# POSITION AND PERSPECTIVES OF EVENT STRATIGRAPHY

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Summary

With bibliographic references the author reviews the notion of geological "event", the present state of the relevant research work and the possibilities of stratigraphic application.

After defining and analyzing the notion of event he discusses the principles upon which the use of "events" in stratigraphic correlation is based. In this context the problems of catastrophism, diastrophism and actualism are touched and the history of relations between plate tectonics and actualism is reviewed.

The phenomena and changes which, in the present state of our knowledge, are suitable for chronostratigraphic correlation, i.e. the so-called "nonconventional" stratigraphic methods, are briefly described. Some of these are based on long-trend variations and on shortcycle phenomena associated with them. Magnetostratigraphy, already in routinized use, and chemostratigraphy, a method still in birth, including correlations based on the variation of isotope composition, should be assigned to this category.

The other group of phenomena that can be used for correlation purposes includes geologically instantaneous changes. These may represent accelerated phases of trend-like, cyclic processes. This category includes rapid changes in climate and eustatic changes in sea level having global effect on the one hand and volcanic tuff ejecta, torrential phenomena, etc. of regional effect on the other.

The above methods based on geohistorical phenomena may enhance stratigraphic correlation even in themselves and without understanding of processes responsible for their birth. On the other hand, event stratigraphy is aimed at understanding of the phenomena, the events. By analyzing the complexity of the resulting effects thus explored, and searching for the implications of these multiple effects, event stratigraphy can draw conclusions as to the isochrony of rock sequences.

The approach and methods of event stratigraphy are illustrated by presentation of studies on the Cretaceous/ /Tertiary boundary. In addition, scientific projects run with Hungarian participation and aimed at an understanding of important geohistorical events (Permian/Triassic boundary, Anisian/Ladinian boundary, Mid-Cretaceous Events, Eocene/Oligocene, Paleogene/Neogene, and Miocene/Pliocene boundaries) are presented.

## Figure captions

1. Relative sea level changes, timing of anoxic events and phosphate episodes and carbon isotope curve for the Late Mesozoic ocean basins (after ARTHUR and JENKYNS 1981).

2. Sea level changes and rates of accumulation of organic carbon, carbonate, biogenic silica and periods of phosphate accumulation in the deep sea during the Cenozoic (after ARTHUR and JENKYNS 1981).

3. Cenozoic fluctuations of carbonate compensation depth from the Late Cretaceous (after HAY 1970). Dashed line = lower limit of accumulation of planktonic foraminiferal tests, solid line = lower limit of accumulation of coccoliths.

4. Results of oxigen isotope analysis and temperature curve for benthic foraminifera and planktonic foraminifera of a Cenozoic oceanic sequence (after BOERSMA and SHACKLETON 1977).

5. Relative sea level changes in the Phanerozoic (after VAIL et.al. 1978) and the main biosiliceous periods (after STEINBERG 1981).

