GSA Data Repository Item # 8514

Title of article Late Pliocene reorganization of deep vertical water-mass structure in the western South Atlantic: Faunal and isotopic evidence

Author(s) David A. Hodell, Douglas F. Williams, and James P. Kennett

see GSA Bulletin v. 96, p. 495 - 503

Contents 15 pages

Tables 1, 2, & 3 and Appendix of DSDP Sites

Table 1: Age framework for Sites 516A, 517, and 518 based upon extrapolation between planktonic foraminiferal datum levels. The ages assigned to the datums are those suggested by Thunnell (1979), which have been calibratged to the polarity time scale of McDougall (1977) and Manikinen and Dalrymple (1979).

Table 2: Results of Q-mode factor analysis on a data matrix composed of 30 benthic foraminiferal species by 43 samples from the Pliocene of DSDP Site 518. Three factors accounted for 93.3% of the total variance. The sum of the squares of the varimax factor scores equals the communality of the sample.

Table 3: Scaled varimax species factor scores derived from Q-mode factor analysis of 30 species of benthic foraminifera from 43 samples of Pliocene age from DSDP Site 518.

Table 1

Datum	FAD	LAD	SITES 516A (Depth, m)	517	518	Age (Thunell, 1979)	Age (Berggren and others, 1983)
Gr. puncticulata	X		35.9		44.0	4.44	4.40
Gs. seigliei		X	35.9			4.44	4.30
Gr. crassaformis	X				44.0	4.20	4.20
Gg. nepenthes		X	22.3		36.8	3.82	3.60
Gr. margaritae		X	19.4		32.4	3.41	3.40
Sphaeroidinellopsis spp.		X	15.0	36.5	30.0	3.10	2.80
Sa. dehiscens	X		15.0	36.5	29.5	3.10	2.80
Gq. altispira		X	12.5	37.5		2.91	2.50
Gr. multicamerata		X	12.5	37.5		2.91	2.50
Gr. miocenica		X		31.1		2.30	2.10
Gs. obliquus		X	9.6	25.2		1.80	2.10
Gr. truncatulinoides	X		9.6	25.2	17.8	1.80	1.90

DSDP Site 518

Table 2

Subbottom depth (m)	Age (Ma)	Communality	Varimax (rotated) Factors Factor 1	Factor 2	Factor 3
18.6	2.24	0.961	0.602	0.577	0.516
19.1	2.26	0.958	0.727	0.467	0.461
19.7	2.30	0.933	0.638	0.585	0.427
20.0	2.32	0.943	0.706	0.496	0.446
20.7	2.40	0.955	0.451	0.285	0.819
21.2	2.44	0.931	0.613	0.598	0.445
21.7	2.49	0.964	0.494	0.617	0.583
22.2	2.54	0.969	0.797	0.382	0.434
22.7	2.58	0.946	0.626	0.427	0.611
23.0	2.62	0.930	0.623	0.539	0.502
23.9	2.70	0.949	0.768	0.299	0.520
24.1	2.71	0.857	0.262	0.447	0.767
24.6	2.76	0.874	0.592	0.495	0.528
25.1	2.80	0.936	0.731	0.381	0.506
25.4	2.82	0.931	0.458	0.533	0.662
26.1	2.86	0.883	0.716	0.473	0.384
28.0	2.95	0.973	0.757	0.280	0.566
28.5	2.97	0.967	0.837	0.388	0.341
29.0	2.99	0.977	0.788	0.323	0.502
29.5	3.03	0.977	0.861	0.376	0.306
30.0	3.07	0.980	0.916	0.212	0.311
30.5	3.11	0.979	0.895	0.223	0.359
31.0	3.16	0.915	0.758	0.235	0.534
31.5	3.21	0.995	0.950	0.214	0.217
31.9	3.23	0.918	0.456	0.549	0.640
32.4	3.27	0.846	0.688	0.332	0.512
32.9	3.36	0.936	0.664	0.341	0.615
33.4	3.46	0.908	0.549	0.496	0.601
33.9	3.55	0.967	0.742	0.551	0.335
34.4	3.64	0.941	0.626	0.709	0.213
36.3	3.75	0.874	0.560	0.677	0.319
36.8	3.84	0.922	0.418	0.802	0.322
37.3	3.86	0.942	0.381	0.791	0.414
37.8	3.88	0.945	0.621	0.714	0.224
38.2	3.89	0.972	0.795	0.573	0.104
40.7	3.99	0.908	0.195	0.575	0.735
41.2	4.01	0.942	0.648	0.522	0.500
41.7	4.03	0.900	0.370	0.597	0.638
42.2	4.05	0.932	0.488	0.624	0.551
42.7	4.07	0.924	0.586	0.599	0.471
43.2	4.09	0.860	0.622	0.461	0.510
43.7	4.12	0.949	0.920	0.309	0.084
44.0	4.14	0.910	0.391	0.311	0.813
		Variance	39.157	30.909	23.252
	Cumulative	Variance	39.157	70.065	93.318

