Auxiliary material for

Sea ice diatom contributions to Holocene nutrient utilization in East Antarctica

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Paleoceanography

Introduction:

These following two tables correspond to the raw stable isotope data generated for this manuscript. These correspond to the data presented in Figure 3 of the manuscript. Sediment depth age (in calibrated Years BP) along with respective standard deviation errors are also provided. Silicon isotope data (ts01) were anaylsed on a Nu Plasma MC-ICP-MS using dry plasma mode on a Cetac Airdus II desolvating nebuliser, at Université Libre de Bruxelles, Belgium. These data were collected over a one year period. Blank levels were monitored on ^{28}Si and were typically 50 to 100 mV compared to a sample ^{28}Si signal of around 5V. Blanks were not subtracted but such blank levels were found to be insignificant on replicates and secondary reference materials. Indeed full and analytical replicates ($n \geq 3$) were conducted on all samples over several months and results were compared to a known secondary reference, "Diatomite", with an analytical reproducibility for δ^{30}Si of +1.27‰ ± 0.18‰ ($1\sigma_{SD}$, n=84) (published value of

+1.26‰ ± 0.1‰1σ_{SD} [*Reynolds et al.*, 2007]). δ^{29}Si:δ^{30}Si ratios of all data were compared with the terrestrial fractionation line (1.96) and data points falling outside of its analytical error were excluded from final data (16 analyses out of the total number of analyses, n=341).

The carbon isotopic composition ($\delta^{13}C_{diat}$) and C content of diatom silica (%C_{diat}) of the intrinsic organic matter , was analysed at Weizmann Institute, Israël, using a Carlo Erba EA1110 elemental analyser in line with a Finnigan MAT 252 stable isotope ratio mass spectrometer. Please refer to methodology section 2 in the mauscript for more detailed analytical information.

1. ts01. Raw $\delta^{30}Si_{diat}$ data from core MD03-2601, including sample ages (calendar years BP) and 1σ.

1.1. Column "Age (Calendar Years BP)", the age of the sediment depth from core MD03-2601.

1.2 Column "$\delta^{30}Si_{diat}$ (‰)", the isotopic composition of sediment.

1.3. Column "1σ" (2 d.p), the standard deviation of replicates, constituting said sample.

2. ts02. Raw $\delta^{13}C_{diat}$ data from core MD03-2601. Note that samples highlighted in grey were also anslysed at ULB for $\delta^{30}Si_{diat}$.

2.1. Column "Age (Calendar Years BP)", the age of the sediment depth from core MD03-2601.

2.2 Column "$\delta^{13}C_{diat}$ (‰)", the isotopic composition of sediment.

2.3. Column "1σ", (2 d.p).

2.4. Column "%C_{diat}", the ‰ carbon content of diatom opal.

2.5. Column "1σ" (2 d.p), the standard deviation of said sample.

ts01

Age (Calendar Years BP)	**$\delta^{30}Si_{diat}$ (‰)**	**1σ**
1039	0.56	0.15
1130	0.43	0.15
1222	0.60	0.16
1406	0.46	0.15
1590	0.29	0.11
1773	0.47	0.06
1960	0.38	0.04
2081	0.46	0.15
2286	0.30	0.07
2530	0.50	0.03
2776	0.41	0.12
3022	0.37	0.11
3062	0.50	0.08
3144	0.26	0.13
3267	0.38	0.21
3307	0.50	0.18
3389	0.38	0.15
3512	0.41	0.10
3634	0.51	0.19
3757	0.26	0.09
3795	0.46	0.18
3879	0.43	0.15
4005	0.05	0.12
4330	0.27	0.10
4451	0.39	0.16
4575	0.32	0.14
4820	0.17	0.13
5065	0.13	0.17
5310	0.31	0.05
5556	0.12	0.14
5677	0.46	0.16
5801	0.22	0.11
6048	0.45	0.20
6378	0.26	0.17
6625	0.34	0.12
6872	0.38	0.23
6994	0.40	0.15
7118	0.12	0.09
7363	0.13	0.09
7608	0.16	0.15
7853	0.08	0.13
8098	0.12	0.07
8301	0.35	0.15
8407	0.14	0.16
8600	0.13	0.12
8792	0.10	0.07

8985	-0.07	0.10
9080	0.31	0.09
9178	0.05	0.07
9384	0.19	0.17
9686	0.15	0.15
9988	0.31	0.14
10248	0.45	0.07
10392	0.35	0.15
10541	0.57	0.12
10695	0.18	0.03
10844	0.47	0.12
10990	0.25	0.09

