

Article

# Re-Evaluation of the Ionian Basin Evolution During the Late Cretaceous to Eocene (Aetoloakarnania Area, Western Greece)

Elena Zoumpouli <sup>1,\*</sup>, Angelos G. Maravelis <sup>2</sup>, George Iliopoulos <sup>3</sup>, Chrysanthos Botziolis <sup>1</sup>, Vasiliki Zygouri <sup>4</sup> and Avraam Zelilidis <sup>1</sup>

<sup>1</sup> Laboratory of Sedimentology, Department of Geology, University of Patras, 26504 Patras, Greece; cbotziolis@upnet.gr (C.B.); a.zelilidis@upatras.gr (A.Z.)

<sup>2</sup> Department of Geology, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece; angmar@geo.auth.gr

<sup>3</sup> Laboratory of Palaeontology and Stratigraphy, Department of Geology, University of Patras, 26504 Patras, Greece; iliopoulosg@upatras.gr

<sup>4</sup> Laboratory of Structural Geology, Department of Geology, University of Patras, 26504 Patras, Greece; zygouri@upatras.gr

\* Correspondence: zoumpouel@gmail.com

**Table S1.** : Description of Microfacies analyses of the samples from Aetoloakarnania area and their age determination.

Samples	Microfacies Analysis Facies Zones /Depositional environment	Fossils	Age-Based on Fossils	Bi- ozone
R1	Pelagic lime packstone with planktonic foraminifera.SMF3 Depositional environment: <i>Toe of slope</i> (FZ:3)	<i>Pseudohastigerina</i> sp. <i>Pseudo-</i> <i>hastigerina micra</i> , <i>Subbotina</i> <i>linaperta</i> , <i>Subbotina eocenica</i> , <i>Globigerinatheka</i> sp.	Eocene (Lutetian - Bartonian)	P11- P13
R2	Pelagic lime mudstone with very few and very small plank- tonic foraminifera. Stylolite SMF3 Depositional environment: <i>Toe of slope</i> (FZ:3)	<i>Pseudohastigerina</i> sp. <i>?Hantkenina</i> sp., <i>Pseudoglo-</i> <i>bigerinella bolivariana</i> S, <i>linaper-</i> <i>ta S. eocenica</i> , <i>Chiloguembelina</i> sp. <i>Acarinina aspensis</i>	Eocene (Lutetian)	P10-11
R3	Pelagic lime packstone with planktonic foraminifera. Smooth lamination SMF3 Depositional environment: <i>Toe of slope</i> (FZ:3)	<i>Catapsydrax</i> cf. <i>dissimilis</i> <i>Glo-</i> <i>bigerinatheka</i> sp. <i>Chi-</i> <i>loguembelina</i> sp., <i>Turborotalia</i> <i>frontosa</i> , <i>Acarinina collactea</i>	Eocene (Lutetian)	P10-11
R4	Pelagic lime mudstone with few scattered (may be transport- ed) planktonic foraminifera SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Pseudohastigerina</i> sp., <i>S. lina-</i> <i>perta</i> , <i>P. bolivariana</i>	Eocene (Lutetian - Bartonian)	P10-11
M1	Pelagic mudstone/wackestone with very small planktonic foraminifera (microfossils and radiolaria). Shell debris of planktonic foraminifera. Some of the planktonic foraminifera are recrystallized. The main matrix is micrite SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Pseudohastigerina</i> sp. <i>P. micra</i> , <i>Acarinina</i> cf. <i>esnaensis</i> , <i>Subboti-</i> <i>na inaequispira</i> , <i>S. linaperta</i> , <i>Chiloguembelina</i> sp.	Eocene (Lutetian - Bartonian)	P11- P13
