

SUPPLEMENTARY MATERIAL FOR
***CENOMANIAN TO CAMPANIAN CARBON ISOTOPE
CHEMOSTRATIGRAPHY FROM THE WESTERN INTERIOR BASIN, U.S.A.***

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Figure 1. Biostratigraphic compilation for the study.

Table 1. Depth of stratigraphic units in the AA, PO, and CL-1 cores.

Stratigraphic unit	Depth (base, m)		
	AA	PO	CL-1
Pierre Shale	2155.93	-	
Upper Chalk	2162.04	-	
Upper Shale	2172.81	-	
Middle Chalk	2178.66	-	
Middle Shale	2196.73	-	
Lower Limestone	2208.80	32.00	
Lower Shale	2221.12	55.32	
Lower Shale and Limestone	2231.69	67.39	
Fort Hays Limestone	2239.63	78.64	56.36
Montezuma Valley	-	-	73.15
Juana Lopez	-	79.55	115.21
Codell Sandstone	2244.94	103.39	
Blue Hill Shale	2245.04	115.21	157.58
Fairport Shale	2263.62	136.25	
Bridge Creek Limestone	2278.99	148.67	
Hartland Shale	2301.54	161.42	
Lincoln Limestone	2326.23	173.13	
Graneros Shale	-	205.13	
Dakota Sandstone	-	-	

Table 2. Ages of the Upper Cretaceous ammonite biozones in the Western Interior of the United States. Standard ammonite zonation is determined by Cobban et al. (2006).

Ammonite biozone (base)	Age (Ma)	
	GTS 2012 ^a	Revised GTS 2012 ^b
<i>Baculites</i> sp. (smooth)	81.28	81.28
Scaphites leei III (Santonian-Campanian boundary)	83.64	84.18
Desmoscaphites bassleri	84.08	84.55
Desmoscaphites erdmanni	84.52	84.95
Clioscaphites choteauensis	85.23	85.65
Clioscaphites vermiformis	85.56	86.00
Clioscaphites saxitonianus	86.17	86.40
Scaphites depressus	87.86	88.22
Scaphites ventricosus	88.77	88.44
Scaphites preventricosus (Turonian-Coniacian boundary)	89.77	89.74
<i>Scaphites mariasensis</i>	89.87	89.87
<i>Prionocyclus germari</i>	89.98	89.98
<i>Scaphites nigricollensis</i>	90.24	90.24
<i>Scaphites whitfieldi</i>	90.65	90.65
<i>Scaphites ferronensis</i>	91.08	91.08
<i>Scaphites warreni</i>	91.34	91.34
<i>Prionocyclus macombi</i>	91.41	91.41
<i>Prionocyclus hyatti</i>	91.60	91.60
<i>Collignonicerias praecox</i>	92.08	92.08
<i>Collignonicerias woollgari</i>	92.90	92.90
<i>Mammites nodosoides</i>	93.35	93.35
<i>Vascoceras birchbyi</i>	93.45	93.45
<i>Pseudaspidoceras flexuosum</i>	93.55	93.55
<i>Watinoceras devonense</i> (Cenomanian-Turonian boundary)	93.90	93.90
<i>Nigericeras scotti</i>	93.98	93.98
<i>Neocardioceras juddii</i>	94.15	94.15
<i>Burroceras clydense</i>	94.27	94.27
<i>Sciponoceras gracile</i> (<i>Euomphaloceras septemseriatum</i>)	94.39	94.39
<i>Sciponoceras gracile</i> (<i>Vascoceras diartianum</i>)	94.57	94.57
<i>Metioceras mosbyense</i>	95.24	95.24
<i>Calycoceras canitaurinum</i> (<i>Dunveganoceras pondi</i>)	95.47	95.47
<i>Plesiakanthoceras wyomingense</i>	95.67	95.67
<i>Acanthoceras amphibolum</i>	95.81	95.81
<i>Acanthoceras bellense</i>	95.90	95.90
<i>Acanthoceras muldoonense</i>	95.98	95.98
<i>Acanthoceras granerosense</i>	96.08	96.08
<i>Conlinoceras tarrantense</i>	96.24	96.24

^a Geologic Time Scale 2012 (Ogg and Hinnov 2012)

^b Durations and basal ages of the Coniacian – Santonian ammonite biozones are revised based on recent work by Sageman et al. (2014). Biozones with the updated ages are marked bold.

Table 3. Total Organic Carbon (carbonate-free basis), Inorganic Carbon (IC), and carbonate concentrations in Codell Sandstone Member of the Portland core.

