Paleoceanography

Supporting Information for

Glacial-Interglacial Changes in Central Tropical Pacific Surface Seawater Property Gradients

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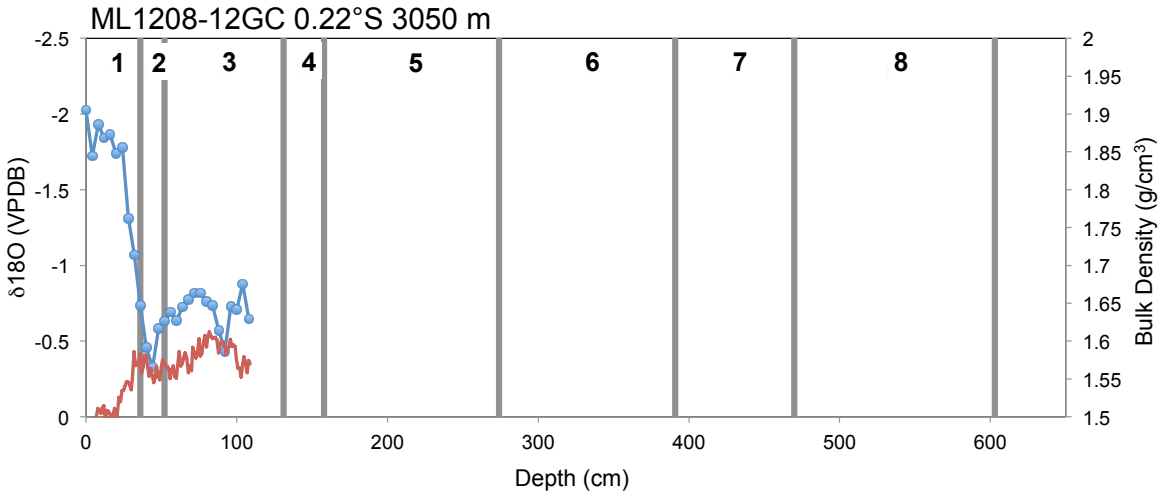
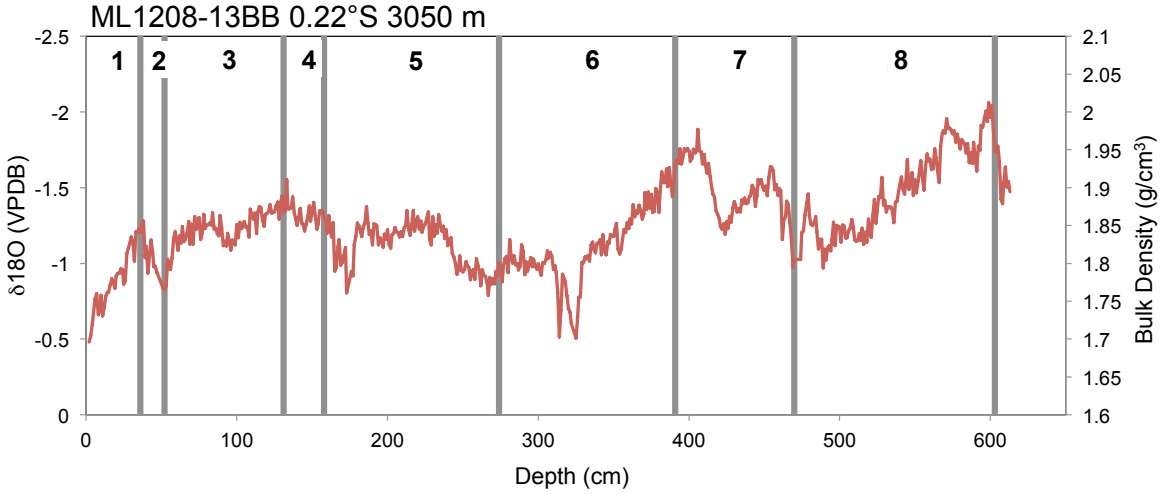
Contents of this file

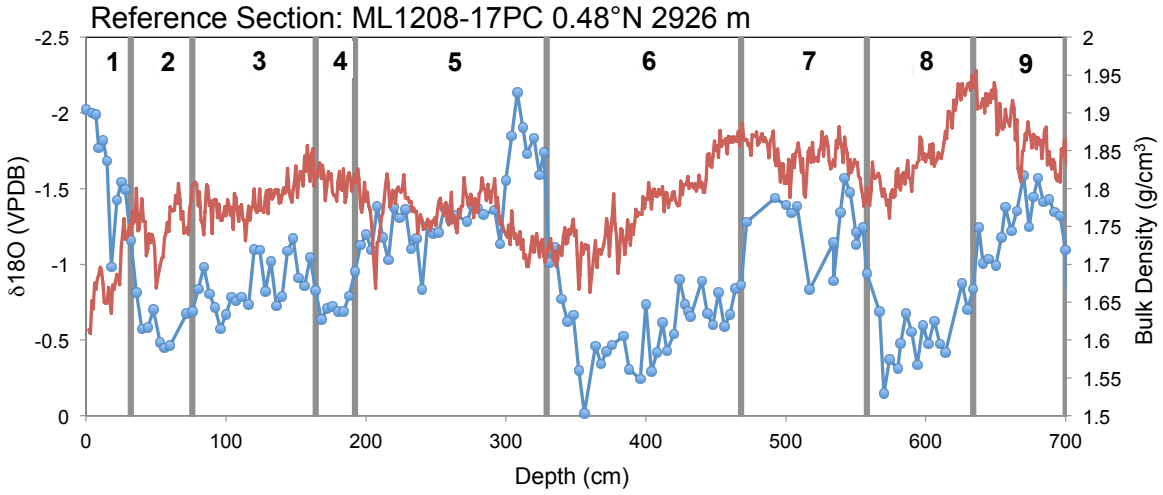
Introduction

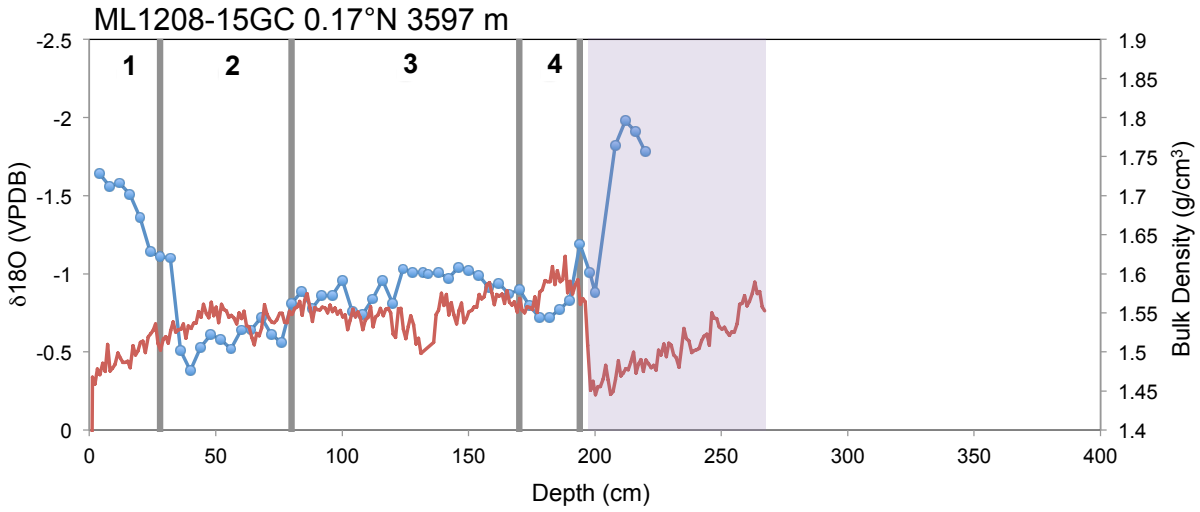
The Supporting Information contains a figure with the Bulk density data for all cores, and oxygen isotope data for select cores. There is also a table containing the core top oxygen isotope data and another containing the age model control points.

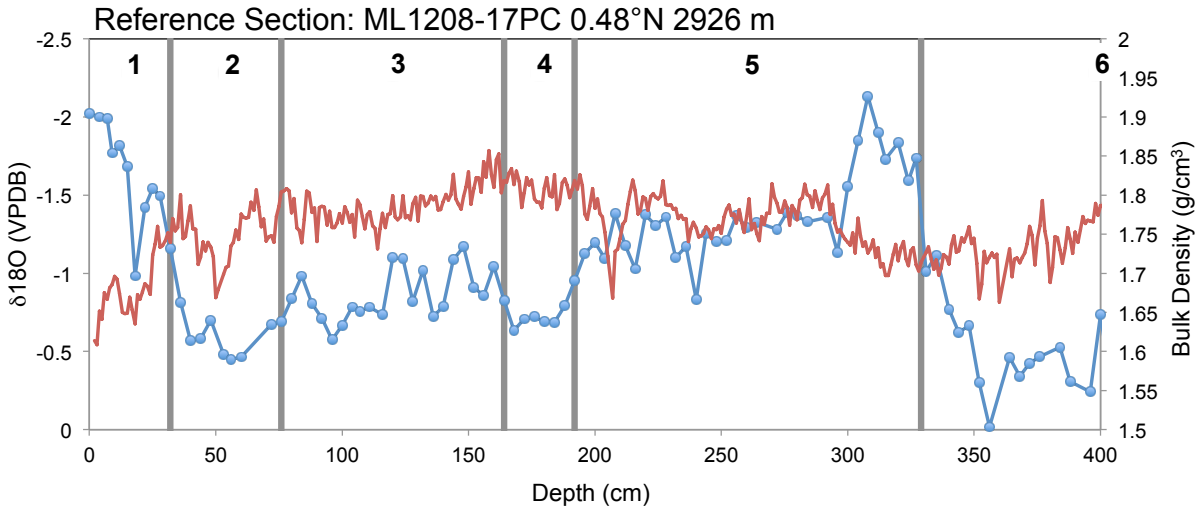
Figure S1. Bulk density as measured by MST (red line), oxygen isotope composition of *G. ruber* (blue symbols) for MGL1208 sediment cores. Cores are organized by latitude from South to North. All cores are shown with the reference core that was used to estimate the location of the Marine Isotope Stage boundaries. These boundaries are indicated with a vertical line and are located based either on oxygen isotope data where available, or on the correlation of the bulk density data with that in the reference core.


