

**Table 3: Palynologic assemblages in the Amiran foreland basin (NE Zagros, Iran)**

Total number of samples analysed: 54

**Section: Amiran**

**Summarised stratigraphy (interpreted)**

SH-2	-	SH-2	Early Eocene (Ypresian)
SH-1	-	SH-1	Indeterminate

Sample	Level in section (m)	Analysis	Age	Biozone	Formation	Palaeoenvironment	Biostratigraphy comments
SH-2-110607-1	1196	P	earliest Eocene (Ypresian)	TP 13b	Kashkan	Inner to middle neritic	<b>P:</b> <i>Apectodinium augustum</i> , <i>Thalassiphora pelagica</i> <b>PF:</b> Poor to very poor OM, type M2(3)s
SH-1-110607-1	1105	P	Indeterminate	Indet	Kashkan	Terrestrial	<b>P:</b> No age diagnostic forms, long-ranging sporomorphs only. <b>PF:</b> Moderate OM, type T2(3)

Total number of samples analysed: 2

**Section: SW Sultan**

**Summarised stratigraphy (interpreted)**

SH-23	-	SH-16	Indeterminate
SH-15	-	SH-15	Middle Eocene (Lutetian) to Early Eocene (Ypresian)
SH-13	-	SH-22	Indeterminate
SH-20	-	SH-17	Early Eocene (Ypresian)

Sample	Level in section (m)	Analysis	Age	Biozone	Formation	Palaeoenvironment	Biostratigraphy comments
SH-23-210607-1	1429	P	Indeterminate	Unassigned	Shahbazan - Asmari	Continental?	<b>P:</b> No age diagnostic forms. <b>PF:</b> Poor OM, type T5(3)b. May be modern contaminant.

SH-16-210607-1	1298	P	Indeterminate	Unassigned	Kashkan	Continental?	P: No age diagnostic forms PF: Moderate to good OM, type T?2
SH-15-210607-2	1278	P	Middle Eocene (Lutetian) to Early Eocene (Ypresian)	TP 12c - 13a	Kashkan	Inner neritic	P: <i>Apectodinium homomorphum</i> , <i>Cordosphaeridium inodes</i> PF: Very poor OM, type M2
SH-13-210607-2	1258	P	Indeterminate	Unassigned	Kashkan	Continental?	P: No age diagnostic forms PF: Poor to moderate OM, type T2
SH-28-170607-1	1249.5	P	Indeterminate	Unassigned	Kashkan	Continental?	P: No age diagnostic forms PF: Poor OM, Type T2s, + modern contamination
SH-24-170607-1	1156	P	Indeterminate	Indeterminate	Kashkan	Indeterminate	P: Barren. PF: Poor OM, mostly small P4.
SH-22-170607-1	1132	P	Indeterminate	Unassigned	Kashkan	Transitional (brackish)	P: No age diagnostic forms PF: Poor OM, type BM2(3), may be mostly modern contaminant
SH-20-170607-2	1103.5	P	Early Eocene, (Ypresian)	TP 13a	Kashkan	Inner neritic	P: <i>Apectodinium paniculatum</i> , <i>A. homomorphum</i> , <i>A. quinquelatum</i> , <i>Diphyes colligerum</i> . PF: Moderate to good OM, type M2s
SH-17-170607-4	1097.5	P	Indeterminate	Unassigned	Taleh Zang	Continental?	P: No age diagnostic forms. PF: Poor OM, type T?1/2.
SH-05-170607-2	953	P	Early Eocene, (Ypresian)	TP 13a	Taleh Zang	Inner neritic	P: <i>Apectodinium paniculatum</i> , <i>Thalassiphora patula</i> . PF: Good OM, type M2.
SH-12-160607-2	875.5	P	Late Eocene (Priabonian) to Early Eocene (Ypresian)	TP 12 - 13	Amiran	Inner neritic	P: <i>Cordosphaeridium inodes</i> . PF: Good OM, type M2.
SH-09-160607-3	815	P	Late Eocene (Priabonian) to Early Eocene (Ypresian)	TP 12 - 13	Amiran	Inner neritic	P: <i>Cordosphaeridium inodes</i> , <i>Charlesdowniea tenuivirgula</i> . PF: Good OM, type M2
SH-07-170607-3	770	P	Early Oligocene to Early Eocene (Ypresian)	TP 9 - 13	Amiran	Transitional (brackish)	P: <i>Cordosphaeridium gracile</i> . PF: Poor - very poor OM, type MB3(5). May be mostly modern contaminant.
SH-05-160607-3	744.5	P	Indeterminate	Unassigned	Amiran	Continental?	P: No age diagnostic forms. PF: Good OM, type T?2.
SH-1-160607-2	553	P	Indeterminate	Unassigned	Amiran	Inner neritic	P: No age diagnostic forms. PF: Poor to moderate OM, type M2s.
SH-12-150607-2	414	P	Indeterminate	Unassigned	Amiran	Continental?	P: No age diagnostic forms. PF: Poor to moderate OM, type T?2.
SH-9-160607-2	393	P	Indeterminate	Unassigned	Amiran	Indeterminate	P: No age diagnostic forms. PF: Good OM, mostly P4, type (TB?)2.
SH-06-150607-2	370	P	Late Eocene (Priabonian) to Early Eocene (Ypresian)	TP 12 - 13	Amiran	Inner to middle neritic	P: <i>Cordosphaeridium inodes</i> , <i>Phthanoperidinium</i> spp. PF: Good OM, type M2(3).

