Biogeosciences

Supporting Information for

Ecological response to collapse of the biological pump following the mass extinction at the Cretaceous-Paleogene boundary

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Introduction

Supporting information includes additional information about the use of hexaperidinioids as a qualitative proxy for nutrient availibility (Text S1) and a detailed description of the procedures followed to arrive at estimated benthic foraminiferal accumulation rates and dinocyst accumulation rates for the Cretaceous-Paleogene boundary interval of the Okçular section, Turkey (Text S2). Supporting information also includes photo plates of the most common benthic foraminiferal taxa (Figures S2 and S3). Datasets provide benthic foraminiferal and dinocyst counts (Data Sets S1 and S2). Details of the analyses are explained in the Materials and Methods section in the main article.

Text S1.

Previous studies have shown that in the Tethys in particular the hexaperidinioids show strong variations across the K-Pg boundary (Brinkhuis et al., 1998; Vellekoop et al., 2015). Based on statistical correlations between palynological records and other paleo-proxies, it has been suggested that this inferred heterotrophic group is indicative of high nutrient availability and/or low salinities. (Eshet et al., 1994; Brinkhuis et al,. 1998; Sluijs and Brinkhuis, 2009). Therefore, high abundances of this morphological group can be related to changes in trophic condition as well as to changes in salinity. Since the Okçular section is deposited at outer neritic to upper bathyal depths, this locality probably represents a relatively distal setting, with little freshwater input. Therefore, changes in relative abundances of hexaperidinioids are more likely to reflect changes in nutrient availability rather than changes in salinity. To nevertheless exclude the possibility that the signals in the palynological record can be attributed to changes in freshwater input, we tested for a significant correlation between relative abundances of hexaperidinioids and relative abundances of terrestrial palynomorphs. Pollen and spores are land-derived and can therefore be regarded as a proxy for the input of terrestrial-derived material. Since a hypothetical decrease in salinity would most likely be associated with increased riverine input, the input of terrestrial-derived material is expected to increase with decreasing salinity.

Our correlation shows that there is no significant relationship between the relative abundances of hexaperidinioids and the relative abundances of terrestrial palynomorphs, $r(31) = 0.0089$, $p > 0.05$ (Figure S1). Therefore, in this study, high abundances of hexaperidinioids are considered indicative of high nutrient availability in the upper water column, instead increased freshwater input.

Text S2.

To estimate the Benthic Foraminiferal Accumulation Rate (BFAR, number of foraminifera per cm^2 per kyr), the number of benthic foraminifera (>63μm) per gram were calculated. In the foraminiferal records of the Mudurnu-Göynük Basin there is a decrease in numbers of benthic foraminifera across the K-Pg boundary, from 600-1100 foraminifera/gram in the Maastrichtian to lowermost Danian values of 150-750 foraminifera/gram. Using the estimated sedimentation rates for the studied interval based on the biostratigraphic age model of Açikalin et al. (2015) and the estimated average density for the lithologies of the Tarakli Fm (2.5 g/cm^3; Manger et al., 1963) the concentrations of foraminifera may be used to estimate the BFAR. The resulting estimated BFAR record shows a drastic decrease across the K-Pg boundary, from 2500-7000 foraminifera/cm^2/kyr in the latest Cretaceous to 225-700 foraminifera/cm^2/kyr in the earliest Paleocene. The benthic foraminiferal accumulation rate does not fully recover until Zone P1b.

To estimate the dinocyst accumulation rates, here defined as the preserved cysts that accumulated per cm^2 sea floor per kyr, the dinocyst concentrations in cysts per gram were calculated. In the palynological records of the Mudurnu-Göynük Basin there is a strong increase in concentrations of dinocysts across the K-Pg boundary, from Maastrichtian abundances of ~1000-2000 cysts/gram at Okçular, to lowermost Danian values of up to ~14000 cysts/gram, representing a 7 fold increase across the boundary. These high concentrations occur in the interval correlative to planktic foraminiferal Zones P0 and Pα, above which concentrations decrease again to ~2500-6500 cysts/gram. Using the estimated sedimentation rates for the studied interval based on the biostratigraphic age model of Açikalin et al. (2015), the concentrations of dinocysts (in cysts/cm^2/gram) may be used to estimate the dinocyst accumulation rates. The resulting records show that the estimated dinocyst accumulation rate shows a general increasing trend across the boundary interval, with no major changes at the boundary itself, implying that the change in absolute concentrations of dinocysts at Okçular is mostly related to the decrease in sedimentation rates across the K-Pg boundary (Açikalin et al., 2015).

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Figure S1

Relative abundances of hexaperidinioids of the Okçular section palynological samples plotted against the relative abundances of sporomorphs within the same samples. This plot indicates that the variations of the relative abundances of hexaperidinioids are likely not related to changes is freshwater input at this locality.

Figure S2

Plate 1. SEM images of most common benthic foraminifera found in this study.

1 a, b, c. Angulogavelinella avnimelechi (Reiss). Okçular, 150 cm.

2 a, b, c. Anomalinoides cf. midwayensis. Okçular, -0.5 cm.

3 a, b, c. Anomalinoides praeacutus (Vasilenko). Okçular, 8-9 cm.

4 a, b, c. Cibicidoides cf. hyphalus. Okçular, 49-50 cm.