Depth (m)	wt.% TOC (CaCO ₃ -free)	wt.% IC	wt.% CaCO ₃
79.58	0.73	0.00	0.00
80.59	0.60	0.00	0.00
81.47	0.16	0.00	0.00
82.54	0.10	0.00	0.00
83.48	0.48	0.00	0.00
84.55	0.16	0.00	0.00
85.62	0.46	0.00	0.00
86.62	0.17	0.00	0.00
87.57	0.15	0.00	0.00
88.48	0.28	0.00	0.00
89.55	0.23	0.00	0.00
90.53	0.26	0.00	0.00
91.53	0.30	0.00	0.00
92.45	0.44	0.00	0.00
93.54	0.31	0.00	0.00
94.52	0.36	0.00	0.00
95.52	0.34	0.00	0.00
96.50	0.33	0.00	0.00
97.51	0.42	0.00	0.00
98.60	0.50	0.00	0.00
99.52	0.46	0.00	0.00
100.52	0.50	0.14	1.19
100.58	0.77	0.00	0.00
101.14	0.46	0.16	1.35
101.50	0.60	0.00	0.00
102.20	0.58	0.14	1.21
102.47	0.70	0.00	0.00
102.74	0.58	0.03	0.22
103.47	0.66	0.00	0.00
103.48	0.67	0.00	0.00

Table 4. Carbon isotope data by depth for Portland core.

Depth (m)	$\delta^{13}\text{C}$ (‰)
27.42	-26.62
27.90	-26.61
28.44	-26.76
28.93	-26.40
29.47	-26.77
30.00	-26.71
30.50	-26.68
31.01	-26.52
31.47	-26.56
32.06	-25.64
32.55	-25.39
33.14	-25.61
33.61	-26.44
34.16	-25.30
34.63	-24.98
35.19	-26.11
35.71	-26.23
36.15	-26.77
36.59	-24.06
37.17	-25.23
37.61	-25.33
38.04	-25.05
38.53	-26.01
39.08	-25.76
39.51	-25.93
39.93	-25.77
40.49	-25.23
40.96	-25.54
41.45	-26.00
42.02	-25.34
42.50	-25.23
43.04	-25.23
43.53	-26.22
43.98	-25.92
44.48	-25.71
45.00	-26.05
45.54	-26.02
46.05	-26.34
46.58	-25.74
47.16	-25.60

47.69	-25.46
48.13	-25.38
48.59	-26.28
49.04	-25.71
49.50	-26.08
50.06	-25.73
50.53	-25.64
51.09	-25.45
51.51	-25.67
52.07	-24.97
52.51	-25.52
53.00	-25.34
53.47	-25.31
54.00	-25.91
54.55	-25.55
55.05	-25.44
55.52	-25.35
56.09	-25.45
56.60	-25.90
57.08	-25.70
57.64	-25.53
58.11	-25.62
58.64	-25.77
59.20	-25.88
59.66	-25.79
60.18	-27.31
60.63	-26.19
61.14	-25.87
61.64	-26.51
62.67	-25.89
63.15	-26.08
63.63	-26.06
64.20	-25.70
64.70	-25.37
65.19	-25.55
65.72	-25.51
67.29	-25.80
67.81	-26.37
68.36	-25.47
68.86	-25.37
69.32	-26.18
69.81	-27.31
71.35	-25.87

71.82	-26.33
72.36	-26.00
72.84	-25.46
73.35	-26.68
73.83	-25.39
74.34	-26.48
75.35	-26.19
75.85	-26.59
76.37	-26.14
76.82	-26.36
77.84	-25.98
78.39	-26.05
78.86	-26.48
79.58	-29.25
80.59	-29.04
81.47	-28.00
82.54	-29.72
83.48	-26.42
84.55	-30.32
85.62	-26.54
86.62	-27.12
87.57	-30.82
88.48	-26.78
89.55	-28.98
90.53	-28.00
91.53	-26.96
92.45	-26.19
93.54	-26.09
94.52	-26.25
95.52	-28.09
96.50	-29.09
97.51	-29.31
98.60	-26.93
99.52	-27.72
100.52	-26.73
100.58	-26.19
101.14	-27.24
101.50	-26.29
102.20	-27.28
102.47	-26.41
102.74	-27.21
103.47	-27.27
103.48	-26.35

104.07	-27.32
104.58	-27.29
104.99	-27.26
105.97	-27.20
106.45	-27.19
106.93	-27.44
107.40	-27.08
107.93	-27.15
108.37	-26.84
108.85	-27.21
109.37	-27.31
109.88	-26.95
110.38	-27.00
110.86	-27.21
111.34	-26.66
111.67	-26.92
112.34	-26.77
112.84	-26.86
113.33	-26.77
113.84	-26.54
114.34	-26.48
114.83	-26.95
115.31	-26.49
115.81	-26.78
116.31	-26.96
116.78	-26.49
117.24	-26.50
117.75	-26.78
118.23	-26.48
118.73	-26.08
119.23	-26.39
119.75	-26.34
120.19	-26.34
120.76	-26.49
121.23	-26.36
121.76	-26.49
122.27	-25.43
122.75	-25.55
123.24	-25.54
123.74	-25.92
124.22	-26.45
124.71	-26.38
125.18	-25.95

