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STRATIGRAPHIC CORRELATION TETHYS — PARATETHYS NEOGENE IGCP PROJECT NO. 25 (HISTORY AND AIMS, ORGANIZATION, RESULTS)**

(Tabs. 5)

A b s t r a c t: Author of the present paper was proposer, organizer and chairman of IGCP Project No. 25 "Stratigraphic correlation Tethys — Paratethys Neogene". Over 400 scientific workers from 35 countries between the Atlantic and Indo-Pacific took part in the Project from 1973 to 1983. Results of stratigraphic revision of over 540 Neogene basins on this large territory changed considerably our previous knowledge on their development, and thus they provide also entirely new foundation for paleogeographical and geodynamical interpretations. References containing about 1000 publications are quoted in IGCP-UNESCO publication, a more detailed description of results in two volumes is now in press in Vienna and another one will be published probably in Elsevier Science Publication in Amsterdam. In this paper I give just very brief information on the solved results of the "first order topics" which serve as a basis for successful solution of the Project.

Р е з ю м е: Автор настоящей статьи был автором предложения, организатором и председателем IGCP проекта № 25 „Стратиграфическая корреляция тетис-паратетис неоген". В работах проекта приняло участие выше 400 научных сотрудников из 35 стран между Атлантическим и Индийско-Тихим океанами с 1973 по 1983 гг. Результаты проверки стратиграфии около 540 неогеновых бассейнов этой большей территории вполне изменили наши предшествующие знания о их развитии, и таким образом, они предоставили новую основу для палеогеографических и геодинамических интерпретаций. Литература содержащая почти 1000 публикаций собрана в IGCP—UNESCO публикации, более детальное описание результатов в двух томах находится сейчас в печати в Вене и один будет опечатан вероятно в Elsevier Science Publication в Амстердаме. В этой статье я информирую лишь коротко о решенных первоочередных темах, которые являлись основой для успешного решения проекта.

History and aims of the Project

First attempts at creation of modern paleogeographic Neogene foundations, especially of the Central Europe, in the sixties were unsuccessful. It was caused mainly by diverse comprehension of stages, i. e. temporal (chronostratigraphic or geochronological) Neogene units. They could be dealt only by very close international cooperation in definitions and nomenclatures.

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** The course and results of the Project are published also in the present journal in Czechoslovakia according to the programme of activity of the Czechoslovak Commission of UNESCO (Informace, No. 2, 1984, p. 5, Praha).

In the 4th Congress of Committee on Mediterranean Neogene Stratigraphy (RCMNS) held in 1967 in Bologna the present author put through foundation of an official working group of stratigraphy of the Western-Central and Eastern Paratethys (Working Group Stratigraphy of the Paratethys Neogene).

In 1969 principles and aims of the International Geological Correlation Programme (IGCP) were approved by IUGS. The present author gave a proposal for international project "Stratigraphic Correlation of Central and Eastern Paratethys Neogene." The Project was approved from the part of IGCP.

Revision of stratotypes and type sections of the Neogene regions was necessary for realization of the Project. Since the Southern and Western European countries did not agree on definitions of nowadays already "classic stages" of the Neogene in the Mediterranean region (Tethys relic) even in the following RCMNS Congress in Lyon (1971), team of the Paratethys working group decided to create the so-called "regional stages" for their region. The Western-Central, but especially the Eastern Paratethys was in question.

This proposal was accepted and published in the H. D. Hedberg's work of world-wide importance (Introduction in International Guide to Stratigraphic Classification etc. ISSC, Lethaia 1972, § 4.18, p. 33, Oslo). Both chronostratigraphic scales (Western-Central and Eastern Paratethys) were officially approved in the 6th RCMNS Congress held in Bratislava in 1975.

IGCP Project 25 cooperated with RCMNS which represented a competent IUGS organization for determination of temporal range and boundaries of Tethys and Paratethys stages. Leader of the Project worked out their well organized common programme, when he was elected also a chairman of RCMNS in Lyon in 1971. This programme obtained bases for a real stratigraphic correlation not only of the large Paratethys, but also of the Mediterranean relic of the Neogene Tethys.

In 1973 the author of this paper was asked by IGCP to extend the Paratethys Project also to correlation with the Tethys Neogene region ("Stratigraphic Correlation Tethys — Paratethys Neogene"). In the final stage in 1983 a chronostratigraphic revision of knowledge on the Neogene regions on the territory between the Atlantic and Indo-Pacific (Neogene of the Southern, Central and Eastern Europe, the Northern Africa, the Northern and Central Asia to India) was carried out at participation of 35 countries.

New stratigraphic foundations from 540 Neogene basins comprised the following phenomena in individual columns (denoted by internationally determined marks): 1. lithologic development; 2. thickness of beds; 3. correspondence to the regional, but mainly to classic Mediterranean stages (as to the units comprehended in chronostratigraphic or geochronological sense); 4. supporting indicators of biostratigraphic correspondence (the most frequently planktonic or benthonic foraminifers, nannoplankton, sporomorphs, radiolarians, molluscs, vertebrates, etc.), radiometric and paleomagnetic age; 5. orogenetic phases; 6. unconformities; 7. subsidence and uplift of the territory.

In 1978 the leader of the Project published a small number of xerox copies of the first version of stratigraphic tables (correlation tables — first working version, the so-called Blue Book). They were discussed in the Project session in 1979 within the 7th RCMNS Congress in Athens. The work represented a basis for further detailization.

Organizing of the Project

Geological Institute of the Slovak Academy of Sciences in Bratislava, but also the other geological institutes and workplaces in Czechoslovakia and in many other countries, further on IUGS, IGCP Secretariat and UNESCO exerted themselves in successful organizing of the Project.

Working organizing of the Project was divided into solution of three diverse, but essential stratigraphic problems:

1. Determination and defining of regional stages capable of correlation with the cooperation of RCMNS within the Tethys and Paratethys region.
2. Solving of the most urgent correlation problems of the Neogene stratigraphy between the Tethys and Paratethys regions (in Europe from Portugal to Turkey and the U.S.S.R.; in the West Asia from the Near East through the U.S.S.R. to Pakistan and India; in the North Africa from Morocco to Egypt) by means of 12 "first order topics" (see the chapter Results of the first order topics).
3. Compilation of modern stratigraphic tables with all attributes from all already known, but also from newly discovered Neogene sedimentary areas between the Atlantic and Indo-Pacific.

The works were directed from one centre, from the Project Secretariat in the Geological Institute of the Slovak Academy of Sciences in Bratislava (Czechoslovakia). Working sessions of national representatives from individual member countries were organized each year; temporal and methodic procedures necessary for the solution of problems in due time were discussed in the sessions. They took place not only in the Smolenice Castle near Bratislava, but often in various places between the Atlantic and Indo-Pacific on the occasion of other international undertakings of IUGS organs.

Secretariat of the Project published at least once a year "Information Bulletin of the IGCP Project No. 25" in English and Russian. Also in this way a sufficient information of co-workers was secured. In the final stage of the work it was substituted by circulars which enabled an exchange of information.

Member countries of the Project (or the persons) covered new research from their own financial sources. In spite of this fact, I must give my thanks to IUGS and IGCP/UNESCO for financial supports which to a great extent enabled participation of at least the official representatives in our sessions.

Results of the Project

Extent of this journal does not allow by far to publish the obtained results of the Project. Therefore, series of stratigraphic tables will be published in 1985 in Vienna in a separate monograph (two volumes) of over 1000 pages extent (saled already in 1985). Detailed results of "the first order topics" will be published completely including discussions in Elsevier Publ. Comp. in Amsterdam.

In the present paper I give just a brief excerpt of the main results achieved in solution of the first order topics. They served as a basis of modern stratigraphic tables from 540 Neogene regions between the Atlantic and Indo-Pacific.

It is sufficient to take the last version of correlation (1983) to see the enormous changes which took place in the past ten years in chronostratigraphic comparison of the Tethys and Paratethys regions, i. e. of the Atlantic and Indo-Pacific paleobioprovinces:

That what was called primarily "Tortonian" in the Central Paratethys (stratotype Tortoniano = Italy) corresponds in age to the Central Paratethys Pannonian and to the Lower and Middle Pontian too. Sarmatian of the Central Paratethys is roughly an age equivalent of the Upper Serravalliano. Badenian is an equivalent of Langhiano and the Lower Serravalliano. The whole temporal extent of Eggenburgian, Ottnangian and Karpatian corresponds to the Tethys Burdigalian (parastratotype in the Mediterranean region) and just the upper part of the Egerian (base 23.2 m. y.) corresponds to base of the Aquitanian. Messiniano (with an upper boundary of 5.4 m. y.) is age equivalent only of the Upper or the Uppermost Pontian and by age it interferes possibly also to the Dacian stage. Therefore, we do not exclude the fact that the Miocene Pliocene boundary determined in international relations in marine environment is just a little younger than the lower boundary of the Central Paratethys Dacian or the Eastern Paratethys Kimmerian stages.