M2	Pelagic wackestone/packstone with planktonic foraminifera and microfossils. Burrowed bioclastic wackestone with abundant fine pelagic bio debris. SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Pseudohastigerina</i> sp. <i>Catapsy-</i> <i>drax</i> , cf. <i>dissimilis</i> , <i>Subbotina</i> <i>inaequispira</i> , <i>S. linaperta</i> , <i>S.</i> <i>eocenica</i> <i>Globigerinatheka</i> sp. <i>Chiloguembelina</i> sp.	Eocene (Lutetian - Bartonian)	P12- P13
M3	Pelagic lime mudstone/wackestone with very small scattered planktonic microfossils (planktonic foraminifera and radio- laria) with smooth lamination and parallel mud cracks. SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Pseudohastigerina</i> sp., <i>Acarinina</i> <i>mcgowrani</i> , <i>S. cf. inaequispira</i> , <i>S.</i> <i>linaperta</i> <i>S. eocenica</i>	Eocene Ypresian - Bartonian)	
M4	Pelagic lime wackestone with abundant small planktonic foraminifera and scattered debris of planktonic foraminifera and debris from other microfossils. SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Pseudohastigerina</i> sp., <i>P. micra</i> , <i>?Hantkenina</i> sp., <i>S. inaeq-</i> <i>uispira</i> , <i>Subbotina eocenica</i> , <i>Pla-</i> <i>norotalites</i> sp., <i>Turborotalia</i> sp. <i>Chiloguembelina</i> sp. <i>Globigeri-</i> <i>natheka</i> sp.	Eocene (Lutetian - Bartonian)	P11- P13
M5	Allochthonous bioclastic packstone/floatstone breccia. Main matrix consists of wackestone/packstone with planktonic foraminifera, large benthic foraminifera, big extraclasts, cor- aline red algae, extraclasts with miliolidae and peloids, ex- traclasts with thauatoporella, extraclasts with pisoids, mol- lusk fragments, calcite clasts and micritized clasts. SMF5 Depositional environment:(FZ:4) <i>Slope shallow slope</i> , high energy environment	Algae, <i>Nummulites</i> sp., <i>Disco-</i> <i>cyclina</i> sp., <i>Discocyclina</i> <i>dis-</i> <i>pansa</i> , <i>Quiqueloculina</i> sp., <i>Alve-</i> <i>olina</i> sp., <i>P. micra</i> , <i>S. linaperta</i> , <i>S. eocenica</i> , <i>Morozovella</i> sp., <i>T.</i> <i>frontosa</i> ?	Eocene (Lutetian)	P11
M6	Polymict clast-supported microbreccia consists of litho and bioclasts and ooids. Most of the bioclasts are "broken". Debris of benthic foraminifera, recrystallized planktonic foraminif- era, SMF5 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>Discocyclina</i> sp., <i>Quiqueloculina</i> sp., <i>Cuvillierina</i> sp., <i>Orbitolites</i> <i>complanatus</i> , red coralline algae, debris from bryozoans?, de- bris of bivalves, <i>Rotalia</i> , <i>Glo-</i> <i>bigerinatheka</i> sp., <i>Morozovella</i> <i>spinulosa</i> , <i>Morozovella lehneri</i>	Eocene (Lutetian - Bartonian)	P11- P12
M7	Pelagic lime mudstone/wackestone with planktonic forami- nifera (microfossils) with crosscutting mud cracks. Very small planktonic foraminifera which most of them are recryst-	<i>P. micra</i> , <i>Globigerina</i> sp., <i>S.</i> <i>eocenica</i> , <i>Truncorotaloides</i> sp., <i>Turborotalia</i> sp., <i>Chi-</i>	Eocene (Lutetian - Bartonian)	