125.65	-26.08
126.14	-26.10
126.59	-25.88
127.09	-26.32
127.57	-26.49
128.06	-26.29
128.53	-26.07
128.99	-26.30
129.48	-26.45
129.97	-26.75
130.47	-26.51
130.94	-26.62
131.41	-26.43
131.91	-27.08
132.37	-26.84
132.82	-26.77
133.35	-27.28
133.80	-27.01
134.29	-27.05
134.75	-27.53
135.24	-27.01
135.74	-27.42
136.21	-27.34
136.68	-27.07
137.03	-27.70
137.11	-27.26
137.16	-25.75
137.17	-27.05
137.21	-26.57
137.26	-25.23
137.31	-25.48
137.36	-25.44
137.41	-27.70
137.46	-28.18
137.56	-28.05
137.68	-27.28
138.19	-27.23
138.22	-27.54
138.27	-26.76
138.58	-27.51
138.63	-26.84
138.70	-26.75
138.78	-27.47

138.83	-25.79
139.15	-27.00
139.18	-27.38
139.40	-25.74
139.67	-26.82
139.70	-25.92
139.75	-26.89
139.80	-26.11
139.85	-26.93
139.90	-27.39
140.00	-26.64
140.05	-27.68
140.10	-25.99
140.15	-25.96
140.41	-26.09
140.46	-26.71
140.56	-26.14
140.60	-27.14
140.65	-25.98
141.07	-26.10
141.12	-24.29
141.27	-25.80
141.37	-25.68
141.66	-25.75
141.70	-25.78
141.81	-25.82
141.96	-25.64
142.25	-25.86
142.33	-24.27
142.43	-26.32
142.75	-26.31
142.80	-25.45
142.85	-25.49
142.90	-25.68
143.31	-23.97
143.41	-24.70
143.46	-24.61
143.51	-23.99
143.56	-26.04
143.86	-25.01
143.91	-24.16
143.96	-24.77
144.01	-23.96

144.06	-23.98
144.11	-24.22
144.15	-24.67
144.19	-24.31
144.35	-22.93
144.40	-23.73
144.45	-24.58
144.48	-23.28
144.53	-24.21
144.78	-24.00
144.82	-23.41
144.87	-23.63
144.92	-23.02
144.97	-22.65
145.01	-23.20
145.07	-23.03
145.16	-24.64
145.26	-23.39
145.31	-23.44
145.37	-23.21
145.46	-24.29
145.83	-24.12
145.88	-22.83
145.93	-22.14
146.00	-25.10
146.04	-23.28
146.39	-24.43
146.49	-25.32
146.80	-25.38
146.85	-24.24
146.92	-23.44
147.17	-25.40
147.22	-23.39
147.27	-23.76
147.97	-25.13
148.02	-22.97
148.07	-25.41
148.11	-25.95
148.70	-24.66
148.75	-24.49
148.80	-25.03
148.85	-26.39
148.95	-26.34

149.00	-27.31
149.06	-26.93
149.25	-27.39
149.75	-27.62
150.25	-27.56
150.75	-27.47
151.25	-27.63
151.75	-27.38
152.35	-27.25
152.75	-27.61
153.25	-27.42
153.75	-27.76
154.25	-27.37
154.75	-27.40
155.35	-27.45
155.85	-27.57
156.35	-28.06
156.85	-27.79
157.35	-27.94
157.85	-27.21
158.35	-27.35
158.85	-27.01
159.35	-27.45
159.85	-27.18
160.35	-27.38
160.75	-27.59
161.25	-27.40
161.77	-27.89
162.21	-27.41
162.73	-26.92
163.21	-27.19
163.72	-27.24
164.19	-26.84
164.73	-27.08
165.24	-27.23
165.76	-27.34
166.21	-27.47
167.00	-27.19
167.50	-27.44
168.00	-27.32
168.50	-27.45
169.00	-27.77
169.50	-27.42

170.00	-27.09
170.50	-26.94
171.00	-27.05
171.50	-27.17
172.00	-27.25
172.50	-27.14
172.93	-27.04
173.36	-27.09
173.88	-26.71
174.24	-27.37
174.63	-27.20
175.13	-26.62
175.38	-26.64
175.63	-26.83
176.13	-26.19
176.63	-26.31
177.13	-25.82
177.63	-26.00
178.13	-26.06
179.00	-26.03
179.50	-24.54
180.00	-25.83
180.50	-25.63
181.00	-25.95
181.50	-25.23
182.00	-25.33
182.50	-25.31
183.00	-25.24
183.50	-25.57
184.00	-25.44
184.50	-25.77
184.85	-25.51
185.10	-25.58
185.35	-25.13
185.60	-25.64
185.85	-25.57
186.10	-25.37
186.35	-25.71
186.60	-25.91
186.85	-25.65
187.10	-25.50
187.35	-25.73
187.60	-25.86

188.10	-25.78
188.60	-25.99
189.10	-26.20
189.60	-26.69
190.91	-26.63
191.41	-26.98
192.29	-26.96
192.86	-26.56
193.42	-27.04
193.98	-27.04
194.64	-26.68
195.26	-26.97
195.71	-26.52
196.59	-26.75
197.62	-27.32
197.70	-26.66
198.06	-26.92
198.62	-26.48
198.91	-26.96
199.88	-26.86
200.36	-26.40
200.75	-26.71
201.41	-26.71
202.28	-26.47
202.66	-26.52
203.16	-26.87
203.66	-26.91
204.16	-27.39
204.66	-27.42

Table 5. Carbon isotope data by depth for Aristocrat Angus core.