8514

Table 3 40/15

DSDP Site 518

Species	Scaled Varimax Factor Scores		
	Factor 1	Factor 2	Factor 3
Nuttalides umbonifera	5.280	1.015	-0.234
Epistominella exigua	0.858	-0.963	1.422
Planulina wuellerstorfi	-0.011	0.801	0.894
Pyrgo spp.	0.267	0.193	0.563
Oridorsalis umbonatus	-0.309	0.540	4.348
Oridorsalis tener	0.066	0.066	-0.011
Uvigerina peregrina	-0.336	2.344	-1.391
Globocassidulina subglobosa	-0.708	4.048	0.163
Cibicidoides kullenbergi	-0.326	1.435	-0.270
Quinqueloculina spp.	0.033	0.012	0.244
Quinqueloculina venusta	-0.007	0.160	-0.049
Fissurina spp.	-0.100	0.503	0.540
Pullenia bulloides	0.482	0.463	1.701
Pullenia quinqueloba	0.088	0.607	0.569
Ehrenbergina spp.	-0.179	0.491	-0.071
Gyroidinoides soldanii	-0.362	0.917	0.511
Gyroidinoides orbicularis	-0.121	0.652	-0.180
Pullenia sp.	0.109	0.215	0.161
Osangularia culter	-0.032	0.215	-0.102
Melonis pompilioides	-0.062	0.173	0.921
Sphaeroidina bulloides	0.154	-0.324	1.008
Bulimina rostrata	0.028	0.208	-0.160
Cibicides spp.	-0.002	0.100	-0.003
Laticarinina pauperata	-0.025	0.102	-0.022
Karreriella spp.	0.060	0.271	0.029
Eggerella spp.	-0.010	-0.001	0.108
Cibicidoides cicatricosus	-0.087	0.412	-0.048
Lagena spp.	0.124	0.287	-0.067
Nonion spp.	0.023	0.371	-0.192
Lenticulina spp.	-0.020	0.021	0.108