5 a, b, c. Cibicidoides pseudoacutus (Nakkady). Okçular, 8-9 cm.

6 a, b, c. Cibicidoides sp. 1. Okçular, 74-75 cm.

7 a, b, c. Gyroidinoides depressa (Alth). Okçular, 49-50 cm.

8 a, b, c. Pulsiphonina prima (Plummer). Okçular, 99-100 cm.

9 a, b, c. Gyroidinoides girardanus (Reuss). Okçular, 350 cm.

10 a, b, c. Osangularia plummerae (Brotzen). Okçular, 29-30 cm.

Figure S3

Plate 2. SEM images of most common benthic foraminifera found in this study.

11 a, b, c. Cibicidoides alleni (Plummer). Okçular, -0.5 cm.

12. Bolivinoides decoratus (Jones). Okçular, 350 cm.

13. Bolivinoides draco draco (Marsson). Okçular, -50 cm.

14. Bulimina arkadelphiana (Cushman and Parker). Okçular, -100 cm.

15. Bulimina prolixa (Cushman and Parker). Okçular, -0.5 cm.

16. Praebulimina carseyae (Plummer). Okçular, -0.5 cm.

17. Eouvigerina subsculptura (McNeil and Caldwell). Okçular, -50 cm.

18. Coryphostoma midwayensis (Cushman). Okçular, 350 cm.

19 a, b. Dorothia oxycona (Reuss). Okçular, 470 cm.

20. Praebulimina reussi (Morrow). Okçular, -100 cm.

21. Gaudryina pyramidata (Reuss). Okçular, 49-50 cm.

22. Oolina orbignyana (Kellough). Okçular, 150 cm.

.

Figure S1

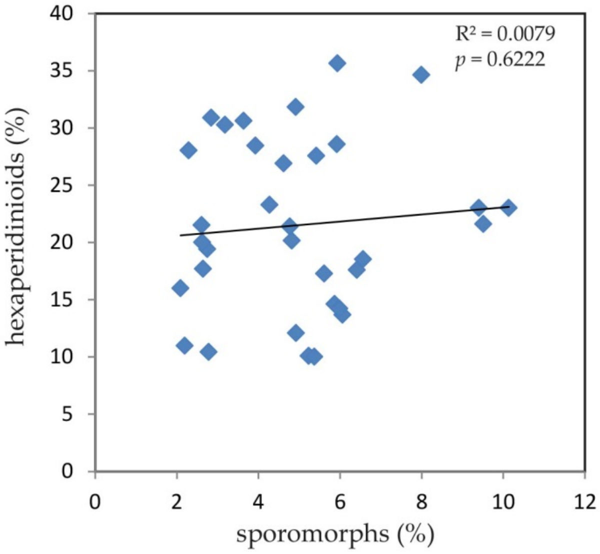
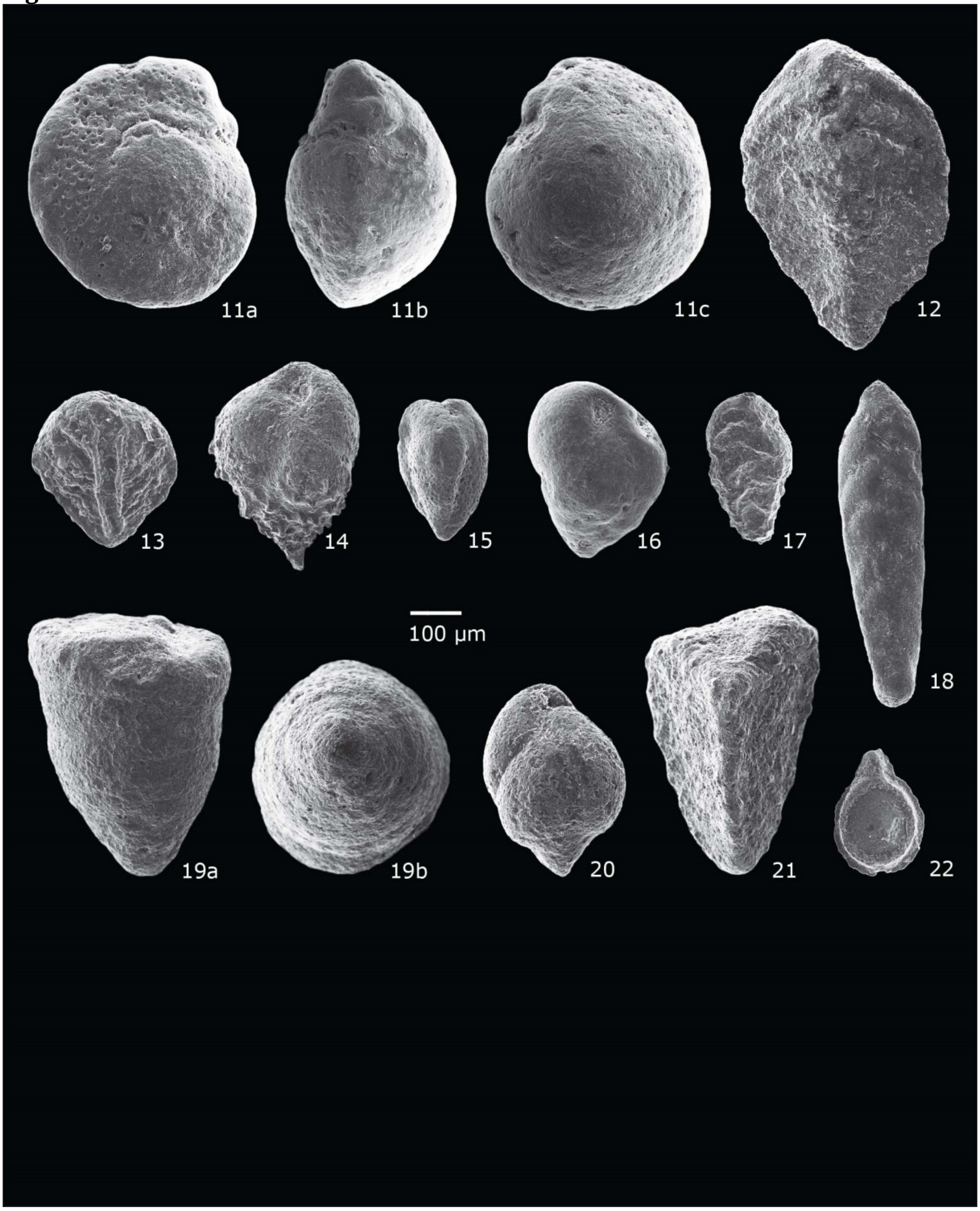