Depth (m)	$\delta^{13}\text{C}$ (‰)
2140.795	-26.91
2141.295	-26.72
2141.770	-26.66
2142.295	-26.31
2142.795	-26.62
2143.295	-26.66
2143.795	-26.63
2144.295	-27.09
2144.795	-26.61
2145.305	-26.73
2145.805	-26.72
2146.310	-26.76
2146.805	-26.80
2147.415	-26.70
2147.915	-26.69
2148.415	-26.72
2148.915	-26.81
2149.415	-27.03
2149.915	-26.85
2150.415	-26.84
2150.935	-26.63
2151.425	-26.76
2151.955	-27.00
2152.455	-27.04
2152.955	-26.93
2153.580	-27.12
2154.080	-27.10
2154.580	-27.18
2155.080	-27.32
2155.580	-27.17
2156.080	-27.32
2156.580	-27.18
2157.080	-26.94
2159.600	-26.90
2162.030	-27.20
2162.690	-26.90
2163.345	-26.87
2164.080	-26.81
2164.685	-26.86
2165.310	-26.68

2165.975	-27.09
2166.560	-26.74
2167.110	-26.70
2167.685	-27.02
2168.235	-27.13
2168.735	-27.13
2169.405	-27.07
2169.905	-27.01
2170.405	-27.09
2170.960	-27.04
2171.520	-27.15
2172.105	-26.98
2172.605	-27.04
2173.135	-27.12
2173.760	-26.96
2174.205	-26.79
2174.805	-26.88
2175.525	-26.54
2176.070	-27.21
2178.195	-27.11
2178.735	-27.07
2179.200	-26.99
2179.700	-26.74
2180.200	-26.81
2180.700	-26.76
2181.200	-26.89
2181.700	-26.49
2182.200	-26.62
2182.700	-26.77
2183.200	-26.90
2183.700	-26.95
2184.265	-26.89
2184.765	-26.86
2185.265	-26.76
2185.765	-26.78
2186.265	-26.78
2186.765	-26.71
2187.265	-26.78
2187.765	-26.82
2188.265	-26.81
2188.765	-26.80
2189.265	-26.46
2189.765	-26.93

2190.265	-26.62
2190.765	-26.31
2191.255	-26.85
2191.800	-26.60
2192.300	-26.70
2192.800	-26.47
2193.300	-26.46
2193.800	-26.24
2194.300	-26.33
2194.800	-26.23
2195.200	-26.39
2195.700	-26.12
2196.195	-26.34
2196.685	-25.23
2197.195	-26.07
2197.655	-25.92
2198.290	-26.38
2199.040	-26.10
2199.790	-25.70
2200.400	-26.22
2201.155	-25.98
2201.835	-25.67
2202.335	-25.59
2202.918	-25.77
2203.418	-25.79
2203.918	-25.63
2204.418	-25.75
2204.923	-25.66
2205.423	-25.59
2205.923	-25.88
2207.133	-25.65
2207.633	-25.80
2208.133	-25.77
2208.633	-25.68
2209.133	-25.79
2209.633	-25.48
2210.133	-25.92
2210.633	-25.81
2211.178	-25.86
2211.658	-25.95
2212.158	-25.66
2212.658	-25.78
2213.208	-26.36

2213.708	-26.31
2214.208	-26.49
2214.728	-26.36
2215.228	-26.45
2215.728	-26.54
2216.178	-26.38
2216.698	-26.36
2217.178	-26.32
2217.673	-26.25
2218.173	-26.31
2218.673	-26.30
2219.173	-26.20
2219.573	-25.87
2220.073	-26.25
2220.573	-26.13
2221.073	-26.42
2221.573	-26.11
2222.088	-25.61
2222.638	-25.28
2223.138	-26.31
2223.638	-26.26
2224.138	-26.05
2224.638	-25.94
2225.138	-26.15
2225.638	-26.29
2226.138	-26.79
2226.638	-26.21
2227.138	-26.52
2227.638	-26.29
2228.138	-26.22
2228.633	-26.55
2229.183	-25.65
2229.683	-26.07
2230.183	-26.26
2230.683	-26.32
2231.183	-26.34
2231.683	-26.21
2232.183	-27.09
2232.683	-27.19
2233.183	-26.09
2233.683	-26.48
2234.183	-26.78
2234.858	-26.58