Subbottom depth (m)	Nuttalides umbonifera	Epistominella exigua	Planulina wuellerstorfi	Pyrgo spp.	Oridorsalis umbonatus	Oridorsalis tener	Uvigerina peregrina	Globocassidulina subglobosa	Cibicidoides kullenbergi	Quinqueloculina spp.	Quinqueloculina venusta	Fissurina spp.	Pullenia bulloides	Pullenia quinqueloba	Ehrenbergina spp.	Gyroidinoides soldanii
18.7	97	10	32	22	62	0	4	62	5	6	0	12	27	16	1	5
19.2	83	15	14	9	35	0	0	31	7	2	0	8	44	5	0	14
19.7	100	28	40	15	36	0	0	61	19	5	0	17	37	17	1	25
20.0	70	25	10	7	26	0	0	34	9	2	0	8	29	4	6	11
20.7	49	33	21	14	75	0	0	14	4	7	0	11	27	16	0	9
21.2	110	26	33	10	45	0	0	79	23	3	0	16	54	8	0	13
21.7	51	8	21	13	39	0	1	44	4	3	0	10	30	15	1	8
22.2	244	61	27	24	113	1	0	75	5	6	0	10	43	8	0	2
22.7	74	17	12	8	65	1	0	31	0	2	0	15	17	7	0	0
23.1	66	9	19	17	34	0	2	33	10	8	0	5	23	9	1	14
24.0	143	16	11	16	93	1	0	16	1	0	0	10	30	9	0	5
24.1	18	7	12	5	35	0	0	18	5	5	0	9	41	17	0	8
24.6	51	11	16	11	27	2	0	27	0	2	0	6	27	34	0	9
25.1	79	11	22	8	35	0	0	14	6	3	0	13	43	21	0	12
25.4	38	6	16	9	35	0	0	27	7	0	0	9	31	20	0	6
26.1	93	45	3	9	26	0	0	52	4	4	0	12	33	12	0	15
28.0	230	95	38	27	138	1	1	36	0	13	6	9	100	27	0	1
28.5	104	10	27	17	31	0	0	20	2	3	5	2	24	14	2	6
29.0	128	49	22	26	60	2	0	27	5	7	2	5	44	10	1	4
29.5	184	41	19	19	52	0	0	50	4	7	0	6	24	8	0	2
30.0	524	96	18	10	160	0	0	10	6	3	0	14	90	21	0	3
30.5	351	75	21	26	129	5	0	9	1	5	0	12	58	32	0	5
31.0	67	38	16	19	32	9	0	8	1	0	0	4	29	6	0	0
31.5	240	47	21	14	37	0	0	5	1	2	0	11	37	16	0	4
31.9	52	29	23	19	54	0	0	51	3	0	0	4	16	14	0	3
32.4	69	5	16	15	35	13	0	6	1	3	1	16	52	14	0	8
32.9	34	14	8	2	25	0	0	6	3	1	0	5	10	6	0	6
33.4	30	13	7	8	22	0	1	19	1	1	0	1	23	0	0	12
33.9	70	1	10	4	25	0	7	26	9	2	4	2	24	12	1	6
34.4	79	4	7	19	25	0	39	42	14	4	0	11	27	16	0	7
36.3	55	1	9	11	25	6	29	26	9	2	1	8	34	18	2	12
36.8	40	1	19	6	24	1	23	35	18	2	13	1	21	16	0	12
37.3	21	1	10	8	18	2	10	23	7	1	3	3	7	7	1	2
37.8	45	0	6	4	12	1	6	35	5	4	0	8	9	11	0	2
38.2	80	0	6	5	8	3	7	34	9	2	0	6	12	12	0	4
40.7	17	0	5	6	43	0	0	25	4	2	1	7	10	4	4	9
41.2	49	8	6	4	29	1	0	21	6	1	0	8	13	8	4	10
41.7	51	15	13	4	65	0	0	59	3	1	0	11	10	13	0	8
42.2	37	0	10	6	34	0	0	27	6	1	1	10	8	6	0	10
42.7	36	2	12	3	18	3	0	22	5	3	0	9	13	5	6	5
43.2	25	0	1	2	20	0	0	7	5	2	3	3	5	4	2	4
43.7	118	0	25	8	8	0	0	9	5	0	0	3	6	10	2	3
44.0	24	11	12	4	45	0	1	7	2	3	0	2	8	7	1	6

