

Supplement 1: Lipid biomarkers measured by GC-MS

Compound*	GeoB 12312	GeoB 12321	GeoB 12331	GeoB 12326-13	GeoB 12326-9	GeoB 12326-7	GeoB 12328-6	GeoB 12328-2	GeoB 12328-4
	Anoxic	Suboxic	Oxic	Anoxic	Suboxic	Oxic	Anoxic	Anoxic	Anoxic
Even long chain n alcohols (ΣC_{24-28})	173.1	303.9	72.2	243.6	246.7	233.6	241.4	159.3	384
Odd long chain n alkanes (ΣC_{27-31})	123.5	286.2	101.1	122.2	134	192.3	112.5	57.9	284.4
C ₃₀ 1,15-diol	125.5	123.4	46	206.9	145.9	44.9	301.7	223.2	201.8
C ₃₂ 1,15-diol	180	268.3	n.d.	198.7	n.d.	n.d.	24.3	136.8	n.d.
C ₃₀ 1,15-keto-ol	21.3	39.8	52	73.2	87.4	30.7	117.7	78.8	68.8
C ₃₂ 1,15-keto-ol	29.8	76.2	19.5	73.9	n.d.	20.9	n.d.	49.3	n.d.
Phytol	1321.7	1392.3	477.4	1782.5	1947.4	355.9	2059.3	2419.6	1354
Phytane	216	112.8	34.6	346.3	123.6	38.2	569.8	460.8	199.9
Pristane	150.2	217.6	134.4	570	363.2	52.3	2037.3	1050.9	432.8
Total sterols (ΣC_{27-30})	9900.3	7031	1882.4	4117.34	6243.97	7796.6	9512.9	5742.13	13563.9
Cholesterol	1945.9	1286.9	287.1	1282.4	1240.6	877.2	783.8	1073.2	1179.4
Cholestanol	449.6	304.5	236.1	476.5	602	661.9	426.3	655.6	466.2
Dinosterol	1995.5	905	317	789.7	513.9	342	1105.7	1067.5	980.5
Dinostanol	131.7	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Dinostanone	16.4	25.3	24.6	27.2	59.1	22.7	191.1	86.7	56.3
Dinosterone	19.2	16.6	28.1	n.d.	47.1	65.7	n.d.	n.d.	n.d.
Dinosterane	n.d.	3.9	23	n.d.	n.d.	1.5	5.2	4.3	7.4

* All reported values are in ng g sediment⁻¹, normalized abundance to a standard (see text) and have not been corrected for compound specific response factors.

Supplement 2: GDGT peak areas and distribution used in the calculation of TEX₈₆ indices.

	<u>OMZ transect</u>		<u>Below OMZ seep</u>				<u>OMZ seep</u>		
	OMZ-anoxic (anoxic)	OMZ-suboxic (suboxic)	OMZ-oxic (oxic)	below OMZ-seep 1 (anoxic)	below OMZ-seep 2 (suboxic)	below OMZ-seep 3 (oxic)	OMZ-seep 1 (anoxic)	OMZ-seep 2 (anoxic)	OMZ-seep 3 (anoxic)
GDGT peak areas									
GDGT-0	3537659115	646466944	287373213	96387435	96387435	300390774	641392516	650377801	444243057
GDGT-1	1403675844	219408981	157159514	37611649	37611649	125094161	367976047	358778708	237579676
GDGT-2	2052767023	321549319	230836278	52242107	52242107	137712830	492488974	485423709	379931095
GDGT-3	523460998	125463678	63630757	13768514	13768514	31808931	119225241	113036605	99260914
Crenarchaeol	11342322473	2132374476	1019610762	294990212	294990212	842971451	2377313797	2359268582	2285539610
Crenarchaeol iso.	1656878913	220565762	99945007	54905802	54905802	102573230	313690101	267210214	252901252
GDGT relative abundance									
GDGT-0	17.24	17.63	15.46	17.53	16.42	19.50	14.87	15.36	12.01
GDGT-1	6.84	5.99	8.46	6.84	6.41	8.12	8.53	8.47	6.42
GDGT-2	10.01	8.77	12.42	9.50	7.94	8.94	11.42	11.46	10.27
GDGT-3	2.55	3.42	3.42	2.50	2.81	2.06	2.76	2.67	2.68
Crenarchaeol	55.28	58.17	54.86	53.64	60.03	54.72	55.13	55.72	61.78
Crenarchaeol iso.	8.08	6.02	5.38	9.98	6.40	6.66	7.27	6.31	6.84

