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THE PALEOCENE-EOCENE BOUNDARY ON TYPE SECTIONS OF AZERBAIJAN

by

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The Paleocene and Eocene sediments of Azerbaijan are characterized by different fauna and flora groups. On the territory of Azerbaijan there are a number of sections clearly demonstrating a fauna and facies change on the Paleocene-Eocene boundary.

Sections with complete paleontologic-stratigraphic information are located in three structural zones with different facies types : the Ordubad flexure, Agjakend flexure and western part of the Absheronian peninsula (fig. 1)

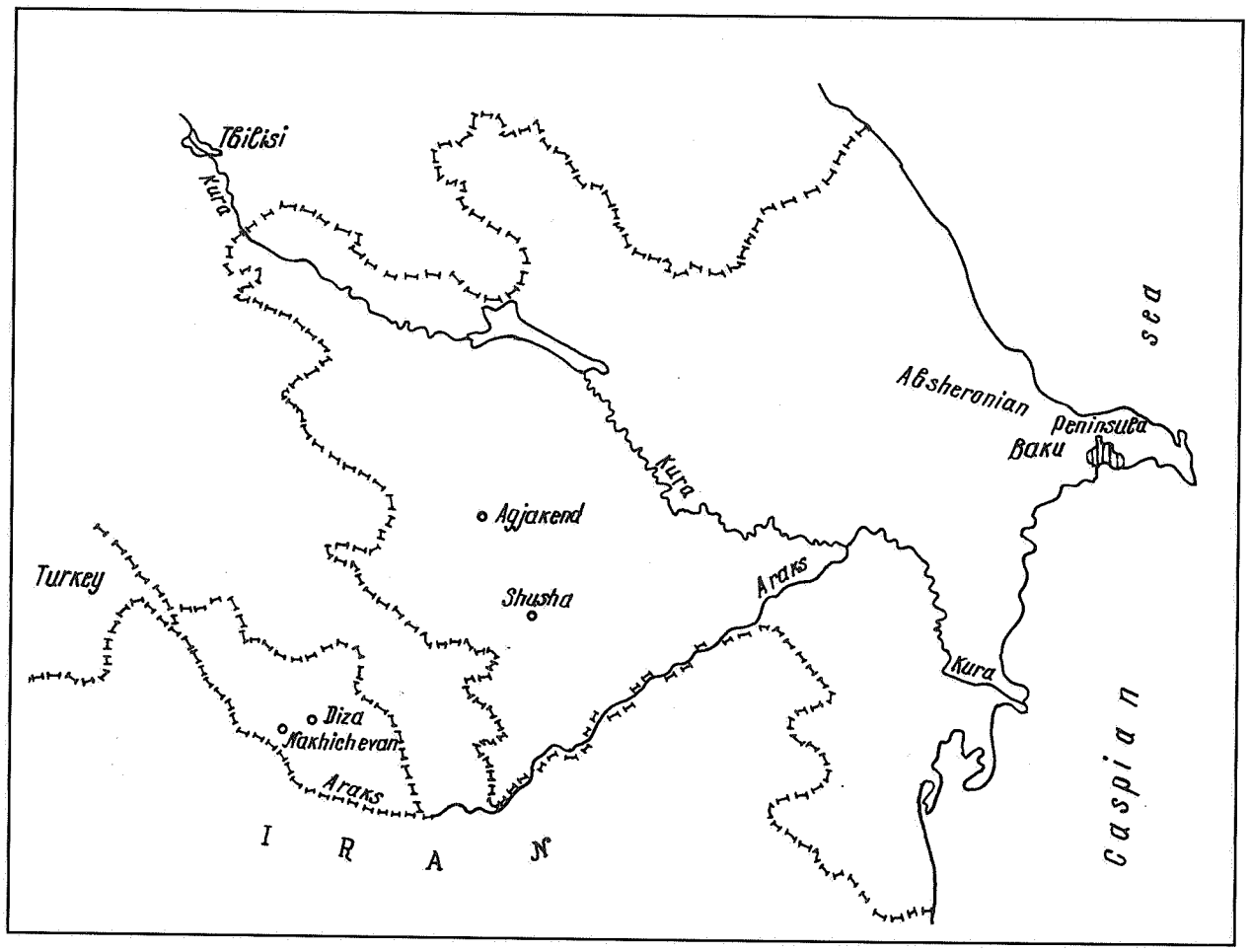

Figure 1. Geographic location of the type sections in Azerbaijan.