Subbottom depth (m)	Gyroidinoides orbicularis	Pullenia sp.	Osangularia culter	Melonis pompilioides	Sphaeroidina bulloides	Bulimina rostrata	Cibicides spp.	Laticarinina pauperata	Karreriella spp.	Eggerella spp.	Cibicidoides cicatricosus	Lagena spp.	Nonion spp.	Lenticulina spp.	Total
18.7	1	13	0	16	20	1	3	1	5	3	0	2	2	2	430
19.2	1	6	0	3	9	0	3	0	5	0	0	4	2	1	313
19.7	2	7	0	5	16	0	0	0	9	2	1	0	2	1	446
20.0	1	8	0	15	7	0	0	0	3	3	0	2	0	1	281
20.7	0	1	0	8	26	0	1	0	2	5	0	1	1	0	327
21.2	0	7	0	13	27	0	1	0	6	2	1	1	1	1	480
21.7	0	3	0	15	8	0	0	0	4	1	0	1	1	1	282
22.2	0	5	0	9	33	1	0	0	10	3	3	1	0	2	686
22.7	1	5	0	9	5	2	2	0	1	0	2	4	0	1	281
23.1	0	7	1	27	14	1	5	0	0	3	2	1	6	0	317
24.0	1	9	0	16	11	0	0	0	4	0	0	3	0	1	396
24.1	0	6	0	11	7	0	0	0	0	0	0	1	0	2	207
24.6	0	4	0	7	13	1	7	0	1	1	0	4	0	2	263
25.1	0	5	0	5	16	0	0	0	4	0	0	2	1	0	300
25.4	0	5	0	17	14	0	0	0	3	3	0	2	0	1	249
26.1	2	2	0	5	16	0	0	0	1	0	0	1	11	3	349
28.0	0	22	0	17	17	0	0	0	8	0	0	11	1	4	802
28.5	0	2	0	10	0	0	0	0	2	0	0	7	1	1	290
29.0	0	15	0	10	16	0	1	0	4	1	1	5	1	2	448
29.5	2	3	0	5	13	0	0	0	5	1	3	1	0	1	450
30.0	1	14	0	27	31	0	0	1	3	0	1	4	0	2	1039
30.5	4	2	0	6	13	0	0	0	2	1	4	10	0	0	771
31.0	0	6	0	6	13	0	0	0	2	1	4	10	0	0	271
31.5	0	13	0	5	16	0	0	0	3	0	1	4	2	0	479
31.9	2	3	0	12	11	0	2	0	4	0	5	1	1	1	310
32.4	2	8	9	7	0	0	0	0	6	0	2	1	0	2	290
32.9	8	1	0	10	4	0	0	0	2	1	1	0	0	0	147
33.4	1	0	1	4	5	1	0	1	2	0	2	2	2	0	159
33.9	2	3	1	10	0	0	0	0	1	2	1	9	0	1	231
34.4	11	4	3	4	4	12	1	0	7	0	3	5	7	0	355
36.3	9	4	2	3	5	8	1	3	4	0	4	8	15	2	316
36.8	8	5	4	1	0	3	1	0	4	0	0	6	5	0	269
37.3	3	0	0	4	0	2	0	0	7	2	1	3	3	0	149
37.8	2	3	0	3	0	1	1	1	3	0	1	1	0	0	164
38.2	0	4	0	2	1	2	1	1	9	0	2	6	8	0	216
40.7	0	4	0	4	0	0	0	1	0	1	2	2	0	0	151
41.2	5	0	0	16	2	0	0	0	7	0	6	4	3	2	213
41.7	3	1	0	25	13	0	0	1	11	0	3	2	3	3	318
42.2	2	0	0	5	0	0	1	0	3	1	3	3	2	2	178
42.7	3	1	0	13	8	0	0	0	3	0	4	3	0	0	177
43.2	2	7	0	1	0	0	1	1	1	0	3	2	0	1	102
43.7	0	5	0	3	0	0	0	0	1	1	2	5	0	0	214
44.0	0	1	0	3	9	0	0	0	2	0	0	3	1	0	152

DSDP Site 516A Globigerinoides quadrilobatus

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
9.81	2.70	0.33	2.03
9.91	2.71	0.39	2.09
10.11	2.73	0.41	1.75
10.61	2.77	0.22	1.92
11.11	2.80	0.42	1.87
11.35	2.82	0.39	2.02
12.35	2.90	0.23	1.93
12.51	2.91	0.15	1.89
13.01	2.95	0.14	1.71
13.51	2.99	0.52	1.89
14.01	3.02	0.32	1.86
14.51	3.06	0.19	1.80
14.81	3.08	0.32	1.94
15.01	3.10	0.45	1.86
15.51	3.14	0.47	1.91
16.01	3.17	0.13	2.07
16.25	3.19	0.13	2.11
16.81	3.23	0.11	2.07
16.91	3.23	0.21	1.75
17.41	3.27	0.29	2.31
17.91	3.30	0.36	2.13
18.41	3.34	0.44	2.08
18.91	3.37	0.57	2.22
19.41	3.41	0.58	2.08
19.91	3.48	0.54	2.01
20.05	3.50	0.08	1.94
20.35	3.54	0.31	1.88
20.41	3.55	0.64	2.10
20.51	3.57	0.56	2.07
20.69	3.59	0.44	1.86
21.18	3.66	0.26	1.83
21.31	3.68	0.60	2.00
21.61	3.72	0.28	1.99
21.81	3.75	0.31	2.12
22.31	3.82	0.41	1.88

DSDP Site 516A Globigerinoides quadrilobatus (cont'd)