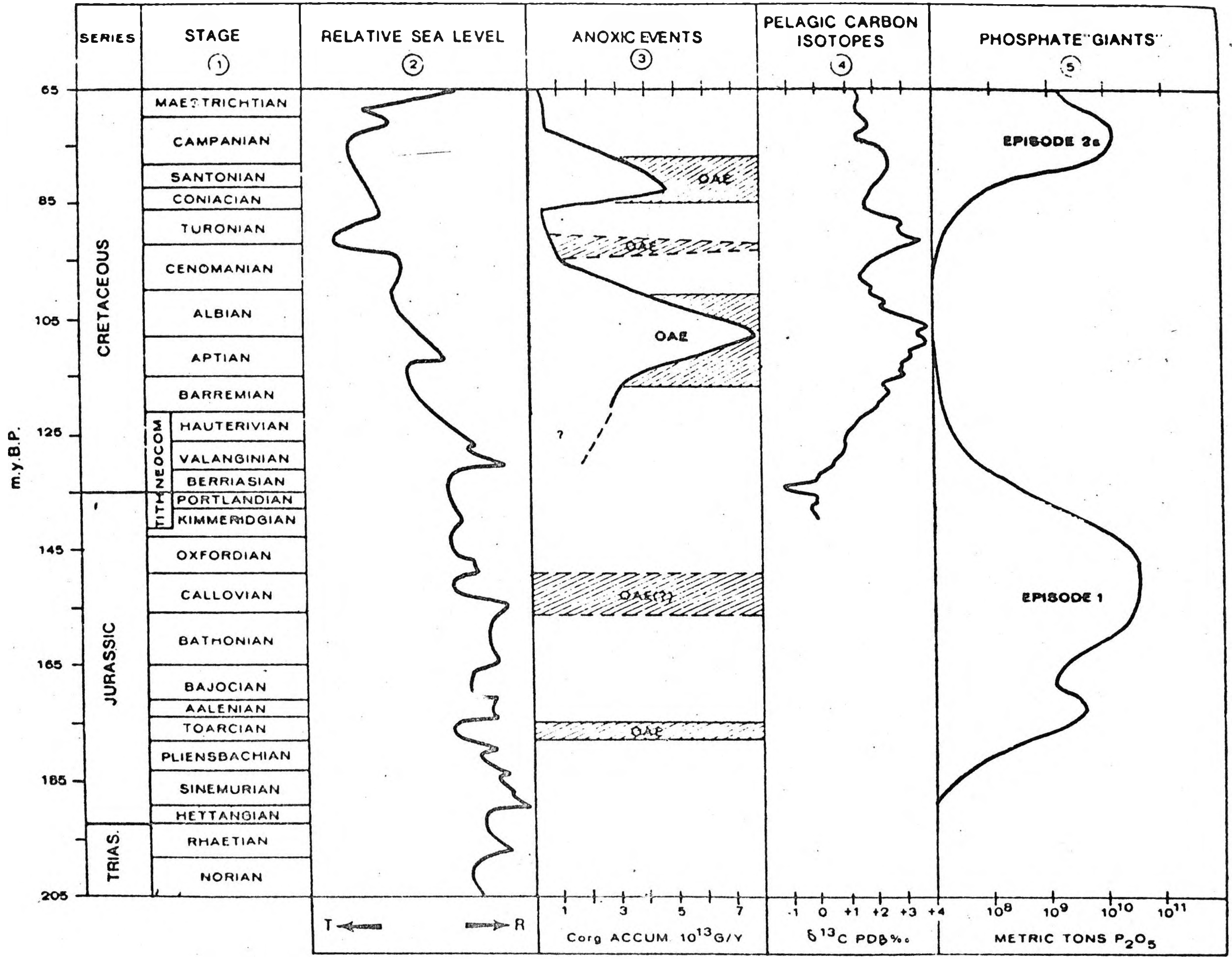
6. Location of continents and oceans 60 M years ago, and complete Cretaceous-Tertiary boundary sequences, were selected for detailed investigations (after SMIT 1982).

7. Planktonic foraminifera of biostratigraphic importance and geomagnetic reversal scale from the Cretaceous-Tertiary boundary section at Kef (Tunisia).

8. Results of carbon isotope analysis on Cretaceous-Tertiary boundary sections and the biostratigraphic horisonts (after HSÜ et.al. 1982).