ML1208-12GC 0.22°S 3050 m
1
2
3
4
5
6
7
8
δ18O (VPDB)
Bulk Density (g/cm3)
Depth (cm)


ML1208-13BB 0.22°S 3050 m
1
2
3
4
5
6
7
8
δ18O (VPDB)
Bulk Density (g/cm3)
Depth (cm)

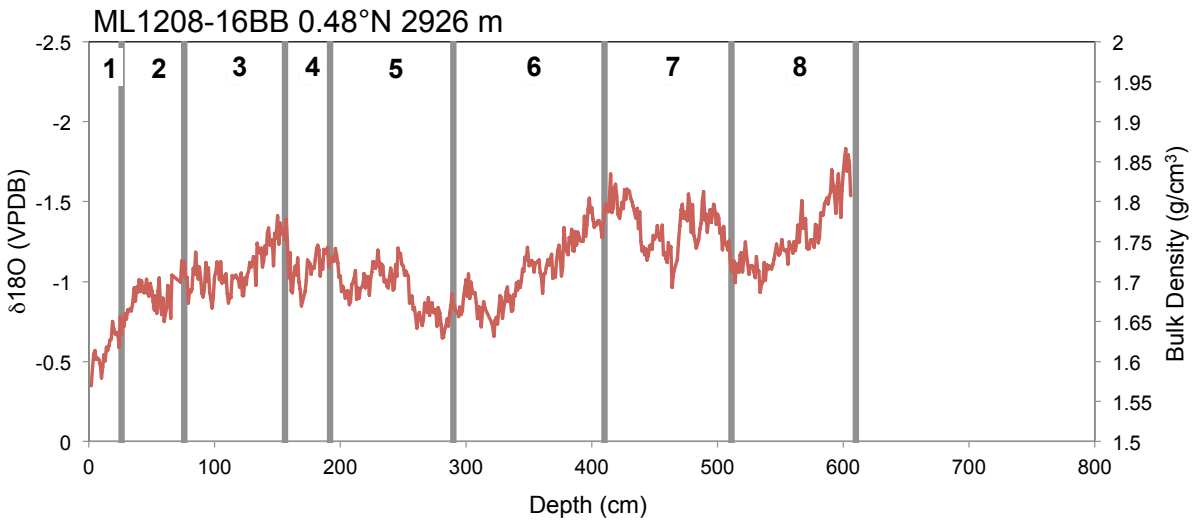

Reference Section: ML1208-17PC 0.48°N 2926 m
1
2
3
4
5
6
7
8
9
δ18O (VPDB)
Bulk Density (g/cm3)
Depth (cm)

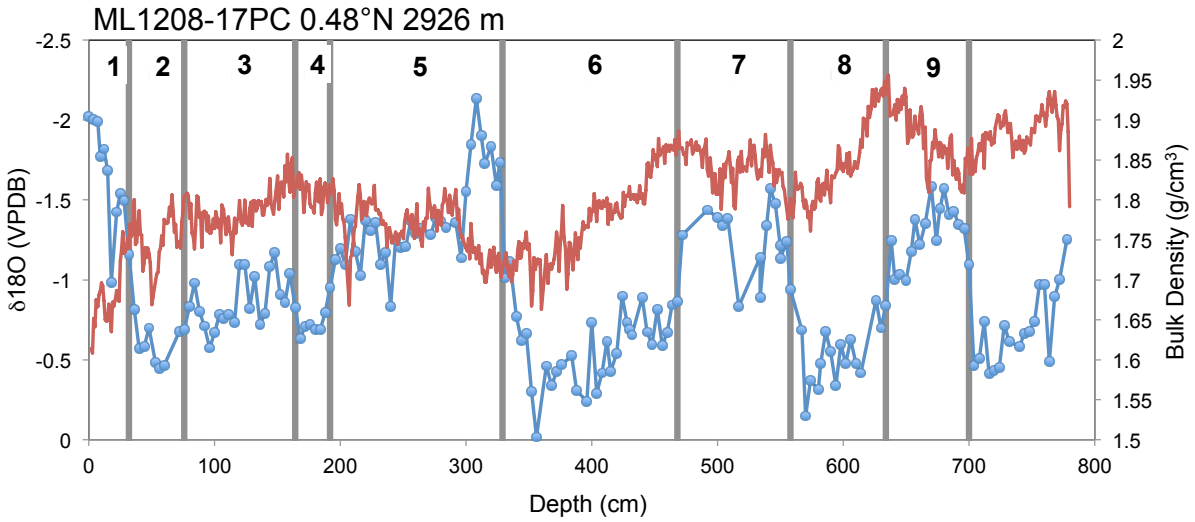


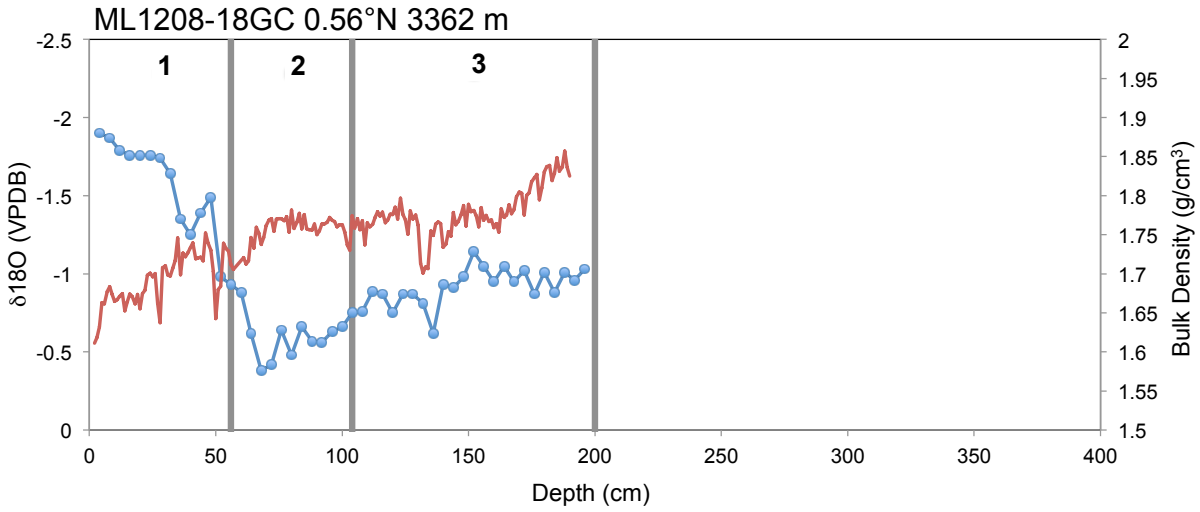


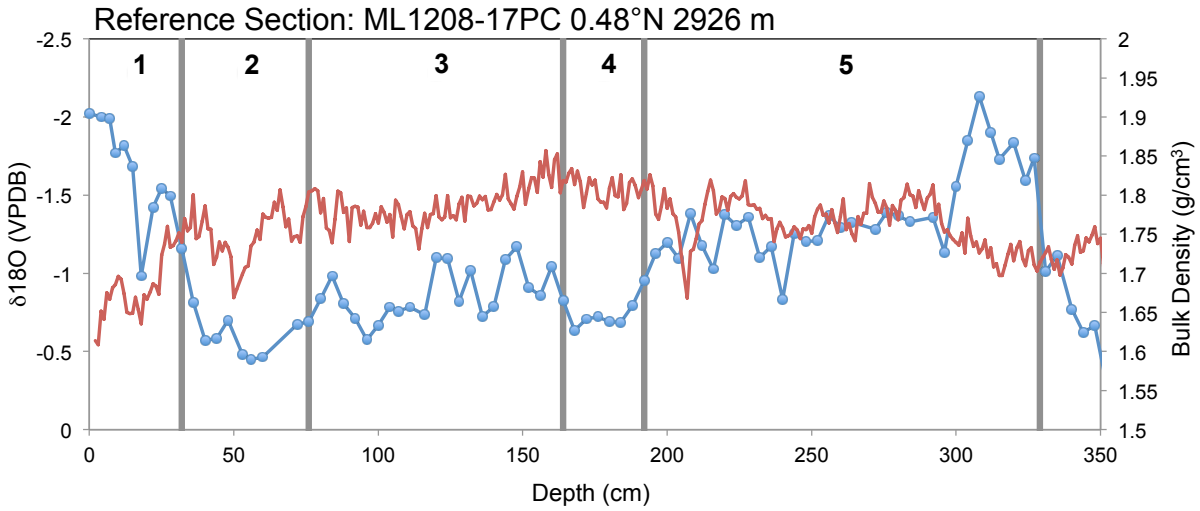
Section below hiatus or double penetration at 195 cm marked with purple box

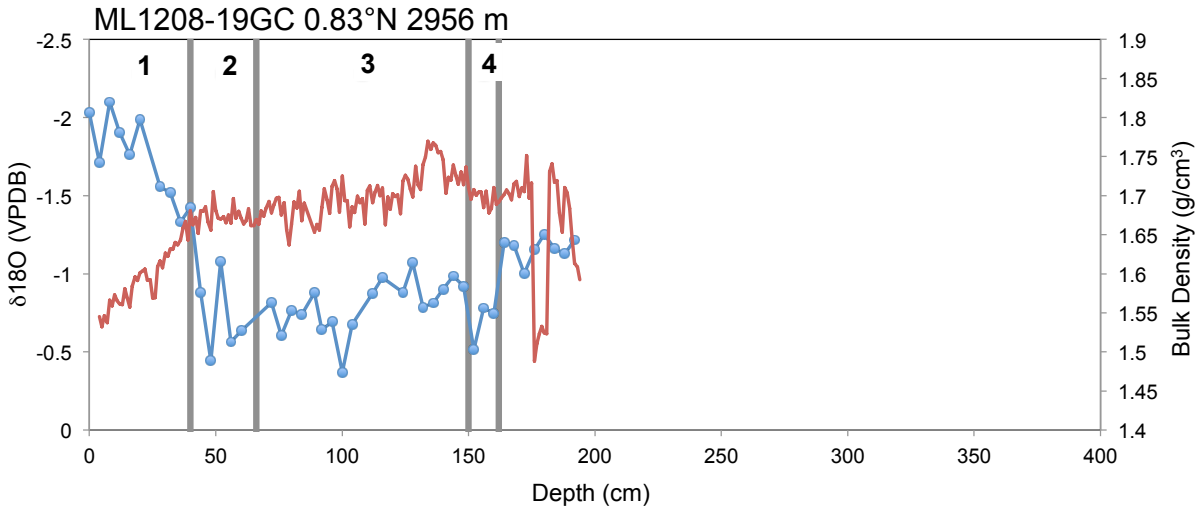
]