R² = 0.0079
p = 0.6222
hexaperidinioids (%)
sporomorphs (%)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12

Figure S2


1a
1b
1c
2a
2b
2c
3a
3b
3c
4a
4b
4c
5a
5b
5c
6a
6b
6c
100 µm
7a
7b
7c
8a
8b
8c
9a
9b
9c
10a
10b
10c

169 **Figure S3**



170
171

Additional Supporting Information

Captions for Data Sets S1 and S2

Data Set S1

Benthic foraminiferal counts of Okçular (Excell file)

Data Set S2

Palynological counts of Okçular (Excell file)

Section	Sample code	Depth	*Ammodiscus spp.*	*Anomalinoides praeacutus*	*Anomalinoides cf. midwayensis*	*Bathysiphon eocenica*	*Bulimina quadrata*	*Buliminella carseyae*	*Praebulimina reussi*	*Sitella spp.*	*Bulimina arkadelphiana*	*Bulimina prolixa*	*Coryphostoma midwayensis*	*Bolivina sp.*	*Bolivinoides draco*	*Bolivinoides decoratus*	*Cibicidoides alleni*
Okcular section	OK 470	470	0	10	4	0	0	0	0	0	0	0	1	0	0	0	2
Okcular section	OK 405	405	0	6	14	1	0	0	0	0	0	0	2	0	0	7	0
Okcular section	OK 350	350	0	3	3	1	0	0	0	0	0	0	5	0	0	12	0
Okcular section	OK 300	300	1	6	4	1	0	0	0	0	0	0	0	0	0	1	0
Okcular section	OK 200	200	0	3	1	1	0	0	0	0	0	0	0	0	0	9	0
Okcular section	OK150	150	0	1	1	0	0	0	0	0	0	0	1	0	0	0	2
Okcular section	OK 99-100	100	0	5	0	1	0	0	0	0	0	0	0	0	0	1	0
Okcular section	OK 74-75	75	0	9	0	1	0	0	0	0	0	0	0	0	0	1	0
Okcular section	OK 49-50	50	1	5	0	2	0	0	0	0	0	0	0	0	0	0	0
Okcular section	OK 29-30	30	0	6	0	1	1	0	0	0	0	0	0	0	0	0	0
Okcular section	OK24-25	25	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0
Okcular section	OK 12-13	13	1	5	0	2	0	0	0	0	0	0	1	0	0	0	0
Okcular section	OK 8-9	9	0	7	2	1	0	0	0	0	0	0	0	0	0	0	0
Okcular section	OK 2-3	3	0	22	3	0	0	0	0	0	0	0	2	0	0	0	0
Okcular section	OK -0,5	-0,5	1	5	8	1	0	6	7	0	0	3	0	0	0	0	2
Okcular section	OK-50	-50	2	0	6	1	1	0	14	0	1	0	0	0	3	0	1
Okcular section	OK-100	-100	0	0	7	2	0	0	19	1	7	0	0	0	1	0	2