Results of the first order topics

Solution of the first order topics was necessary for improvement of the first version of the stratigraphic tables. They were solved by numerous international teams within the years 1974—1980. In the present paper just a very brief information on results is given on the basis of the first versions of final reports of the years 1978—1982.

T o p i c 1. "Correlation of the Caucasian Stage of the Eastern Paratethys with the same age deposits of the Central Paratethys". (Excerpted from the report by M. F. N o s o v s k y, 1978).

Research started after establishment of the Caucasian regional stage. A part of the so-called Maikop Formation along the river Kuban in the surroundings of the town Cherkesk was chosen as a stratotype. Parastratotype represents deep borehole in the North Caucasus (45 km NE of the town Tikhoretsk):

a) 750—792 m: aleuritic, non-calcareous clays with *Protelphidium* aff. *dendriticus* CHAL., *Rotalia propinqua* (REUSS), *Uvigerinella* sp., *Haplophragmoides* sp. They correspond to the beds with *Uvigerinella californica*, i. e. to the upper part of the Caucasian.

b) 792—850 m: aleuritic, mostly non-calcareous clays. Rich foraminiferal fauna of *Bolivina goudkoffi* type. *Uvigerinella californica uruchensis* BOGD., *Caucasina buliminoides* BOGD., *Spiroplectammina caucasica* DJAN., *Haplophragmoides kjurendagensis* MOR. occur too (lower part of the Caucasian). Planktonic foraminifers were not found, therefore an exact correlation with the Lower Miocene stages of the Central Paratethys is problematic. Palynological spectra are characterized by predominance of conifers and just by a sporadic occurrence of subtropical elements. The closest similarity of spectrum appears to be with "the Askanian" and "the Upper Staevakian" substages in the southern Ukraine. The Caucasian occupies its stratigraphic position on the

boundary between "the upper Morozkin" beds (beds with *Spiroplectammina terekensis*) and the Sakaraulian stage (beds with *Neobulimina elongata*).

T o p i c 2. "Correlation of the Tarkhanian Stage of the Eastern Paratethys with the same age deposits of the Central Paratethys". (Excerpted from the report by M. F. N o s o v s k y, 1978).

In the region of the Eastern Paratethys investigations were aimed at the study of the Middle Miocene sections on the Kerch peninsula, in the western Georgia and in the Ukraine.

1. Neostratotype of the Tarkhanian stage was determined and described on the Kerch peninsula.

2. Stratotype section consists of the Kamyshlakian, Tarkhanian s. str. (beds with *Pseudoamussium denudatum*) and Yurakov substage. Today's Tarkhanian is considered for a broader time interval (with its underlying and overlying strata) than the original one, especially on the basis of foraminifers and molluscs research.

3. The lower boundary of the Tarkhanian can be determined in shallow-water facies by the occurrence of stenohaline molluscs of Gorijsk and Tomakovsk beds, in deep-sea environment with stenohaline molluscs and planktonic foraminifers of Kamyshlak and Kuvinsk beds. The upper boundary of this time unit is preliminarily determined on the base of *Spiratella* beds.

4. Continuous sedimentation without gap and angular unconformity is confirmed between the Kotsakhurian and Tarkhanian stages.

5. The Tarkhanian contains nannoflora of NN-4 and 5 Zone. In this way, the opinion that the Tarkhanian corresponds in age to the Karpatian of the Central Paratethys, and not only to the Lower Badenian, is confirmed.

T o p i c 3. "Correlation of the Pontian Stage deposits of the Euxino-Caspian, Dacian and Pannonian basins". (Excerpted from the report by P. S t e v a n o v i ć, 1979).

A. The report contains results of research carried out from 1977 to 1979.

a) In Austria, in the Vienna basin, the lower boundary of the Pontian was established between the F and G zones. It has a limnic character (F, G and H zones). The problem whether the H horizon passes to the Dacian remains questionable.

b) In Czechoslovakia, the horizon with *Congeria subglobosa* and *C. zahalkai* corresponds to the E zone in Austria, i. e. still to the uppermost Pannonian. On the basis of ostracod fauna, there were views to range the E zone to the Pontian or to divide this zone into subzones. The Pontian has a limnic and fluvial-limnic character from the southern margin of the Bohemian massif to the Eastern Slovakia.

c) Development in Hungary is similar to that in Czechoslovakia, Yugoslavia and Austria. Nomenclature used by many Hungarian authors is unsatisfactory. They often use the term "the Upper Pannonian" instead "the Pontian", the former being a time equivalent of the Pontian in Yugoslavia, Rumania and other countries of the Central Europe. In the Balaton region, the Pontian has two more brackish facies: 1. beds with *Congeria balatonica*, 2. beds with vivipa-

Table 1

Division of the development of the Pontian and its base (Pannonian) in Yugoslavia on the basis of molluscan fauna

PONTIAN	Pliocene Pl_2	Lower Palludinian beds		
	Pt — 3 Bosphorian	beds with *Budmania histiosphora, Limnocardium ferrugineum* (atypical occurrence of Bosphorian)		beds with *Unio, Viviparus* and *Prosodacna* (small forms only)
	Pt — 2 Portaferrian (P. Stevanović, 1951)	aleurites, clays with *Congeria rhomboides, Limnocardium mayeri, Parvidacna planicostata*, etc.	sands with *Congeria triangularis* and *Dreissena auricularis*	beds with *Unio wetzlari, Prosodacna carbonifera, Viviparus vivinacticus, Paradacna radiata, Dreissena serbica*
	Pt — 1 Novorossian (N. Andrusov, 1917)	white marls with *Paradacna abichi* (so-called upper abichi beds)	marls and sands with *Congeria praerhomboidea* (Pannonian basin); *Congeria rumana* (Dacian basin)	sands and sandstones with *Congeria ungulacaprae* and *Congeria apertum*, etc.
PANNONIAN	Pn — 2 Servian (P. Stevanović, 1957)	marls with *Paradacna abichiformis* (Provalenciennesia beds)	clays with *Congeria czijeki, C. zsigmondyi* (Provalenciennesia beds)	sands, aleurites with *Congeria subglobosa, C. pancini, Melanopsis vindobonensis* (= E zone of Vienna basin)
	Pn — 1 Slavonian (N. Andrusov, 1923)	white marls with *Congeria banatica* (so-called Provalenciennesia beds)	aleurites with *Congeria partschi, C. hörnesi, Limnocardium conjugens trifkovici, Monodacna viennensis*, etc.	
BESSARABIAN	S — 3 Sarmatian	marls with *Radix croatica*	marls and limestones with *Congeria ornithopsis, C. soceni, Melanopsis impressa*	oolitic limestones with *Nubecularia novorossica;* serpilites with *Spirorbis heliciformis;* bryozoic limestones

Note: Presence of typical Bosphorian (N. I. Andrusov, 1917) has not yet been sufficiently proved in the Pannonian basin. We suppose that it corresponds to the beds with *Budmania histiophora* and fresh-water sediments with *Unio, Viviparus*, small prosodacnas between the Portaferrian s. str. and the Lower Palludinian beds (P. Stevanović).

ras and prosodacnas. Beds with *Unio* belong still to the Upper Pontian, not to the Dacian.

d) State of knowledge on development of the Pontian in Yugoslavia is given in Tab. 1 presented in the IGCP meeting held in Smolenice on February 25, 1977.

e) Stratigraphic division of the Pontian in Rumania is similar as in the region of the southern Ukraine, with a difference that the Lower Pontian is called "Odessian".

f) In Bulgaria, a division corresponds to that in Rumania and in the East Carpathian foredeep in Yugoslavia. Novorossian and Portaferrian have strongly brackish character.

In the 9th Symposium on Paratethys in Sofia a draft of division of the Pontian into three substages (Novorossian, Portaferrian, Bosphorian) was proposed and approved. Choice of hypostratotype of the Pontian was recommended in type sections near Arshincevo on Kamysh-Burun (the Crimea, U.S.S.R.).