ts02

Age (Calendar Years BP)	**$\delta^{13}C_{diat}$** ‰	**1σ**	**$\%C_{diat}$**	**1σ**
1050	-22.65	0.18	0.25	0.01
1130	-22.17	0.05	0.20	0.00
1191	-21.71	0.04	0.22	0.01
1314	-21.20	0.07	0.20	0.00
1375	-22.04	0.16	0.22	0.01
1436	-21.63	0.12	0.20	0.00
1498	-20.85	0.13	0.20	0.00
1559	-20.08	0.18	0.19	0.00
1622	-21.53	0.10	0.21	0.01
1742	-22.24	0.01	0.23	0.00
1804	-22.14	0.04	0.24	0.01
1865	-21.55	0.18	0.20	0.01
1926	-23.52	0.15	0.21	0.00
2000	-22.96	0.09	0.22	0.00
2081	-22.85	0.14	0.29	0.00
2163	-20.30	0.07	0.19	0.00
2237	-20.59	0.14	0.18	0.01
2326	-22.58	0.07	0.20	0.00
2408	-20.18	0.04	0.18	0.00
2490	-20.60	0.01	0.20	0.00
2572	-21.30	0.11	0.18	0.00
2738	-20.21	0.05	0.15	0.00
2817	-21.30	0.16	0.20	0.01
2899	-19.76	0.11	0.16	0.00
2980	-21.37	0.13	0.19	0.00
3062	-21.05	0.15	0.20	0.00
3144	-19.59	0.07	0.15	0.01
3228	-21.42	0.14	0.19	0.00
3307	-18.94	0.17	0.17	0.01
3471	-19.23	0.09	0.19	0.00

3552	-17.81	0.05	0.18	0.02
3634	-19.44	0.07	0.21	0.00
3716	-19.55	0.04	0.20	0.00
3795	-19.89	0.18	0.20	0.01
3879	-20.27	0.01	0.23	0.00
3961	-20.69	0.07	0.20	0.00
4043	-20.80	0.07	0.21	0.00
4127	-18.89	0.05	0.20	0.01
4206	-20.43	0.08	0.20	0.00
4288	-18.30	0.08	0.19	0.00
4370	-20.19	0.05	0.22	0.00
4451	-19.86	0.10	0.20	0.00
4533	-19.16	0.02	0.19	0.00
4615	-19.67	0.10	0.20	0.01
4697	-20.18	0.10	0.19	0.00
4778	-20.81	0.13	0.25	0.02
4860	-18.51	0.15	0.18	0.00
4942	-19.35	0.01	0.20	0.00
5023	-20.45	0.13	0.18	0.00
5105	-18.51	0.15	0.17	0.00
5187	-19.16	0.07	0.20	0.00
5269	-19.85	0.02	0.19	0.01
5350	-18.73	0.00	0.17	0.00
5432	-19.95	0.17	0.20	0.00
5514	-18.97	0.03	0.18	0.00
5596	-18.93	0.10	0.18	0.01
5677	-19.12	0.08	0.21	0.00
5759	-18.93	0.08	0.18	0.01
5841	-19.58	0.11	0.19	0.00
5924	-19.94	0.10	0.23	0.00
6006	-18.22	0.09	0.19	0.00
6088	-19.09	0.08	0.17	0.01
6171	-20.14	0.16	0.22	0.01
6253	-20.44	0.17	0.21	0.00
6335	-19.01	0.16	0.17	0.00
6418	-17.74	0.00	0.18	0.00
6583	-19.56	0.07	0.19	0.00
6665	-18.18	0.09	0.19	0.00
6747	-18.98	0.06	0.20	0.00
6830	-18.24	0.10	0.18	0.00
6912	-20.56	0.18	0.22	0.01
6994	-20.38	0.12	0.20	0.00
7077	-19.28	0.07	0.19	0.00
7158	-18.90	0.08	0.18	0.00
7240	-19.00	0.03	0.20	0.00
7321	-18.68	0.10	0.19	0.00
7403	-20.67	0.07	0.19	0.01
7485	-20.74	0.04	0.22	0.01
7566	-18.46	0.03	0.18	0.00

7648	-20.68	0.03	0.18	0.00
7729	-20.05	0.10	0.18	0.00
7821	-21.68	0.08	0.18	0.01
7888	-22.04	0.08	0.25	0.02
8056	-20.58	0.01	0.20	0.02
8135	-20.11	0.08	0.21	0.00
8219	-20.80	0.06	0.19	0.00
8301	-21.55	0.02	0.23	0.00
8374	-20.26	0.21	0.20	0.01
8438	-18.96	0.05	0.17	0.00
8503	-21.21	0.17	0.19	0.00
8567	-20.01	0.15	0.15	0.00
8627	-19.89	0.11	0.18	0.00
8691	-20.81	0.13	0.19	0.00
8760	-19.42	0.12	0.15	0.01
8824	-20.27	0.04	0.17	0.00
8952	-20.32	0.09	0.17	0.01
9017	-20.14	0.08	0.16	0.00
9081	-20.91	0.05	0.19	0.00
9145	-19.91	0.11	0.16	0.00
9209	-21.98	0.09	0.18	0.01
9274	-20.73	0.05	0.19	0.01
9338	-21.52	0.12	0.19	0.00
9433	-19.97	0.08	0.17	0.00
9534	-20.76	0.13	0.18	0.01
9635	-20.34	0.12	0.16	0.00
9735	-20.26	0.13	0.18	0.00
9836	-20.89	0.10	0.19	0.00
9937	-20.44	0.13	0.17	0.00
10038	-19.36	0.06	0.17	0.00
10139	-20.54	0.10	0.16	0.00
10249	-19.86	0.09	0.17	0.00
10340	-20.52	0.01	0.19	0.00
10441	-21.25	0.12	0.19	0.00
10542	-21.60	0.20	0.17	0.00
10643	-19.65	0.02	0.19	0.00
10750	-20.36	0.19	0.16	0.00
10844	-19.69	0.01	0.21	0.00
10945	-20.51	0.01	0.19	0.00