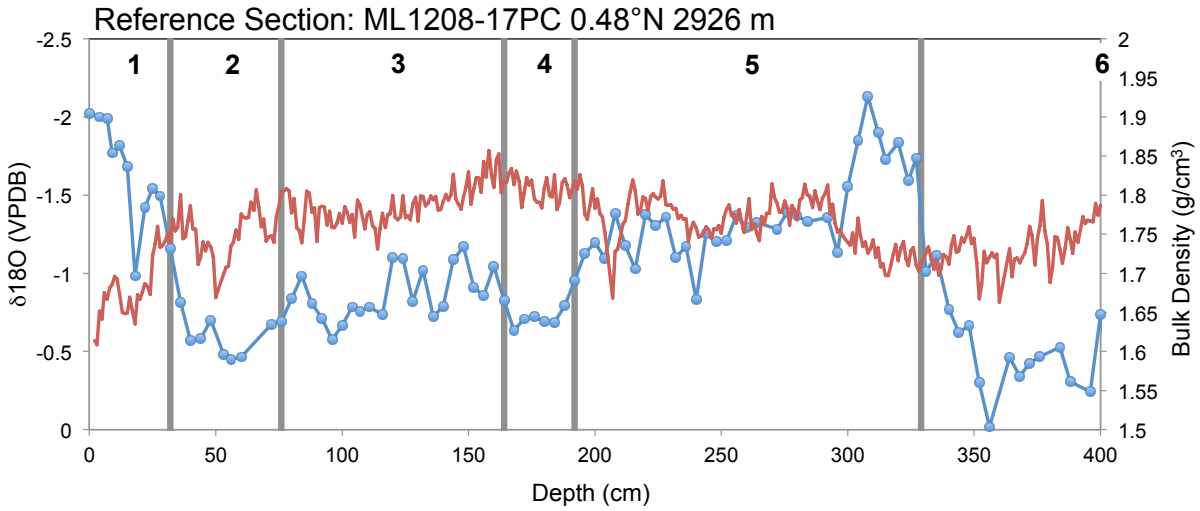

ML1208-16BB 0.48°N 2926 m
1
2
3
4
5
6
7
8
δ18O (VPDB)
Bulk Density (g/cm3)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
100
200
300
400
500
600
700
800

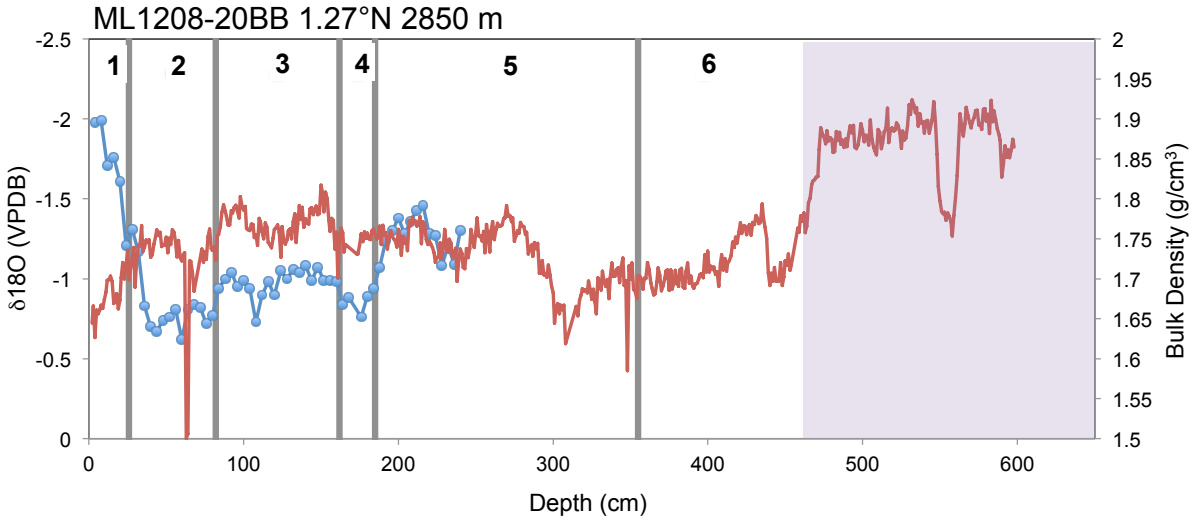

ML1208-17PC 0.48°N 2926 m
1
2
3
4
5
6
7
8
9
δ18O (VPDB)
Bulk Density (g/cm3)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
100
200
300
400
500
600
700
800

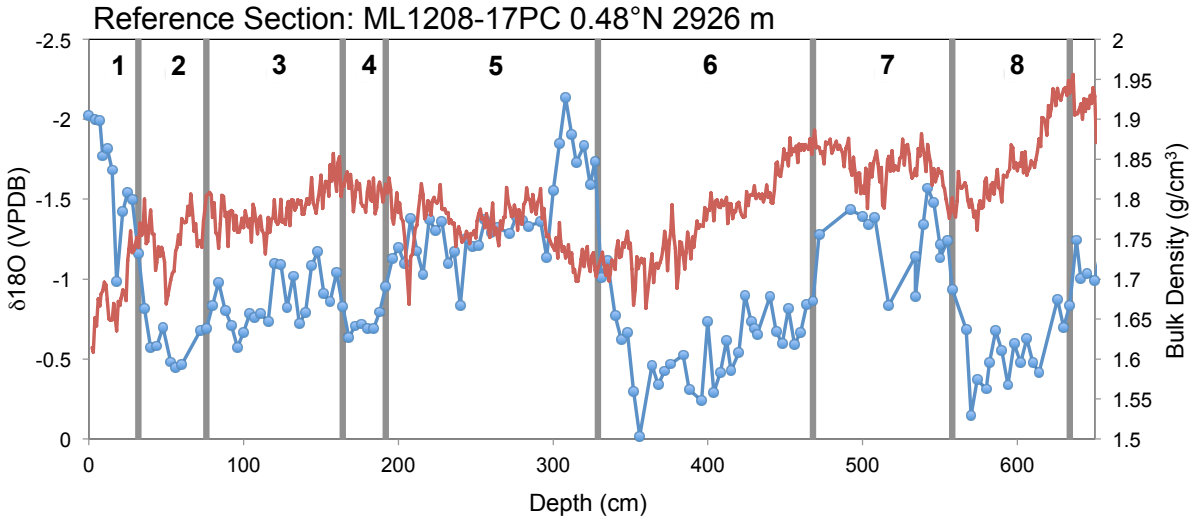

ML1208-18GC 0.56°N 3362 m
1
2
3
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
50
100
150
200
250
300
350
400


Reference Section: ML1208-17PC 0.48°N 2926 m
1
2
3
4
5
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
50
100
150
200
250
300
350

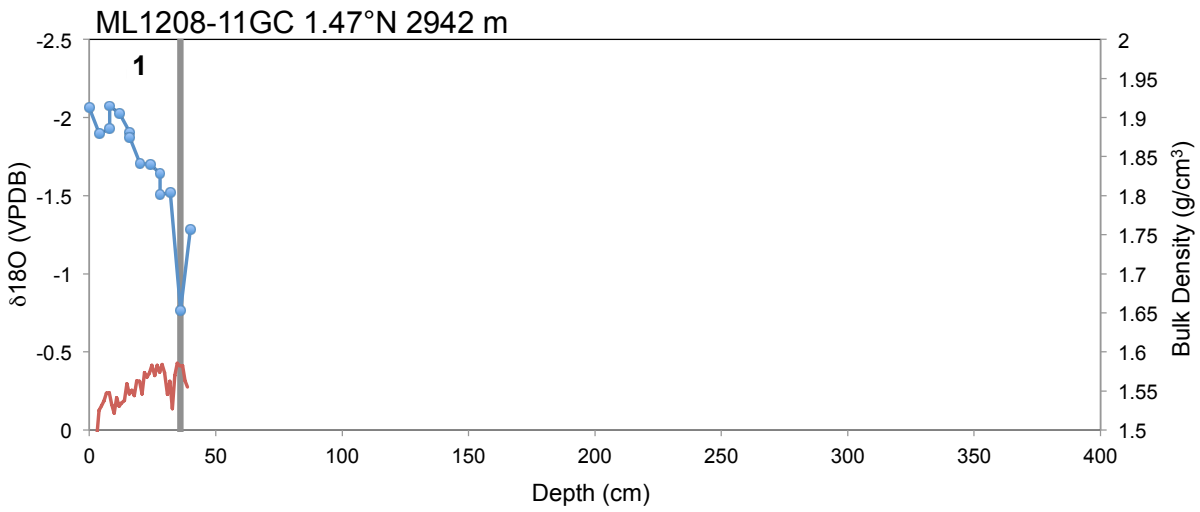

ML1208-19GC 0.83°N 2956 m
1
2
3
4
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
1.45
1.4
0
50
100
150
200
250
300
350
400

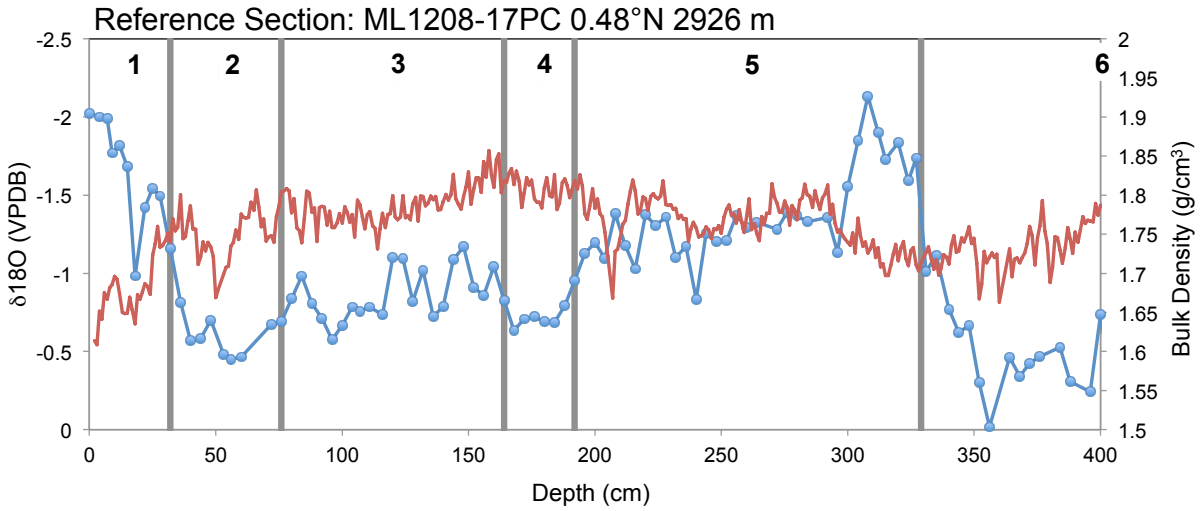

Reference Section: ML1208-17PC 0.48°N 2926 m
1
2
3
4
5
6
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
50
100
150
200
250
300
350
400