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
23.31	3.87	0.16	1.84
23.81	3.89	0.17	1.92
24.31	3.91	0.23	1.93
24.81	3.93	0.21	2.30
25.31	3.96	0.15	2.15
25.71	3.98	0.26	2.12
26.21	4.00	0.31	2.10
26.71	4.02	0.11	1.98
27.21	4.05	0.14	2.24
27.71	4.07	0.30	1.96
28.21	4.09	0.30	2.07
28.71	4.11	0.30	2.17
29.21	4.14	0.40	2.11
30.11	4.18	0.41	2.16
30.61	4.20	0.43	1.98
31.11	4.22	0.37	2.41
31.61	4.25	0.40	1.96
32.11	4.27	0.21	1.96
32.61	4.29	0.65	2.13
33.11	4.31	0.40	2.25
33.61	4.34	0.51	2.42
34.11	4.36	0.19	2.43
34.51	4.38	0.14	2.38
35.01	4.40	0.29	2.18
35.51	4.43	0.25	2.54
35.69	4.43	0.22	1.94
35.91	4.44	0.41	1.97
36.01	4.44	0.09	2.47
36.51	4.47	0.13	2.58
36.79	4.49	-0.06	2.31
37.01	4.51	0.10	2.40
37.41	4.54	0.19	2.19
37.51	4.54	0.41	2.62
37.65	4.55	0.16	2.23
37.85	4.57	0.05	2.15
38.01	4.58	0.30	2.45
38.51	4.61	0.20	2.41

8514
90/15

DSDP Site 516A *P. wuellerstorfi*/*C. kullenbergi*

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
9.91	2.71	2.88	1.13
10.11	2.73	2.17	0.42
10.61	2.77	2.76	0.87
11.11	2.80	2.91	0.85
11.35	2.82	2.62	0.89
12.35	2.90	2.68	0.81
12.51	2.91	2.88	0.83
13.01	2.95	2.86	1.07
13.51	2.99	2.71	0.86
14.01	3.02	2.43	0.62
14.51	3.06	2.43	0.57
14.81	3.08	2.61	1.11
15.01	3.10	2.53	0.76
15.51	3.14	2.71	0.71
16.01	3.17	2.43	0.51
16.25	3.19	2.49	0.86
16.81	3.23	2.44	1.01
16.91	3.23	2.20	0.89
17.41	3.27	2.36	0.68
17.91	3.30	2.47	0.80
18.41	3.34	2.23	0.79
18.91	3.37	2.32	0.69
19.41	3.41	2.15	0.60
19.91	3.48	2.23	0.50
20.05	3.50	2.29	0.83
20.35	3.54	2.46	0.97
20.41	3.55	2.35	0.87
20.51	3.57	2.29	1.00
20.69	3.59	2.37	1.02
21.18	3.66	2.50	0.89
21.31	3.68	2.24	0.58
21.61	3.72	2.21	0.85
21.81	3.75	2.16	0.77

DSDP Site 516A P. wuellerstorfi/C. kullenbergi (cont'd)

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
22.81	3.84	2.44	0.77
23.31	3.87	2.11	0.60
23.81	3.89	2.27	0.72
24.31	3.91	2.34	0.67
24.81	3.93	2.37	0.70
25.31	3.96	2.27	0.64
25.71	3.98	2.40	0.57
26.21	4.00	1.97	0.78
26.71	4.02	2.18	0.71
27.21	4.05	2.16	0.84
27.71	4.07	2.18	0.66
28.21	4.09	1.90	0.73
28.71	4.11	1.98	0.77
29.21	4.14	2.16	0.67
30.11	4.18	2.25	0.59
30.61	4.20	2.33	0.79
31.11	4.22	2.13	0.92
31.61	4.25	2.38	0.83
32.11	4.27	2.26	0.80
32.61	4.29	2.15	1.06
33.11	4.31	2.31	0.77
33.61	4.31	2.37	0.95
34.11	4.36	2.42	1.02
34.51	4.38	2.77	0.76
35.01	4.40	2.34	0.36
35.51	4.43	2.31	0.64
35.69	4.43	3.06	0.89
35.91	4.44	3.06	0.54
36.01	4.44	2.30	0.90
36.51	4.47	2.26	0.90
37.01	4.51	2.11	0.82
37.51	4.54	2.20	1.01
38.01	4.58	2.29	0.87
38.51	4.61	2.12	0.86