Division of the Pannonian (sensu restricto) into the Lower "Slavonian" and the Upper "Servian" was approved as well.

For the time being, there are no serious problems in the fundamental questions of the Pontian correlation between the Eastern and Central Paratethys. Some questions of detailed division, as far as the Portaferrian/Bosphorian boundary is concerned, are not yet solved univocally.

B. (Excerpt from the report by I. G. Taktakishvili, 1978).

Recently, the scheme of A. G. Eberzin has been still mostly used in the Euxin region:

Stage	Substage	
PONTIAN	Upper	Bosphorian
	Middle	beds with *Congeria subrhomboidea*
	Lower	beds near Odessa beds called Eupatorian

Independence of the Eupatorian in the sense of a chronostratigraphic unit was proved. Stratigraphic correspondence of the Odessa beds is beyond any doubt. Therefore, it is necessary to divide the Novorossian into two horizons: the lower — Eupatorian and the upper — Odessian.

Time interval of the Middle Pontian can be divided too. In connection with the occurrence of rhomboid beds in the western Georgia (Chelidze 1953, 1974; Taktakishvili, 1971, 1976) it seemed necessary to include them into the Middle Pontian. It consists of two horizons: the lower — "subrhomboid" and the upper — "rhomboid" (the so-called Urtiy or Biy beds). For the present, this detailed division of the Portaferrian is possible probably only in the Black Sea region.

The lower boundary of the Bosphorian, especially in the western Georgia, is not yet quite clear.

At present, the following scheme of the Pontian division seems to be the most detailed in the Black Sea region:

Stage	Substage	Horizon
PONTIAN	(Upper) Bosphorian	Bosphorian
	(Middle) Portaferrian	"Rhomboid" "Subrhomboid"
	(Lower) Novorossian	Odessian Eupatorian

This stratigraphic scheme does not include deep-sea, fresh-water Pontian sediments. Their stratigraphic correlation is very difficult.

"Rhomboid" beds of the western Georgia correspond perhaps in age to the Lower Bosphorian in the Kerch-Taman region.

In order to make a precise Pontian Paratethys correlation, it is necessary to establish time span of the Portaferrian. Total and classic development is known from the Pannonian region, however, it is reduced in eastward direction.

Topic 4. "Correlation of the Post-Pontian deposits of the Eastern and Central Paratethys". (Excerpted from the report by I. G. Taktakishvili, 1978).

A. Kimmerian. According to the present stratigraphic scheme it is divided into the three substages: the lower — Azovian, the middle — Kamysh-Burunian and the upper — Pontikapeian. At present, independence of the Azovian is beyond any doubt. In spite of this fact, independence of the Upper Kimmerian (Pontikapeian) is not entirely cleared up. Existence of the Pontikapeian substage is indisputable only on the Kerch and Taman peninsulas. Correlation of the Kimmerian and Dacian is very probable, whereby the Azovian substage corresponds temporally to the Getian and Kamysh-Burunian and the Pontikapeian to the Parskovian.

Egrisian. According to Taktakishvili, the Akchagylian could not be considered for a regional stage of the Eastern Paratethys from the following reasons: Tamanian beds have very limited distribution (bordered only by the Azovian Sea) and they represent only an insignificant part of the stage. In contrast to it, there are well exposed Kuyalnikian sediments in the Black Sea region (in Odessa region). This is the reason why he would consider rather the Kuyalnikian for the regional stage of the Eastern Paratethys than the Akchagylian.

However, a newer solution was found. Kuyalnikian in the western Georgia (namely in the Guria region) is biostratigraphically fully represented by its

extent and content (in contrast to the Kuyalnikian near Odessa), he proposes new name of this time unit — "Egrisian" (after historical name of the western Georgia — "Egrisi"). Stratotype and boundary stratotypes of this stage divided into three substages: the lower — Skurdumian, the middle — Etserian and the upper — Tsikhisperidian were described. The Kuyalnikian stratotype of Odessa corresponds only to the upper part of middle and lower part of the Upper Egrisian.

The Egrisian is incomparably better exposed in various regions of the Black Sea basin than the Akchagylian and it is connected with the Kimmerian sediments in the underlying strata and with the Gurian stage in the overlying strata without any unconformity and gap.

B. (Excerpt from the report by I. C. Motas, I. Andreescu, I. Papaianopol, R. Olteanu, 1978).

In the Dacian basin (paleogeographically transitional region between the Central and Eastern Paratethys) the Post-Pontian sediments belong to two stages: Dacian and Romanian. At present, this nomenclature is valid also for the whole Central Paratethys.

1. The Dacian, divided into the Getian and Parskovian, is characterized by genera *Stylodacna, Prosodacna, Psilodon, Zamphiridacna, Pachydacna, Parapachydacna*, etc. with ostracods *Cytherissa* and *Candona.*

In the Getian the common species with the Lower Kimmerian (Azovian) of the Euxin region, such as *Prosodacna semisulcata, Phyllocardium planum planum, Plagiodacna carinata, Caladacna steindachneri, Dreissenomya aperta, Dreissena rostriformis* with prosodacnas of longiuscula type and with pachydacnas often occur. From ostracods, *Caspiocypris labiata, Pontoniella striata, Cypria tocorjescui, Bacunella djanelidze, Cytherissa bogatschovi, Leptocythere caspia, Loxoconcha eichwaldi*, etc. should be mentioned.

The Parskovian shows a great similarity with the beds of Douab in the Euxin basin in Georgia. The common species are: *Congeria mirabilis, C. pontodaubica, Dreissena obliqua.* Common forms with the Middle and Upper Kimmerian occur too: *Horiodacna rumana* and euxinicardies of the conathacum type. As far as ostracods are concerned, we mention only occurrence of *Pontoniella hastata, Cypria tocorjescui, Candona abichi, Cytherissa bogatschovi*, etc.

The Dacian, as a whole, can be correlated with the Kimmerian of the Euxin basin and with a part of the lower Palludinian beds of the Pannonian basin.

2. Romanian. This stage is divided into three biozones on the basis of molluscan associations: 1. *Viviparus bifarcinatus*, 2. *Rugunio lenticularis*, 3. *Bogatschevia tamanensis* and *Rugunio riphaei.* Each zone comprises 2—4 subzones.

Zone 1 corresponds temporally to the sediments with mammalian fauna of Berești, Malusteni and Baraolt-Capeni. They are equivalent to the lower part of the so-called Moldavian sedimentary complex (Kutchiurgan) in the south of the U.S.S.R. and to the Lower Villafranchian (Étouaires) in the western Europe.

Zone 2 corresponds temporally to the beds with mammalian fauna of Tulucești, Cernatești, etc. and it can be correlated with the upper part of the Moldavian sedimentary complex in the U.S.S.R. (Kotlovina) and with the upper part of the Lower Villafranchian (Montopoli) in the western Europe.

Table 2

Stratigrahpic correlation of the stages of Circum-Mediterranean region. State of knowledge in 1983. (After F. Rögl – F. F. Steininger: Vom Zerfall der Tethys zum Mediterran und Paratethys. Ann. Naturhist. Mus. Wien. 85/A, pp. 135–163, Wien).

Zone 3 corresponds temporally to mammalian faunas of the Khapry, Milcov de Jos, Slatina, Cherleşti types, etc. They are equivalent to the Middle and partly to the Upper Villafranchian of Roccaneyra, Saint-Vallier, Le Coupet, Olivola, etc.

According to preliminary radiometric results, the Dacian/Romanian boundary is about 3.7—3.8 m. y. old; boundary between the biozones 2 and 3 of the Romanian is about 2.6—2.5 m. y. old.

Romanian corresponds temporally to the middle Palludinian beds and from a small part also to the upper Palludinian beds in the Pannonian basin.

Topic 5. "Correlation of the Late Oligocene and Early Miocene of the Central Paratethys with the Alpine foredeep and Rhône basin deposits". (Excerpted from the report by F. Rögl, 1978).