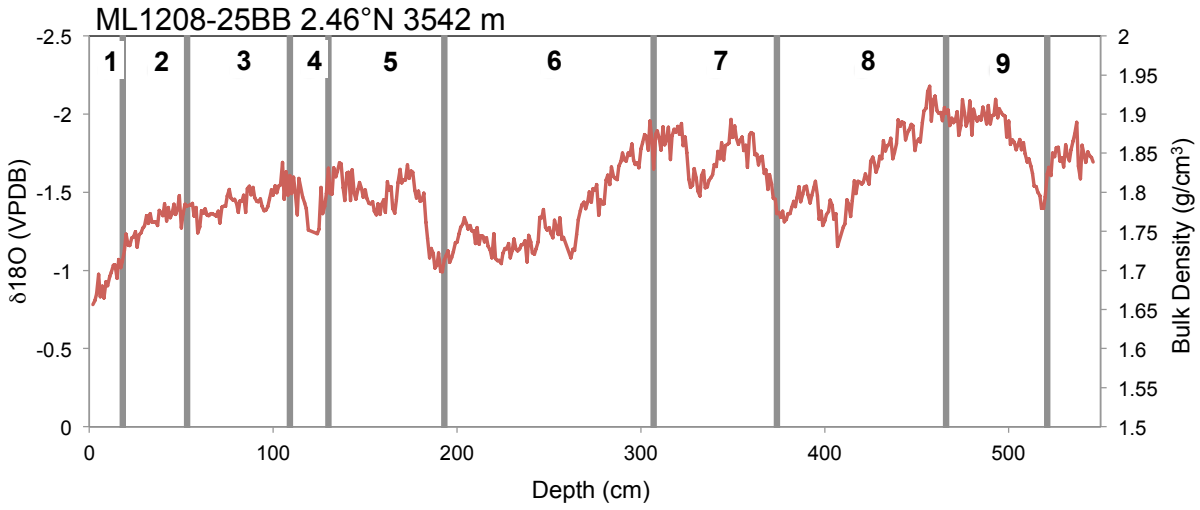




Section below hiatus marked with purple box


ML1208-11GC 1.47°N 2942 m
1
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
50
100
150
200
250
300
350
400


Reference Section: ML1208-17PC 0.48°N 2926 m
1
2
3
4
5
6
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
50
100
150
200
250
300
350
400


ML1208-25BB 2.46°N 3542 m
1
2
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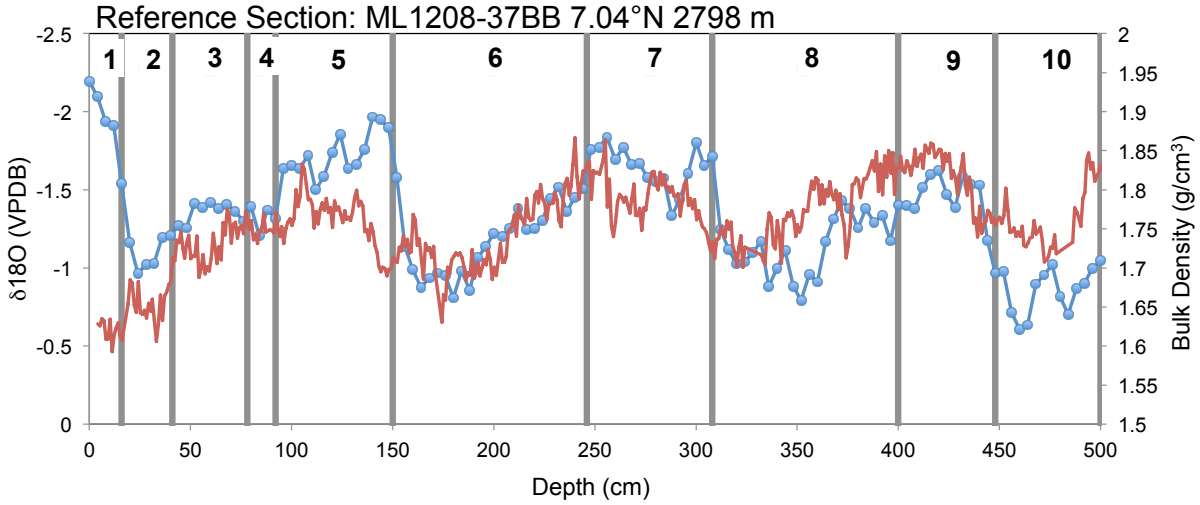
8
9
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)


Reference Section: ML1208-37BB 7.04°N 2798 m
1
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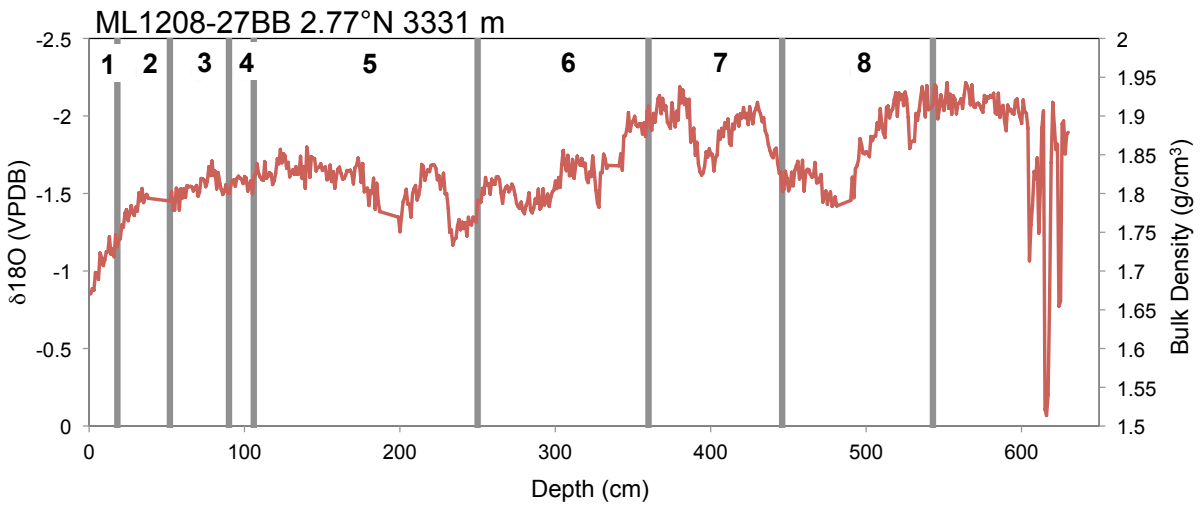
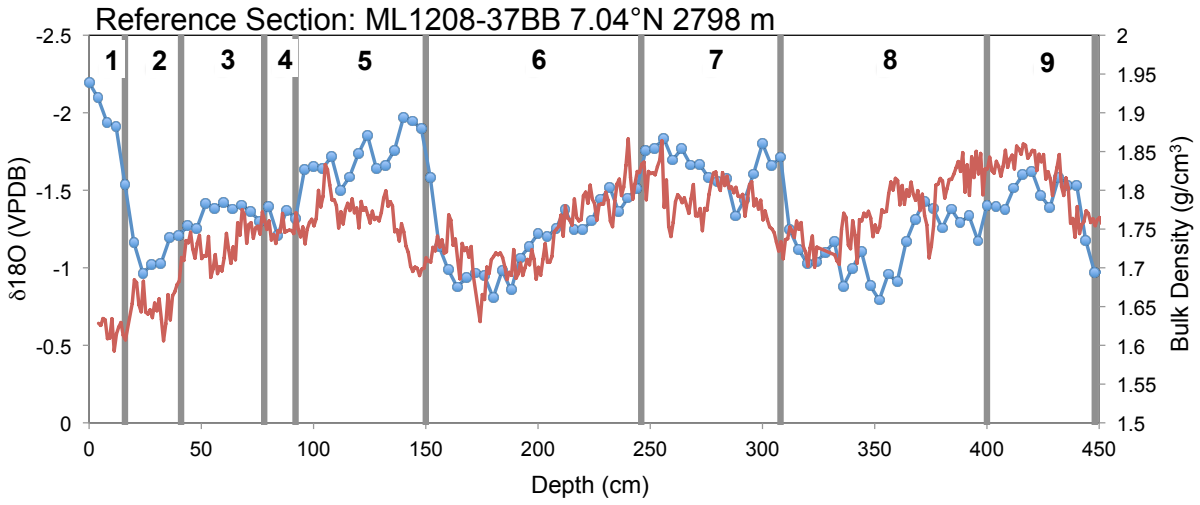
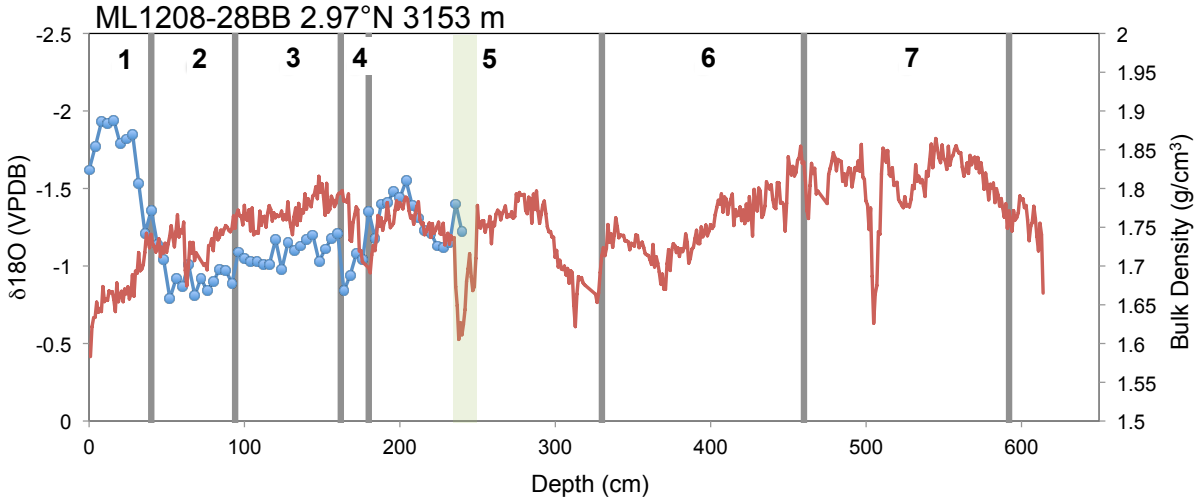
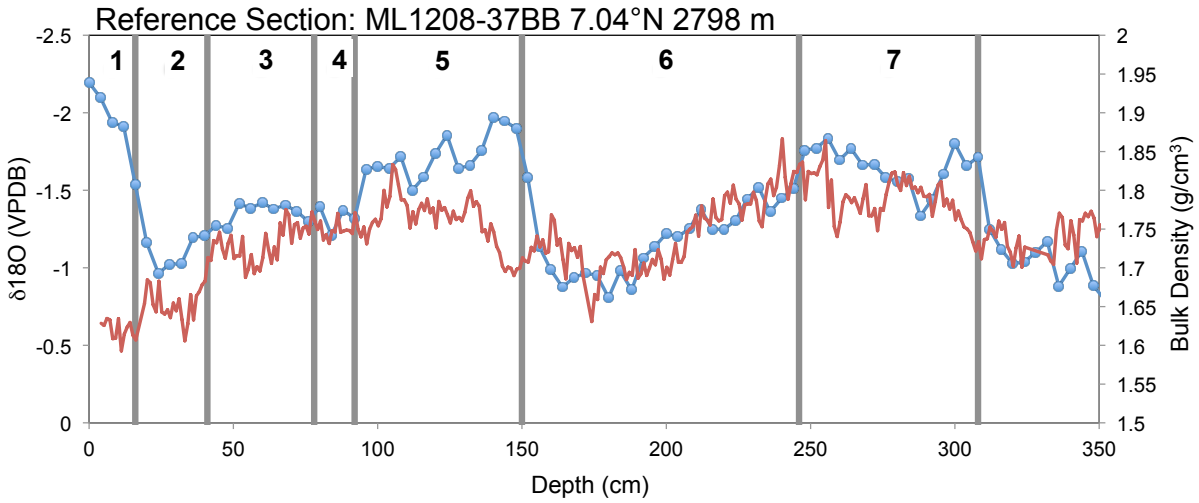
8
9
10
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)