DSDP Site 517 Globigerinoides quadrilobatus

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
24.71	1.76	-0.04	1.86
25.21	1.80	-0.10	2.04
25.71	1.84	-0.01	1.65
26.21	1.88	0.04	2.00
26.71	1.93	-0.08	2.12
27.21	1.97	0.02	1.94
27.71	2.01	0.04	2.18
28.21	2.05	-0.10	1.79
29.11	2.13	0.02	1.94
29.61	2.17	-0.07	1.74
30.11	2.22	-0.02	2.01
30.61	2.26	-0.09	1.87
31.11	2.30	0.11	2.19
31.61	2.35	0.27	1.79
32.11	2.40	0.39	1.94
32.61	2.44	0.20	1.77
33.11	2.49	0.14	1.93
33.51	2.53	0.05	2.03
34.01	2.58	0.21	2.15
34.51	2.62	0.32	1.94
35.01	2.67	0.48	1.99
35.51	2.72	-0.17	2.26
36.51	2.81	0.16	2.11
37.01	2.86	-0.11	2.13
37.51	2.91	0.03	2.26
37.91	2.96	0.08	2.11
38.41	2.97	0.02	2.04
38.91	2.99	0.09	2.03
40.91	3.00	0.17	1.92
41.41	3.01	0.21	2.00
43.81	3.07	0.05	1.93
44.31	3.09	0.19	2.21
44.81	3.10	-0.11	2.31
45.31	3.11	-0.08	2.15
45.81	3.13	0.08	2.14
46.31	3.14	-0.13	2.20
46.71	3.15	0.20	2.13
47.21	3.16	0.29	1.90
47.71	3.18	0.01	1.71
48.21	3.19	0.34	2.08
48.71	3.20	0.62	1.94
49.21	3.21	0.12	2.35
49.71	3.23	0.50	2.11
50.21	3.24	0.40	2.13
50.71	3.25	0.23	1.68

8514
12 of 15

DSDP Site 517 P. wuellerstorfi/C. kullenbergi

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
24.71	1.76	2.63	1.23
25.21	1.80	2.76	1.23
25.71	1.84	3.06	0.69
26.21	1.88	2.77	0.78
26.71	1.93	2.86	0.72
27.21	1.97	2.66	0.81
27.71	2.01	2.82	1.08
28.18	2.05	2.64	0.84
28.21	2.05	2.71	0.91
29.11	2.13	2.82	0.92
29.61	2.17	3.15	0.98
30.02	2.21	2.87	1.28
30.06	2.26	2.80	0.86
31.08	2.28	2.89	0.69
31.11	2.30	2.93	0.70
31.61	2.35	2.94	0.62
32.11	2.40	2.82	0.85
32.61	2.44	2.95	1.05
32.90	2.47	2.60	0.94
33.51	2.53	2.63	1.07
34.51	2.62	3.24	0.78
34.98	2.67	3.04	0.57
35.48	2.72	2.63	0.93
35.51	2.72	2.37	0.80
35.80	2.75	2.34	0.93

DSDP Site 517 P. wuellerstorfi/C. kullenbergi (cont'd)

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
37.50	2.91	2.34	0.99
37.91	2.96	2.36	1.06
38.36	2.97	2.51	0.87
38.91	2.99	2.37	1.08
39.41	2.96	2.36	1.06
40.41	2.99	2.37	1.08
40.88	3.00	2.59	0.97
41.38	3.01	2.57	0.97
41.41	3.01	2.39	0.87
42.61	3.04	2.71	0.64
42.80	3.04	2.36	0.87
43.30	3.06	2.75	0.96
43.81	3.07	3.00	0.26
44.08	3.08	2.61	0.90
44.31	3.09	2.31	1.06
44.81	3.10	2.22	1.03
45.28	3.11	1.93	0.98
45.31	3.11	2.22	0.97
45.81	3.13	2.13	0.97
46.28	3.14	2.09	0.99
46.73	3.15	3.24	0.61
47.71	3.18	2.42	0.91
48.21	3.19	2.67	0.82
48.71	3.20	2.43	0.86
49.21	3.21	2.24	0.87
49.71	3.23	2.17	1.17
50.71	3.25	2.04	0.62