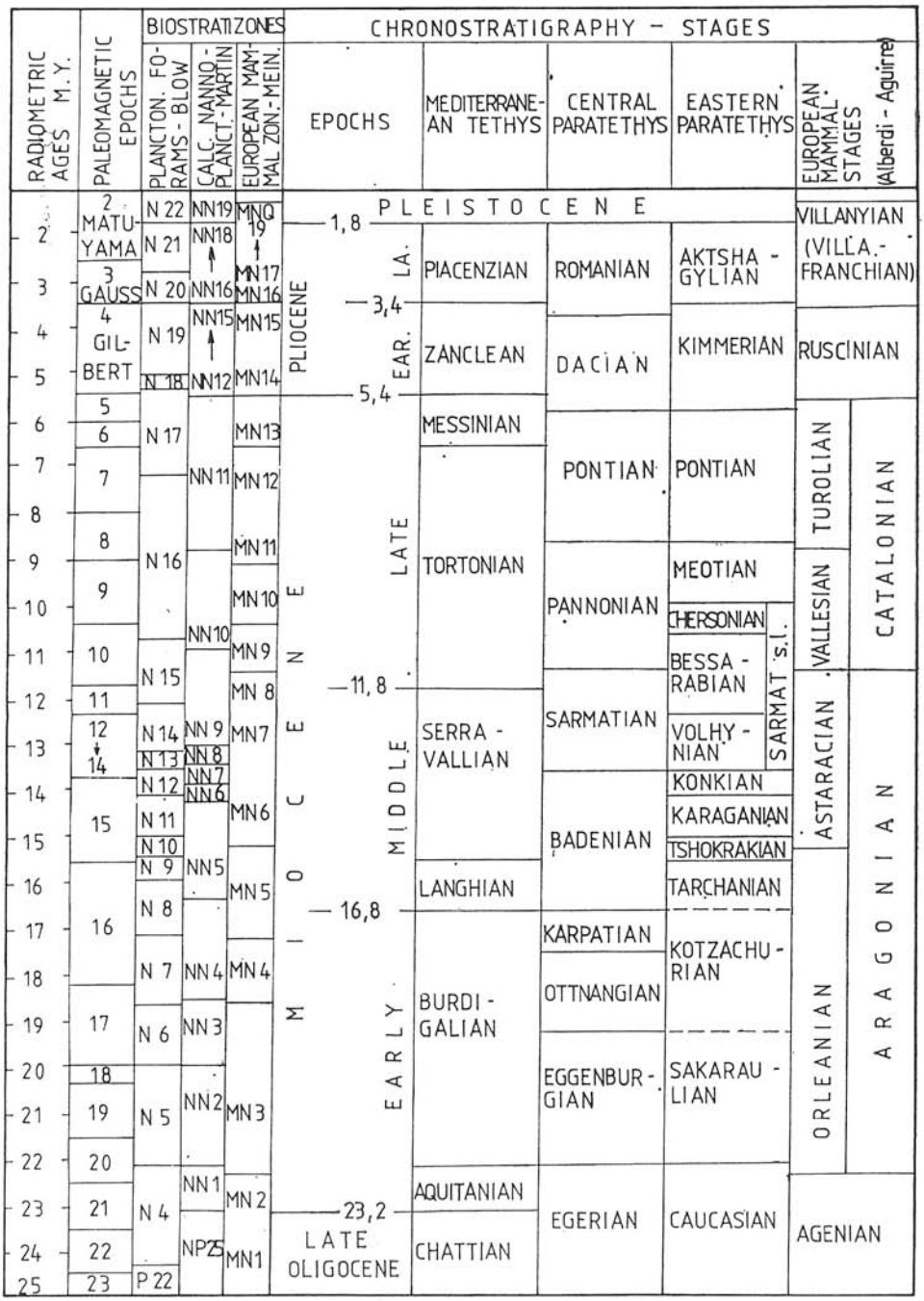
The work was divided into two parts: firstly, introducing good and new stratigraphic foundations (in a scientific, but also in nomenclature way) for correlation; secondly, realizing new field research in various profiles using all paleontological and sedimentological methods and achieving step by step a modern conception of the Neogene correlation of the whole Alpine foredeep, Neogene relics in the centre of the folded Alps till the connection with the Mediterranean Tethys in the Rhône region.

1. For the marine sediments a reliable correlation scheme was created on the basis of nannoplankton, foraminifers and molluscs between the Central and Western Paratethys. Correlation of marine and non-marine development represented one of the most important parts of this topic and it was solved for the Upper Oligocene and Lower Miocene by palynological zonation, which is at present valid for the whole Neogene between the Switzerland and Hungary. Biostratigraphic classification according to ostracods was successfully solved for correlation between the Mediterranean Tethys and Paratethys.

Similarly, correlation of mammalian localities of the Western and Central Paratethys with palynological zones was carried out.

2. Results of regional field works:

a) Rhône basin: This area was emerged in the beginning of the Miocene, but already as soon as at the end of the Oligocene too. First marine sediments which could correspond to holostratotype "Aquitanian" in the Atlantic region were found only near the present Mediterranean shore zone (Carry-le-Rouet, Cap Janet). New boundaries of the regions flooded by the Aquitanian Sea in the northward and eastward directions were established. These areas characterized by alternation of marine and continetal periods are of extraordinary importance from the point of view of calibrated occurrence of micromammals. In the surroundings of Marseille, micromammalian localities of Cap Janet in the first "anteaquitanian" sequence belong to mammalian MN O Mein's biozone; their approximate correlation with fauna of the so-called "Linzer Sande" (Ege-


RADIOMETRIC AGES M.Y.
PALEOMAGNETIC EPOCHS
BIOSTRATIZONES
PLANCTON. FORAMS - BLOW
CALC. NANNOPLANCT. - MARTIN
EUROPEAN MAMMAL ZON. - MEIN.
CHRONOSTRATIGRAPHY – STAGES
EPOCHS
MEDITERRANEAN TETHYS
CENTRAL PARATETHYS
EASTERN PARATETHYS
EUROPEAN MAMMAL STAGES (Alberdi - Aguirre)
PLEISTOCENE
PLIOCENE
MIOCENE
LATE
MIDDLE
EARLY
LATE OLIGOCENE
1,8
3,4
5,4
11,8
16,8
23,2
EAR.
LA.
MATUYAMA
GAUSS
GILBERT
PIACENZIAN
ZANCLEAN
MESSINIAN
TORTONIAN
SERRAVALLIAN
LANGHIAN
BURDIGALIAN
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MEOTIAN
CHERSONIAN
BESSARABIAN
VOLHYNIAN
KONKIAN
KARAGANIAN
TSHOKRAKIAN
TARCHANIAN
KOTZACHURIAN
SAKARAULIAN
CAUCASIAN
SARMAT s.l.
VILLANYIAN
(VILLA.-FRANCHIAN)
RUSCINIAN
TUROLIAN
VALLESIAN
ASTARACIAN
ORLEANIAN
AGENIAN
CATALONIAN
ARAGONIAN

rian) of the Central Paratethys and with the locality of Rances in the Western Paratethys is possible. In the "Golfe de Digne" (Basses Alpes), the faunas of Lambert and Vallée du Bés are characterized by elements of the second, more frequent Miocene transgression in the "Burdigalian" stage which preserved its sediments similarly as the Aquitanian in the Rhône basin. Near Montpellier, vertebral localities of Les Cevennes and La Paillade are interstratified with marine sediments. Caunelles and Lespignan (of the same age as localities Lambert and Vallée du Bés) are situated in the centre of marine sediments. Their foraminiferal fauna is not rich, but it is sufficient for correlation of bioclastic formation of "Carry", closely above the more recent mammalian locality Lespignan (MN 2 Zone), further also *Globigerinoides trilobus* (N 5) characterizes marine beds. Some localities in Switzerland are identical in age.

b) Western Paratethys: Three research fieldworks were carried out in the regions between Voralberg (Austria), in Switzerland and Haute Savoie (France). Profiles of type sections were measured, sampled and worked out. The results solved many present problems of stratigraphy, facial character and paleogeography from the Oligocene till the Early Miocene. Determined ages of various formations brought many changes concerning marine transgression and marine connections with the Mediterranean in time and space.

c) Central Paratethys: Molasse zones in Austria, or between Bavaria and Czechoslovakia, were influenced by the changes of marine phases and facies in the Late Oligocene and the Early Miocene too. Regressive and transgressive cycles are closely connected, they are similar as in the Western Paratethys. Reconstructions required as detailed as possible determination of chronostratigraphic and geochronological values. Special plan was established for correlation of marine and continental sediments by research of micromammals in the marine sediments. In the Eggenburgian region almost the most suitable mammalian associations in marine deposits corresponding to the marine Lower Miocene (Eggenburgian) were found.

Continuation of near-shore facies to deep-sea molasse was enabled by research in morphotectonic depressions.