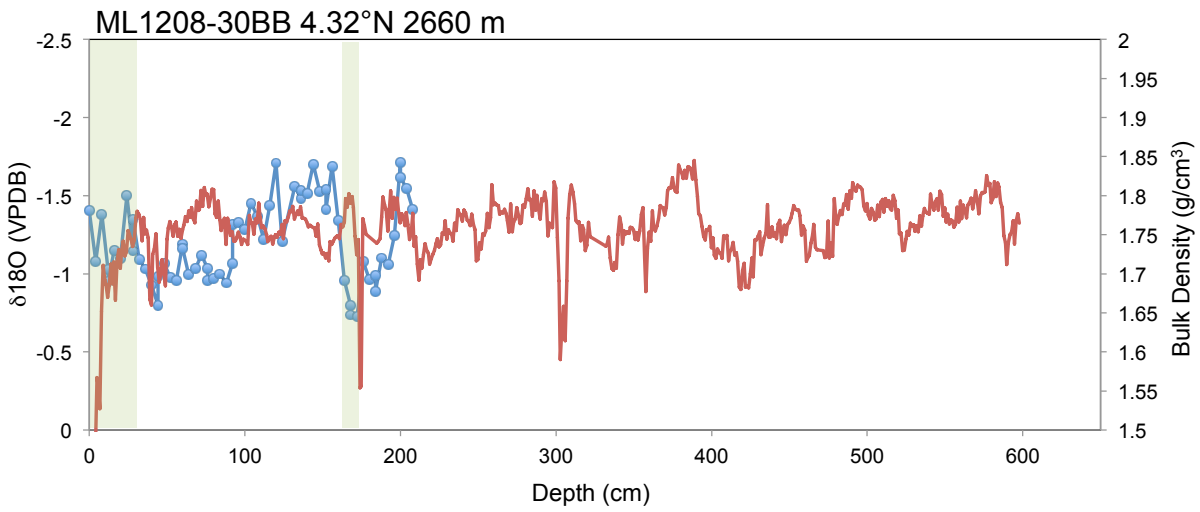


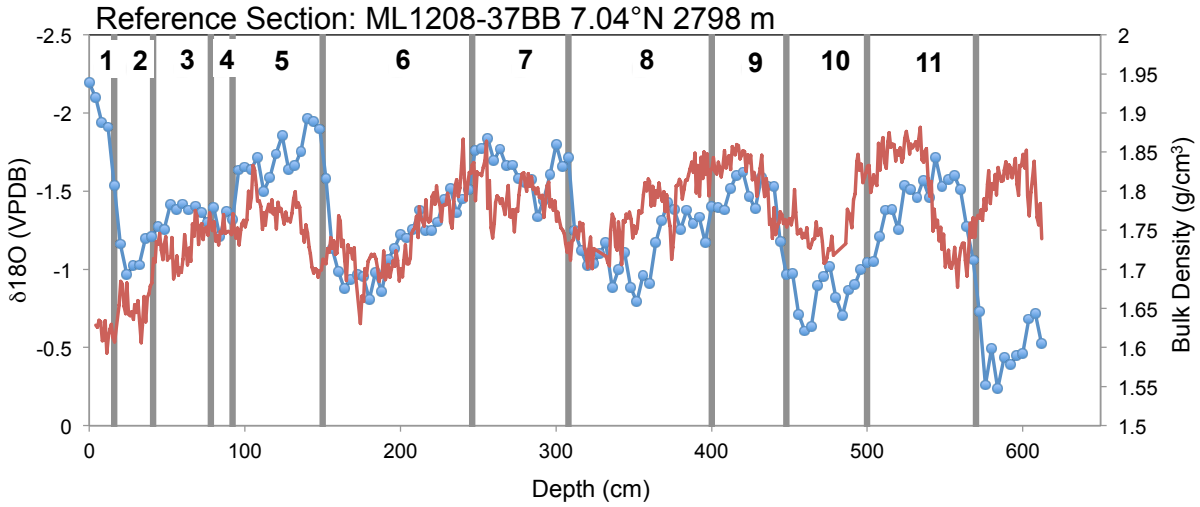
Bottom 20 cm disturbed during cutting
Top 10 cm compressed during extrusion



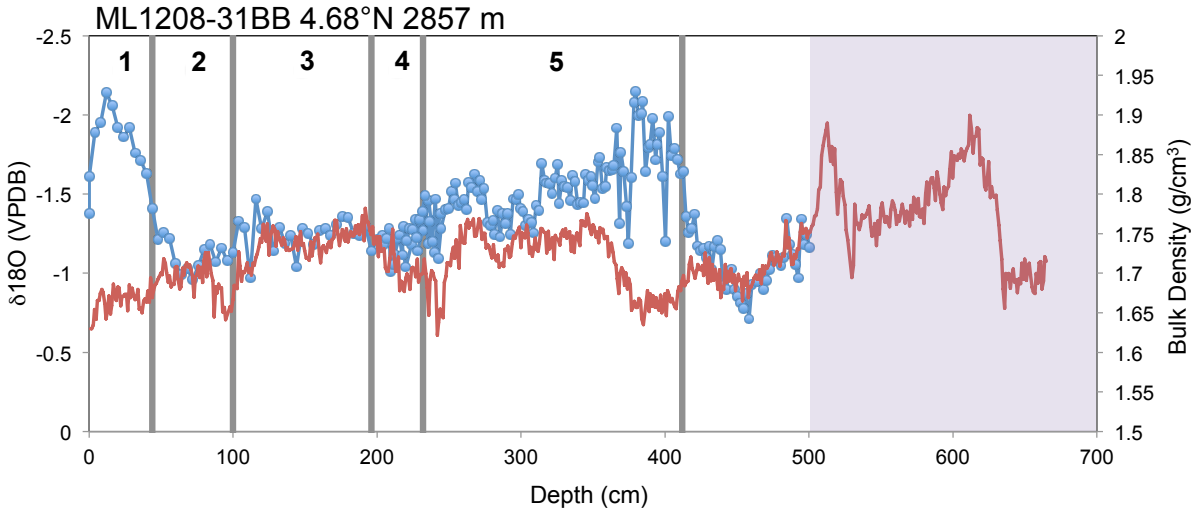


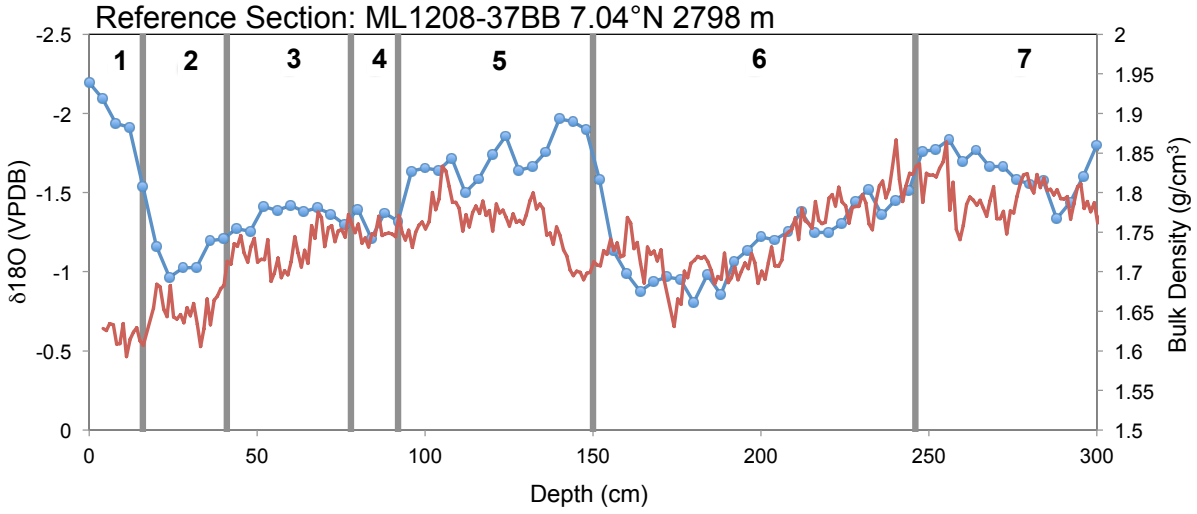
Sand layer identified during sample washing indicated in green



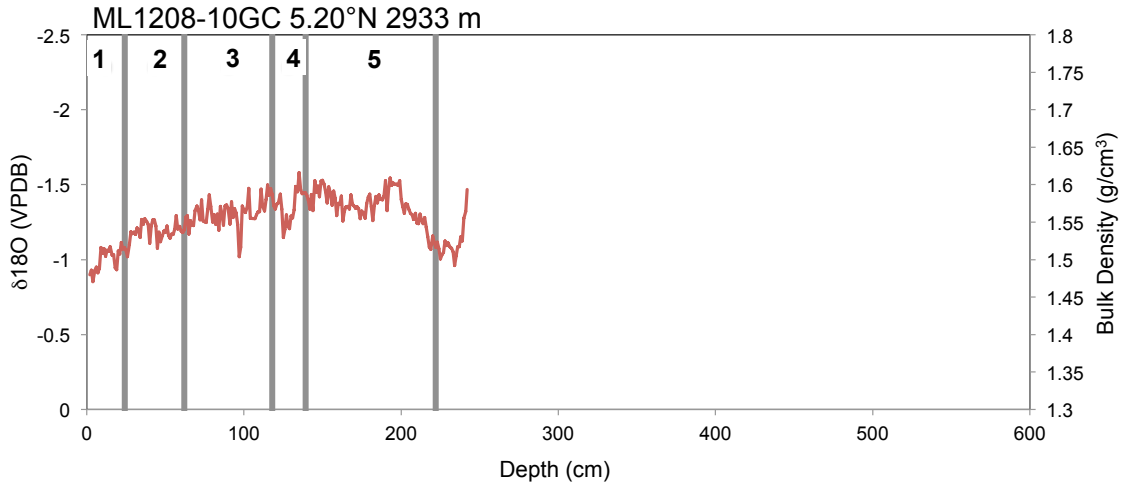


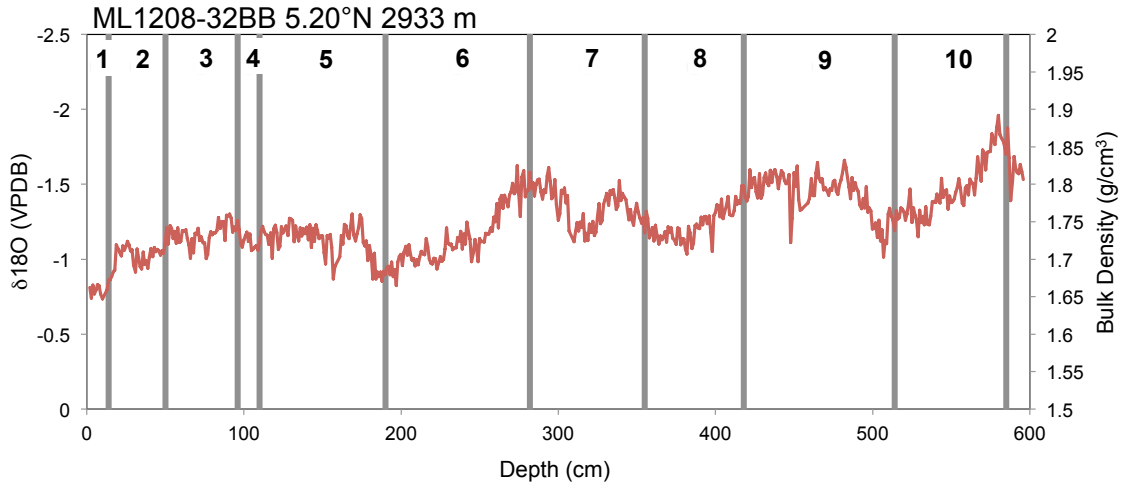
Sand layers identified during sample washing indicated in green
Top 25 cm mixed during recovery