2235.573	-26.53
2236.153	-26.41
2236.683	-26.00
2237.708	-26.99
2238.418	-26.85
2238.828	-26.95
2239.313	-26.29
2239.813	-26.32
2240.298	-26.81
2241.364	-26.92
2242.009	-26.92
2242.519	-26.97
2243.019	-26.65
2243.519	-26.38
2244.129	-26.86
2244.629	-26.45
2245.129	-25.60
2245.629	-25.59
2246.129	-25.76
2246.629	-25.75
2247.159	-25.79
2247.659	-25.53
2248.164	-25.93
2248.644	-25.67
2249.144	-25.81
2249.644	-25.81
2250.144	-25.66
2250.649	-26.14
2251.144	-25.61
2251.644	-25.47
2252.144	-25.73
2252.644	-26.28
2253.144	-26.09
2253.644	-26.34
2254.144	-26.50
2254.644	-26.11
2255.144	-26.47
2255.634	-26.16
2256.119	-26.49
2256.619	-26.16
2257.119	-26.24
2257.619	-26.52
2258.119	-26.16

2258.619	-26.71
2259.119	-26.63
2259.619	-26.47
2260.119	-26.17
2260.519	-26.36
2261.019	-25.93
2261.519	-26.46
2262.019	-26.17
2262.519	-26.32
2263.019	-26.27
2264.014	-25.88
2264.514	-26.09
2265.014	-26.74
2265.514	-25.64
2266.014	-25.93
2266.514	-25.39
2267.014	-26.43
2267.514	-26.01
2268.014	-25.96
2269.049	-25.75
2269.549	-25.16
2270.049	-24.88
2270.509	-25.62
2271.009	-25.10
2271.509	-24.80
2272.009	-24.25
2272.514	-24.01
2273.014	-23.80
2273.509	-23.37
2273.974	-24.06
2274.474	-24.13
2274.974	-23.71
2275.474	-23.96
2275.944	-24.48
2276.469	-24.54
2276.999	-25.38
2277.504	-24.84
2278.004	-25.48
2278.494	-26.50
2278.544	-26.23
2278.644	-26.07
2278.694	-26.73
2278.744	-26.80

2278.794	-26.39
2278.844	-26.98
2278.944	-26.56
2278.994	-26.36
2279.044	-26.66
2279.094	-26.41
2279.144	-26.14
2279.244	-26.46
2279.294	-26.45
2279.344	-26.78
2279.394	-26.31
2280.494	-26.82
2281.994	-27.11
2282.494	-26.67
2282.994	-26.65
2283.994	-26.64
2284.494	-26.80
2285.494	-26.78
2285.994	-27.06
2286.494	-26.91
2286.994	-26.80
2287.484	-26.79
2287.984	-26.78
2288.469	-26.86
2288.969	-26.58
2289.469	-26.69
2289.969	-26.88
2290.429	-26.55
2290.929	-26.76
2291.429	-26.70
2291.929	-26.75
2292.614	-26.76
2293.114	-26.93
2293.564	-26.96
2294.064	-27.02
2294.524	-26.84
2294.974	-26.83
2295.474	-26.74
2295.974	-26.92
2296.474	-26.68
2296.974	-26.73
2297.474	-26.60
2298.074	-26.65

2298.574	-26.80
2299.029	-26.80
2299.529	-26.74
2299.944	-26.58
2300.444	-26.83
2300.944	-26.83
2301.444	-26.62
2301.944	-26.66
2302.444	-26.86
2302.944	-26.94
2303.444	-26.70
2303.944	-26.98
2304.444	-26.70
2304.944	-27.17
2305.444	-26.63
2305.944	-26.70
2306.444	-26.77
2307.044	-26.59
2307.544	-26.57
2308.044	-26.81
2308.544	-26.59
2309.054	-27.05
2309.554	-26.17
2310.054	-26.42
2310.594	-26.12
2311.094	-26.30
2311.594	-26.51
2312.094	-26.76
2312.594	-26.62
2313.094	-26.86
2313.594	-27.06
2314.094	-26.71
2314.524	-26.44
2315.024	-26.69
2315.524	-26.83
2316.024	-26.67
2316.524	-26.45
2317.024	-26.33
2317.524	-26.48
2318.024	-27.23
2318.519	-26.34
2319.019	-26.65
2319.494	-26.72

2319.974	-26.56
2320.474	-26.57
2320.974	-26.55
2321.474	-26.44
2321.899	-26.59
2322.399	-26.10
2322.899	-26.18
2323.399	-26.32
2323.899	-26.43
2324.679	-26.74
2324.894	-26.73
2325.419	-26.49
2325.919	-26.47
2326.789	-25.71
2327.289	-26.41
2327.789	-25.73
2328.289	-25.46
2328.789	-25.45
2329.289	-24.94
2329.789	-25.02
2330.289	-25.37
2330.789	-25.27
2331.324	-24.98
2331.829	-25.38
2332.259	-25.14
2332.759	-25.21
2333.299	-25.29
2333.749	-25.12
2334.249	-25.65
2334.749	-25.79
2335.249	-25.64
2335.854	-25.78
2336.664	-25.73
2337.164	-25.87
2337.664	-25.90
2338.164	-26.23
2338.664	-26.34
2339.164	-25.87
2339.664	-26.52
2340.164	-26.58
2340.664	-26.32
2341.194	-26.56
2341.719	-26.74

2342.149	-26.59
2342.739	-26.81
<u>2343.189</u>	<u>-26.43</u>

Table 6. Carbon isotope data by depth for CL-1 core.