T o p i c 6. "Correlation of the Badenian Stage with the same age deposits of the Tethys area". (Excerpted from the report by A. P a p p, 1977).

At present, plankton provides the most reliable bases for discussion and solution. Badenian base is characterized by FAD genus *Praeorbulina* in the Central Paratethys and it can be ranged temporally to the upper part of N 8 Zone (zone with *Globigerinoides bisphericus* and *Globigerinatella* passes also to the underlying strata of the Karpatian).

Base of the Langhiano stage was defined with the first occurrence of the genus *Praeorbulina* too. From the above-mentioned it comes out that the Langhiano base is an age equivalent to the Badenian base.

N 9 Zone (*Orbulina suturalis* and *Globorotalia perirephoronda)* is certainly represented within a time span of the Badenian in the Central Paratethys. Since the leading species of N 10, N 11 and N 12 Zones are characterized from the tropical regions and they do not occur in the Central Paratethys, it is impossible to range the higher horizons to these zones. Therefore, it will be difficult to establish exactly the upper boundary of Langhiano (with the upper boundary of N 10) within the Badenian.

Table 3

Stratigraphic correlation of the biozones and stages of the Mediterranean Tethys relic. State of knowledge in 1983. (After M. B. Cita).

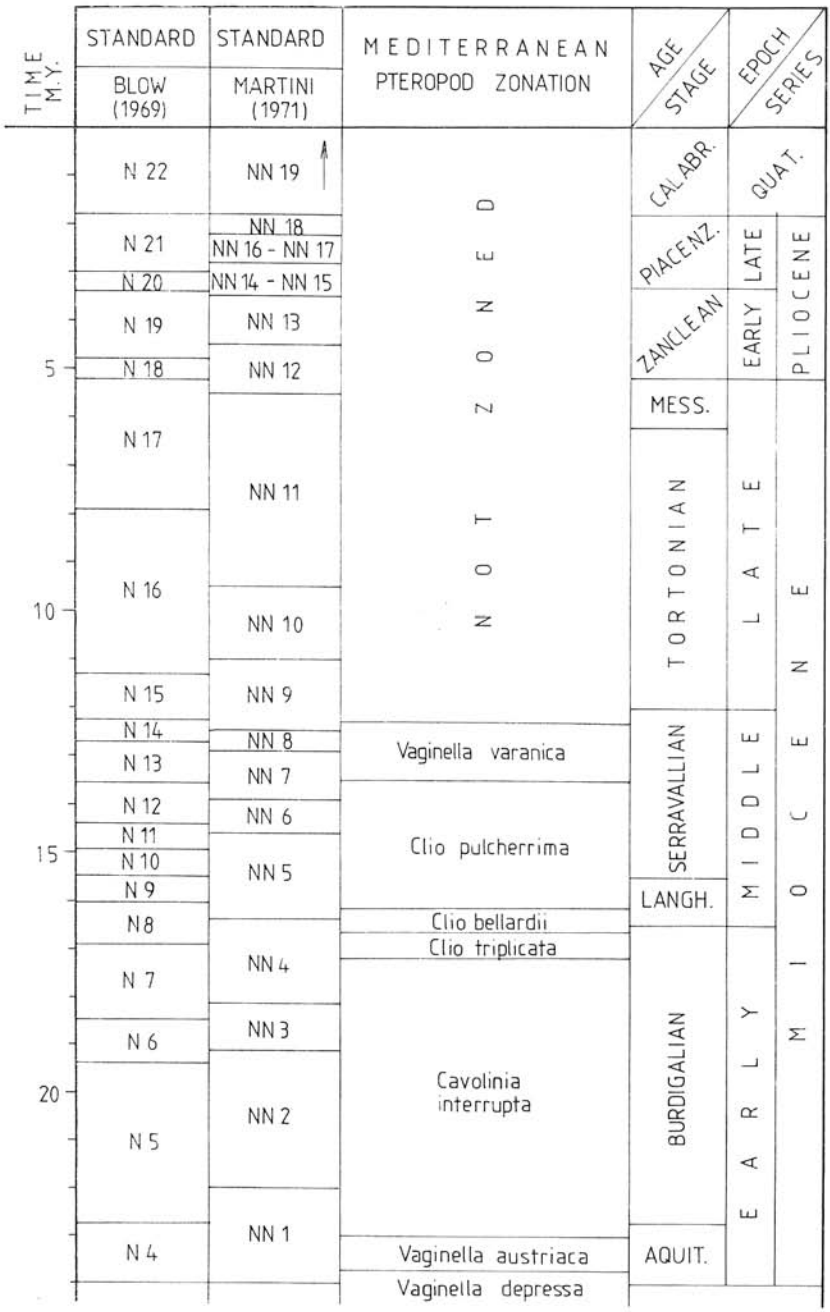


Table 4

Stratigraphic correlation of DSDP 397 (Cape Bojador) with classic development of the Messiniano and Zancleano and their paleogeographical changes in the rest of the Mediterranean. State of knowledge in 1979. (After M. B. Cita).

Nannoplankton of the earlier and partly of the Middle Badenian corresponds certainly to NN 5 Zone. In the upper part of the Badenian (Bulimina-Bolivina Zone or Kosovian) NN 6 and NN 7 Zones are demonstrable. The question whether the very short NN 8 Zone is represented in the Badenian requires still very critical research.

If we define the upper boundary of the Langhiano by the upper boundary of N 10 Zone which, according to contemporary information, runs closely below the upper boundary of NN 5, a correlation of the Lower Serravalliano with the Upper Badenian is demonstrable.

In the middle Badenian horizons, i. e. in the "Agglutinant" Zone (Wieliczian), there are often found globigerines refering to a close connection with *Globigerina druryi* and *G. decoraperta* represented also in N 13. In comparison with nannoplankton occurrences, they show relations to N 13 Zone. Therefore, the Badenian is placed between N 8 and N 13 Zones. In the region of the Mediterranean Tethys relic, time interval of the Badenian corresponds probably to the Langhiano stage and to the lower part of the Serravalliano.

Topic 7. "Correlation of the Late Oligocene and Early Miocene in the Tethys area". (Excerpted from the report by E. Martini, 1977).

On the basis of the work of numerous team the following new results were obtained:

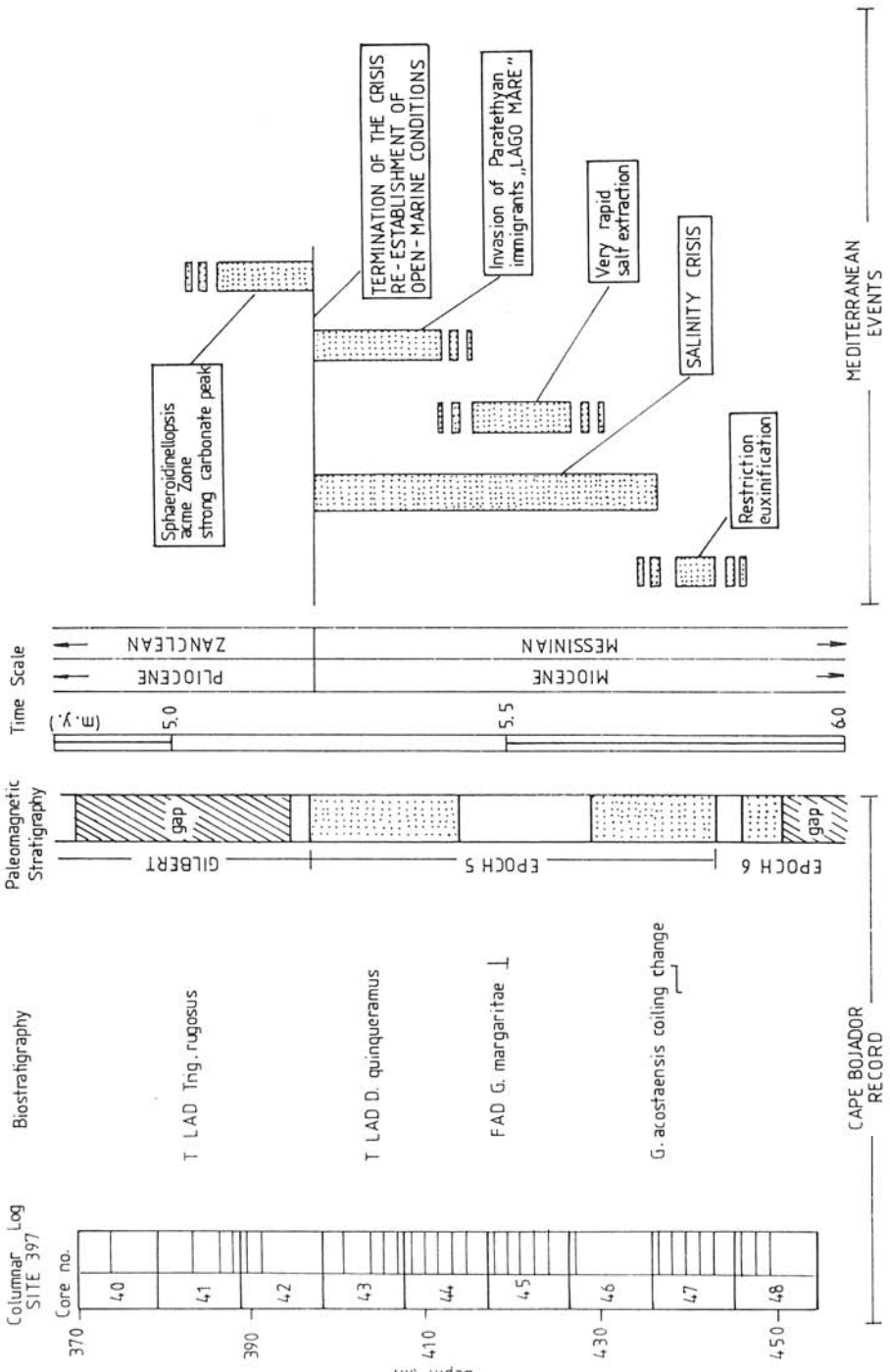
a) Spain: Betic Cordilleras; several type sections of marine sediments on the Oligocene/Miocene boundary dated by foraminifers were proposed.