DSDP Site 518 Globigerinoides quadrilobatus

85 14

14 of 15

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
18.7	2.24	0.10	1.64
19.2	2.26	-0.54	1.71
19.7	2.30	-0.31	1.58
20.2	2.35	0.00	1.83
20.7	2.40	0.18	1.62
21.2	2.44	-0.68	1.78
21.7	2.49	-0.61	1.47
22.2	2.54	0.12	1.35
22.7	2.58	0.23	1.73
23.1	2.62	-0.18	1.44
24.0	2.70	0.10	1.77
24.1	2.71	0.22	1.84
24.6	2.76	-0.46	1.72
25.1	2.80	-0.04	1.74
25.4	2.82	-0.07	1.50
26.1	2.86	-0.48	1.85
28.0	2.95	0.01	1.33
28.5	2.97	-0.29	1.54
29.0	2.99	-0.10	1.53
29.5	3.03	0.05	1.50
30.5	3.11	0.37	1.70
31.0	3.16	0.15	1.67
31.5	3.21	-0.08	1.51
31.9	3.23	0.26	1.75
32.4	3.27	0.03	1.47
32.9	3.36	-0.09	1.84
33.4	3.46	-0.09	1.77
33.4	3.46	-0.09	1.77
33.6	3.50	0.08	1.98
33.9	3.55	0.27	1.99
34.1	3.59	0.28	1.85
34.4	3.64	0.45	1.90
34.8	3.72	0.21	1.92
36.3	3.75	0.39	1.86
36.5	3.82	0.28	2.03
36.8	3.84	0.19	1.79
37.3	3.86	0.55	1.66
37.8	3.88	0.19	1.81
38.1	3.89	0.34	1.83
38.2	3.89	0.31	1.86
38.5	3.90	0.09	1.91
40.6	3.98	0.39	1.90
40.7	3.99	0.38	1.63
41.2	4.01	0.28	1.78
41.7	4.03	0.20	1.39
42.2	4.05	0.10	1.79
42.4	4.06	0.46	1.98
42.7	4.07	0.32	1.72

DSDP Site 518 P. wuellerstorfi/C. kullenbergi

Subbottom depth (m)	Age (Ma)	$\delta^{18}O$ (o/oo, PDB)	$\delta^{13}C$ (o/oo, PDB)
18.7	2.24	2.97	0.70
19.7	2.30	2.79	0.80
20.2	2.35	2.79	0.80
20.7	2.40	3.36	0.24
21.2	2.44	2.81	0.41
21.7	2.49	2.48	0.87
22.2	2.54	2.80	0.59
22.7	2.58	3.00	0.54
23.1	2.62	3.22	0.69
24.1	2.71	2.67	0.99
25.1	2.80	2.53	0.84
26.1	2.86	2.91	0.50
28.0	2.95	3.08	0.50
28.5	2.97	2.73	0.43
29.0	2.99	2.95	-0.02
29.5	3.03	2.63	0.56
30.0	3.06	3.21	0.40
30.5	3.11	2.98	0.33
31.0	3.16	2.71	0.27
31.5	3.21	2.75	0.44
31.9	3.23	2.48	0.66
32.4	3.27	2.75	0.65
32.9	3.36	2.08	0.86
33.3	3.45	2.19	0.75
33.6	3.50	2.14	0.82
33.9	3.55	2.41	0.53
34.1	3.59	2.09	1.10
34.4	3.64	2.39	0.96
34.8	3.72	2.08	1.03
36.8	3.84	2.32	1.00
37.3	3.86	2.38	0.96
37.8	3.88	2.16	0.92
38.1	3.89	2.13	1.04
38.2	3.89	2.16	1.00
38.5	3.90	2.12	1.17
40.6	3.98	2.13	0.74
41.2	4.01	2.44	0.80
41.7	4.03	2.50	0.59
42.2	4.05	2.50	0.89
42.4	4.06	2.37	0.97
42.7	4.07	2.28	0.73
43.2	4.09	2.39	0.74
43.3	4.10	2.23	0.30
43.7	4.12	2.56	0.83
43.8	4.13	2.12	0.71
44.0	4.14	2.36	0.76