Cibicidoides pseudo-acutus	*Cibicides cf. hyphalus*	*Cibicidoides sp. 2*	*Dentalina spp.*	*Dorothia oxycona*	*Dorothia spp.*	*Epistominoides midwayensis*	*Frondicularia spp.*	*Gaudryina spp.*	*Glomospira spp.*	*Guttulina spp.*	*Gyroidina girardanus*	*Gyroidina depressa*	*Trochammina spp.*	*Cibicidoides sp. 1*	*Angulogavelinella avnimelechi*	*Lagena spp.*	*Lenticulina spp.*	*Lenticulina dissona*	*Marginulina spp.*	*Neoflabellina spp.*	*Nonionella spp.*	*Oolina orbignyana*
1	15	0	2	6	0	0	0	0	0	0	3	1	0	0	9	3	4	0	0	0	0	1
0	6	0	1	4	0	0	0	0	0	0	2	7	1	0	5	4	6	0	0	0	0	0
0	7	0	2	3	1	0	0	0	0	0	3	2	1	0	2	5	7	0	0	0	1	0
0	12	0	3	5	1	0	0	0	0	0	8	2	1	0	5	7	5	1	0	0	0	1
0	5	0	2	4	0	0	0	2	0	0	4	2	0	0	11	7	2	0	0	0	0	2
1	2	0	2	3	0	0	0	1	0	0	5	2	1	0	7	6	5	0	0	0	0	3
0	11	0	2	6	0	0	0	1	0	0	3	1	2	2	0	6	3	0	0	0	0	0
0	14	0	3	3	0	0	0	1	0	0	2	1	1	2	0	6	6	0	0	0	0	0
1	16	0	3	3	0	0	0	0	0	0	1	5	1	0	0	3	4	0	1	0	0	0
6	9	0	2	1	0	0	0	0	0	0	2	0	3	2	0	4	4	0	0	0	0	0
11	11	0	3	0	0	0	0	0	0	0	2	0	2	1	0	3	5	0	0	0	0	0
16	9	0	1	0	0	0	0	2	3	0	1	1	16	0	0	2	2	0	0	0	0	0
19	9	0	2	0	0	0	0	3	3	0	0	2	21	0	0	0	1	0	0	0	0	0
8	4	0	3	0	0	0	0	1	2	0	1	2	12	0	0	1	2	0	0	0	0	0
3	1	0	2	1	0	0	0	0	0	0	3	4	0	1	0	4	3	0	0	0	0	1
4	4	0	3	0	1	0	0	0	0	0	1	1	3	0	0	7	2	0	1	0	1	1
6	4	0	2	0	1	0	1	1	0	0	2	2	2	0	0	4	4	1	0	0	0	2

Oolina acuticosta	*Oridorsalis spp.*	*Osangularia plummerae*	*Pseudonodosaria spp.*	*Pseudouvigerina plummerae*	*Pullenia spp.*	*Pulsiphonina prima*	*Eponides spp.*	*Quadrimorphina allomorphinoides*	*Quinqeloculina spp.*	*Ramulina globulifera*	*Pleurostomella spp.*	*Coryphostoma gigantea*	*Spiroplectammina spectabilis*	*Spiroplectammina laevis*	*Stensioeina pommerana*	*Stilostomella spp.*	*Tritaxia pyramidata*	*Clavulinoides spp.*	*Eouvigerina subsculptura*	*Trochospiral indet.*	*Agglutinant indet.*	*Arenaceous agglutinants*
1	3	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	12	1	0	9	0	1
1	5	4	0	1	4	0	0	1	0	0	0	0	0	0	0	0	4	0	0	9	0	1
1	4	2	0	0	5	0	0	1	0	1	0	0	0	0	0	0	8	0	0	8	0	2
1	2	3	1	1	4	0	0	1	0	0	0	0	0	0	0	0	5	1	0	7	1	0
0	7	8	1	1	3	0	0	2	0	0	0	0	0	0	0	0	7	2	0	7	1	1
0	3	16	0	1	2	3	1	1	0	0	0	0	0	0	0	0	11	0	0	3	1	1
0	2	14	0	2	1	3	0	2	0	0	0	0	0	0	0	0	11	0	0	2	0	4
0	1	16	0	1	1	0	0	0	0	1	0	0	0	0	0	0	7	1	0	7	0	3
0	0	28	0	0	0	0	0	0	0	1	0	0	0	0	0	0	13	0	0	4	0	3
0	0	36	0	1	2	0	0	0	0	0	0	0	0	0	0	0	2	3	0	5	0	2
0	0	35	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	6	0	1
0	0	20	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2
0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1
0	0	12	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	13
0	0	6	1	1	4	0	0	0	0	0	1	0	0	0	0	0	1	4	4	4	0	3
0	2	6	2	1	1	0	2	0	1	0	0	1	0	0	1	0	2	0	4	6	0	6
1	1	3	2	0	2	0	1	1	0	1	1	0	1	0	1	0	1	0	0	4	0	4

Cibicidoides indet.	Indet.	Berger Parker	Infaunal:	bi-/tri-serials
2	1	15,4	36,2	1,6
1	1	13,8	38,4	9,2
6	1	11,8	56,6	16,8
6	3	12,2	41,2	2,0
3	2	10,7	48,0	10,5
2	7	16,4	42,0	1,4
5	5	14,1	45,8	3,2
8	2	16,4	37,5	2,1
2	1	27,6	37,3	0,7
4	0	35,8	30,2	2,7
4	0	34,8	19,8	1,2
5	3	20,4	35,1	1,9
5	1	20,9	34,1	0,7
1	2	22,0	41,6	3,7
2	7	8,2	52,4	22,3
2	6	13,8	60,4	25,2
2	4	18,7	62,3	27,7