Depth (m)	$\delta^{13}\text{C}$ (‰)
55.53	-26.49
56.45	-26.23
57.36	-25.68
58.22	-26.78
59.13	-26.18
60.05	-26.25
60.96	-26.73
61.87	-26.71
62.79	-26.30
63.70	-25.61
64.62	-26.34
65.53	-25.93
66.45	-26.22
67.36	-26.26
68.28	-25.93
69.19	-26.76
70.10	-26.34
71.02	-26.68
71.93	-26.10
72.85	-26.38
73.76	-26.38
74.68	-26.42
75.59	-26.18
76.50	-26.21
77.42	-26.34
78.33	-26.10
79.25	-26.28
80.16	-26.46
81.08	-26.11
81.99	-26.23
82.91	-26.15
83.82	-26.34
84.73	-26.50
85.65	-26.23
86.56	-26.44
87.48	-26.59
88.39	-26.71
89.31	-26.50
90.22	-27.03
91.14	-26.95

92.05	-26.77
92.96	-27.30
93.88	-27.43
94.79	-27.53
95.71	-27.56
96.62	-27.67
97.54	-27.53
98.45	-27.83
99.36	-27.26
100.04	-27.87
101.19	-27.45
102.11	-27.81
103.02	-27.66
103.94	-27.51
104.85	-27.24
105.77	-27.13
106.68	-27.30
107.59	-26.96
108.51	-27.46
109.42	-27.88
110.34	-27.53
111.25	-27.61
112.17	-27.14
113.08	-26.53
114.00	-27.27
114.91	-27.22
115.82	-27.43
116.74	-27.00
117.65	-26.54
118.57	-26.17
119.48	-26.14
120.40	-26.82
121.31	-26.53
122.22	-26.53
123.14	-26.18
124.05	-25.12
124.97	-26.29
125.88	-26.11
126.80	-25.73
127.71	-26.20
128.63	-25.90
129.54	-26.52
130.45	-26.81

131.37	-26.89
132.28	-25.98
133.20	-26.20
134.11	-25.75
135.03	-25.84
135.94	-25.69
136.86	-26.38
137.77	-26.07
138.68	-25.32
139.60	-26.01
140.51	-25.86
141.43	-25.72
142.34	-25.74
143.26	-25.80
144.17	-25.74
145.08	-26.43
146.00	-26.02
146.91	-26.31
147.83	-25.96
148.74	-25.75
149.66	-25.79
150.57	-25.60
151.49	-26.11
152.40	-26.05

Table 7. Compiled carbon isotope data by age.

Age (Ma)	$\delta^{13}\text{C}_{\text{org}}$ (‰)
82.343	-26.90
83.047	-27.20
83.239	-26.90
83.428	-26.87
83.641	-26.81
83.817	-26.86
83.998	-26.68
84.185	-27.09
84.262	-26.74
84.334	-26.70
84.410	-27.02
84.483	-27.13
84.549	-27.13
84.641	-27.07
84.710	-27.01
84.779	-27.09
84.856	-27.04
84.933	-27.15
84.986	-26.98
85.025	-27.04
85.067	-27.12
85.116	-26.96
85.151	-26.79
85.198	-26.88
85.254	-26.54
85.297	-27.21
85.464	-27.11
85.506	-27.07
85.543	-26.99
85.582	-26.74
85.621	-26.81
85.664	-26.76
85.716	-26.89
85.769	-26.49
85.821	-26.62
85.874	-26.77
85.926	-26.90
85.979	-26.95
86.015	-26.89
86.037	-26.86

86.059	-26.76
86.081	-26.78
86.103	-26.78
86.125	-26.71
86.148	-26.78
86.170	-26.82
86.192	-26.81
86.214	-26.80
86.236	-26.46
86.258	-26.93
86.280	-26.62
86.302	-26.31
86.324	-26.85
86.348	-26.60
86.370	-26.70
86.393	-26.47
86.424	-26.46
86.458	-26.24
86.492	-26.33
86.526	-26.23
86.553	-26.39
86.587	-26.12
86.621	-26.34
86.654	-25.23
86.689	-26.07
86.720	-25.92
86.763	-26.38
86.814	-26.10
86.865	-25.70
86.906	-26.22
86.958	-25.98
87.004	-25.67
87.038	-25.59
87.077	-25.77
87.111	-25.79
87.145	-25.63
87.179	-25.75
87.214	-25.66
87.248	-25.59
87.282	-25.88
87.364	-25.65
87.398	-25.80
87.432	-25.77