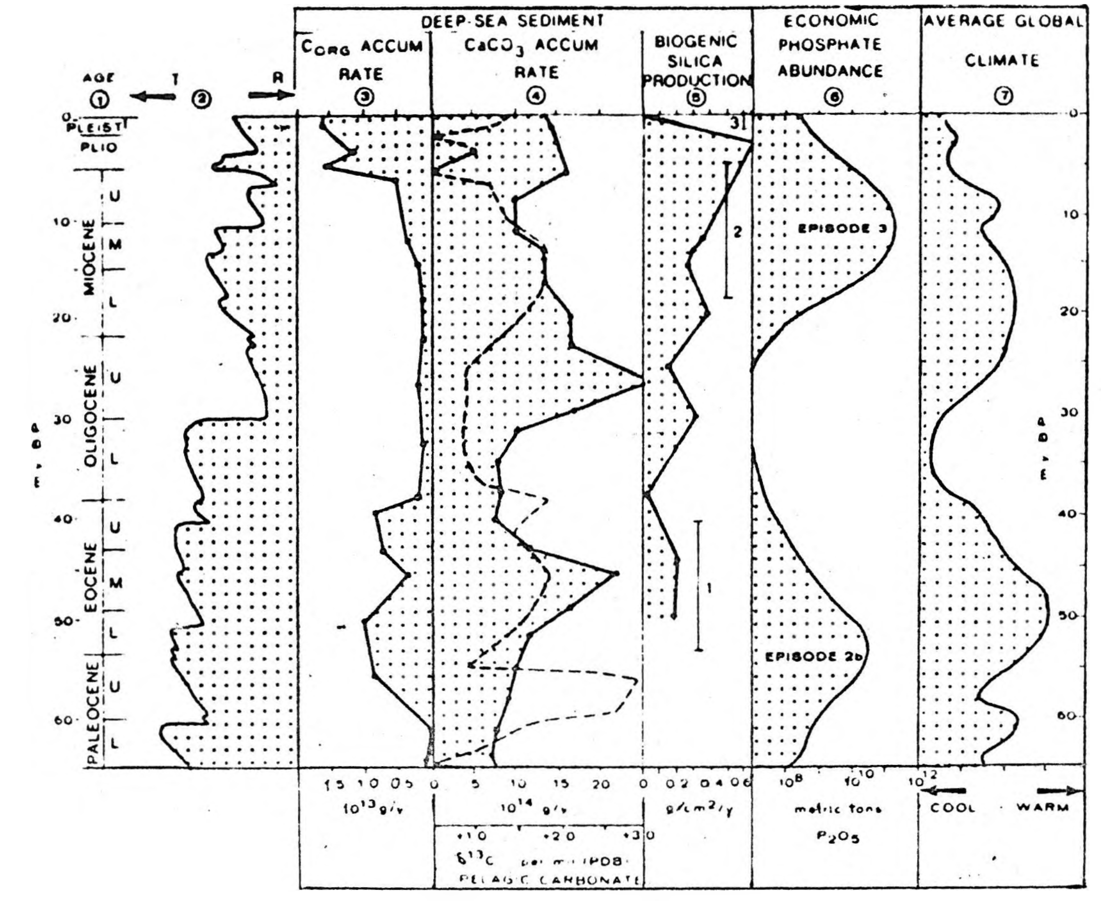
9. Litho-, bio- and carbon isotope stratigraphy of the Cretaceous-Tertiary boundary interval on "Ein Mor" section (S. Israel) (after MAGARITZ et.al. 1982).