Section	Code	Depth (cm)	Slide	Weight (g)	*Achilleodinium bianii*	*Achomosphaera ramulifera*	*Achomosphaera sagena*	*Adnatosphaeridium buccinum*	*Alisocysta circumtabulata*	*Alisocysta* spp.	*Alterbidinium acutulum*	*Andalusiella dubia*	*Andalusiella gabonensis*	*Andalusiella polymorpha*
Okcular section	OK	470	1	12,30	0	6	1	0	0	0	0	0	0	0
Okcular section	OK	405	1	11,09	0	5	1	0	0	0	0	0	0	0
Okcular section	OK	350	1	11,35	0	4	2	0	0	0	0	0	0	0
Okcular section	OK	300	1	10,65	0	7	3	0	0	0	0	0	0	0
Okcular section	OK	250	1	10,87	1	1	0	0	0	0	0	0	0	0
Okcular section	OK	200	1	13,49	0	3	2	0	0	0	0	0	0	0
Okcular section	OK	175	1	12,21	0	7	1	0	0	0	0	0	0	0
Okcular section	OK	150	1	10,53	0	1	0	0	0	0	0	0	0	0
Okcular section	OK	125	1	9,90	0	5	0	0	0	0	0	0	0	0
Okcular section	OK	99,5	1	10,87	0	9	0	0	0	0	0	0	0	0
Okcular section	OK	69,5	1	10,72	0	4	0	0	0	0	0	0	0	0
Okcular section	OK	49,5	1	9,92	0	10	0	0	0	0	0	0	0	0
Okcular section	O)	34,5	1	9,75	0	3	0	0	0	0	0	0	0	0
Okcular section	OK	29,5	1	9,97	0	2	0	0	0	0	0	0	1	0
Okcular section	OK	24,5	1	10,07	1	5	0	0	0	0	0	0	1	0
Okcular section	OK 1140	19,5	1	10,21	0	1	1	0	0	0	0	0	0	0
Okcular section	OK	17,5	1	10,20	0	5	0	0	0	0	0	0	1	0
Okcular section	OK	12,5	1	11,28	0	4	1	0	0	0	0	0	1	0
Okcular section	OK	9,5	1	10,77	0	7	1	0	0	0	0	0	0	0
Okcular section	OK	7,5	1	9,80	0	5	0	0	0	0	0	0	0	0
Okcular section	OK	6	1	11,27	0	6	0	0	0	0	0	0	0	0
Okcular section	OK	4,5	1	8,18	0	6	1	0	0	0	0	0	0	0
Okcular section	OK	2,5	1	10,10	0	1	0	0	0	0	0	0	1	0
Okcular section	OK	1,5	1	11,22	0	1	2	0	0	0	0	0	1	0
Okcular section	OK	0,5	1	9,93	0	5	0	0	0	0	0	0	1	0
Okcular section	OK	-0,5	1	13,95	0	6	0	0	0	0	0	0	0	0
Okcular section	OK 1097	-13,5	1	10,49	0	4	2	0	0	0	0	0	0	0
Okcular section	OK 1081	-29,5	1	10,66	0	0	0	0	0	0	0	0	0	0
Okcular section	OK	-50	1	11,04	0	3	1	0	0	0	0	0	0	0
Okcular section	OK	-80	1	8,67	0	2	1	0	0	0	0	0	0	0
Okcular section	OK	-100	1	11,31	0	5	1	0	0	0	0	0	0	0
Okcular section	OK	-120	1	11,09	1	4	1	0	0	0	0	0	1	0
Okcular section	OK	-150	1	14,01	1	5	0	0	0	0	0	0	0	0

Apteodium fallax	*Areoligera coronata*	*Areoligera senonensis*	*Areoligera* spp.	*Batiacasphaera rifensis*	*Caligodinium amiculum*	*Cannosphaeropsis utinensis*	*Carpatella cornuta*	*Carpatella septata*	*Cassidium fragile*	*Cerodinium boloniense*	*Cerodinium diebelii*	*Cerodinium leptodermum*	*Cerodinium cf. leptodermum*	*Cerodinium mediterraneum*	*Cerodinium pannuceum*	*Cerodinium speciosum*	*Cerodinium striatum*	*Cerodinium* spp.	*Circulodinium distinctum*	*Cladopyxidium velatum*	*Cometodinium? Whitei*	*Cordosphaeridium inodes*
0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0
0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0
0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
0	0	1	2	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0
0	1	1	1	0	0	0	1	0	1	1	1	0	0	0	0	1	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0
0	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	0	0	0	0
0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	2	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0
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0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0
0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	2	0	2	0	0	0	0
0	0	0	1	0	0	0	0	0	0	2	1	0	0	1	0	1	0	6	0	0	0	0
0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	1	0	0
1	2	0	3	0	0	0	0	0	0	1	2	0	0	0	0	4	0	1	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	1	0	0
0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0
0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Cordosphaeridium fibrospinosum	*Cordosphaeridium fibrospinosum* cornuta	*Coronifera striolata*	*Cribroperidinium* sp. A	*Cribroperidinium pyrum*	*Cribroperidinium septatum*	*Cribroperidinium wilsonii forma A*	*Cribroperidinium wetzelii*	?*Dapsilidinium* spp.	*Damassadinium californicum*	*Damassadinium* cf. *californicum*	*Deflandria galatea*	*Deflandria tuberculata*	*Diconodinium wilsonii*	Dinocyst sp. 1 (cf. *Eurysphaeridium)*	?Dinocyst sp 2	*Dinogymnium acuminatum*	*Diphyes colligerum*	*Diphyes* ?*recurvatum*	*Disphaerogena carposphaeropsis*	*Disphaerogena carposphaeropsis* cornuta	?*Downiesphaeridium*	*Druggidium meerensis*
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Exochospaeridium bifidum	*Exchosphaeridium phragmites*	*Fibradinium annetorpense*	*Fibrocysta axialis*	*Fibrocysta bipolaris*	*Fibrocysta licia*	*Fibrocysta* indet.	*Florentinia ferox*	*Florentinia ?flosculus*	*Florentinia mantelli*	*Glaphyrocysta* cf. *castelcasiense?*	*Glaphyrocysta perforata*	*Glaphyrocysta retiintexta*	*Glaphyrocysta semitecta*	*?Gonyaulax* sp.	*Hafniasphaera septata*	*Heterosphaeridium? heteracanthum*	*Hystrichodinium pulchrum*	*Hystrichokopolma bulbosum*	*Hystrichosphaeridium duplum*	*Hystrichosphaeridium tubiferum*	*Hystrichosphaeridium* cf. *tubiferum*	*Hystrichosphaeridium ?recurvatum*
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	2	0
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	6	0	0
1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	6	2	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0	0
0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	4	2	0
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0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	6	1	0
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0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	1	0
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0
0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	5	1	0
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	3	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	3	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	1	0	1	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0
0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	2	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0