b) France: Cap Janet (Marseille) and Carry-le-Rouet, containing besides micromammals also gastropods, foraminifers, ostracods and nannoplankton, were almost solved out as far as correlation is concerned.

c) Italy: Several type sections in the northern Sicily show continuous marine sedimentation through this important stratigraphic boundary. In the southern regions of Marche, lithostratigraphic units of this period are dated in schlier facies by foraminifers; marine profiles of the northern Apennines show together with volcanic intercalations radiometric age of about 23.8 m. y. In the Ligure-Piemontese basin, the younger Oligocene and marine Miocene dated by foraminifers, nannoplankton and pteropods are solved to a such extent that they can be correlated with the other Tethys and Paratethys regions.

d) Greece: In the southern Zakynthos, the Lower Miocene is lying, to all appearance, on the Eocene conglomerates; in the northern Zakynthos, marine younger Oligocene and older Miocene dated by foraminifers prove the occurrence of these time units, in spite of the fact that they do not prove continuous sedimentation.

e) Cyprus: Agrokipia region is characterized by complete Oligocene/Lower Miocene sequence dated by foraminifers. Continuous strata sequences are known in the regions of Troodos, Mesaoria, Pentadaktylos.


Columnar Log
SITE 397
Core no.
40
41
42
43
44
45
46
47
48
370
390
410
430
450
Depth (m)
Biostratigraphy
T LAD Trg. rugosus
T LAD D. quinqueramus
FAD G. margaritae
G. acostaensis coiling change
CAPE BOJADOR RECORD
Paleomagnetic Stratigraphy
gap
GILBERT
EPOCH 5
EPOCH 6
gap
Time Scale
(m.y.)
5.0
5.5
6.0
PLIOCENE
MIOCENE
ZANCLEAN
MESSINIAN
Sphaeroidinellopsis acme Zone strong carbonate peak
TERMINATION OF THE CRISIS RE-ESTABLISHMENT OF OPEN-MARINE CONDITIONS
Invasion of Paratethyan immigrants „LAGO MARE"
Very rapid salt extraction
SALINITY CRISIS
Restriction euxinification
MEDITERRANEAN EVENTS

f) Egypt: Shallow-marine Oligocene and Lower Miocene are preserved in the western region of "the Western Desert". Research of foraminiferal and nannoplankton associations is carried on.

g) Israel: Surface exposures of the Late Oligocene/Lower Miocene are not known. However, in deep boreholes, e. g. Gaza-1, they are accompanied by miogypsins and planktonic foraminifers.

h) DSDP: Any criteria for O/M boundary were not determined in boreholes Leg 13 and 42 A.

Topic 8. "Correlation of the younger Neogene in the Tethys area (from the Middle Miocene to Pleistocene)". (Excerpted from the report by M. B. Cita, 1978).

Views on correlation are as follows (from the underlying to overlying strata):

a) Chronostratigraphic boundary of the Lower/Middle Miocene corresponds to the Langhiano base, to the first occurrence of *Praeorbulina glomerosa* (so-called *Praeorbulina* datum.

b) The Middle/Upper Miocene boundary corresponds to the Serravalliano Tortoniano boundary. Biostratigraphic boundary between *Globorotalia mayeri* and *G. menardii* does not correspond exactly to the definition of the Tortoniano stratotype. Some authors use *Globorotalia acostaensis* datum (base of N 16 Zone) as a base of the Upper Miocene.

c) The Upper Miocene/Lower Pliocene boundary corresponds to the boundary of chronostratigraphic units (stages) of Messiniano/Zancleano. In definition, this boundary is identical with the base of *Spaeroidinellopsis Acme*-Zone or MPl 1 Zone.

d) The Lower/Upper Pliocene boundary corresponds to the Zanclean Piacenzian boundary and to MPl 4/MPl 5 Zone. Boundary of both Pliocene stages corresponds roughly to the Gilbert/Grauss boundary according to paleomagnetic stratigraphy.

Research of foraminifers in the Eastern Mediterranean and the Near East has been discussed in recent years. Two problems are debatable:

a) Occurrence of gaps in the Middle Miocene sections and their regional significance.

b) Age of evaporites in the sections of the Eastern Mediterranean.

In order to solve both problems and correlation on continents and in the Levant region, reambulation of knowledge started by means of DSDP.

Numerous biostratigraphic investigations were carried out in the Neogene sections in Spain, Algeria and Morocco. The best documented section so far is in the Bou Regreg valley near Rabat.

In the Vera basin (southern Spain), Cuevas del Almanzora section proposed in Bratislava (1975) as Messiniano parastratotype on the basis of its presupposed continuous marine sedimentation through the Miocene/Pliocene boundary is neither without a gap, nor entirely marine. Lack of sediments corresponding to the Messiniano evaporites in this region has been already described in the previous literature.

In biostratigraphic and paleomagnetic investigations the following stratigraphic data on hemipelagic sequences of the Late Neogene (drilled near Cap Bojador, DSDP 397) were obtained (from bottom to top):

a) Zone with *Globorotalia acostaensis* changes already on the base of Epoch 5.

b) First occurrence of *Globorotalia margaritae* belongs approximately to the centre of Epoch 5.

c) Last occurrence of *Discoaster quinqueramus* in the latest parts of the Epoch 5. This species is found in Messiniano marls forming intercalations in evaporites.

d) Last occurrence of *Triquetrorhabdulus rugosus* is in the lower horizons of the Gilbert Epoch. This moment is marked simultaneously with the first occurrence of *Ceratolithus acutus*.

In the profile of Cap Bajador, the last occurrence of *Globorotalia miocenica* was established in the Reunion phase within the Matuyama Epoch. In the Stirone section in the northern Apennines, the Reunion phase was distinguishable, because the first "northern guest" *Arctica islandica* is already present. Owing to this, we propose correlation possibilities connected with boundary of *Globorotalia* extinction and the first occurrence of northern forms in the Mediterranean.

T o p i c 9. "Correlation of the marine and non-marine Neogene of the Eastern Mediterranean". (Excerpted from the report by L. B e n d a and J. E. M e u l e n k a m p, 1978).

Correlation between marine microfossils zones, mammalian zones and pollen spectra, between marine and continental development of the stages was further studied and revised. The hitherto obtained results are given in Tab. 5. Any problems of fundamental importance did not remain unsolved for the upper part of the Neogene, but further investigations are necessary in order to clear up differences in value of Eskihisar associations relative to marine and continental chronostratigraphic units. Data from the marine profiles prove the fact that transition from type section between the Kale and Eskihisar associations took place 17 m. y. ago, while the lower boundary of Eskihisar association was dated in continental development at about 20 m. y. Further investigations will provide knowledge on age of the boundary between the Kurbalik and Kale formations in relation to marine and continental sections.