10. Biostratigraphic data and results of oxigen and carbon isotope analysis on the type-section at Kef (Tunisia).

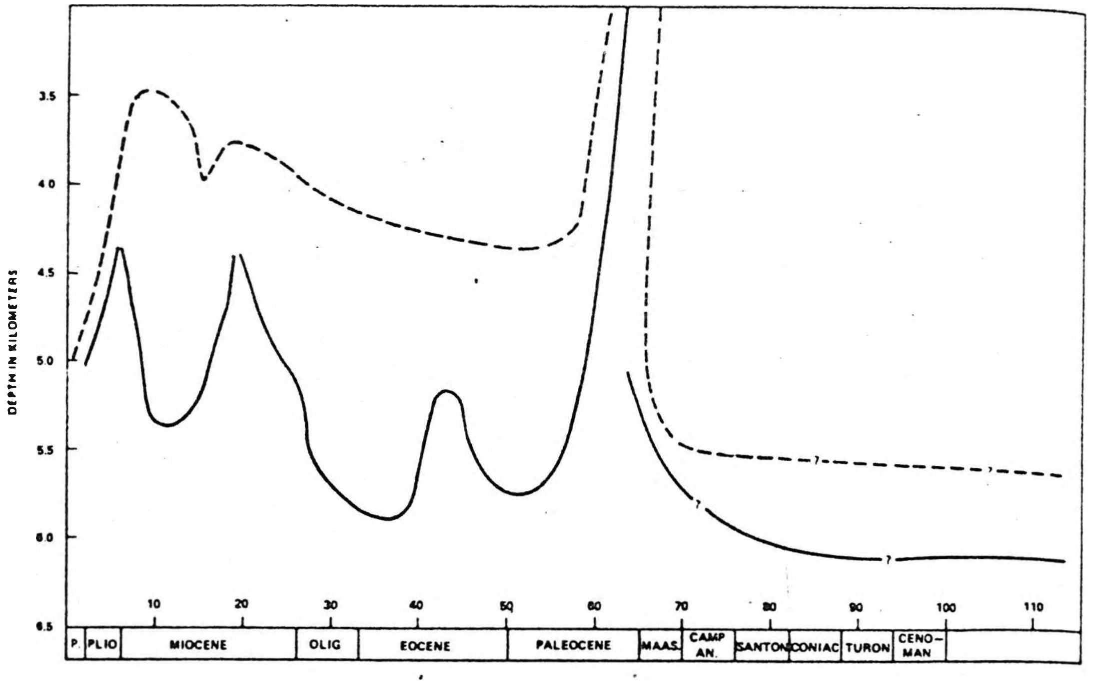


SERIES
STAGE ①
RELATIVE SEA LEVEL ②
ANOXIC EVENTS ③
PELAGIC CARBON ISOTOPES ④
PHOSPHATE "GIANTS" ⑤
m.y.B.P.
65
85
105
125
145
165
185
205
CRETACEOUS
JURASSIC
TRIAS.
NEOCOM
TITH
MAESTRICHTIAN
CAMPANIAN
SANTONIAN
CONIACIAN
TURONIAN
CENOMANIAN
ALBIAN
APTIAN
BARREMIAN
HAUTERIVIAN
VALANGINIAN
BERRIASIAN
PORTLANDIAN
KIMMERIDGIAN
OXFORDIAN
CALLOVIAN
BATHONIAN
BAJOCIAN
AALENIAN
TOARCIAN
PLIENSBACHIAN
SINEMURIAN
HETTANGIAN
RHAETIAN
NORIAN
OAE
OAE
OAE
OAE(?)
OAE
?
EPISODE 2a
EPISODE 1
T ← → R
1 3 5 7
Corg ACCUM $10^{13}$ G/Y
-1 0 +1 +2 +3 +4
$\delta^{13}C$ PDB‰
$10^8$ $10^9$ $10^{10}$ $10^{11}$
METRIC TONS $P_2O_5$