SH-03-150607-1	340	P	Late Eocene (Priabonian) to Early Eocene (Ypresian)	TP 12-13	Amiran	Inner neritic	<b>P:</b> <i>Areoligera</i> sp., stratigraphical position. <b>PF:</b> Moderate to good OM, type M2
SH-23-140607-2	330	P	Early Eocene (Ypresian)	TP13b	Amiran	Inner to middle neritic	<b>P:</b> <i>Apectodinium quinquelatum</i> , <i>A. paniculatum</i> , <i>A. homomorphum</i> . <b>PF:</b> Good OM, type M2(3).
SH-20-140607-1	299	P	Early Miocene to Eocene	TP 6b - 13	Amiran	Transitional (brackish)	<b>P:</b> <i>Homotryblum tenuispinosum</i> . <b>PF:</b> Moderate OM, type MB3b. May be mostly modern contaminant.
SH-16-140607-2	270	P	Early Eocene (Ypresian)	TP13b	Amiran	Inner to middle neritic	<b>P:</b> <i>Apectodinium paniculatum</i> , <i>A. homomorphum</i> , <i>A. quinquelatum</i> , <i>Adnatosphaeridium robustum</i> , <i>Homotryblum tenuispinosum</i> , <i>Diphyes colligerum</i> . <b>PF:</b> Good OM, type M3(2)
SH-14-140607-2	255	P	Early Eocene (Ypresian)	TP13b	Amiran	Inner neritic	<b>P:</b> <i>Apectodinium quinquelatum</i> . <b>PF:</b> Good OM, type M2.
SH-11-140607-2	229	P	Early Eocene (Ypresian)	TP13b	Amiran	Inner to middle neritic	<b>P:</b> <i>Apectodinium homomorphum</i> , <i>Adnatosphaeridium robustum</i> , <i>Perfotricolpites digitatus</i> , stratigraphical position. <b>PF:</b> Good OM, type M2(3).
SH-08-140607-2	200	P	Early Eocene (Ypresian)	TP13b	Amiran	Inner to middle neritic  some restriction	<b>P:</b> <i>Spiniferites septatus</i> , <i>Phthanoperidinium amoenum</i> , <i>P. comatum</i> , <i>Adnatosphaeridium robustum</i> , <i>Areoligera coronata</i> ; stratigraphical position. <b>PF:</b> Good OM, type M3(5)b.
SH-05-140607-3	177	P	Indeterminate	Unassigned	Amiran	Transitional (brackish)	<b>P:</b> No age diagnostic forms. <b>PF:</b> Poor OM, type B2.
SH-22-130607-2	149	P	Early Eocene (Ypresian)	TP13b	Amiran	Inner - Middle Neritic	<b>P:</b> <i>Apectodinium paniculatum</i> , <i>A. quinquelatum</i> , <i>Adnatosphaeridium vittatum</i> . <b>PF:</b> Good recovery, type M2(3).
SH-19-130607-6	129	P	Late Eocene (Priabonian) to Early Eocene (Ypresian)	TP 12 - 13	Amiran	Indeterminate	<b>P:</b> Based on stratigraphical position. <b>PF:</b> Good OM, type (M?)2
SH-17-130607-2	104	P	Early Eocene (Ypresian)	TP13b	Amiran	Inner - Middle Neritic	<b>P:</b> <i>Homotryblum tenuispinosum</i> , <i>Diphyes colligerum</i> , <i>Systematophora placacantha</i> , <i>Systematophora placacantha</i> , <i>Adnatosphaeridium vittatum</i> , stratigraphical position (early Ypresian above) <b>PF:</b> Good recovery; type M2(3).