Supplement 3: Dinoflagellate cyst count data

Sample Oxygen classification	GeoB 12312		GeoB 12321		GeoB 12331		GeoB 12326-13		GeoB 12326-9		GeoB 12326-7		GeoB 12328-6		GeoB 12328-2		GeoB 12328-4	
	Anoxic		Suboxic		Oxic		Anoxic		Suboxic		Oxic		Anoxic		Anoxic		Anoxic	
Dinoflagellate cysts	# cysts	cysts/g*	# cysts	cysts/g*	# cysts	cysts/g*	# cysts	cysts/g*	# cysts	cysts/g*	# cysts	cysts/g*	# cysts	cysts/g*	# cysts	cysts/g*	# cysts	cysts/g*
<i>Bitectatodinium spongium</i>	10	161.97	12	194.05	7	76.03	8	82.20	9	55.43	11	73.25	4	80.00	10	163.45	6	68.49
<i>Brigantedinium</i> spp.	144	2332.36	115	1859.64	170	1846.42	145	1489.93	142	874.60	103	685.84	84	1680.00	103	1683.56	77	879.00
cyst of <i>Protoperidinium monospinum</i>	10	161.97	7	113.20	8	86.89	9	92.48	4	24.64	17	113.20	3	60.00	5	81.73	6	68.49
<i>Diplopelta minor</i>	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00	1	16.35	0	0.00
<i>Diplopelta parva</i>	0	0.00	2	32.34	0	0.00	0	0.00	3	18.48	0	0.00	0	0.00	2	32.69	1	11.42
<i>Dubridinium</i> spp.	3	48.59	9	145.54	0	0.00	7	71.93	10	61.59	2	13.32	1	20.00	1	16.35	0	0.00
<i>Echinidinium aculeatum</i>	12	194.36	6	97.02	7	76.03	3	30.83	1	6.16	6	39.95	4	80.00	2	32.69	10	114.16
<i>Echinidinium bispiniformum</i>	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	6.66	0	0.00	0	0.00	0	0.00
<i>Echinidinium delicatum</i>	1	16.20	1	16.17	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	11.42
<i>Echinidinium granulatum</i>	6	97.18	36	582.15	28	304.12	10	102.75	12	73.91	19	126.51	12	240.00	23	375.94	12	136.99
<i>Echinidinium transparentum</i>	11	178.17	7	113.20	16	173.78	4	41.10	4	24.64	10	66.59	4	80.00	7	114.42	6	68.49
<i>Echinidinium zonneveldii</i>	2	32.39	1	16.17	1	10.86	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Echinidinium</i> spp.	17	275.35	23	371.93	26	282.39	16	164.41	10	61.59	22	146.49	13	260.00	26	424.98	19	216.89
<i>Impagidinium aculeatum</i>	0	0.00	1	16.17	1	10.86	1	10.28	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Impagidinium paradoxum</i>	0	0.00	0	0.00	1	10.86	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Impagidinium patulum</i>	0	0.00	0	0.00	3	32.58	0	0.00	0	0.00	2	13.32	1	20.00	0	0.00	0	0.00
<i>Leipokatium invisitatum</i>	1	16.20	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Lingulodinium machaerophorum</i>	1	16.20	0	0.00	0	0.00	0	0.00	0	0.00	1	6.66	0	0.00	0	0.00	0	0.00
<i>Lejeuncysta oliva</i> (cyst of <i>P. leonis</i> ?)	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00	0	0.00	0	0.00
<i>Lejeuncysta sabrina</i> (cyst of <i>P. leonis</i> ?)	2	32.39	1	16.17	1	10.86	2	20.55	0	0.00	0	0.00	0	0.00	2	32.69	0	0.00
<i>Lejeuncysta</i> spp.	0	0.00	4	64.68	1	10.86	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	11.42
<i>Nematospheeropsis labyrinthus</i>	4	64.79	3	48.51	73	792.87	4	41.10	15	92.39	20	133.17	2	40.00	4	65.38	2	22.83
<i>Operculodinium centrocarpum</i> sensu Wall and Dale (1966)	0	0.00	1	16.17	2	21.72	0	0.00	0	0.00	0	0.00	0	0.00	2	32.69	2	22.83