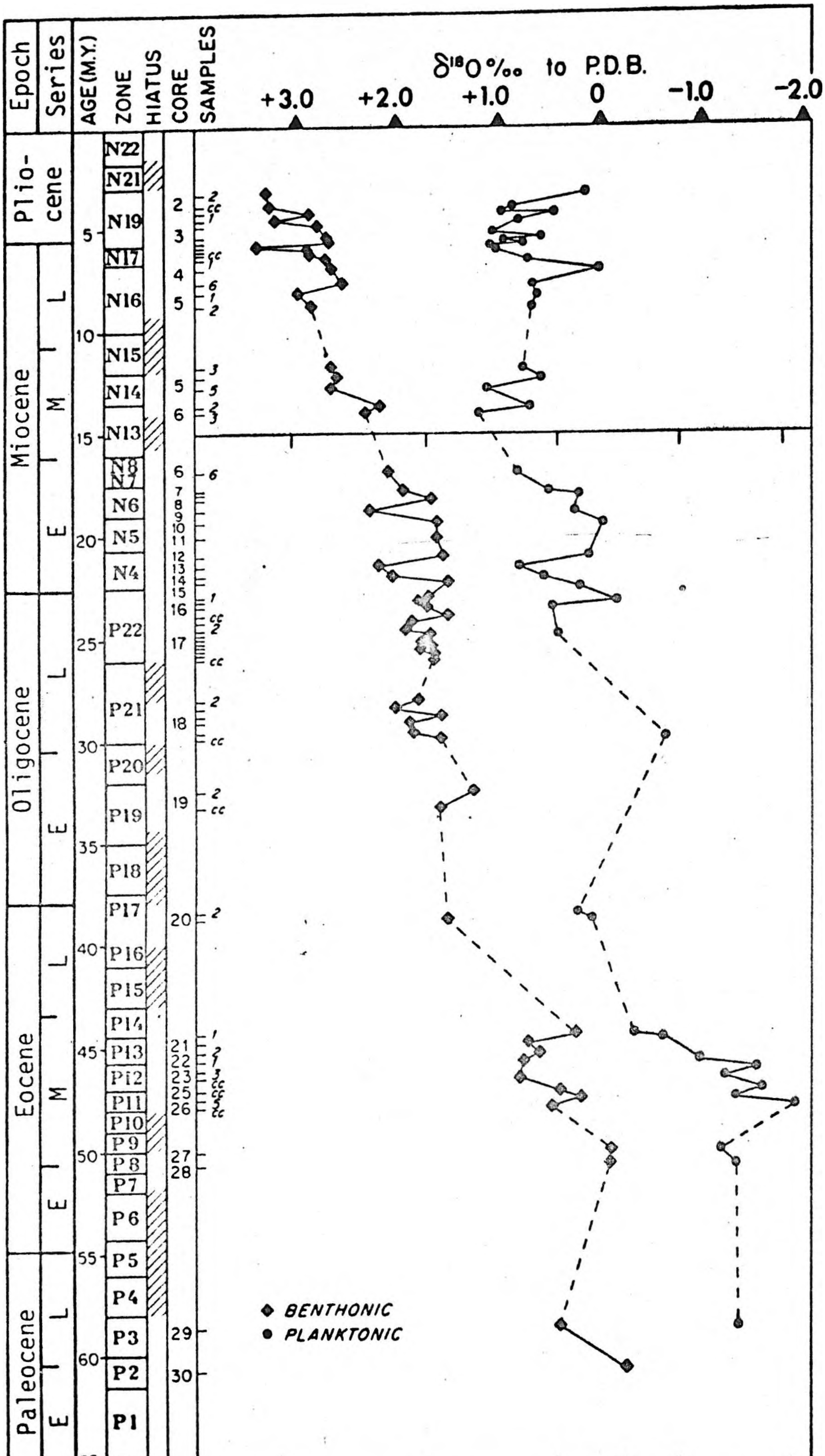

1. ábra (Fig. 1)