Total number of samples analysed: 29

Section: NE Rit

Summarised stratigraphy (interpreted)			
SH-07	-	SH-07	No younger than Middle Eocene (Lutetian)
SH-10	-	SH-10	Middle Eocene (Lutetian) to Early Eocene (Ypresian)
SH-15	-	SH-18	Early Eocene (Ypresian)

Sample	Level in section (m)	Analysis	Age	Biozone	Formation	Palaeoenvironment	Biostratigraphy comments
SH-07-180607-1	1122	P	No younger than Middle Eocene (Lutetian)	TP 12b (or older?)	Kashkan	Inner neritic	<b>P:</b> <i>Areoligera senonensis</i> . <b>PF:</b> Poor to very poor OM, type M2s.
SH-10-180607-1	841	P	Middle (Lutetian) to Early Eocene (Ypresian)	TP 12b - 13a	Kashkan	Inner neritic	<b>P:</b> <i>Melitasphaeridium pseudorecurvatum</i> , <i>Apectodinium homomorphum</i> . <b>PF:</b> Very poor OM, type M2s.
SH-15-180607-2	578	P	Early Eocene	TP 13b-13a	Amiran	Middle neritic	<i>Adnatosphaeridium vittatum</i> , <i>Systematophora placacantha</i> , <i>Homotryblum tenuispinosum</i> . <b>PF:</b> Good OM, type M3.
SH-16-180607-2	531	P	Early Eocene	TP 13b-a	Amiran	Inner to middle neritic	<b>P:</b> <i>Glaphrocysta ordinata</i> , <i>Homotryblum tenuispinosum</i> , <i>Adnatosphaeridium vittatum</i> , <i>Perforicolpites digitatus</i> . <b>PF:</b> Moderate OM, type M3(2).
SH-17-180607-2	351	P	Middle Eocene (Lutetian) to Early Eocene (Ypresian)	TP 12b-13a	Amiran	Inner neritic	<b>P:</b> <i>Adnatosphaeridium vittatum</i> , <i>Melitasphaeridium pseudorecurvatum</i> . <b>PF:</b> Good OM, type M2.
SH-18-180607-2	91	P	Middle Eocene (Lutetian) to Early Eocene (Ypresian)	TP 12-13	Amiran	Inner to middle neritic	<b>P:</b> <i>Lentinia wetzeli</i> . <b>PF:</b> Good OM, type M3(2).

Total number of samples analysed: 6

Section: SW Rit

Summarised stratigraphy (interpreted)			
SH-9	-	SH-3	Early Eocene (Ypresian)

Sample	Level in	Analysis	Age	Biozone	Formation	Palaeoenvironment	Biostratigraphy comments
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	<b>section (m)</b>						
SH-9-220607-2	408	P	Early Eocene (Ypresian)	TP 13b	Amiran	Middle neritic	<b>P:</b> <i>Apectodinium paniculatum</i> , <i>A. parvum</i> , <i>A. homomorphum</i> , <i>Adnatosphaeridium vittatum</i> , <i>Homotryblium tenuispinosum</i> <b>PF:</b> Good OM, type M3
SH-8-220607-2	289	P	Early Eocene, (Ypresian)	TP 13b	Amiran	Middle neritic	<b>P:</b> <i>Apectodinium quinquelatum</i> , <i>Hystrichosphaeridium tubiferum</i> , <i>Adnatosphaeridium vittatum</i> , <i>A. multispinosum</i> , <i>Homotryblium tenuispinosum</i> , <i>Systematophora placacantha</i> . <b>PF:</b> Good OM, type M3
SH-6-220607-2	216	P	Early Eocene, (Ypresian)	TP 13b	Amiran	Inner to middle neritic	<b>P:</b> <i>Apectodinium paniculatum</i> , <i>A. quinquelatum</i> , <i>Adnatosphaeridium robustum</i> , <i>Homotryblium tenuispinosum</i> , <i>Perforicolpites digitatus</i> <b>PF:</b> Good OM, type M2(3)
SH-4-220607-1	135	P	Middle Eocene (Lutetian) to Early Eocene (Ypresian)	TP 12b-13b	Amiran	Middle neritic	<b>P:</b> <i>Adnatosphaeridium robustum</i> , <i>Homotryblium tenuispinosum</i> <b>PF:</b> Good OM, type M3
SH-14-120607-3	130	P	Indeterminate	Indet	Amiran	Continental - Transitional	<b>P:</b> No age diagnostic forms <b>PF:</b> Good OM, type BT3
SH-14-120607-2	129	P	Middle Eocene (Lutetian) to Late Palaeocene	TP 12c-14	Amiran	Inner - Middle Neritic	<b>P:</b> <i>Apectodinium homomorphum</i> . <b>PF:</b> Good recovery; type M2(3)
SH-3-220607-1	64	P	Early Eocene (Ypresian)	TP 13b	Amiran	Middle neritic	<b>P:</b> <i>Retidiporites magdalensis</i> (sporomorph), <i>Homotryblium tenuispinosum</i> , <i>Adnatosphaeridium vittatum</i> , <i>Apectodinium homomorphum</i> , <i>Cerodinium wardense</i> <b>PF:</b> Very good OM, type M3
SH-2-230607-2	15	P	Early Eocene (Ypresian)	TP 13	Amiran	Inner neritic	<b>P:</b> <i>Adnatosphaeridium vittatum</i> , <i>Systematophora placacantha</i> , stratigraphic position <b>PF:</b> Good OM, type M2
SH-1-230607-2	5	P	Early Eocene, (Early Ypresian)	TP 13a	Amiran	Inner neritic	<b>P:</b> <i>Apectodinium paniculatum</i> , <i>A. quinquelatum</i> , <i>Hystrichosphaeridium tubiferum</i> , <i>Adnatosphaeridium vittatum</i> , <i>Diphyes colligerum</i> . <b>PF:</b> Moderate OM, type M2
SH-3-230607-2	2	P	Early Eocene (Ypresian)	TP 13	Purple Shales	Inner to middle neritic	<b>P:</b> <i>Hystrichosphaeridium tubiferum</i> , <i>Cerodinium speciosum</i> , <i>Deflandrea denticulata</i> , <i>Wetzeliella articulata</i> , <i>Hystrichokolpoma rigaudiae</i> , <i>Adnatosphaeridium vittatum</i> <b>PF:</b> Good OM, type M2(3)d