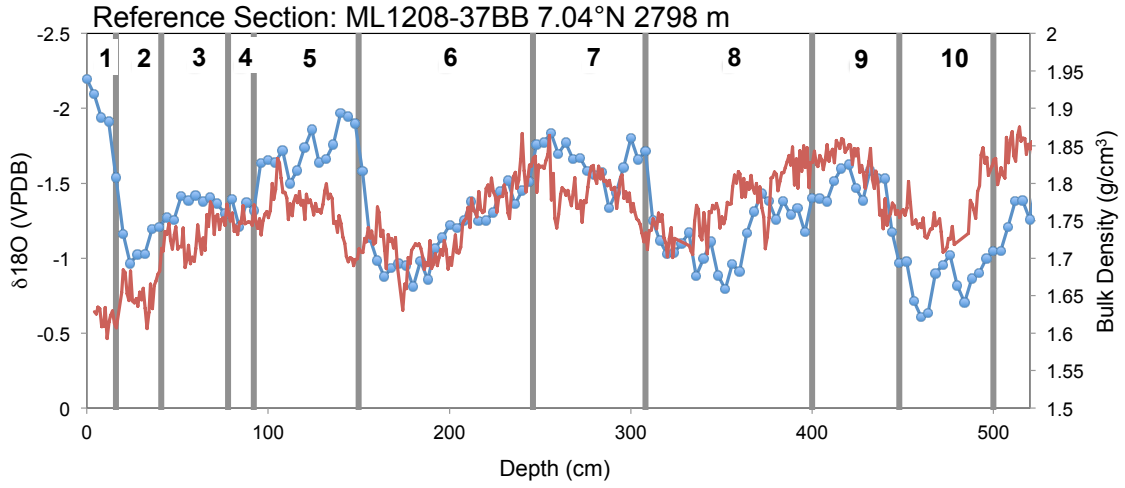


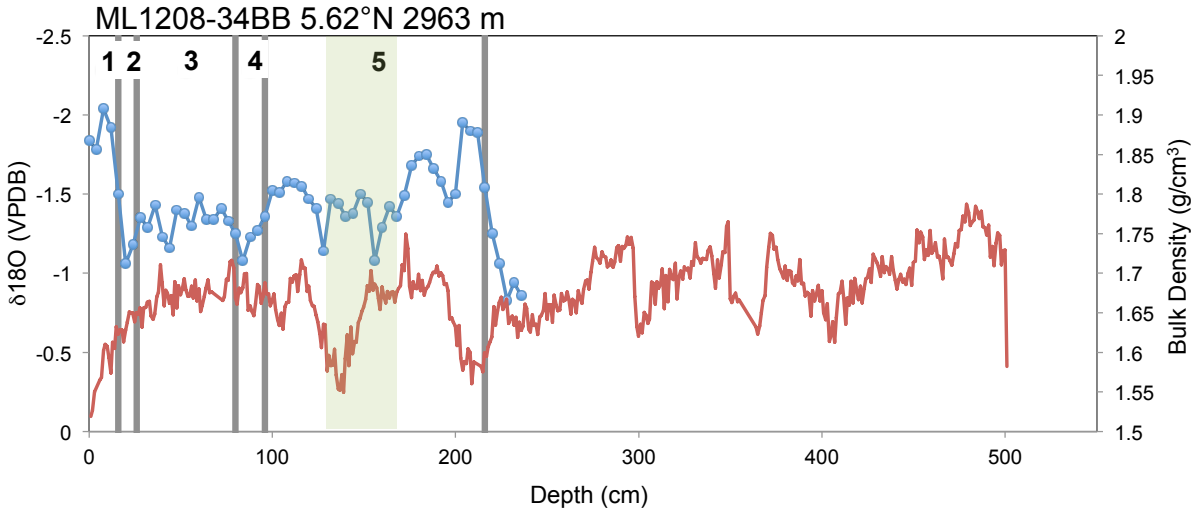


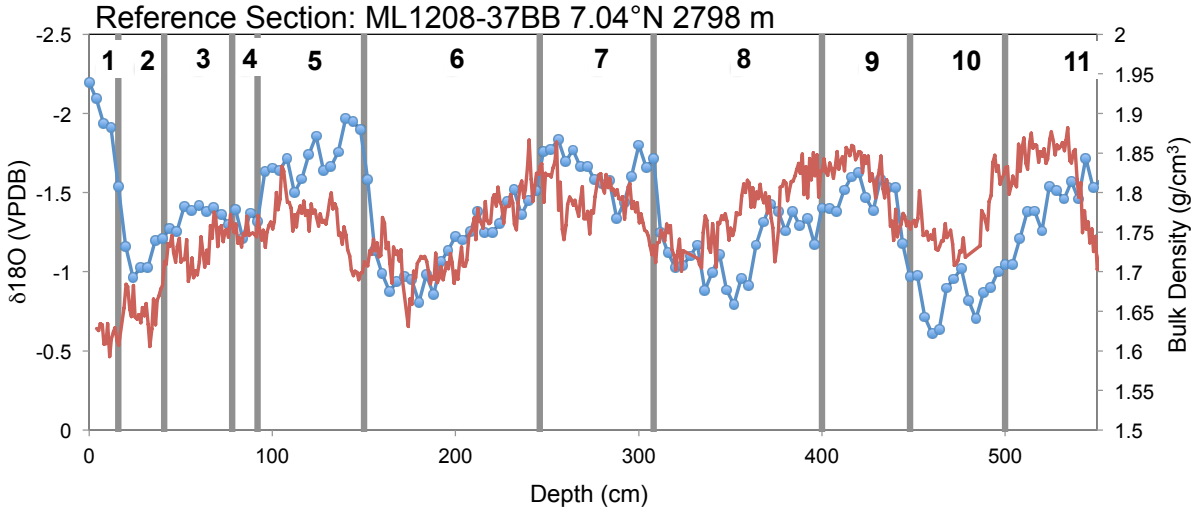
Erosional surface at 508 cm and 634 cm. Core section below hiatus marked with purple box.


ML1208-10GC 5.20°N 2933 m
1
2
3
4
5
δ18O (VPDB)
Bulk Density (g/cm3)
Depth (cm)

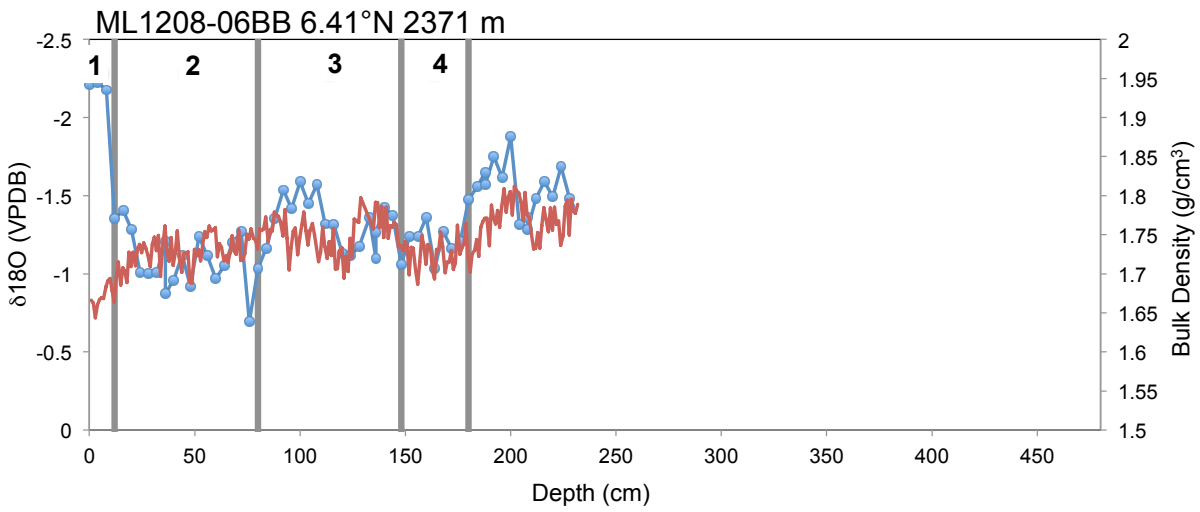

ML1208-32BB 5.20°N 2933 m
1
2
3
4
5
6
7
8
9
10
δ18O (VPDB)
Bulk Density (g/cm3)
Depth (cm)

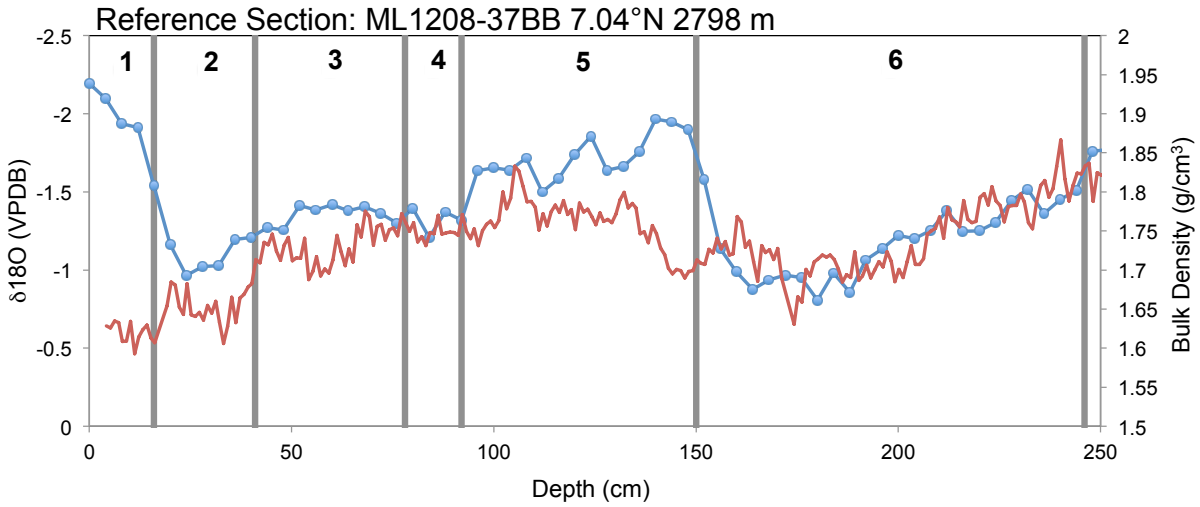

Reference Section: ML1208-37BB 7.04°N 2798 m
1
2
3
4
5
6
7
8
9
10
δ18O (VPDB)
Bulk Density (g/cm3)
Depth (cm)

