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*Supplement of*

## **Carbon isotope ( $\delta^{13}\text{C}$ ) excursions suggest times of major methane release during the last 14 ka in Fram Strait, the deep-water gateway to the Arctic**

**C. Consolaro et al.**

*Correspondence to:* [chiara.consolaro@uit.no](mailto:chiara.consolaro@uit.no), [chiara.consolaro@plymouth.ac.uk](mailto:chiara.consolaro@plymouth.ac.uk), [chiara.consolaro@icloud.com](mailto:chiara.consolaro@icloud.com)

**Table S1. Oxygen and Carbon isotope record of JM10-330GC**

Depth (cm bsf)	Age (cal years BP)	Ice Volume Correction (IVC)	$\delta^{18}\text{O}$ <i>N.</i> <i>pachyderma</i> (s)	$\delta^{18}\text{O}_{\text{IVC}}$ <i>N.</i> <i>pachyderma</i> (s)	$\delta^{13}\text{C}$ <i>N.</i> <i>pachyderma</i> (s)	$\delta^{18}\text{O}$ <i>C.</i> <i>neoteretis</i>	$\delta^{18}\text{O}_{\text{IVC}}$ <i>C.</i> <i>neoteretis</i>	$\delta^{18}\text{O}$ <i>C.</i> <i>neoteretis</i> After cleaning	$\delta^{18}\text{O}_{\text{IVC}}$ <i>C.</i> <i>neoteretis</i> After cleaning +ICV	$\delta^{13}\text{C}$ <i>C.</i> <i>neoteretis</i>	$\delta^{13}\text{C}$ <i>C.</i> <i>neoteretis</i> After cleaning
0	150	0	3.19	3.19	0.37	4.48	4.48	N.D.	N.D.	-0.45	N.D.
5	470	0	3.27	3.27	0.35	4.57	4.57	N.D.	N.D.	-0.42	N.D.
10	683	0	3.11	3.11	0.17	4.62	4.62	N.D.	N.D.	-0.59	N.D.
15	948	0	3.28	3.28	0.30	4.16	4.16	N.D.	N.D.	-0.43	N.D.
20	1214	0	3.38	3.38	0.47	4.61	4.61	N.D.	N.D.	-0.38	N.D.
25	1480	0	3.31	3.31	0.34	4.47	4.47	N.D.	N.D.	-0.49	N.D.
30	1746	0	3.26	3.26	0.43	4.44	4.44	N.D.	N.D.	-0.50	N.D.
35	2011	0	3.31	3.31	0.35	4.44	4.44	N.D.	N.D.	-0.42	N.D.
40	2277	0	3.34	3.34	0.43	4.60	4.60	N.D.	N.D.	-0.45	N.D.
45	2543	0	3.49	3.49	0.51	4.44	4.44	N.D.	N.D.	-0.41	N.D.
50	2809	0	3.37	3.37	0.48	4.60	4.60	N.D.	N.D.	-0.45	N.D.
55	3074	0	3.45	3.45	0.68	4.55	4.55	N.D.	N.D.	-0.48	N.D.
60	3340	0	3.43	3.43	0.62	4.55	4.55	N.D.	N.D.	-0.41	N.D.
65	3529	0.01	3.31	3.30	0.71	4.33	4.32	N.D.	N.D.	-0.51	N.D.
75	3717	0.02	3.66	3.64	0.67	4.47	4.45	N.D.	N.D.	-0.51	N.D.
80	3906	0.02	3.47	3.44	0.68	4.49	4.46	N.D.	N.D.	-0.44	N.D.
85	4095	0.03	3.71	3.68	0.68	4.49	4.46	N.D.	N.D.	-0.40	N.D.
90	4283	0.03	3.19	3.16	0.54	3.61	3.58	N.D.	N.D.	-0.19	N.D.
95	4472	0.03	3.59	3.55	0.55	4.34	4.30	N.D.	N.D.	-0.45	N.D.
100	4660	0.04	3.26	3.22	0.51	4.49	4.45	N.D.	N.D.	-0.39	N.D.
105	4849	0.04	3.68	3.64	0.59	3.93	3.89	N.D.	N.D.	-0.46	N.D.
110	5038	0.04	3	2.96	0.47	4.57	4.53	N.D.	N.D.	-0.43	N.D.