Hystrichostrogylon coninckii	*Hystrichosphaeropsis ovum*	*Impagidinium* spp.	*Impagidinium* sp. 1 of Thomson & Heilmann-Clausen	*Isabelidinium bakeri*	*Kallosphaeridium yorubaense*	*?Laciniadinium* sp.	*Lanternosphaeridium lanulosum*	*Lanternosphaeridium reinhardtii*	*Lanternosphaeridium* "reduced"	*Lejeunecysta globosa*	*Lejeunecysta hyalina*	*Lejeunecysta izerzenensis*	*Lejeunecysta* spp.	*Manumiella conorata*	*Manumiella druggii*	*Manumiella seelandica*	*Membranilarnacia? tenella*	*Membranilarnacia polycladiata*	*Neonorthidium perforatum*	*Odontochitina operculata*	*Oligosphaeridium complex*	*Oligosphaeridium saghirum*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
1	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6
1	0	4	0	0	0	0	0	0	0	0	1	0	0	0	7	0	0	0	1	0	0	4
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0	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3

Operculodinium centrocarpum	*Palaeoperidinium pyrophorum*	*Palaeocystodinium australinium*	*Palaeocystodinium golzowense*	*Palaeocystodinium* spp.	*Palaeohystrichophora infusoriodes*	*Paleotetradinium silicornum*	*Palynodinuim grallator*	*Palynodinuim* cf. *grallator*	*Pervosphaeridium* spp.	?*Phanerodinium* sp.	*Phelodinium magnificum*	*Phelodinium pentagonale*	*Pierceites pentagona*	*Pyxidinopsis* spp.	*Raetaedinium truncigerum*	*Renidinium gracile*	*Riculacysta amplexa*	*Senegalinium bicavatum*	*Senegalinium ?dilwynense*	*Senegalinium* indet.	*Senegalinium laevigatum*	*Senegalinium microgranulatum*
4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	6	0	0
6	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	3	0
4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	6	3	0
2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	1	16	6	1
5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	4	5	0
5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	10	11	1
7	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	4	0	11	11	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	8	13	0
6	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	2	0	3	7	1
8	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	2	0	3	8	1
5	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	0	6	8	0
5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	14	5	1
5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	12	10	2
2	0	0	1	1	0	0	1	0	2	0	0	0	0	0	0	0	0	2	0	6	4	0
3	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	4	0	4	3	0
3	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	11	5	2
4	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	7	0	3	3	1
5	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	2	0	6	3	0
4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	6	3	1
4	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	9	4	1
2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	11	4	1
3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	14	5	1
6	0	0	2	0	0	0	0	3	0	0	0	0	1	0	0	0	0	5	0	13	2	1
5	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	5	4	0
3	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	4	4	0
2	0	1	1	1	0	0	4	0	0	0	0	0	0	1	0	0	0	1	0	6	2	0
1	0	0	0	0	0	0	5	0	0	1	0	0	0	0	0	0	0	2	0	8	3	0
5	0	0	0	1	0	0	2	1	1	0	0	0	0	0	1	0	0	1	0	2	2	0
1	0	0	0	0	0	0	3	1	0	0	0	0	1	0	0	0	0	0	0	5	0	0
1	0	1	0	1	0	0	1	0	1	0	1	0	1	0	1	0	0	1	0	5	3	2
2	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	2	0	2	0	0
5	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	5	2	0