	tallized SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>loguembelina</i> sp., <i>Globigerinatheka</i> sp., <i>Acarinina</i> sp.		
M8	Allochthonous bioclastic packstone /floatstone breccia, biogenic material, and lithified sediments may have derived from "reef tops or flanks and deposited in high-energy slope settings by rockfall and various mass flow processes. Bioclasts consist of red algae, benthic foraminifera. Other clasts with ooids and peloids and clasts with planktonic foraminifera. Calcite veins have been observed. SMF5 Depositional environment (FZ:4) <i>Slope</i>	Red algae <i>Nummulites</i> sp. <i>Discocyclus</i> sp. <i>D. dispansa</i> <i>Lokhartia</i> sp. <i>Orbitolites complanatus</i> <i>Pseudo-hastigerina</i> sp. <i>Globigerinatheka</i> sp. <i>P. bolivariana</i> <i>T. frontosa</i>	Eocene (Late Lutetian)	P11-12
M9	Pelagic Packstone with planktonic foraminifera and radiolaria. Most of the planktonic foraminifera are recrystallized. Smooth lamination SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>Truncorotaloides topilensis</i> , <i>S. eocenica</i> , <i>Globigerinatheka</i> sp., <i>Morozovella caucasica</i> , <i>M. lehneri</i> , <i>Morozovelloides crassatus</i>	Eocene (Late Lutetian)	P11-P12
M10	Pelagic packstone with planktonic foraminifera and radiolaria. Smooth lamination. Debris from benthic foraminifera SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Planorotalites</i> sp., <i>Lokhartia</i> sp., <i>Globigerinatheka</i> sp., <i>Morozovella</i> sp., <i>A. esnaensis</i> , <i>Acarinina</i> sp.	Eocene (Lutetian - Bartonian)	
M11	Pelagic lime mudstone/wackestone with planktonic foraminifera and radiolaria. Crosscutting veins have been observed Very few scattered benthic foraminifera SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Discocyclus</i> sp., <i>Globigerinatheka</i> sp., <i>T. frontosa</i> , <i>M. lehneri</i> , <i>Acarinina bullbrookii</i>	Eocene (Lutetian)	P11
M12	Benthic foraminifera very big Nummulites and extracasts with ooids. Allochthonous and autochthonous deep water sedimentation SMF5 Depositional environment: (FZ 4) <i>Slope</i>	<i>Nummulites</i> sp., <i>Discocyclus</i> sp., <i>Triloculina</i> sp., <i>Lokhartia</i> sp., <i>Rotaliidae</i> , <i>Globigerinidae</i>	Eocene	
M13	Pelagic lime wackestone/packstone with planktonic foraminifera and some scattered benthic foraminifera. Some are recrystallized. SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Globigerinatheka</i> sp., <i>S. linaperta</i> , <i>Subbotina yeguaensis</i> , <i>A. bullbrookii</i> ?, <i>P. bolivariana</i>	Eocene (Lutetian)	P11
M14	Pelagic wackestone /packstone with planktonic foraminifera and scattered benthic foraminifera (probably transported) SMF3/4 Depositional environment: (FZ:3) <i>Toe of slope</i>	Algae, Radiolaria, Nummulites sp. <i>Discocyclus</i> sp., <i>Alveolina</i> sp. <i>Rotalia</i> sp.?, <i>Globigerinatheka</i> sp. <i>P. bolivariana</i> <i>T. frontosa</i> <i>G. planoconica</i>	Eocene (Lower Lutetian)	P10-P9b
M15	Microbreccia bioclastic wackestone/ mudstone with planktonic foraminifera, transported algae and debris of benthic foraminifera, extracasts with Miliolidae, and fenestral caves with sparite. SMF4 Depositional environment: (FZ 4) <i>Slope</i>	Algae, <i>Discocyclus</i> sp., <i>Globigerinatheka</i> sp., <i>T. frontosa</i> , <i>Morozovella</i> sp., <i>A. bullbrookii</i> , <i>A. esnaensis</i> , <i>Acarinina coalingensis</i> , <i>S. inaequispira</i> , <i>S. linaperta</i>	Eocene (Ypresian - Lower Lutetian)	P7-P10a - P7-P9
M16	Microbreccia bioclastic wackestone with planktonic foraminifera and transported algae and debris of benthic foraminifera, extracasts with Miliolidae. SMF4 Depositional environment: (FZ 4) <i>Slope</i>	Algae, Radiolaria Nummulites sp. <i>Discocyclus</i> sp., <i>Globigerina</i> sp. <i>A. bullbrookii</i> <i>A. coalingensis</i> <i>Turborotalia</i> sp. <i>Igorina broedermanni</i>	Eocene (Ypresian - Lower Lutetian)	P7-P10a - P7-P9
M17	Microbreccia, bioclastic-lithoclastic wackestone/ packstone. Pelagic wackestone/packstone with planktonic foraminifera and scattered benthic foraminifera (probably transported) SMF4 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>Alveolina</i> sp. <i>Acarinina strabocella</i> <i>Planorotalites pseudomenardi</i> <i>Morozovella velascoensis</i>	Paleocene (Late Thanetian)	P4c-P5a
M18	Pelagic lime mudstone /wackestone with planktonic foraminifera. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	Radiolaria, <i>A. esnaensis</i> , <i>Morozovella</i> cf. <i>aequa</i> , <i>M. angulata</i> , <i>Subbotina triloculinoides</i>	Paleocene (Late Thanetian)	P4c-P5a
M19	Pelagic lime mudstone /wackestone with planktonic foraminifera. SMF3	<i>Acarinina strabocella</i> , <i>A. esnaensis</i> , <i>Planorotalites</i> cf. <i>chapmani</i> ,	Late Thanetian - Early Ypresian	P4c-P6