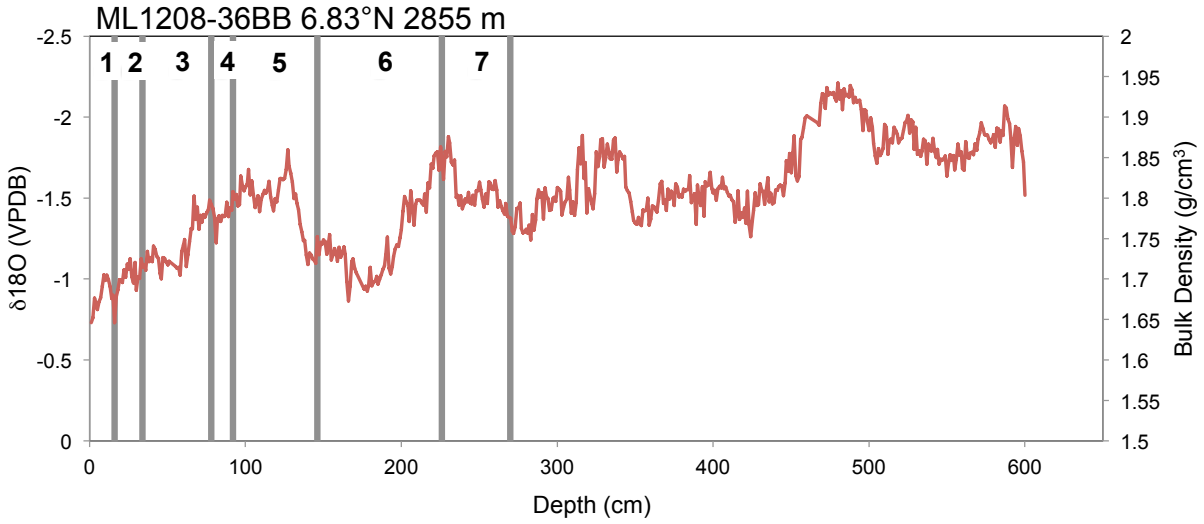


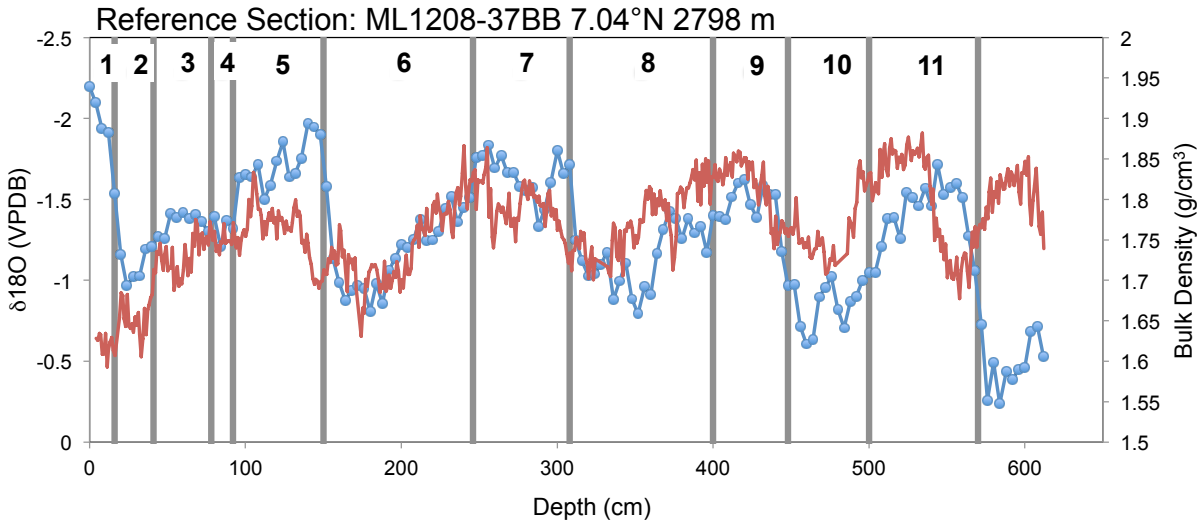


Sand layer identified during sample washing indicated in green
Additional sand layer in core description at 307-348 cm


ML1208-06BB 6.41°N 2371 m
1
2
3
4
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
50
100
150
200
250
300
350
400
450


Reference Section: ML1208-37BB 7.04°N 2798 m
1
2
3
4
5
6
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
50
100
150
200
250





Biostrat indicates bottom of core is Pliocene (hiatus between 320 and 463 cm)

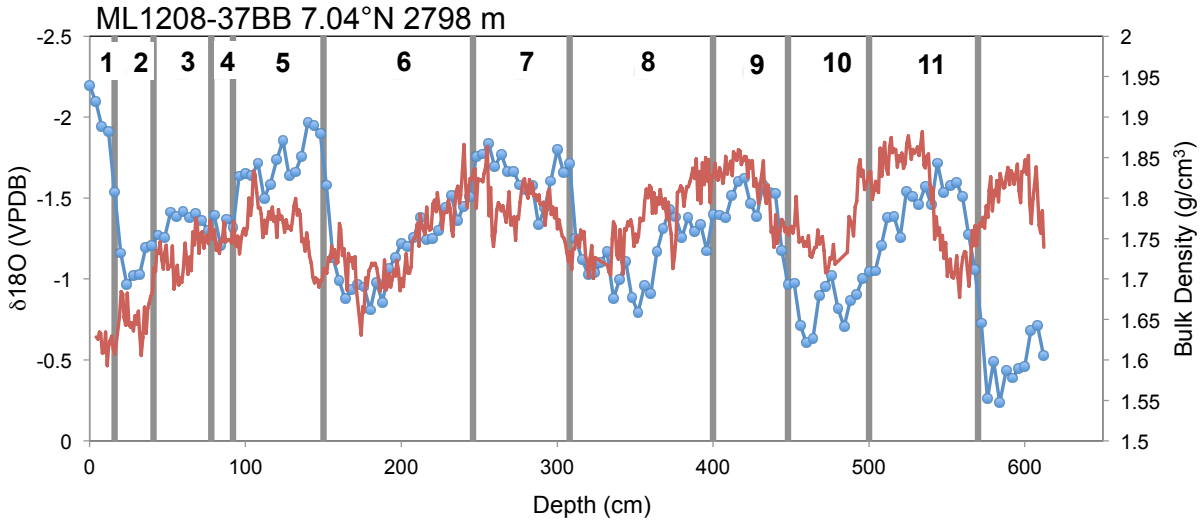

ML1208-37BB 7.04°N 2798 m
1
2
3
4
5
6
7
8
9
10
11
δ18O (VPDB)
Bulk Density (g/cm³)
Depth (cm)
-2.5
-2
-1.5
-1
-0.5
0
2
1.95
1.9
1.85
1.8
1.75
1.7
1.65
1.6
1.55
1.5
0
100
200
300
400
500
600

Table S1. Individual Specimen Core Top Isotope Data

Core	$\delta^{18}O$ (‰ PDB)	$\delta^{13}C$
N. dutertrei individuals 355-425μm		
19GC	-0.28	1.60
19GC	0.04	1.68
19GC	-0.39	1.63
19GC	-0.52	1.62
19GC	-0.87	1.51
19GC	-1.09	1.62
19GC	-0.30	1.35
19GC	-0.58	1.73
20BB	-1.57	1.67
20BB	-0.70	1.73
20BB	-0.86	1.74
20BB	-0.38	1.55
20BB	-0.80	1.52
20BB	-0.68	1.32
20BB	-1.45	1.64
20BB	-1.11	2.09
31BB	-1.15	1.71
31BB	-0.76	1.69
31BB	0.12	1.71
31BB	-0.14	1.44
31BB	-1.21	1.55
31BB	-1.84	1.38
31BB	0.23	1.56
31BB	-0.88	1.59
10GC	-1.93	1.29
10GC	-1.05	1.97
10GC	-0.57	1.61
10GC	-0.79	1.77
10GC	-1.76	1.83
10GC	-1.28	1.30
10GC	-0.80	1.64
10GC	-1.00	1.49
34BB	0.49	1.03
34BB	-0.94	0.75
13BB	-0.49	1.64
13BB	-0.90	1.83
13BB	-0.12	1.76
13BB	-1.07	2.08
13BB	-0.79	1.60

13BB	-1.01	1.39
13BB	-0.91	1.68
13BB	0.03	1.69
15GC	-0.35	1.74
15GC	-0.49	2.04
15GC	-0.24	1.66
15GC	-0.45	1.37
15GC	-0.79	1.93
15GC	-0.39	1.75
15GC	0.49	1.66
15GC	-0.77	1.51
18GC	-0.67	1.42
18GC	-0.10	1.65
18GC	-0.52	1.54
18GC	-0.48	1.68
18GC	-0.01	1.54
18GC	-0.18	1.46
18GC	-0.84	1.51
18GC	-0.94	1.54
36BB	-0.65	1.49
36BB	-2.15	2.01
36BB	-1.52	1.53
36BB	-1.66	1.54
36BB	-1.76	1.67
36BB	0.46	0.98
36BB	0.03	1.54
36BB	0.32	1.17
37BB	-1.90	1.63
37BB	-1.21	1.66
37BB	-1.89	1.61
37BB	-1.67	2.20
37BB	-2.06	1.96
37BB	-1.39	1.99
37BB	-1.94	2.61
37BB	-1.28	1.50
17TC	-0.90	1.44
17TC	-0.78	1.38
17TC	-0.39	1.65
17TC	0.07	1.53
17TC	-0.96	1.44
17TC	0.24	1.59
17TC	0.19	1.52