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In the Ordubad flexure the Paleocene sediments are represented by clays, argillites, marls with intercalations of calcareous sandstones and limestones attaining a total thickness up to 800 m. In the studied area the planktonic foraminiferal zones *Acarinina subsphaerica* and *Acarinina acaranita* are clearly observed in the Thanetian beds. Paleocene-Eocene transitional layers are observed in a number of sections of Ordubad flexure. In the Diza section (tab. 1), the transition is expressed in uniform rocks : carbonate clays, sandstones.

The *Acarinina acarinata* Zone with the association of planktonic foraminifers : *Acarinina primitiva, A. intermedia, Globigerina compressaformis, G. nana, G. quadritriloculinoides, G. velascoensis, G. bacuana,* etc. belongs to the Upper Paleocene.

This zone is succeeded within the same lithological sequence by *Morozovella aequa* zone with the association of planktonic foraminifers : *Morozovella apanthesma, M. perclara, M. wilcoxensis, M. quetra, Acarinina camerata*, etc.

The *Morozovella aequa* zone refers to the lower part of Eocene and in the Diza section its thickness equals 121 m.

The *Morozovella aequa* zone is also known from sections in the Crimea, Northern Caucasus, Western Turkmenistan. The stratigraphic position of the *Morozovella aequa* zone is debatable. Same scientists do not recognize this zone and in their works they single out the *Morozovella subbotinae* s.l. above the *Acarinina acarinata* zone as the scheme for Southern Russian regions. Other scientists refer the *Morozovella aequa* zone to the Upper Paleocene and third group of scientist consider this zone to be in the Lower Eocene.

The foraminiferal faunas of the *Morozovella aequa* zone are not recognised in all sections. For this reason the recognition of this zone is still controversial.

The Diza section is completed by the *Morozovella subbotinae* zone, characterized by an increase in fragmentary material.

In the Tirkesh section (Tab. 2) the *Acarinina acarinata* zone consists of calcareous clays with sandstone layers and is characterised by associations of planktonic foraminiferal and nannoplankton. The above clays refer to the *Morozovella aequa* zone.

A uniform transition from the beds with *Acarinina acarinata* to the ones with *Morozovella aequa* is observed in numerous sections of the Ordubad flexure without volcanogenic rocks. In the eastern and northeastern part of the Ordubad flexure the Eocene volcanism is widespread. In the middle and final part of the Early Eocene, the Ordubad flexure was subjected to violent volcanism resulting in the formation of volcanic and volcano-sedimentary beds.

To the West, there is a considerable decrease and gradual wedgeout of the volcanic beds, which are replaced by tufo-sedimentary and sedimentary formations.

A good paleontologic description is available for the complete Lower Eocene section in normal sedimentary facies (Tab. 1).

In the Upper Paleocene sediments of the Ordubad flexure, the complex *Nummulites fraasi* zone : *N. deserti, N. Praeexilis, N. silvanus, N. subplanulatus, Operculina heberti, O. subsalsa, Discocyclina seunessii*, etc., is observed, which can be compared to the planktonic foraminiferal zones *Acarinina subsphaerica* and *Acarinina acarinata* or NP6, NP7, NP8, NP9 to the *Nummulites fraasi* zone.

Although the lithologic transition from the Paleocene to the Eocene is gradual, the turnover of the Nummulitid associations across this boundary is nearly complete. The complex *Nummulites spillecensis* zone appears : *N. bolcensis, N. akkurdanensis, N. exilis, N. nitidus, N. spiretypus, N. subplanulatus, N. planulatus.* It corresponds to the *Morozovella aequa, M. subbotinae, M. marginodentata* zones of planktonic foraminifers or to NP10, NP 11, NP 12.

In other regions of Azerbaijan the Paleocene-Eocene transition is expressed in distinctive facies conditions. In the Agjakend flexure a monotonous clay sequence was deposited during the transition but slightly above the basis of the Eocene clays and sandstones appear.