	Depositional environment (FZ:3) <i>Toe of slope</i>	<i>Morozovella occlusa</i> , <i>Morozovella</i> sp.		
M20	Pelagic lime mudstone/wackestone with planktonic foraminifera and a few scattered transported benthic foraminifera. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>Discocyclusa</i> sp., <i>A. esnaensis</i> , <i>M. angulata</i> , <i>M. velascoensis</i> , <i>A. coalingsensis</i> , <i>P. chapmani</i> , <i>Igorina albeani</i>	Paleocene (Late Thanetian)	P4c-P5a
M21	Pelagic lime mudstone /wackestone with planktonic foraminifera. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>P. pseudomenardi</i> , <i>Acarinina subsphaerica</i> , <i>Acarinina primitiva</i> , <i>M. cf. aequa</i> , <i>Subbotina</i> sp.	Paleocene (Thanetian)	P4c
M22	Pelagic lime mudstone /wackestone with planktonic foraminifera. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>A. cf. esnaensis</i>		
KM1	Pelagic lime/wackestone with planktonic foraminifera, a "flow of packstone" of planktonic foraminifera SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>Acarinina pentacamerata</i> , <i>Acarinina bulbrooki</i> , <i>T. frontosa</i> , <i>Globigerinatheca</i> sp.	Lutetian	
KM2	Pelagic wackestone/packstone with planktonic foraminifera and some scattered benthic foraminifera (Maybe transported). Some of them are recrystallized SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>Acarinina pseudotopilensis</i> , <i>Turbototalia increbescens</i> , <i>I. broedermanni</i> , <i>Globigerinatheca</i> sp., <i>Morozovella</i> sp., <i>Discocyclusa</i> sp.	Lutetian	
KM3	Pelagic wackestone with planktonic foraminifera with some scattered benthic foraminifera some of them are recrystallized SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>Nummulites</i> sp., <i>A. strabocella</i> , <i>Acarinina soldadoensis</i> , <i>A. primitiva</i> , <i>A. bulbrooki</i> , <i>A. cf. coalingsensis</i> , <i>Morozovella formosa</i> , <i>Catapsydrax</i> sp.	Ypresian	P6b
KM4	Pelagic wackestone with planktonic foraminifera with some scattered benthic foraminifera some of them are recrystallized (Nummulites). Contains a little more mudstone than KM3 and we observe a flow SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>			
KM5	Pelagic wackestone with planktonic foraminifera. Some planktonic foraminifera are recrystallized. Some scattered benthic foraminifera have been observed as well as calcite veins and stylolites. SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>A. esnaensis</i> ? <i>A. pseudotopilensis</i> , <i>Acarinina primitiva</i> , <i>P. chapmani</i> , <i>Subbotina cf. triangularis</i>	Ypresian	P6
KM7	Microbreccia bioclastic packstone with planktonic foraminifera, benthic foraminifera, Miliolidae, (debris), debris from Bivalves. Most of the microfossils are recrystallized. High energy SMF4 Depositional environment: (FZ:4) <i>Slope</i>	Miliolidae <i>Discocyclusa</i> sp., <i>P. pseudomenardi</i> , <i>M. angulata</i>	Thanetian	P4
KM6	Wackestone with planktonic foraminifera. Most of the planktonic foraminifera are recrystallized SMF3 Depositional environment: (FZ:3) <i>Toe of slope</i>	<i>M. angulata</i> , <i>M. occlusa</i> , <i>M. aequa</i> , <i>M. velascoensis</i> , <i>Morozovella conicotruncata</i> , <i>A. esnaensis</i> , <i>G. planoconica</i> , <i>P. chapmani</i>	Thanetian	P4c-P5a
KM8	Microbreccia bioclastic packstone with planktonic foraminifera and scattered benthic foraminifera. Most of the planktonic foraminifera are recrystallized. Calcite veins SMF4 Depositional environment (FZ:4) <i>Slope</i>	<i>Quinqueloculina</i> sp., <i>Discocyclusa</i> sp., <i>Nummulites</i> sp., <i>M. angulata</i> , <i>Igorina</i> sp., <i>S. triangularis</i> , <i>A. subsphaerica</i>	Selandian - Thanetian	
KM9	Microbreccia bioclastic packstone with benthic foraminifera (many of them are recrystallized) and planktonic foraminifera. Only a few planktonic foraminifera. SMF4 Depositional environment (FZ:4) <i>Slope</i>	<i>Quinqueloculina</i> sp., <i>Discocyclusa</i> sp., <i>Alveolina</i> sp., <i>Assilina</i> sp., <i>Nummulites</i> sp., <i>Asterocyclusa</i> sp., <i>Parasubbotina varianta</i>	Thanetian	
KM10	Microbreccia bioclastic Wackestone/packstone with planktonic foraminifera. Scattered benthic foraminifera were transported and recrystallized. Densely packed planktonic foraminifera. SMF4	<i>M. occlusa</i> , <i>M. aequa</i> , <i>Igorina albeani</i> , <i>Subbotina velascoensis</i>	Thanetian	P4c