Senegalinium obscurum	*Senoniasphaera inornata*	*Senoniasphaera* cf. *inornata*	small peridinioid indet.	*Spinidinium denispinatum*	*Spinidinium? Pilatum*	*spiniferites cornuta*	*Spiniferites pseudofurcatus*	*Spiniferites ramoses* cpx.	*Spiniferites* sp. 1	*Spiniferites ?terminus*	*Spongodinium delitense*	*Surculosphaeridium? longifurcatum*	*Tanyosphaeridium xanthiopyxides*	*Thalassiphora cf. patula*	*Thalassiphora pelagica*	*Thalassiphora pelagica* "reduced"	*Trabeculidium quinquetrum*	*Trichodinium castanea*	*Trichodinium* sp. 1	*Trithyrodinium evittii*	*Trithyrodinium* sp.	*?Turnosphaera hypoflata*
5	0	0	0	0	0	0	0	54	1	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	58	2	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	50	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	1	45	2	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	36	2	0	0	0	1	0	0	0	0	0	0	1	0	0
1	0	0	1	0	0	0	0	44	1	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	1	0	33	2	0	0	0	0	0	0	0	0	0	0	1	0	0
1	0	0	0	0	0	0	0	33	1	0	0	0	0	0	0	0	0	0	0	2	0	0
0	0	0	0	2	0	0	0	39	1	0	0	0	0	0	0	0	0	0	0	1	0	0
1	0	0	0	0	0	0	0	31	3	0	0	0	0	0	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	34	4	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	26	2	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	0	0	0	0	0	33	2	0	0	0	1	0	0	0	0	0	0	1	0	0
1	1	0	1	0	1	0	0	30	1	0	0	0	0	0	0	0	0	0	0	1	0	0
1	0	0	0	0	0	0	1	31	1	0	0	0	1	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	37	3	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	35	6	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	44	2	0	0	0	0	0	0	0	0	0	0	1	0	0
0	1	0	1	0	0	0	0	43	0	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	41	1	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	38	2	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	1	0	0	0	0	38	1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	43	1	0	0	0	0	0	0	0	0	0	0	1	0	0
6	0	0	0	0	0	0	0	27	1	0	0	0	0	0	0	0	0	0	0	2	0	0
1	0	0	0	0	0	0	0	35	2	0	0	0	1	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	3	41	3	1	0	0	0	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	37	2	0	0	0	1	0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	37	1	0	0	0	0	0	0	0	1	0	0	4	0	0
0	0	0	1	0	1	0	2	43	2	0	0	0	0	0	0	0	1	0	0	0	0	0
0	0	0	1	0	0	0	1	33	3	0	0	0	0	0	0	0	0	0	0	1	0	0
1	0	0	1	0	0	0	1	26	1	0	0	0	0	0	0	0	0	0	0	2	0	0
0	0	0	1	0	0	0	0	46	0	1	0	0	0	0	0	0	0	0	0	1	0	1
0	0	0	1	0	0	0	0	54	2	0	0	0	0	0	0	0	0	0	0	1	0	0

?Unipontidinium aquaeductum	*Xiphophoridium* alatum	dinocyst indet	Skolochorate indet.	P-cyst indet	Acritarch 1 (spiny)	Acritarch 2 (smooth)	Acritarch 3 (blob)	Acritarch long spines	Acritarch 4 (triangular)	*Codoniella campanulata*	"Impletosphaeridium"	*Fromea* sp.	*Veryhachium* sp.	foram lining 1	foram lining 2	foram lining 3	foram lining 3	Bisaccate pollen	pollen
0	0	4	1	3	1	0	0	0	0	0	0	0	1	0	0	0	0	0	5
0	0	4	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
0	0	6	2	4	0	1	0	0	0	0	1	0	1	0	0	0	1	0	1
0	0	3	1	4	0	1	0	0	0	0	0	0	1	0	0	0	0	0	4
0	0	5	2	4	0	3	0	0	0	0	0	0	1	0	0	0	0	0	2
0	0	3	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	1	3
0	0	3	2	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
0	0	4	2	3	0	2	0	0	0	0	1	0	2	0	0	0	1	0	4
0	0	5	1	2	0	5	0	0	0	0	1	0	5	0	1	0	1	0	3
0	0	2	3	3	0	4	0	0	0	0	1	0	1	0	0	1	1	0	7
0	0	3	2	2	0	1	0	0	0	0	1	0	2	0	0	0	0	0	3
1	0	5	3	1	1	7	0	0	0	0	1	1	2	0	1	0	1	0	3
0	0	5	3	2	1	6	0	0	0	0	1	0	0	0	0	0	0	0	4
0	0	4	3	5	0	7	0	0	0	0	0	0	0	0	0	1	1	0	4
0	0	8	4	4	0	2	0	0	0	0	0	0	0	0	0	0	1	0	8
0	0	4	4	6	0	1	0	0	0	0	2	0	1	0	0	0	0	0	2
0	0	5	3	3	1	1	0	0	0	0	0	0	0	0	1	0	1	0	3
0	0	3	3	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
0	0	4	3	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4
0	0	5	2	4	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1
0	0	2	1	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3
0	0	3	4	6	1	0	0	0	0	0	1	0	1	0	0	0	1	0	3
0	0	4	4	4	1	1	0	0	0	0	1	0	0	0	0	0	1	0	4
0	0	4	2	3	1	2	0	0	0	0	4	0	2	0	0	0	1	0	5
0	0	5	3	3	1	1	0	0	0	0	11	0	1	0	1	1	1	0	4
0	0	7	1	6	1	2	0	0	0	0	0	0	0	0	0	0	0	0	4
0	0	4	2	4	0	1	0	0	0	0	1	0	0	0	0	0	1	0	1
0	0	3	2	7	0	1	0	0	0	0	1	0	0	0	0	1	1	0	1
0	0	7	2	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
0	0	12	3	4	1	0	0	0	0	0	0	0	0	0	1	0	2	0	2
0	0	5	3	5	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
0	0	5	2	5	0	2	0	0	0	1	2	0	1	0	1	0	1	0	2
0	0	5	3	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2