In the Western Absheronian peninsula, a replacement of the Sumgait formation by the Koun formation corresponds to this interval.

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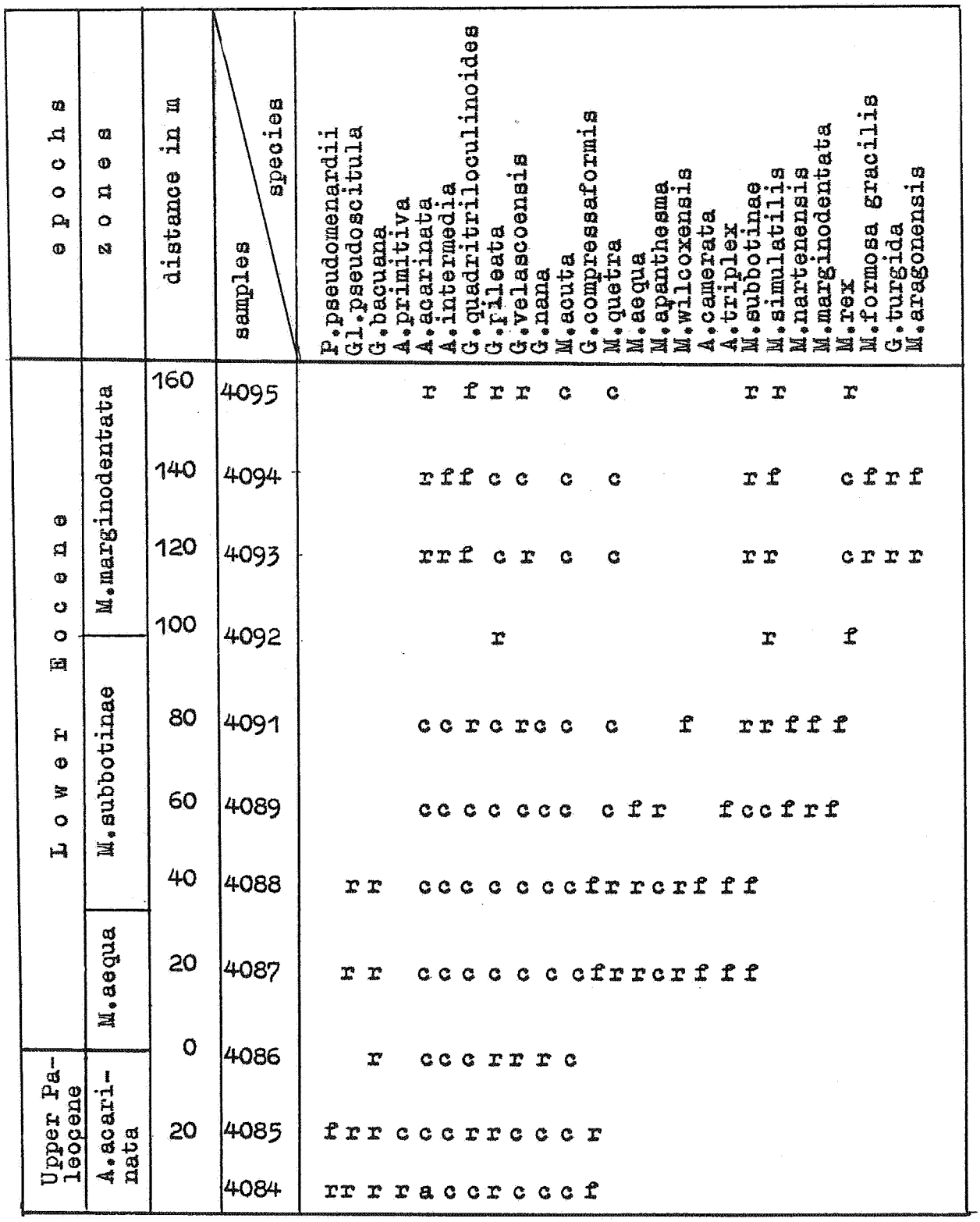
epochs	zones	distance in m	samples \ species	P.pseudomenardii	A.intermedia	G.pileata	G.velascoensis	G.quadritriloculinoides	G.nana	G.bacuana	G.linaperta	A.mckannai	A.subsphaerica	A.acarinata	G.compressaformis	A.primitiva	M.aequa	M.apanthesma	M.perclara	M.wilcoxensis	M.quetra	M.acuta	A.triplex	A.camerata	M.subbotinae	M.nartenensis	M.marginodentata	G.simulatilis	G.contorta	M.formosa gracilis	M.rex	G.prolata	G.turgida
	M.margino-dentata	440	3526			rr	r	r	f					r	r								c						f	f	f	r	c
		400	3523			rr	r	c	c					r	c								c	f	c				r	r	r	r	r
			3520			rr	r	c	r				f	c	c								r	f	c				r	r	r	r	r
			3519			rf	r	c	c					c	f								c	f	c				r	r	r	r	
Lower Eocene		360	3518			rr	r	r	r					r									r	r	f	r	r						
	M.subbotinae		3515			rr	r	r	r					r							f		r	r	f	f	r						
		320	3514			rr	r	r	r					r							f		r	r	f		r						
			3513			rr	r	f	r					r							f		r	r	f	f	r						
		280	3512			f	c	r	f					rr							f		r	f	r								
			3510			c	c	r	c	c	r		r	r	c								r	r	f		r						
		240	3508			r	c	c	c	c	f		c	c	c								r	fc	r	f	r	c					
		200	3506			f	f	f																									
		160	3504			c	c	c	c	c	c		c	c	c						f		r	r	c	r	r	f	r				
			3503			cc		c	c	r			c	r	c	r	r						r	f	c	f	f	r					
		120	3502			c	c	c	c	c	r		c	c	c		c	f	f	f			r	f									
	M.aequa	80	3498			f	f	r	f	r			r	f	r		r																
			3497			rf	r	f	r				r	r	r		r		f	f													
		40	3494			f		f	r					r			r		f	r	f												
		0	3492			c	c	r	r	c	r	r		c	c	r	c	r	r	r	r												
*	**		3490			c	c	c	c	r		r	c	c	c																			
		40	3487	r	c	c	c	c	c	r	r		c	c	c	r																	