Depositional environment (FZ:4) Slope				
KM11	Pelagic limestone wackestone/mudstone with very small planktonic foraminifera which are recrystallized, and very big calcite veins. Low energy environment. SMF3	<i>S. triangularis</i> <i>S. velascoensis</i> <i>A. esnaensis</i>	Thanetian	
Depositional environment (FZ:3) Toe of slope				
KM12	Microbreccia bioclastic Wackestone/packstone with planktonic foraminifera and scattered benthic foraminifera (miliolidae) (recrystallized), micritic clasts transported, debris of bioclasts and ooids. SMF4	Miliolidae, <i>Discocyclina</i> sp., <i>Lokhartia</i> sp., <i>S. triloculinoides</i> , <i>P. varianta</i> , Algae?	Selandian - Thanetian	
Depositional environment (FZ4) Slope				
KM13	Pelagic lime wackestone with planktonic recrystallized microfossils (very small planktonic foraminifera) and many debris from planktonic foraminifera. Mudcracks SMF3	<i>M. angulata</i>	Selandian - Thanetian	
Depositional environment (FZ:3) Toe of slope				
KM14	Microbreccia bioclastic packstone with scattered planktonic foraminifera, micritic clasts (maybe extracasts), and benthic scattered foraminifera recrystallized (the whole section looks like recrystallized). SMF4			
Depositional environment: (FZ:4) Slope				
KM15	Allochthonous and autochthonous deep water sedimentation (It seems there are two facies). Microbreccia, bioclastic-lithoclastic packstone/rudstone, consisting of grains of various origins. We are adjacent to reef/forereef and reef slopes. Chaotic fabric and packstone. Recrystallized planktonic foraminifera, micritic clasts, big extracasts like maybe from a platform (peloids with Miliolidae. mollusk debris, Pisoids. The main matrix is packstone with planktonic foraminifera. SMF5	Miliolidae, <i>Quiqueloculina</i> sp., <i>Discocyclina</i> sp., <i>I. albeari</i> , <i>M. velascoensis</i>	Selandian - Thanetian	P4
Depositional environment (FZ: 4) Slope				
KM16	Microbreccia bioclasts-lithoclasts packstone with planktonic foraminifera and scattered recrystallized benthic foraminifera, small micritic clasts, clasts with ooids. SMF4	<i>Discoocyclina</i> sp., <i>Pseudo-menardella ehrenbergi</i> , <i>Igorina pusilla</i> , <i>Miscellanea miscella</i> , <i>Morozovella conicotruncana</i>	Selandian	P3b
Depositional environment (FZ:4) Slope				
KM17	Allochthonous bioclastic breccia consists of grains of various origins. Chaotic fabric. Adjacent to a reef, forereef (reef slope). Rudist fragments, extracasts with peloids and Miliolidae, extracasts with ooids. The main matrix is wackestone/packstone with planktonic foraminifera. SMF4-5	Miliolidae, <i>Orbitoides media</i> , <i>Alanlordella</i> sp.	Campanian - Maastrichtian	
Depositional environment FZ:4 Slope				
KM:18	Wackestone with very small planktonic foraminifera. All are recrystallized. Bioturbation of planktonic foraminifera SMF3			
Depositional environment (FZ:3) Toe of slope				
KM:19	Allochthonous bioclastic rudstone/packstone breccia. Main matrix wackestone with planktonic foraminifera. Blocky cement. Calcite cement consists of medium to coarse-grained crystals without a preferred orientation. Characterized by variously sized crystals. Micritic clasts. Sparite network. Mud-supported. Debris of bioclasts (bivalves) derived from the platform. SMF4	Rudist fragments, <i>O. media</i> , <i>?Rugoglobigerina</i> sp	Campanian - Maastrichtian	
Depositional environment (FZ:4) Slope				
KM:20	Microbreccia bioclastic packstone with pelagic foraminifera, wackestone, mud cracks, calcite veins. Two facies (like two environments) A) Pelagic foraminifera wackestone, many of them are recrystallized, and some scattered benthic foraminifera. B) Microsparite and microbreccia lithoclastic packstone with extracasts and benthic foraminifera SMF4	Miliolidae		
Depositional environment (FZ:4) Slope				