New knowledge clearing up chronostratigraphic position of the Pontian in connection with correlation of the Mediterranean marine stages was gathered. Biostratigraphic data from the northern Greece indicate that brackish sediments of the Pontian may be correlated roughly with the Messiniano or Turolian.

T o p i c 10. "Correlation of the marine and non-marine Neogene of the Western Mediterranean area". (Excerpted from the report by P. M e i n, 1977—1978).

The results of this first order topic were particularly evaluated. P. M e i n's report was accepted:

1. We confirm possibility and necessity of biostratigraphic division of continental sediments based on mammalian occurrence.

2. We found out that this division cannot be exactly applied to stage division of marine Neogene.

3. Though it is hitherto impossible to use a common stratigraphic language between continental and marine development, it is necessary to introduce classification with clear terminology, nomenclature and definition.

Table 5

Correlation of marine and continental stratigraphy in the East Mediterranean area. State of knowledge in 1983. (After L. Benda and J. E. Meulenkamp).

4. Stratigraphic division on the basis of mammalian fossils was established on the basis of "mammalian units" ("unités mammaliennes").

5. Each "mammalian unit" is defined by faunal complex, including emigrants from the other bioprovinces or continents.

6. Faunal contents extends sometimes beyond the established MN zones. But each "unit" (zone) represents one time section.

7. Each unit has a chronostratigraphic character.

8. "Mammalian units" (zones) are denoted numerically from MN 1 to MN 17.

9. These units were from the beginning distinguished in intercontinental relations. They were mostly correlated with marine stratigraphic units.

10. In this way, "mammalian units" gained the level of "mammalian age" ("âge mammalienne"). Some selected names of mammalian stages, such as "Vallésien", "Turolien", "Ruscinien" were used already for a long time.

11. The term "Villafranchien" is substituted by the term "Villanyien" containing MN 16 and MN 17 Zones.

12. The latest investigations permit to change some older type localities on the basis of occurrence of fossil mammals:

MN 17: St. Vallier	for Villány 3
MN 16: Triversa	for Rébiélice
MN 13: Venta del Moro	for Arquillo
MN 5: Pontlevoy	for Las Planas 4 B.

13. MN zonation can be used also in the region of the Eastern Mediterranean.

14. Extraordinary attention will be paid to mammals migration from the point of view of their age occurrence.

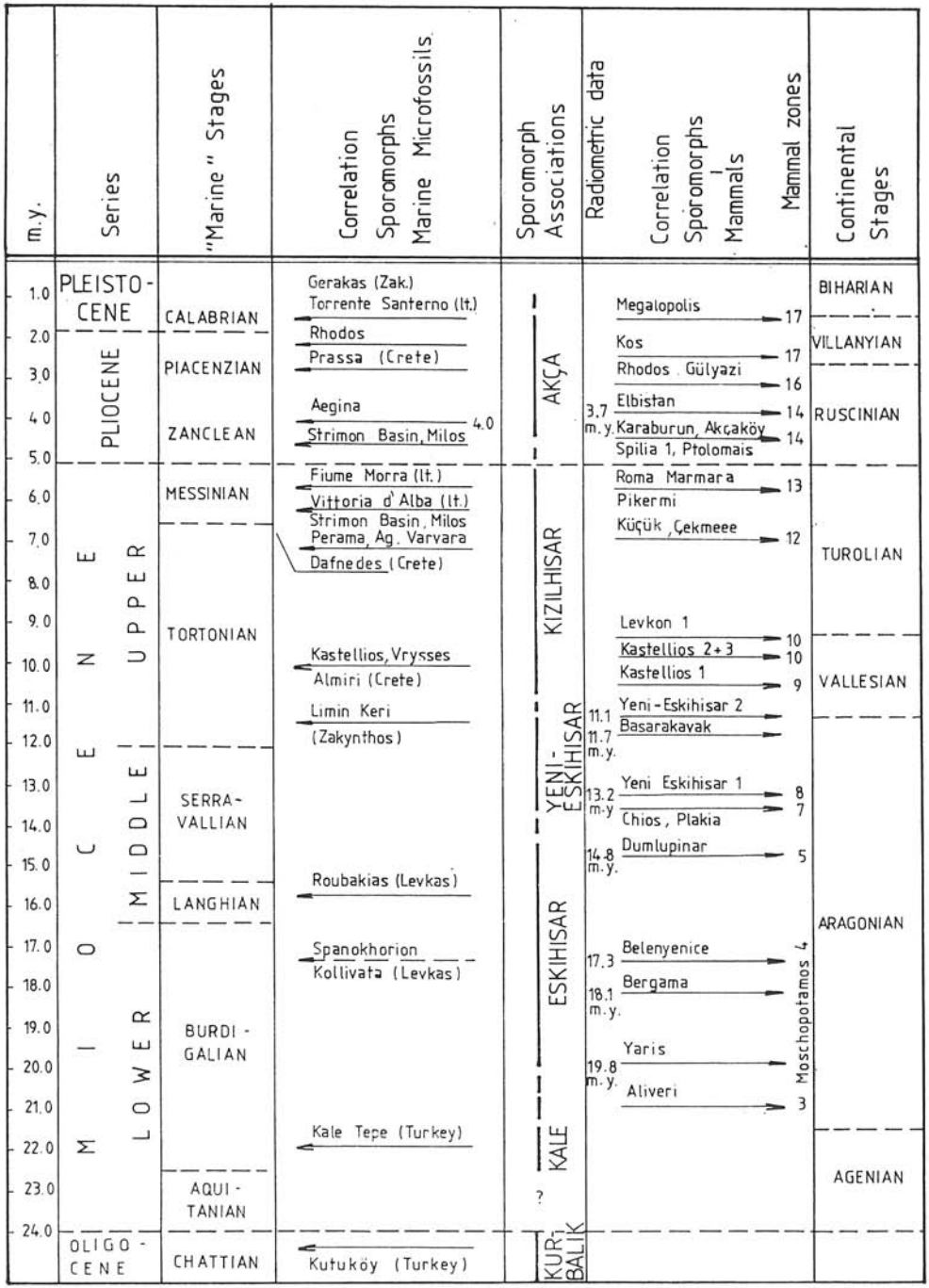
Topic 11. "Correlation of the Post-Badenian and Ante-Pontian deposits of the Euxino-Caspian, Dacian and Pannonian basins". (Excerpted from the report by F. Marinescu, 1978).

As far as the base of this time interval is concerned (Badenian Sarmatian boundary), there are no any correlation problems. Time correlation of the Konkian with the upper part of Kosovian was proved too.

1. Problem of correlation of the Sarmatian of the Pannonian region with the Dacian basin and with the Euxino-Caspian region is satisfactorily solved out. The upper boundary of the Sarmatian s. str. (Suess) runs on the Lower/Upper Bessarabian boundary (in the Dacian basin on the Sarmatian/Malvensian boundary). The presence of the Lower Bessarabian in the Sarmatian s. str. was always questionable. Presence of some species of *Mactra* and *Cerastoderma*, statolytes of Misidae prove the presence of the Lower Bessarabian in the Pannonian region.