2. ábra /Fig. 2/

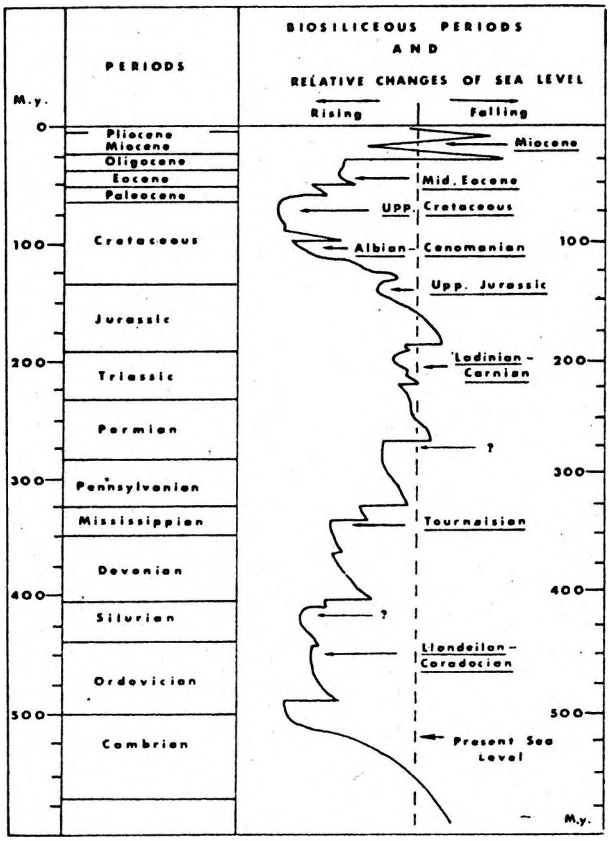



3. ábra /Fig. 3/

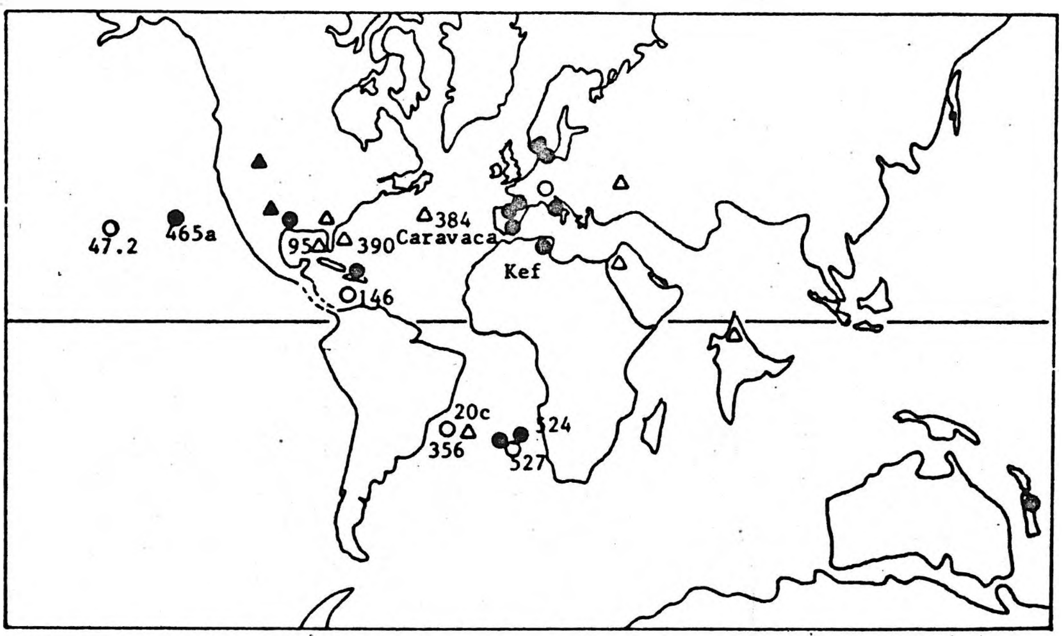


Epoch
Series
AGE (M.Y.)
ZONE
HIATUS
CORE
SAMPLES
δ18O ‰ to P.D.B.
+3.0
+2.0
+1.0
0
-1.0
-2.0
Plio-cene
Miocene
Oligocene
Eocene
Paleocene
BENTHONIC
PLANKTONIC
0°
5°
10°
15°
20°
TEMPERATURE (C.)