KM:21	Two facies A) Main matrix sparite (Biosparite) or grainstone with small bioclasts some scattered benthic foraminifera, debris from bivalves. B) (small ) Non-laminated peloidal packstone with fenestral caves and few scattered benthic foraminifera, Rudist fragments SMF4 Depositional environment (FZ:4) <i>Slope</i>	Rudist fragments	
KM:22	Allochthonous packstone and rudstone/floatstone. Breccia. Two facies A) Packstone with peloids and scattered benthic foraminifera. Calcite cement, debris from bivalves. The main matrix wackestone with planktonic foraminifera and scattered benthic foraminifera, and small debris of Rudists. Breccia mass flow, big extraclasts: grainstone with pisoids and aggregate grains interrupted by calcite veins, hard ground. B) Wackestone with planktonic foraminifera and scattered benthic foraminifera, scattered bivalves, small Rudist debris. Cracks filled with calcite represent the youngest tectonic events. A mixture of allochthonous and autochthonous sediments. SMF4-5 Depositional environment FZ:4 <i>Slope</i>	Algae, <i>Thaumatoporella</i> sp. <i>Rugoglobigerina</i> sp.	Campanian - Maastrichtian
KM:23A	Allochthonous bioclastic packstone /floatstone breccia. Fine-grained breccias consist of grains of various origins. Polymict clast supported microbreccia. Main matrix wackestone/packstone with planktonic foraminifera and scattered debris of bivalves, the planktonic foraminifera are recrystallized. Extraclasts: Wackestone with Miliolidae, floatstone with recrystallized <i>Orbitoides</i> . Another extraclasts area: grainstone with aggregate grainstone and peloids, smooth lamination. SMF5 Depositional environment (FZ:4) <i>Slope</i>	Miliolidae, <i>Orbitoides</i> sp., <i>Globotruncana dubleubei</i> , <i>Con-tusotruncana fornicate</i> , <i>Rugoglobigerina</i> sp., <i>Heterohelix</i> sp., Algae	Maastrichtian
KM:23B	Allochthonous bioclastic packstone /floatstone breccia consisting of reef-derived material. Chaotic fabric and packstone texture of matrix. Calcite veins filled with sparite. Porosity developed through early vadose leaching of skeletal grains and dissolution of parts of matrix combined with fracturing and brecciation. The main matrix is wackestone with recrystallized planktonic foraminifera. Extraclasts: grainstone with aggregate grains, debris of bivalves and Mollusk, cherts grains, and grainstone with Miliolidae SMF5 Depositional environment (FZ:4) <i>Slope</i>	Miliolidae, <i>Orbitoides</i> sp., <i>Globotruncana rosetta</i> <i>Con-tusotruncana contusa</i>	Maastrichtian 2-3
KM:24	Microbreccia, bioclastic-lithoclastic packstone. The main matrix consists of microsparite with a few scattered planktonic foraminifera and transported debris of benthic foraminifera, some small debris of bivalves, and micritic clasts. It seems that it is recrystallized. SMF4 Depositional environment (FZ:4) <i>Slope</i>	<i>Rugoglobigerina</i> sp.	Campanian - Maastrichtian
KM:25	Mudstone/wackestone with very small planktonic foraminifera Bioturbation, the flow of very small planktonic foraminifera. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>		
KM:26	Allochthonous microbreccia, bioclastic packstone, main matrix wackestone with planktonic foraminifera which are recrystallized. Scattered recrystallized benthic foraminifera and scattered fragments of bivalves and Mollusks. Polymict clast supported microbreccia. Bioturbation of small planktonic foraminifera which all are recrystallized. SMF4-5 Depositional environment:(FZ:4) <i>Slope</i>	<i>Globotruncana aegyptiaca</i> <i>Globotruncanita stuarti</i> <i>Abathomphalus mayaroensis</i>	Maastrichtian 2-3
K1	Allochthonous bioclastic packstone /floatstone breccia. The majority of the thin section consisting of sparite. The other	Radiolaria, Rudist fragments	