87.466	-25.68
87.500	-25.79
87.534	-25.48
87.568	-25.92
87.602	-25.81
87.639	-25.86
87.671	-25.95
87.705	-25.66
87.739	-25.78
87.777	-26.36
87.811	-26.31
87.845	-26.49
87.880	-26.36
87.914	-26.45
87.948	-26.54
87.979	-26.38
88.014	-26.36
88.047	-26.32
88.080	-26.25
88.114	-26.31
88.244	-26.30
88.284	-26.20
88.316	-25.87
88.356	-26.25
88.396	-26.13
88.436	-26.42
88.478	-26.11
88.522	-25.61
88.568	-25.28
88.611	-26.31
88.653	-26.26
88.695	-26.05
88.737	-25.94
88.779	-26.15
88.822	-26.29
88.864	-26.79
88.906	-26.21
88.948	-26.52
88.990	-26.29
89.033	-26.22
89.074	-26.55
89.121	-25.65
89.163	-26.07

89.205	-26.26
89.247	-26.32
89.290	-26.34
89.332	-26.21
89.374	-27.09
89.416	-27.19
89.459	-26.09
89.501	-26.48
89.543	-26.78
89.600	-26.58
89.660	-26.53
89.709	-26.41
89.756	-26.00
89.824	-26.49
89.851	-26.23
89.876	-25.68
89.904	-26.78
89.931	-26.18
89.958	-26.25
89.986	-26.73
90.013	-26.71
90.040	-26.30
90.067	-25.61
90.095	-26.34
90.122	-25.93
90.149	-26.22
90.176	-26.26
90.204	-25.93
90.240	-26.76
90.259	-26.34
90.289	-26.68
90.318	-26.10
90.347	-26.38
90.377	-26.38
90.406	-26.42
90.435	-26.18
90.465	-26.21
90.494	-26.34
90.523	-26.10
90.552	-26.28
90.582	-26.46
90.611	-26.11
90.640	-26.23

90.664	-26.15
90.686	-26.34
90.708	-26.50
90.730	-26.23
90.751	-26.44
90.773	-26.59
90.795	-26.71
90.817	-26.50
90.838	-27.03
90.860	-26.95
90.882	-26.77
90.903	-27.30
90.925	-27.43
90.947	-27.53
90.969	-27.56
90.990	-27.67
91.012	-27.53
91.034	-27.83
91.050	-27.26
91.077	-27.87
91.099	-27.45
91.121	-27.81
91.142	-27.66
91.164	-27.51
91.186	-27.24
91.207	-27.13
91.229	-27.30
91.251	-26.96
91.273	-27.46
91.294	-27.88
91.316	-27.53
91.338	-27.61
91.359	-27.14
91.381	-26.53
91.403	-27.27
91.420	-27.22
91.434	-27.43
91.449	-27.00
91.463	-26.54
91.478	-26.17
91.492	-26.14
91.506	-26.82
91.521	-26.53

91.535	-26.53
91.550	-26.18
91.564	-25.12
91.579	-26.29
91.593	-26.11
91.608	-25.73
91.622	-26.20
91.637	-25.90
91.651	-26.52
91.666	-26.81
91.680	-26.89
91.694	-25.98
91.709	-26.20
91.723	-25.75
91.738	-25.84
91.752	-25.69
91.767	-26.38
91.781	-26.07
91.796	-25.32
91.810	-26.01
91.825	-25.86
91.839	-25.72
91.853	-25.74
91.868	-25.80
91.882	-25.74
91.897	-26.43
91.911	-26.02
91.926	-26.31
91.940	-25.96
91.955	-25.75
91.969	-25.79
91.984	-25.60
91.998	-26.11
92.084	-26.05
92.102	-26.78
92.119	-26.96
92.136	-26.49
92.153	-26.50
92.171	-26.78
92.188	-26.48
92.206	-26.08
92.224	-26.39
92.242	-26.34

92.258	-26.34
92.278	-26.49
92.295	-26.36
92.314	-26.49
92.332	-25.43
92.349	-25.55
92.367	-25.54
92.385	-25.92
92.402	-26.45
92.419	-26.38
92.436	-25.95
92.453	-26.08
92.471	-26.10
92.487	-25.88
92.504	-26.32
92.522	-26.49
92.539	-26.29
92.556	-26.07
92.572	-26.30
92.590	-26.45
92.607	-26.75
92.625	-26.51
92.642	-26.62
92.659	-26.43
92.677	-27.08
92.693	-26.84
92.709	-26.77
92.728	-27.28
92.744	-27.01
92.762	-27.05
92.778	-27.53
92.796	-27.01
92.813	-27.42
92.830	-27.34
92.847	-27.07
92.860	-27.70
92.862	-27.26
92.864	-25.75
92.865	-27.05
92.866	-26.57
92.868	-25.23
92.870	-25.48
92.871	-25.44