2. As far as correlation of the Pannonian (sensu restricto), the Central and Eastern Paratethys is concerned, we have an opinion that it is a time equivalent to the Upper Bessarabian, Chersonian and Meotian. Arguments:

a) Base of the Pontian is synchronously established in both regions.


m.y.
Series
"Marine" Stages
Correlation Sporomorphs Marine Microfossils
Sporomorph Associations
Radiometric data
Correlation Sporomorphs / Mammals
Mammal zones
Continental Stages
PLEISTOCENE
PLIOCENE
MIOCENE
UPPER
MIDDLE
LOWER
OLIGOCENE
CALABRIAN
PIACENZIAN
ZANCLEAN
MESSINIAN
TORTONIAN
SERRAVALLIAN
LANGHIAN
BURDIGALIAN
AQUITANIAN
CHATTIAN
Gerakas (Zak.)
Torrente Santerno (It.)
Rhodos
Prassa (Crete)
Aegina
Strimon Basin, Milos
4.0
Fiume Morra (It.)
Vittoria d'Alba (It.)
Strimon Basin, Milos
Perama, Ag. Varvara
Dafnedes (Crete)
Kastellios, Vrysses
Almiri (Crete)
Limin Keri
(Zakynthos)
Roubakias (Levkas)
Spanokhorion
Kollivata (Levkas)
Kale Tepe (Turkey)
Kutuköy (Turkey)
AKÇA
KIZILHISAR
YENI-ESKIHISAR
ESKIHISAR
KALE
?
KURŞUNLU BALIK
3.7 m.y.
Megalopolis
17
Kos
17
Rhodos Gülyazi
16
Elbistan
14
Karaburun, Akçaköy
14
Spilia 1, Ptolomais
Roma Marmara
13
Pikermi
Küçük Çekmeee
12
Levkon 1
10
Kastellios 2+3
10
Kastellios 1
9
11.1
11.7 m.y.
Yeni-Eskihisar 2
Basarakavak
13.2 m.y
Yeni Eskihisar 1
8
7
Chios, Plakia
14.8 m.y.
Dumlupinar
5
17.3
Belenyenice
18.1 m.y.
Bergama
19.8 m.y.
Yaris
Aliveri
3
Moschopotamos 4
BIHARIAN
VILLANYIAN
RUSCINIAN
TUROLIAN
VALLESIAN
ARAGONIAN
AGENIAN

b) Several species of the genus *Congeria* typical of the lower horizons of the Pannonian (*C. ornithopsis, C. neumayri*) occur outside the Carpathian arc, in the Upper Bessarabian sediments.

c) The Lower Meotian of the Dacian region can be correlated with the Pannonian according to the most frequent occurrence of *C. ramphophora* (well-known from C and D zones).

d) Small dreisenides, known from the Pannonian basin in the Pannonian E zone, occur together with *Dreissenomya primiformis* in the Upper Meotian of the Dacian basin.

e) Bessarabian and Chersonian have inverse polarization; in the Meotian it is normal. But is necessary to verify these data in the Pannonian region.

f) Strong transgression of the Lower Meotian is reflected mainly in Pannonian C and D zones and ingression of the Upper Meotian corresponds to E zone.

g) As far as radiometric age is concerned, the Meotian base was determined at 9.5 m. y., whereby the first Pannonian sediments, e. g. in Czechoslovakia (representing perhaps C zone) were dated at about 10 m. y.

3. As far as correlation of the Lower Meotian of the Dacian basin with the Euxin basin is concerned, Meotian base is characterized by the first occurrence of the genus *Dosinia*, whereby in the Dacian basin it starts with fresh-water to oligohaline formation (sporadically continental) and only in its overlying strata there are the beds with *Dosinia*. Correlation of the lower boundary of the Meotian is a subject of discussion. We state that there is a total absence of Chersonian fossils in these basal beds in the Dacian region, but a presence of the genera *Scrobicularia, Abra*, etc. accompanying the formations of basal dosinian beds in the Euxin region is well-known.

4. There are certain minor problems in the correlation of the Meotian Pontian boundary. Great number of species, ostracods typical of the Pontian were established in the sediments closely below the lower boundary of the Pontian. They occurred together with typical molluscs of the Pannonian E zone (= Servian, according to Yugoslavian regional nomenclature).

T o p i c 12. "Correlation of the Messinian Stage with the same age deposits of the Paratethys and the correlation of the Miocene Pliocene boundary". (Excerpted from the report by A. P a p p, 1978).

A. First correlation was carried out by means of comparison of radiometric data comming from the Paratethys Sarmatian, Pannonian s. rest., Pontian and Dacian with radiometrically calibrated stages of the Tethys region. Zonation of mammalian faunas of the European Neogene, especially those interbedded into the marine sediments of the Mediterranean Tethys (Castellios, Crevillente, La Alberca and Hauterive) may be, in our opinion, primary correlation boundaries.

Numerous mammalian associations (Drassburg, Geiselberg, Vösendorf, Kofidisch, Eichkogel, Hatvan, Pestszentlörinc, Polgárdi, Baltavár, Tataros, etc.) occur in the Central Paratethys in the Austrian-Hungarian region together with typical endemic molluscan faunas. They can be exactly ranged into the regional stages of the Central Paratethys and they can be, without any difficulties, correlated with the zones of the rest European Neogene, i. e. of the Mediterranean Tethys too.

On the basis of these investigations, the Sarmatian corresponds chronostratigraphically to the Upper Serravalliano and to the Lower Tortoniano; the Pan-

nonian s. restr. — to the lower and middle part of the Tortoniano and the Pontian — to the Upper Tortoniano and Messiniano.

Consequently, the Miocene Pliocene boundary is lying in the Paratethys somewhere near the upper boundary of the Pontian. Dacian and Romanian belong to the Pliocene.

B. (Excerpt from the report by V. N. Semenenko, 1982).

In the region of the southern Ukraine, investigations concerning the first order topics Nos. 3, 4 and 12 were carried out. They were concentrated especially to nannoplankton, to determination of paleomagnetic ages of the sediments identifiable biostratigraphically in the Kerch-Taman region. Nannoplankton coincides with the marine zones, sedimentary areas in them have been recently considered for more or less isolated and more brackish than the Mediterranean Tethys or the Central-Western Paratethys. Thus a direct marine connection with the eastern region of the Tethys relic or with the Indo-Pacific region was proved.

The Meotian sediments are magnetized reversally in their lower part, normally in the upper part. NN 10 Zone (*Discoaster neohamatus, D. neorectus, Minylitha convallis*) was found in the upper part of the Meotian. The lower horizons of the Meotian are comparable with paleomagnetic epoch 8, the upper ones with epoch 7. According to radiometric measurements (K/Ar), the lower boundary of the Meotian is approximately 10.5 ± 1.5 m. y. old. Investigations of benthonic foraminifers and nannoplankton may indicate that marine connection was not oriented to the west, but rather in direction of the Indo-Pacific.

The whole Pontian (excluding the lowest horizon) is magnetized inversely and it corresponds to epoch 6. (Comming out from this fact, the Pontian lasted only a very short time — about 0.6 m. y.).

The Lower Kimmerian contains nannoplankton with *Discoaster quinqueramus* (NN 11), *Ceratolithus tricorniculatus* (NN 12) and *C. acutus*. The Lower Kimmerian (Azovian substage), where the molluscan fauna has a transitional character between the Pontian and Kimmerian, is paleomagnetically normal and it corresponds to epoch 5. Middle and Upper Kimmerian is characterized by normal, as well as by reversal magnetization and it is comparable with the Gilbert Epoch. Erosive phase on the Kimmerian base corresponds in the Euxin region to the so-called "East Caucasian" phase of orogenetic movements.
Deposits of the Akchagylian stage have paleomagnetic character of the Gauss epoch and the lower part of Matuyama.

These are only very shortened reports on important first order topics of the Project, which, for a great part, solved out (though sometimes contradictorily) stratigraphy and whole geological development of the Mediterranean Tethys and Paratethys regions.

Even after finishing the Project, geochronological, chrono- and biostratigraphic data being detailized provide great possibilities of application of the Neogene development between the Atlantic and Indo-Pacific (see the chapter Results of the Project). In the stratigraphic correlation of the Neogene so important changes appeared (in temporal relations exceeding several million of years; see Tab. 2), that old conceptions of the Neogene paleogeography and

geodynamics have been already overcome. In spite of several contradictions between the results of first order topics, we are getting a new picture of development of such important region classic for the Neogene.

In my following publications I intend, in a shortest time, to aim at possibility of utilization of the Project results, such as denotation of territorial and facial distribution of organogenic limestones, denotation of the most intensive areas of subsidence, at the regions of uplifts and subsidence, at denotation of areas with maximum thickness of the Neogene sediments, at supposed areas of strong denudation, at the reasons of distribution of marine, brackish and continental sediments, at character and significance of volcanic activity, at effects of the so-called "Neogene orogenetic phases of the same age" with their consequences in time and space, etc.

In this informative paper I do not quote publications of the authors. There are over 1000 papers, monographs and books concerning individual results of the Project. References are given in two separate publications of IGCP UNESCO (the so-called IGCP Catalogue, Vol. I., II., Paris).

I have to stress again that almost 400 scientific workers took place in solution of the first order topics, besides delegated national representatives from 35 countries.

On this occasion, I as the leader of the Project express my thanks to all active co-workers, especially to those who represented some countries of the Near East and North Africa by their knowledge, these states do not take part in solution of the Project from organizational or political reasons. I thank to all for comprehension of the importance of this intercontinental task, for their enthusiasm and active cooperation.

Translated by O. Mišániová