	part is polymict clast-supported microbreccia including planktonic foraminifera, radiolaria micritic clasts, Miliolidae, Rudist fragments, extarclasts of grainstone with very big pisoids and ooids SMF5 Depositional environment (FZ:4) <i>Slope</i>		
K2	Microbreccia bioclastic packstone. Rudist fragments. The main matrix is wackestone with planktonic foraminifera and debris maybe from reef derived bioclasts. Scattered miliolidae, micritic extraclasts. Calcite veins, extraclasts packstone with benthic foraminifera (Miliolidae and peloids). The planktonic foraminifera are recrystallized. Pisoids and fenestral caves filled with sparite. SMF4-5 Depositional environment (FZ:4) <i>Slope</i>	Miliolidae <i>G. stuarti</i> <i>Euglobigerina</i> sp.	Late Campanian - Maastrichtian
K3	Allochthonous bioclastic packstone /floatstone breccia. The main matrix is packstone with planktonic foraminifera, Rudist debris, fenestral caves with calcite cement. Extraclasts: fragments of bivalves and Mollusks, also extraclasts of grainstone with benthic foraminifera (Miliolidae), peloids and bioclastic grainstone, grainstone of ooids. Debris of Rudists. Reef-derived organisms. SMF5 Depositional environment (FZ:4) <i>Slope</i>	<i>Quiqueloculina</i> , <i>Triloculina</i> , Algae Coral? Bryozoa? <i>Globotruncana falsostuarti</i> <i>Globotruncanita stuarti</i>	Late Campanian - Maastrichtian
K4	Allochthonous bioclastic packstone /floatstone breccia. The main matrix is wackestone with recrystallized planktonic foraminifera. Big extraclasts: coated bioclastic grainstone, grainstone with peloids and benthic foraminifera, and grainstone with ooids and pisoids. Rudist fragments, Miliolidae, recrystallized planktonic foraminifera, and calcite veins. SMF5 Depositional environment (FZ:4) <i>Slope</i>	Miliolidae, <i>Quiqueloculina</i> sp.	
K5	Smooth lamination. Packstone with planktonic foraminifera which most of which are recrystallized. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>		
K6	Polymict clast-supported microbreccia, consisting of carbonate litho and bioclasts and quartz grains, fragments of bivalves and mollusks? And few scattered benthic foraminifera? Main matrix wackestone with Planktonic foraminifera SMF4 Depositional environment (FZ:4) <i>Slope</i>	<i>Globotruncana arca</i> <i>Globotruncana linneiana</i>	Campanian - Maastrichtian
K7 K8	Allochthonous polymict clast-supported bioclastic packstone /floatstone microbreccia. Many reef derived organisms like large Rudist fragments, micritic clasts with algae? Extraclasts: grainstone with coated grain and onchoids big microsparite clasts, encrusting clasts, extraclasts with very few benthic foraminifera. Recrystallization SMF4-5 Depositional environment (FZ:4) <i>Slope</i>	? <i>Globotruncana ventricosa</i>	Campanian - Maastrichtian
K17	Allochthonous bioclastic breccia. Densely packed fossil fragments with a high percentage of reef derived organisms. Burrow clasts (bioturbation), extraclasts of wackestone with Miliolidae. The main matrix: wackestone with very small planktonic foraminifera SMF4-5 Depositional environment (FZ:4) <i>Slope</i>	Algae, Miliolidae <i>Orbitoides</i> <i>Archaeoglobigerina</i> sp. <i>Globotruncanita pettersi</i>	Maastrichtian
K16	Mudstone/wackestone with very small planktonic microfossils and crosscutting mud cracks and stylolite may be by pressure. Calcite veins. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>		
K15	Mudstone/wackestone with planktonic microfossils which are recrystallized. Calcite veins (mud cracks) SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>		