17TC	-0.75	1.50
12GC	-0.06	1.57
12GC	-0.85	1.72
12GC	-0.74	1.80
12GC	-0.15	1.71
12GC	-0.77	1.85
12GC	-1.02	1.55
12GC	-0.49	1.38
12GC	-0.47	1.44
16BB	-0.80	1.74
16BB	-0.48	1.58
16BB	-1.10	1.83
16BB	-0.09	1.66
16BB	-0.54	1.59
16BB	-0.51	1.54
16BB	-1.78	1.56
16BB	-0.50	1.54
11GC	-1.17	2.06
11GC	-0.58	1.66
11GC	-0.79	1.61
11GC	-0.16	1.33
11GC	-0.27	1.59
11GC	-0.27	1.38
11GC	-0.68	1.62
11GC	-0.56	1.52
25BB	-0.45	1.70
25BB	0.25	1.45
25BB	-1.09	1.35
25BB	-1.85	1.80
25BB	-0.81	1.50
25BB	-1.09	1.59
25BB	-0.27	1.53
25BB	-0.42	1.53
27BB	-0.32	1.49
27BB	-1.06	1.79
27BB	-0.54	1.91
27BB	-0.97	1.20
27BB	-1.55	1.38
27BB	-0.56	1.29
27BB	-0.67	1.38
27BB	-1.74	1.38
28BB	-0.54	1.42

28BB	-0.52	0.95
28BB	-0.63	1.58
28BB	-1.32	1.61
28BB	-0.79	1.37
28BB	-1.44	1.67
28BB	-0.49	1.35
28BB	-0.81	1.57
06BB	-1.04	0.95
06BB	-0.78	1.37
06BB	0.28	1.43
06BB	-0.16	1.41
06BB	-0.82	1.03
06BB	-1.04	1.86
06BB	-1.21	1.79
06BB	-2.05	1.83
35BB	0.15	1.13
35BB	-0.13	0.88
35BB	-0.90	1.10
35BB	-0.65	0.76
35BB	-1.45	1.40
35BB	-0.37	1.24
35BB	-1.61	0.77
35BB	-0.19	1.42
G. tumida individuals 425-500 μm		
06BB	-0.72	1.36
06BB	-0.15	1.47
06BB	-0.91	1.98
06BB	-0.88	1.71
06BB	-0.43	1.61
06BB	-1.17	1.88
06BB	-0.97	1.78
06BB	-1.27	1.69
10GC	-0.32	1.79
10GC	-0.13	1.59
10GC	-0.30	1.76
10GC	-0.13	2.24
10GC	1.15	2.02
10GC	-0.25	1.61
10GC	0.61	1.53
10GC	0.88	1.66
11GC	-0.15	1.78
11GC	0.15	1.63

11GC	-1.02	1.78
11GC	0.52	1.22
11GC	-0.70	1.91
11GC	-0.36	1.65
11GC	0.99	1.72
11GC	-0.82	1.97
12GC	-0.02	2.06
12GC	-0.19	1.94
12GC	-1.00	1.82
12GC	-0.56	1.94
12GC	-0.63	2.17
12GC	-0.78	2.24
12GC	-0.26	2.07
12GC	-0.95	1.98
13BB	-0.43	1.86
13BB	-0.63	2.03
13BB	-0.87	2.11
13BB	-0.94	2.05
13BB	-0.04	1.89
13BB	-0.31	1.88
13BB	-0.04	1.85
13BB	-0.93	1.84
15GC	-0.12	2.04
15GC	-0.39	1.88
15GC	-0.31	1.79
15GC	-0.22	1.92
15GC	-0.53	1.90
15GC	0.10	1.99
15GC	-0.69	1.45
15GC	-0.40	1.95
16BB	-1.00	2.11
16BB	0.03	1.77
16BB	0.25	1.92
16BB	-0.42	1.90
16BB	-0.25	1.79
16BB	-0.74	2.26
16BB	0.24	1.80
16BB	-0.78	1.93
17TC	-0.79	2.02
17TC	-0.48	1.67
17TC	-1.09	1.93
17TC	-0.69	1.96

17TC	-0.26	1.78
17TC	-0.46	2.07
17TC	-0.35	1.82
17TC	-0.38	2.06
18GC	-0.85	1.95
18GC	-1.05	2.05
18GC	0.07	1.98
18GC	-0.72	1.95
18GC	-0.05	2.15
18GC	-0.44	2.04
18GC	-0.23	1.40
18GC	-0.02	1.64
19GC	0.11	1.71
19GC	-0.66	2.02
19GC	-0.11	1.65
19GC	-0.63	1.60
19GC	0.27	1.89
19GC	-0.96	1.89
19GC	-1.16	2.07
19GC	-0.93	1.80
20BB	-0.29	1.77
20BB	-0.71	1.78
20BB	-1.41	2.25
20BB	-1.11	1.84
20BB	-0.81	1.97
20BB	-0.70	2.00
20BB	-0.60	1.96
20BB	-0.95	1.83
25BB	-1.00	1.82
25BB	-0.89	1.84
25BB	-0.07	1.77
25BB	-0.42	1.64
25BB	0.71	1.69
25BB	-0.91	1.78
25BB	-1.02	1.63
25BB	-1.00	1.91
27BB	-0.19	1.71
27BB	-1.07	1.97
27BB	-1.31	1.87
27BB	-0.77	1.86
27BB	-0.32	1.75
27BB	-1.21	1.93

27BB	-0.90	1.91
27BB	-0.55	1.77
28BB	-0.99	1.22
28BB	0.44	1.73
28BB	-0.77	1.83
28BB	-0.93	2.00
28BB	-1.05	2.01
28BB	-0.58	1.69
28BB	-0.10	1.62
28BB	-0.63	1.73
31BB	-0.74	1.73
31BB	-1.07	1.74
31BB	-1.25	1.91
31BB	-1.05	1.54
31BB	-0.54	1.88
31BB	-1.24	2.20
31BB	-0.11	1.67
31BB	-0.90	1.84
34BB	-1.45	2.20
34BB	-0.65	1.74
35BB	-0.34	1.37
35BB	0.43	1.65
35BB	0.72	1.64
35BB	-0.17	2.01
35BB	-0.94	2.39
35BB	-0.14	1.53
35BB	-0.55	1.87
35BB	0.56	2.03
36BB	-0.82	1.51
36BB	-1.61	2.24
36BB	-0.01	1.40
36BB	0.27	1.63
36BB	0.08	1.48
36BB	-1.19	1.97
36BB	0.31	1.58
36BB	-0.38	1.51
37BB	0.38	1.97
37BB	-0.14	1.62
37BB	-1.25	2.03
37BB	-0.76	1.90
37BB	0.68	1.36
37BB	-0.02	1.79

37BB	-0.93	1.96
37BB	-1.12	2.07

Table S2. Age Model Control Points

Depth (cm)	Calendar Age	Constraint
ML1208-06BB		
0	6619	Coretop age for 37BB
12	14000	Marine Isotope Stage 1/2
80	29000	Marine Isotope Stage 2/3
148	57000	Marine Isotope Stage 3/4
180	71000	Marine Isotope Stage 4/5
204	87000	Marine Isotope Stage 5.2
ML1208-10GC		
16	6735	Assigned age of $\delta^{18}O_{min}$ in 31BB
30	14000	Marine Isotope Stage 1/2
76	29000	Marine Isotope Stage 2/3
120	57000	Marine Isotope Stage 3/4
134	71000	Marine Isotope Stage 4/5
192	109000	Marine Isotope Stage 5.4
ML1208-11GC		
0	3734	Average age of radiocarbon dated core tops south of 2°N
36	14000	MIS Stage 1/2
ML1208-12GC		
0	3734	Average age of radiocarbon dated core tops south of 2°N
36	14000	Marine Isotope Stage 1/2
52	29000	Marine Isotope Stage 2/3
131	57000	Marine Isotope Stage 3/4
ML1208-15GC		
0	7618	Radiocarbon
28	14000	Marine Isotope Stage 1/2
80	29000	Marine Isotope Stage 2/3
170	57000	Marine Isotope Stage 3/4
194	71000	Marine Isotope Stage 4/5
ML1208-17PC		
0	3734	Average age of radiocarbon dated core tops south of 2°N
32	14000	Marine Isotope Stage 1/2
76	29000	Marine Isotope Stage 2/3
164	57000	Marine Isotope Stage 3/4
192	71000	Marine Isotope Stage 4/5
308	123000	Marine Isotope Stage 5.5
329	130000	Marine Isotope Stage 5/6
468	191000	Marine Isotope Stage 6/7
558	243000	Marine Isotope Stage 7/8
634	300000	Marine Isotope Stage 8/9
700	337000	Marine Isotope Stage 9/10

ML1208-18GC

0	3167	Radiocarbon
16	5916	Radiocarbon
32	9552	Radiocarbon
48	10713	Radiocarbon
60	16053	Radiocarbon
68	18052	Radiocarbon
112	31844	Radiocarbon
140	36795	Radiocarbon
200	57000	Marine Isotope Stage 3/4

ML1208-19GC

0	2895	Radiocarbon
40	14000	Marine Isotope Stage 1/2
66	29000	Marine Isotope Stage 2/3
150	57000	Marine Isotope Stage 3/4
162	71000	Marine Isotope Stage 4/5

ML1208-20BB

0	3823	Radiocarbon
26	14000	Marine Isotope Stage 1/2
82	29000	Marine Isotope Stage 2/3
162	57000	Marine Isotope Stage 3/4
185	71000	Marine Isotope Stage 4/5
355	130000	Marine Isotope Stage 5/6

ML1208-28BB

8	6735	Assigned age of $\delta^{18}O_{min}$ in 31BB
40	14000	Marine Isotope Stage 1/2
94	29000	Marine Isotope Stage 2/3
162	57000	Marine Isotope Stage 3/4
180	71000	Marine Isotope Stage 4/5
330	130000	Marine Isotope Stage 5/6

ML1208-34BB

8	6735	Assigned age of $\delta^{18}O_{min}$ in 31BB
16	14000	Marine Isotope Stage 1/2
80	57000	Marine Isotope Stage 3/4
96	71000	Marine Isotope Stage 4/5
152#	109000	Marine Isotope Stage 5.4
172#	130000	Marine Isotope Stage 5/6

ML1208-31BB

0	12689*	Radiocarbon
4	7231*	Radiocarbon
12	6735	Radiocarbon
40	13030	Radiocarbon
72	20560	Radiocarbon

100	29000	Marine Isotope Stage 2/3
196	57000	Marine Isotope Stage 3/4
232	71000	Marine Isotope Stage 4/5
412	130000	Marine Isotope Stage 5/6
ML1208-37BB		
0	6619	Radiocarbon
16	14000	Marine Isotope Stage 1/2
41	29000	Marine Isotope Stage 2/3
78	57000	Marine Isotope Stage 3/4
92	71000	Marine Isotope Stage 4/5
112	87000	Marine Isotope Stage 5.2
132	109000	Marine Isotope Stage 5.4
150	130000	Marine Isotope Stage 5/6
246	191000	Marine Isotope Stage 6/7
308	243000	Marine Isotope Stage 7/8
400	300000	Marine Isotope Stage 8/9
448	337000	Marine Isotope Stage 9/10
500	374000	Marine Isotope Stage 10/11
570	424000	Marine Isotope Stage 11/12

* Radiocarbon date not used in age model

[#]Depth adjusted by 44 cm after removing data from sand layer