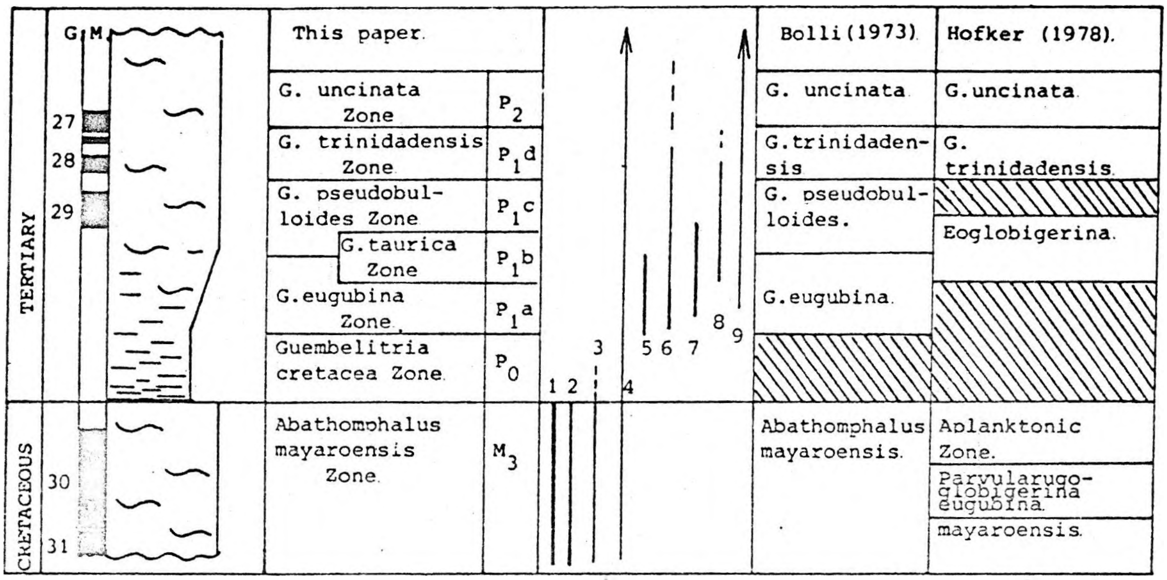

4. ábra /Fig. 4/



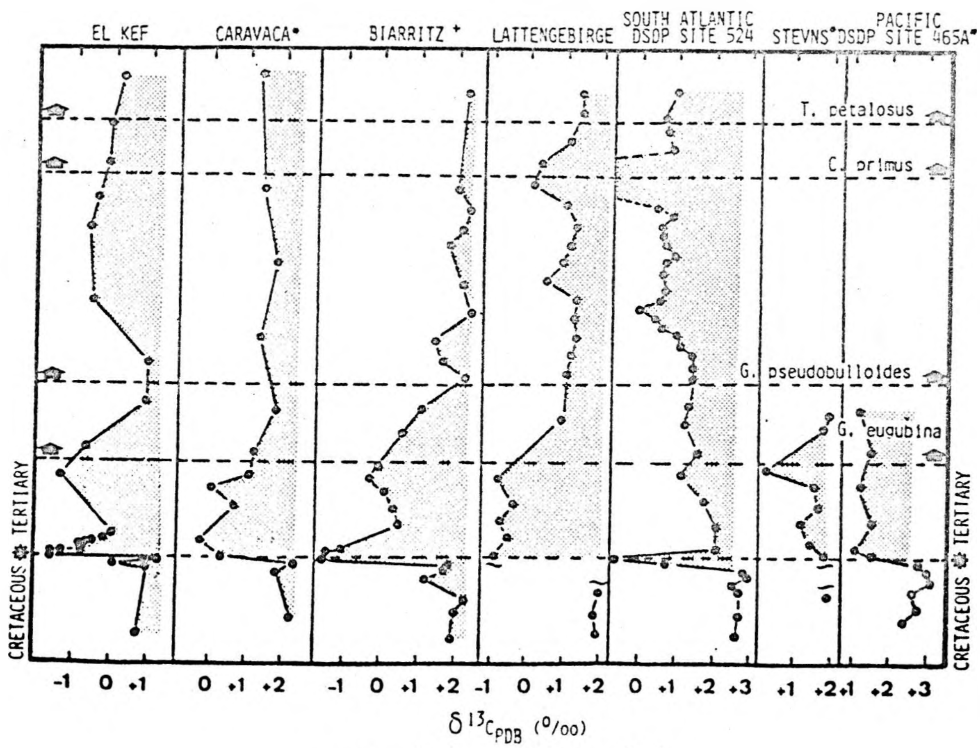

5. ábra /Fig. 5/



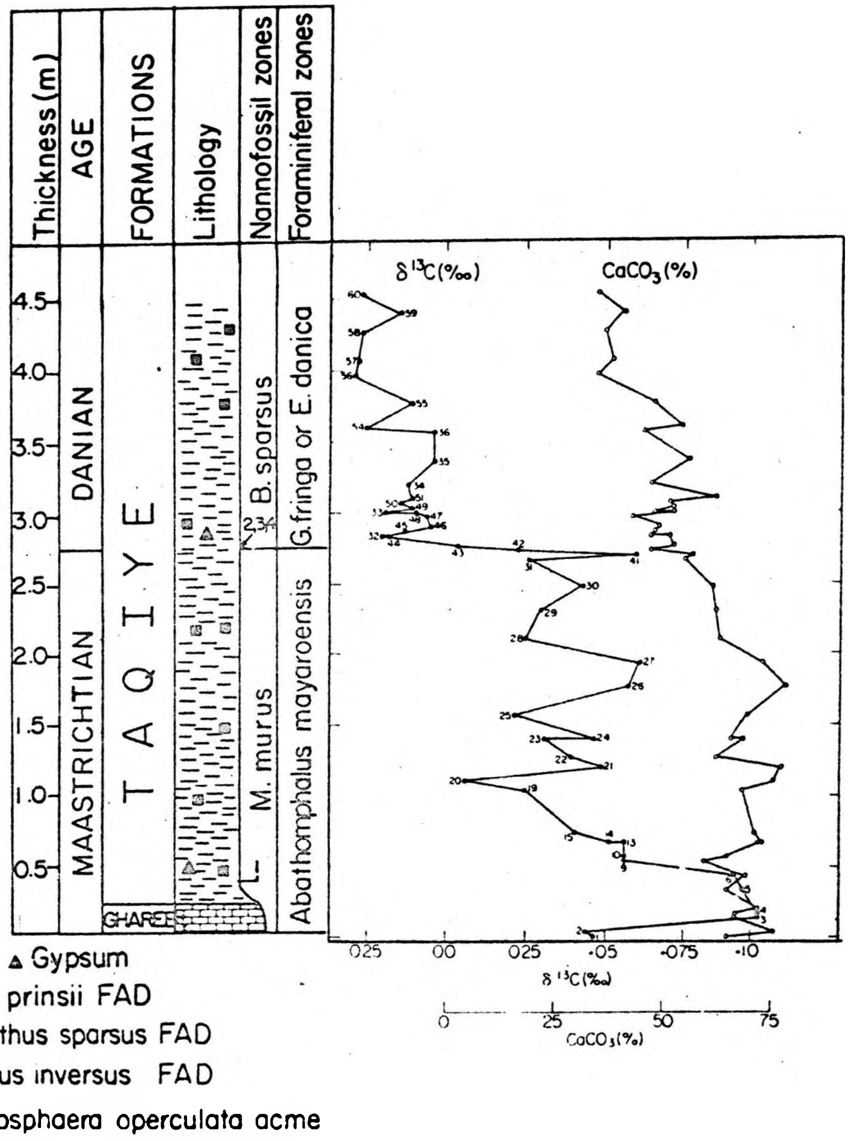

6. ábra /Fig. 6/



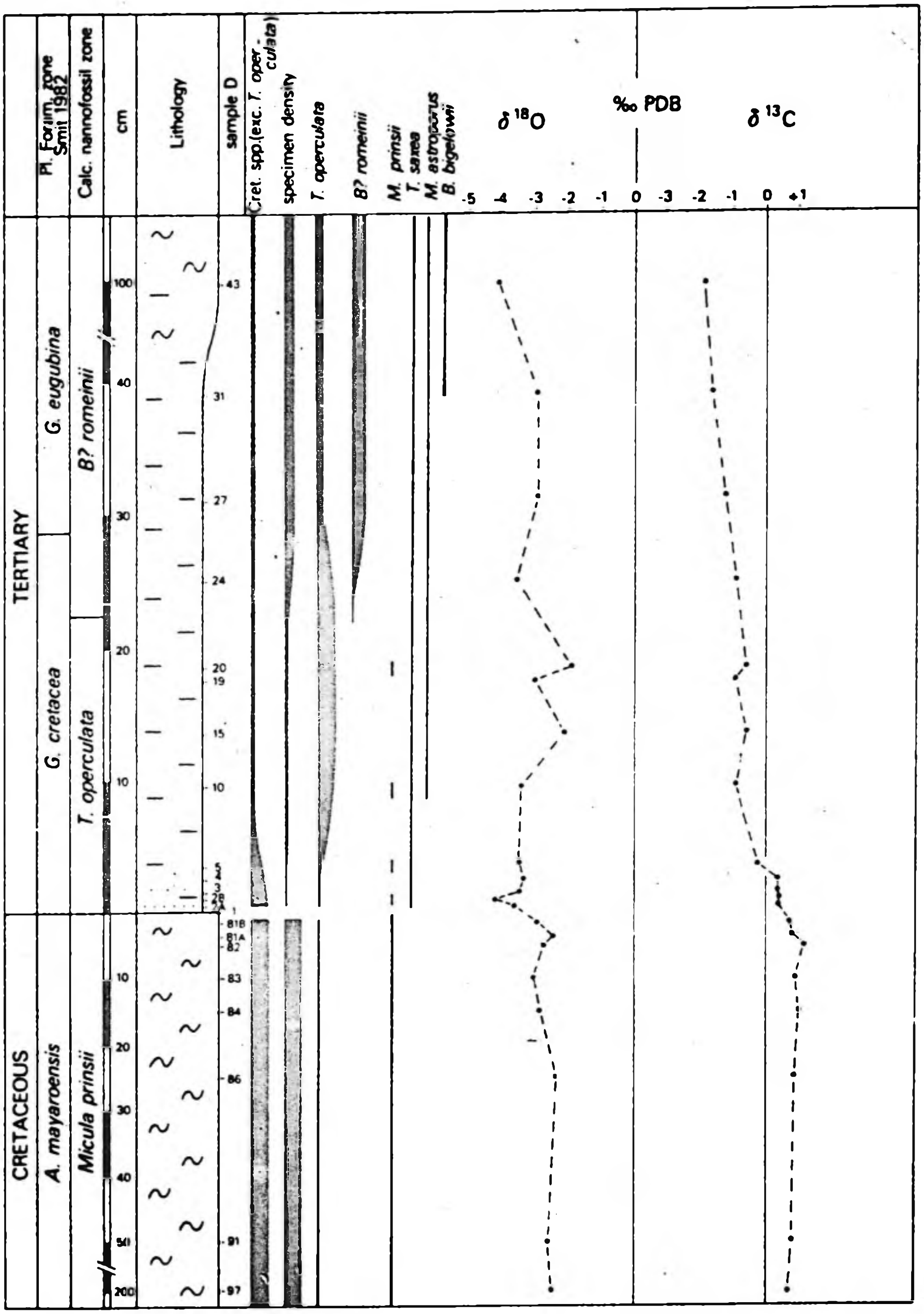

7. ábra /Fig. 7/




8. ábra /Fig. 8/


Thickness (m)
AGE
FORMATIONS
Lithology
Nannofossil zones
Foraminiferal zones
DANIAN
MAASTRICHTIAN
TAQIYE
GHAREB
B. sparsus
M. murus
G. fringa or E. danica
Abathomphalus mayaroensis
δ¹³C(‰)
CaCO₃(%)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.25 0.0 0.25 -0.5 -0.75 -1.0
δ¹³C(‰)
0 25 50 75
CaCO₃(%)
Pyrite
Gypsum
1. Micula prinsii FAD
2. Biantolithus sparsus FAD
3. Markalius inversus FAD
4. Thoracosphaera operculata acme

9. ábra (Fig. 9)




10. ábra /Fig. 10/