 4.

CONCLUSIONS

Summarising the aforesaid it can be concluded that the calcareous nannofossil zones distinguished presently in the Upper Cretaceous of Georgia are well correlatable with coeval zones throughout the world - with more or less reliability. There are, however, still some problems, specially in the lower part of the Upper Cretaceous.

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