<i>Operculodinium centrocarpum</i> s.s.	0	0.00	1	16.17	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Operculodinium israelianum</i>	6	97.18	3	48.51	21	228.09	2	20.55	3	18.48	17	113.20	5	100.00	5	81.73	6	68.49
<i>Operculodinium longispinigerum</i>	2	32.39	2	32.34	6	65.17	2	20.55	3	18.48	5	33.29	2	40.00	2	32.69	3	34.25
<i>Operculodinium</i> spp.	1	16.20	3	48.51	2	21.72	0	0.00	4	24.64	2	13.32	1	20.00	3	49.04	4	45.66
<i>Pentapharsodinium daleii</i>	1	16.20	0	0.00	1	10.86	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
cyst of <i>Polykrikos kofoidii</i>	0	0.00	2	32.34	3	32.58	0	0.00	3	18.48	4	26.63	1	20.00	2	32.69	2	22.83
<i>Polysphaeridium zoharyi</i>	1	16.20	9	145.54	9	97.75	1	10.28	0	0.00	8	53.27	0	0.00	0	0.00	0	0.00
cyst of <i>Protoperidinium americanum</i>	0	0.00	3	48.51	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Trinovantedinium applanatum</i> (cyst of <i>P. pentagonum</i>)	4	64.79	5	80.85	9	97.75	5	51.38	4	24.64	5	33.29	3	60.00	6	98.07	4	45.66
cyst of <i>P. conicoides</i>	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Stelladinium robustum</i> (cyst of <i>P. robustum</i>)	2	32.39	3	48.51	3	32.58	3	30.83	3	18.48	2	13.32	3	60.00	1	16.35	1	11.42
<i>Stelladinium stellatum/reidii</i> (cyst of <i>P. compressum/reidii</i>)	1	16.20	3	48.51	2	21.72	4	41.10	4	24.64	6	39.95	1	20.00	7	114.42	2	22.83
cyst of <i>Peridinoide</i> spp.	4	64.79	12	194.05	8	86.89	6	61.65	2	12.32	13	86.56	7	140.00	13	212.49	7	79.91
<i>Pyxidinospis reticulata</i>	0	0.00	0	0.00	3	32.58	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Quinquecuspis concreta</i> (cyst of <i>P. leonis</i> ?)	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	16.35	1	11.42
<i>Selenopemphix nephroides</i> (cyst of <i>P. subinermis</i>)	1	16.20	5	80.85	4	43.45	0	0.00	3	18.48	5	33.29	2	40.00	5	81.73	2	22.83
<i>Selenopemphix quanta</i> (cyst of <i>P. conicum</i>)	5	80.98	3	48.51	3	32.58	0	0.00	1	6.16	3	19.98	3	60.00	3	49.04	2	22.83
<i>Spiniferites membranaceus</i>	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	16.35	0	0.00
<i>Spiniferites mirabilis</i>	0	0.00	0	0.00	0	0.00	0	0.00	1	6.16	0	0.00	0	0.00	0	0.00	0	0.00
<i>Spiniferites pachydermus</i>	2	32.39	41	663.00	20	217.23	10	102.75	21	129.34	22	146.49	4	80.00	5	81.73	2	22.83
<i>Spiniferites ramosus</i>	0	0.00	1	16.17	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
<i>Spiniferites</i> spp.	1	16.20	1	16.17	4	43.45	4	41.10	6	36.95	10	66.59	5	100.00	5	81.73	3	34.25
<i>Votadinium calvum</i> (cyst of <i>P. oblongum</i>)	3	48.59	2	32.34	6	65.17	1	10.28	4	24.64	3	19.98	0	0.00	1	16.35	0	0.00
<i>Xandarodinium xanthum</i> (cyst of <i>P. divaricatum</i>)	0	0.00	0	0.00	0	0.00	1	10.28	0	0.00	0	0.00	1	20.00	0	0.00	0	0.00
Total dinoflagellate cysts	258		328		449		248		272		319		168		248		182	
Volume (ml) on slides	0.1		0.1		0.15		0.2		0.4		0.3		0.2		0.2		0.4	
Dry weight sediment (g)	0.3087		0.3092		0.3069		0.4866		0.4059		0.5006		0.25		0.3059		0.219	
Total concentration (cysts/g)	4178.814		5304.010		4876.724		2548.294		1675.289		2124.118		3360.000		4053.612		2077.626	

* indicates cysts per gram dry sediment