Depth (cm bsf)	Age (cal years BP)	Ice Volume Correction (IVC)	$\delta^{18}\text{O}$ N. <i>pachyderma</i> (s)	$\delta^{18}\text{O}_{\text{IVC}}$ N. <i>pachyderma</i> (s)	$\delta^{13}\text{C}$ N. <i>pachyderma</i> (s)	$\delta^{18}\text{O}$ C. <i>neoteretis</i>	$\delta^{18}\text{O}_{\text{IVC}}$ C. <i>neoteretis</i>	$\delta^{18}\text{O}$ C. <i>neoteretis</i> After cleaning	$\delta^{18}\text{O}_{\text{IVC}}$ C. <i>neoteretis</i> After cleaning +ICV	$\delta^{13}\text{C}$ C. <i>neoteretis</i>	$\delta^{13}\text{C}$ C. <i>neoteretis</i> After cleaning
115	5226	0.04	3.55	3.50	0.55	4.39	4.34	N.D.	N.D.	-0.48	N.D.
120	5415	0.05	3.24	3.19	0.54	4.34	4.29	N.D.	N.D.	-0.65	N.D.
125	5604	0.05	3.51	3.46	0.44	4.33	4.28	N.D.	N.D.	-0.56	N.D.
130	5792	0.05	3.68	3.63	0.5	4.58	4.53	N.D.	N.D.	-0.85	N.D.
135	5981	0.05	3.73	3.68	0.58	4.42	4.37	N.D.	N.D.	-0.74	N.D.
140	6170	0.06	3.22	3.16	0.42	4.57	4.51	N.D.	N.D.	-0.57	N.D.
145	6358	0.06	3.38	3.32	0.41	4.57	4.51	N.D.	N.D.	-0.45	N.D.
150	6547	0.08	3.11	3.03	0.46	4.60	4.52	N.D.	N.D.	-0.58	N.D.
155	6735	0.08	3.47	3.39	0.46	4.64	4.56	N.D.	N.D.	-0.49	N.D.
160	6924	0.08	3.02	2.94	0.42	4.47	4.39	N.D.	N.D.	-0.57	N.D.
165	7113	0.1	3.43	3.33	0.4	4.48	4.38	N.D.	N.D.	-0.78	N.D.
170	7301	0.1	3.18	3.08	0.37	4.53	4.43	N.D.	N.D.	-0.78	N.D.
175	7490	0.1	2.62	2.52	0.11	4.60	4.50	N.D.	N.D.	-0.60	N.D.
180	7725	0.1	2.81	2.71	0.18	4.56	4.46	N.D.	N.D.	-0.63	N.D.
185	7843	0.12	2.91	2.79	0.25	4.45	4.33	N.D.	N.D.	-0.65	N.D.
190	7960	0.12	3.16	3.04	0.32	4.67	4.55	N.D.	N.D.	-0.70	N.D.
195	8078	0.12	2.98	2.86	0.24	4.61	4.49	N.D.	N.D.	-0.79	N.D.
200	8195	0.15	3.12	2.97	0.3	4.52	4.37	N.D.	N.D.	-0.71	N.D.
205	8313	0.15	2.86	2.71	0.19	4.47	4.32	N.D.	N.D.	-0.70	N.D.
210	8430	0.15	2.91	2.76	0.23	4.63	4.48	N.D.	N.D.	-0.73	N.D.
215	8548	0.2	2.9	2.70	0.23	4.38	4.18	N.D.	N.D.	-0.82	N.D.
220	8665	0.2	3.01	2.81	0.07	4.23	4.03	N.D.	N.D.	-0.72	N.D.
225	8783	0.2	2.92	2.72	0.14	4.29	4.09	N.D.	N.D.	-0.63	N.D.
230	8900	0.25	2.89	2.64	0.09	4.06	3.81	N.D.	N.D.	-0.75	N.D.