92.873	-27.70
92.875	-28.18
92.879	-28.05
92.883	-27.28
92.905	-27.23
92.909	-27.54
92.917	-26.76
92.966	-27.51
92.974	-26.84
92.984	-26.75
92.997	-27.47
93.005	-25.79
93.055	-27.00
93.060	-27.38
93.094	-25.74
93.137	-26.82
93.141	-25.92
93.149	-26.89
93.157	-26.11
93.165	-26.93
93.173	-27.39
93.189	-26.64
93.196	-27.68
93.204	-25.99
93.212	-25.96
93.253	-26.09
93.261	-26.71
93.276	-26.14
93.283	-27.14
93.290	-25.98
93.358	-26.10
93.368	-24.29
93.398	-25.80
93.418	-25.68
93.470	-25.75
93.477	-25.78
93.494	-25.82
93.517	-25.64
93.567	-25.86
93.584	-24.27
93.605	-26.32
93.674	-26.31
93.684	-25.45

93.695	-25.49
93.706	-25.68
93.793	-23.97
93.815	-24.70
93.825	-24.61
93.836	-23.99
93.847	-26.04
93.906	-25.01
93.913	-24.16
93.919	-24.77
93.925	-23.96
93.932	-23.98
93.938	-24.22
93.943	-24.67
93.948	-24.31
93.968	-22.93
93.975	-23.73
93.981	-24.58
93.985	-23.28
93.991	-24.21
94.023	-24.00
94.028	-23.41
94.034	-23.63
94.041	-23.02
94.047	-22.65
94.052	-23.20
94.060	-23.03
94.071	-24.64
94.084	-23.39
94.090	-23.44
94.098	-23.21
94.109	-24.29
94.156	-24.12
94.162	-22.83
94.169	-22.14
94.178	-25.10
94.183	-23.28
94.227	-24.43
94.240	-25.32
94.296	-25.38
94.304	-24.24
94.316	-23.44
94.358	-25.40

94.367	-23.39
94.375	-23.76
94.495	-25.13
94.503	-22.97
94.512	-25.41
94.518	-25.95
94.576	-24.66
94.578	-24.49
94.581	-25.03
94.584	-26.39
94.589	-26.34
94.591	-27.31
94.595	-26.93
94.604	-27.39
94.631	-27.62
94.657	-27.56
94.683	-27.47
94.709	-27.63
94.735	-27.38
94.766	-27.25
94.787	-27.61
94.813	-27.42
94.839	-27.76
94.866	-27.37
94.892	-27.40
94.923	-27.45
94.949	-27.57
94.975	-28.06
95.001	-27.79
95.027	-27.94
95.054	-27.21
95.080	-27.35
95.106	-27.01
95.132	-27.45
95.158	-27.18
95.184	-27.38
95.205	-27.59
95.231	-27.40
95.257	-27.89
95.277	-27.41
95.302	-26.92
95.324	-27.19
95.348	-27.24

95.371	-26.84
95.396	-27.08
95.420	-27.23
95.445	-27.34
95.466	-27.47
95.491	-27.19
95.505	-27.44
95.520	-27.32
95.535	-27.45
95.549	-27.77
95.564	-27.42
95.578	-27.09
95.593	-26.94
95.608	-27.05
95.622	-27.17
95.637	-27.25
95.652	-27.14
95.664	-27.04
95.680	-27.09
95.703	-26.71
95.718	-27.37
95.735	-27.20
95.757	-26.62
95.768	-26.64
95.779	-26.83
95.800	-26.19
95.819	-26.31
95.836	-25.82
95.853	-26.00
95.869	-26.06
95.898	-26.03
95.915	-24.54
95.932	-25.83
95.948	-25.63
95.965	-25.95
95.982	-25.23
95.998	-25.33
96.015	-25.31
96.032	-25.24
96.048	-25.57
96.065	-25.44
96.083	-25.77
96.107	-25.51

96.124	-25.58
96.141	-25.13
96.158	-25.64
96.175	-25.57
96.191	-25.37
96.208	-25.71
96.225	-25.91
96.242	-25.65
96.256	-25.50
96.270	-25.73
96.283	-25.86
96.311	-25.78
96.339	-25.99
96.367	-26.20
96.395	-26.69
96.468	-26.63
96.496	-26.98
96.545	-26.96
96.577	-26.56
96.608	-27.04
96.639	-27.04
96.676	-26.68
96.710	-26.97
96.735	-26.52
96.784	-26.75
96.842	-27.32
96.846	-26.66
96.866	-26.92
96.898	-26.48
96.913	-26.96
96.968	-26.86
96.994	-26.40
97.016	-26.71
97.053	-26.71
97.101	-26.47
97.122	-26.52
97.150	-26.87
97.178	-26.91
97.206	-27.39
<u>97.234</u>	<u>-27.42</u>

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