K15B	Mudstone/ wackestone with very small planktonic microfossils. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>		
K14	Polymict clast-supported microbreccia consisting of carbonate litho and bioclasts. The main matrix consists of packstone with planktonic foraminifera. SMF3-4 Depositional environment (FZ:3) <i>Toe of slope</i>	<i>Alanlordiella</i> sp., <i>Globotruncana esnehansis</i> , <i>G. falsostuarti</i> , <i>Globotruncana linneina</i>	Early Maastrichtian
K13	Polymict clast-supported microbreccia consisting of carbonate litho and bioclasts as well as micritic intraclasts. The main matrix consists of packstone with planktonic foraminifera (most of them recrystallized). SMF4 Depositional environment (FZ:4) <i>Toe of slope</i>	<i>Textularia</i> sp., <i>Globotruncana bulloides</i> , <i>G. falsostuarti</i> , <i>G. arca</i> , <i>A. mayaroensis</i> ,	Maastrichtian
K12	Polymict clast supported microbreccia consisting of carbonate litho and bioclast. Scattered planktonic foraminifera and scattered benthic foraminifera. SMF4 Depositional environment (FZ:4) <i>Slope</i>	<i>A. mayaroensis</i> , algae	Early Maastrichtian
K11	Packstone with planktonic foraminifera which are recrystallized. Burrowed bioclastic wackestone with abundant very small planktonic foraminifera and radiolaria. Microfracture. Smooth lamination. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	Radiolaria	
K10	Pelagic foraminifera wackestone with radiolaria. Smooth flow of planktonic microfossils. SMF3 Depositional environment (FZ:3) <i>Toe of slope</i>	Radiolaria, Spumellaria	
K9	Mudstone/wackestone with planktonic microfossils and radiolaria (very small planktonic foraminifera) SMF3 Depositional environment <i>FZ:3 Toe of slope</i>		