Depth (cm bsf)	Age (cal years BP)	Ice Volume Correction (IVC)	$\delta^{18}\text{O}$ N. <i>pachyderma</i> (s)	$\delta^{18}\text{O}_{\text{IVC}}$ N. <i>pachyderma</i> (s)	$\delta^{13}\text{C}$ N. <i>pachyderma</i> (s)	$\delta^{18}\text{O}$ C. <i>neoteretis</i>	$\delta^{18}\text{O}_{\text{IVC}}$ C. <i>neoteretis</i>	$\delta^{18}\text{O}$ C. <i>neoteretis</i> After cleaning	$\delta^{18}\text{O}_{\text{IVC}}$ C. <i>neoteretis</i> After cleaning +ICV	$\delta^{13}\text{C}$ C. <i>neoteretis</i>	$\delta^{13}\text{C}$ C. <i>neoteretis</i> After cleaning
235	9015	0.25	3.06	2.81	0.1	4.23	3.98	N.D.	N.D.	-0.84	N.D.
240	9135	0.25	3.26	3.01	0.11	4.69	4.44	N.D.	N.D.	-0.92	N.D.
245	9253	0.25	2.96	2.71	0.1	4.62	4.37	N.D.	N.D.	-1.34	N.D.
250	9370	0.3	2.86	2.56	0.12	4.88	4.58	N.D.	N.D.	-1.29	N.D.
255	9471	0.3	2.9	2.60	0.02	4.59	4.29	N.D.	N.D.	-1.57	N.D.
260	9572	0.3	2.79	2.49	-0.1	4.85	4.55	N.D.	N.D.	-1.49	N.D.
265	9673	0.35	3.13	2.78	0.03	4.64	4.29	N.D.	N.D.	-1.61	N.D.
270	9775	0.35	3.4	3.05	-0.34	4.91	4.56	N.D.	N.D.	-1.70	N.D.
275	9876	0.35	3.29	2.94	-0.19	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
278	9937	0.4	N.D.	N.D.	N.D.	4.10	3.70	N.D.	N.D.	-1.85	N.D.
280	9977	0.4	3.55	3.15	-0.03	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
285	10078	0.4	3.39	2.99	0.04	4.73	4.33	N.D.	N.D.	-2.35	N.D.
290	10179	0.4	3.32	2.92	-0.16	4.64	4.24	N.D.	N.D.	-3.09	N.D.
295	10280	0.4	3.21	2.81	-0.02	5.15	4.75	N.D.	N.D.	-3.41	N.D.
300	10382	0.45	3.62	3.17	0.00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
305	10483	0.45	3.57	3.12	-0.14	4.27	3.82	N.D.	N.D.	-2.27	N.D.
310	10584	0.5	3.66	3.16	-0.13	4.98	4.48	N.D.	N.D.	-1.08	N.D.
315	10685	0.5	3.41	2.91	-0.15	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
320	10786	0.5	3.84	3.34	-0.40	5.16	4.66	N.D.	N.D.	-1.21	N.D.
325	10887	0.6	3.70	3.10	-0.11	4.96	4.36	N.D.	N.D.	-1.10	N.D.
330	10989	0.6	3.74	3.14	-0.14	4.92	4.32	N.D.	N.D.	-1.15	N.D.
335	11090	0.6	3.52	2.92	-0.02	4.95	4.35	N.D.	N.D.	-0.98	N.D.
340	11373	0.6	3.74	3.14	-0.05	4.84	4.24	N.D.	N.D.	-1.19	N.D.
345	11703	0.6	3.48	2.88	-0.16	4.89	4.29	N.D.	N.D.	-1.29	N.D.

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350	12032	0.6	3.64	3.02	-0.16	4.70	4.08	N.D.	N.D.	-1.41	N.D.
355	12361	0.7	3.49	2.84	-0.14	4.33	3.68	N.D.	N.D.	-1.14	N.D.
360	12690	0.675	2.56	1.89	-0.01	4.62	3.94	N.D.	N.D.	-1.30	N.D.
365	12735	0.675	3.07	2.40	-0.04	4.94	4.27	N.D.	N.D.	-1.10	N.D.
370	12866	0.675	4.28	3.61	-1.00	N.D.	N.D.	5.28	4.60	N.D.	-1.44
371	12892	0.675	3.97	3.30	-0.74	4.98	4.31	N.D.	N.D.	-2.21	N.D.
375	12997	0.7	3.92	3.22	-0.60	5.15	4.45	5.01	4.31	-1.77	-1.50
380	13127	0.7	4.00	3.30	-0.33	5.07	4.37	5.09	4.39	-1.73	-1.56
385	13257	0.71	4.17	3.46	-0.32	5.15	4.44	5.07	4.36	-1.39	-1.46
389	13388	0.72	4.03	3.31	-0.54	5.01	4.29	N.D.	N.D.	-1.77	N.D.
390	13518	0.72	4.12	3.40	-2.61	5.26	4.54	5.11	4.39	-4.37	-2.75
395	13649	0.75	4.14	3.39	-0.34	5.21	4.46	5.15	4.40	-1.87	-1.60
400	13779	0.75	3.96	3.21	-0.74	5.20	4.45	5.18	4.43	-1.99	-1.55
405	13910	0.775	3.96	3.19	-0.62	5.19	4.42	5.16	4.39	-1.80	-1.64
410	13914	0.8	4.19	3.39	-0.84	5.10	4.30	5.25	4.45	-2.87	-2.61
411	13936	0.825	3.98	3.16	-0.83	5.22	4.40	5.15	4.33	-2.72	-2.50
415	14040	0.85	4.25	3.40	-0.57	5.21	4.36	5.15	4.30	-1.75	-1.36
418	14118	0.85	4.13	3.28	-0.99	5.24	4.39	5.16	4.31	-1.92	-2.32