Table 1. Species ranges of planktonic foraminifera at Diza, Azerbaijan.
r : rare ; c : common ; f : frequent : a : abundant ; P : *Planorotalites* ; Gl : *Globorotalia* ; M : *Morozovella* ; G : *Globigerina* ; A : *Acarinina*. * Upper Paleocene ; ** *A. acarinata*.



epochs	zones	distance in m	samples	species	P.pseudomenardii	Gl.pseudoscitula	G.bacuana	A.primitiva	A.acarinata	A.intermedia	G.quadritriloculinoides	G.fileata	G.velascoensis	G.nana	M.acuta	G.compressaformis	M.quetra	M.aequa	M.apanthesma	M.wilcoxensis	A.camerata	A.triplex	M.subbotinae	M.simulatilis	M.nartenensis	M.marginodentata	M.rex	M.formosa gracilis	G.turgida	M.aragonensis
Lower Eocene	M.marginodentata	160	4095					r	f	r	r	c	c									r	r			r				
		140	4094					r	f	f	c	c	c	c								r	f			c	f	r	f	
		120	4093					r	r	f	c	r	c	c								r	r			c	r	r	r	
	M.subbotinae	100	4092								r												r			f				
		80	4091					c	c	r	c	r	c	c		c				f		r	r	f	f	f				
		60	4089					c	c	c	c	c	c	c		c	f	r			f	c	c	f	r	f				
		40	4088		r	r		c	c	c	c	c	c	c	f	r	r	c	r	f	f	f								
	M.aequa	20	4087		r	r		c	c	c	c	c	c	c	f	r	r	c	r	f	f	f								
Upper Paleocene		0	4086			r		c	c	c	r	r	r	c																
	A.acarinata	20	4085		f	r	r	c	c	c	r	r	c	c	c	r															
			4084		r	r	r	a	c	c	r	c	c	c	f																

Table 2. Species ranges of planktonic foraminifera at Tirkesh, Azerbaijan.
r : rare ; c : common ; f : frequent : a : abundant ; P : *Planorotalites* ; Gl : *Globorotalia* ; M : *Morozovella* ; G : *Globigerina* ; A : *Acarinina*.