spores	spores trilete	bryophyte spore	Tetrad pollen	*Botryococcus* sp.	*Palamblages* sp.	*Pterospermella* sp.	*Paralecaniella inendata*	*Schematophora* sp.	*Tasmanites* sp.	*Trigonopyxidium* sp.	Arthopod remains	Total Dinocysts	Total % P-cysts	P/G ratio	% Dinocysts	% other marine algae	% Freshwater Algae
0	1	0	0	0	0	0	0	0	0	1	0	271	16	0,16	91	1	0
0	1	0	0	0	0	0	0	0	0	0	0	310	13	0,13	97	1	0
0	1	0	0	0	0	0	0	0	0	3	0	330	24	0,24	91	3	0
0	2	0	0	0	0	0	1	0	0	0	0	313	21	0,21	91	1	1
0	0	0	0	0	0	0	0	0	0	1	0	310	34	0,34	90	5	0
0	3	0	0	1	0	0	0	0	0	0	0	329	17	0,17	92	2	1
0	1	0	0	0	0	0	0	0	0	0	0	332	32	0,32	95	2	0
0	1	0	0	0	0	0	1	0	0	0	0	326	38	0,38	89	5	1
0	1	0	0	0	0	0	0	0	0	0	0	314	33	0,33	83	13	0
0	3	0	0	0	0	0	0	0	0	0	0	329	27	0,27	81	8	0
0	2	0	0	0	0	0	0	0	0	0	0	325	20	0,20	91	3	1
0	1	0	0	0	0	0	1	0	0	0	0	333	25	0,25	84	12	1
0	1	0	0	0	0	0	0	0	0	0	0	329	30	0,30	85	9	0
0	2	0	0	0	0	0	0	0	0	1	0	313	42	0,42	84	9	0
0	2	0	0	0	0	0	1	0	0	1	0	326	28	0,28	85	4	1
0	3	0	0	0	0	0	0	0	0	0	0	328	28	0,28	92	3	0
0	1	0	0	0	0	0	0	0	0	0	0	318	31	0,31	92	3	0
0	1	0	0	0	0	0	0	0	0	0	0	328	27	0,27	95	2	0
0	0	0	0	0	0	0	1	0	0	0	0	308	25	0,25	93	2	1
0	1	0	0	0	0	0	0	0	0	0	0	332	35	0,35	94	3	0
0	1	0	0	0	0	0	0	0	0	0	0	338	31	0,31	95	1	0
0	1	0	0	0	0	0	1	0	0	0	0	329	36	0,36	92	4	1
0	2	0	0	0	0	0	1	0	0	1	0	342	34	0,34	88	4	1
0	3	0	0	0	0	0	0	0	0	0	0	328	41	0,41	79	12	0
0	5	0	0	0	0	0	0	0	0	1	0	285	24	0,24	73	16	0
0	2	0	0	0	0	0	0	0	0	0	0	317	21	0,21	90	4	0
0	1	0	0	0	0	0	1	0	0	0	0	316	21	0,21	94	3	2
0	1	0	0	0	0	0	0	0	0	0	0	314	36	0,36	92	5	0
0	3	0	0	0	0	0	1	0	0	0	0	282	16	0,16	92	2	1
0	3	0	0	0	0	0	2	0	0	0	0	288	17	0,17	89	4	2
0	2	0	0	0	0	0	1	0	0	0	0	376	27	0,27	88	4	1
0	1	0	0	0	0	0	1	0	0	0	0	356	17	0,17	90	7	1
0	3	0	0	0	0	0	0	0	0	0	0	275	13	0,13	92	2	1

% terrestrial palynomorphs	% Marine Algae	t/m	*Spiniferites* complex	hexa p-cysts	*Manumiella* spp.	other	Absolute dinocyst concentration (dinocysts/gram)
6	93	0,07	62	14	0	24	4803
2	98	0,02	66	11	0	23	6492
3	94	0,06	57	19	0	24	5544
6	93	0,07	58	18	0	25	6402
3	95	0,05	39	20	0	41	2819
6	94	0,06	51	15	0	34	5210
2	97	0,03	43	28	0	29	3723
5	94	0,06	35	32	0	33	5504
3	96	0,04	45	30	0	25	4769
10	89	0,11	43	23	0	34	14027
6	94	0,06	43	17	0	40	10780
4	95	0,05	38	23	0	39	9188
5	94	0,06	39	28	0	34	8999
6	93	0,07	33	36	0	31	9862
9	89	0,11	39	23	0	38	8866
5	95	0,05	42	21	0	37	9013
5	95	0,05	46	27	0	27	5457
3	97	0,03	50	21	0	28	8622
5	95	0,05	50	20	0	29	8252
3	97	0,03	47	31	0	22	5837
4	96	0,04	46	28	0	26	6036
4	96	0,04	46	31	0	24	5167
6	92	0,08	46	29	0	26	5733
8	91	0,09	30	35	0	35	4054
10	89	0,11	42	22	0	37	5475
6	94	0,06	52	14	0	33	2129
2	97	0,03	45	16	0	38	2203
3	97	0,03	39	18	7	36	1709
5	94	0,06	52	12	1	35	1508
5	93	0,07	40	10	1	49	1365
7	92	0,08	34	19	0	47	1970
3	96	0,04	51	10	0	38	1615
5	94	0,06	61	10	0	29	1064