**Total number of samples analysed:** 10

**Section:** NE Chenareh

Summarised stratigraphy (interpreted)			
SH-12	-	SH-3	Indeterminate
SH-2	-	SH-2	Middle Eocene (Lutetian ) to Early Eocene (Ypresian)
SH-18	-	SH-14	Early Eocene (Ypresian)
SH-4	-	SH-4	earliest Eocene (Ypresian) - latest Palaeocene (Thanetian)

Sample	Level in section (m)	Analysis	Age	Biozone	Formation	Palaeoenvironment	Biostratigraphy comments
SH-12-200607-2	581.5	P	Indeterminate	Indeterminate	Taleh Zang - Kashkan	Indeterminate	<b>P:</b> Barren <b>PF:</b> Good OM, Mostly P4, type 2
SH-3-200607-2	455	P	Indeterminate	Unassigned	Amiran	Inner to middle neritic	<b>P:</b> No age diagnostic forms <b>PF:</b> Moderate OM, type M2(3)
SH-2-200607-4	311	P	Middle Eocene (Lutetian) to Early Eocene (Ypreian)	TP 12b - 13a	Amiran	Inner to middle neritic	<b>P:</b> <i>Homotryblium tenuispinosum</i> , <i>Adnatosphaeridium vittatum</i> , <i>Phthanoperidinium amoenum</i> , <i>P. levimurum</i> , <i>Areoligera senonensis</i> , <i>Glaphyrocysta ordinata</i> <b>PF:</b> Poor to moderate OM, type M2(3)s
SH-18-190607-2	296	P	Early Eocene (Early Ypresian)	TP 13a	Amiran	Middle neritic	<b>P:</b> <i>Apectodinium quinquelatum</i> , <i>A. homomorphum</i> , <i>Thalassiphora patula</i> , <i>T. pelagica</i> , <i>Homotryblium tenuispinosum</i> , <i>Adnatosphaeridium vittatum</i> <b>PF:</b> Good OM, type M3
SH-17-190607-2	280	P	Early Eocene (Early Ypresian)	TP 13a	Amiran	Inner to middle neritic	<b>P:</b> <i>Apectodinium hyperacanthum</i> , <i>A. quinquelatum</i> , <i>Thalassiphora pelagica</i> , <i>Dracodinium simile</i> , <i>Homotryblium tenuispinosum</i> , <i>Hystrichokolpoma cinctum</i> , <i>Wetzeliella articulata</i> <b>PF:</b> Good OM, type M3(2)
SH-14-190607-2	181	P	Middle Eocene (Lutetian) to Early Eocene (Ypresian)	TP 12b-13b	Amiran	Inner neritic	<b>P:</b> <i>Adnatosphaeridium vittatum</i> <b>PF:</b> Poor OM, type M2
SH-4-190607-2	20	P	earliest Eocene to latest Palaeocene	TP 13b -14	Amiran	Inner to middle neritic	<b>P:</b> <i>Apectodinium paniculatum</i> , <i>A. quinquelatum</i> <b>PF:</b> Moderate OM, type M2(3)

Total number of samples analysed: 7