AGU PUBLICATIONS

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Supporting Information for

Lithogenic particle transport trajectories on the northwest Atlantic margin

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Contents of this file

Introduction

Supplementary material contains 5 figures and 2 data tables. Figure S1 shows transmissometer results at 10 stations along the Line W transect. Figure S2 shows detrital Nd content (ppm) in selected core-top (0-1 cm) sediments. Figure S3 is a cross plot of detrital Nd content (ppm) and Al content (%) for sinking particles at Station W. Figure S4 includes cross plots of a) $\varepsilon_{Nd\text{-}detrital}$ versus Nd content (ppm) and b) $\varepsilon_{Nd\text{-}detrital}$ versus Nd flux (in μg $m^{-2}d^{-1}$) of sinking particles at Station W. Figure S5 shows detrital Nd isotope compositions of core-top (0-1 cm) sediments in the northwest Atlantic and outcrops. Table S1 provides sampling date, detrital $^{143}Nd/^{144}Nd$ ratio, $\varepsilon_{Nd\text{-}detrital}$, and Nd content of sinking particle samples. Table S2 shows the isotopic composition and content of detrital Nd, and $\Delta^{14}C$ values of bulk organic carbon in core-top sediments in the northwest Atlantic margin and downcore samples at Bermuda Rise.

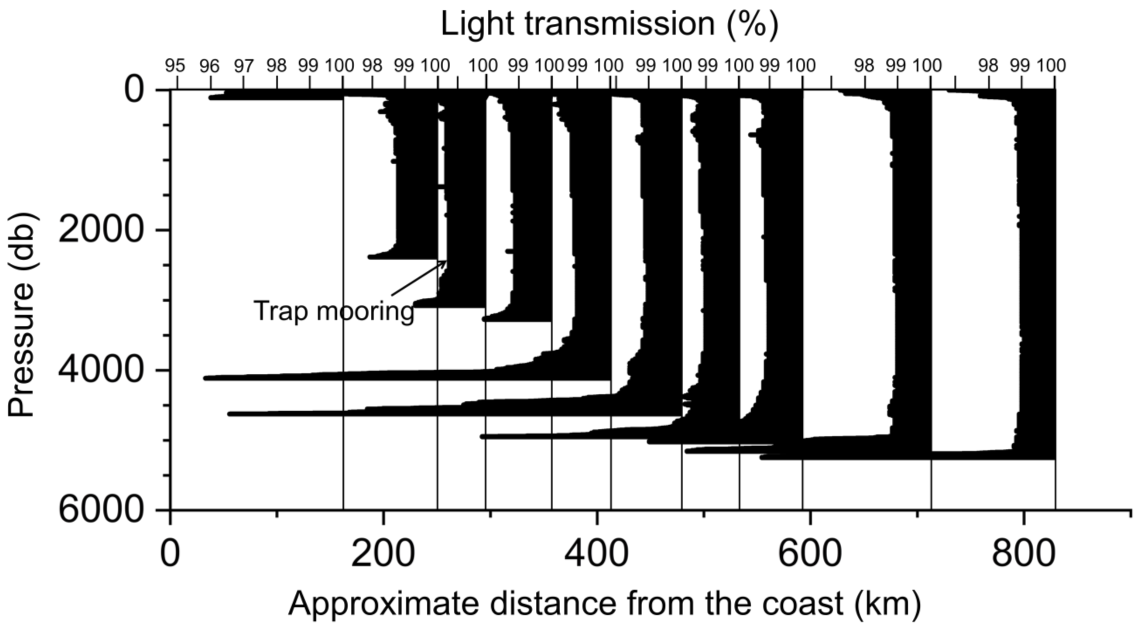

Figure S1. Transmissometer results at 10 stations along the Line W transect, obtained in May 2014 by CTD casts on the R/V *Knorr* (top x-axes). Each plot is positioned according to the approximate distance from Cape Cod (bottom x-axis). Intermediate nepheloid layers (INLs) and benthic/bottom nepheloid layers (BNLs) can be seen as decreased light transmission. Note that the transmissometry data are uncalibrated, and so it is not possible to convert them to suspended particulate matter concentrations. The data are available at https://dods.ndbc.noaa.gov/thredds/catalog/data/oceansites/DATA/LINE-W/catalog.html.

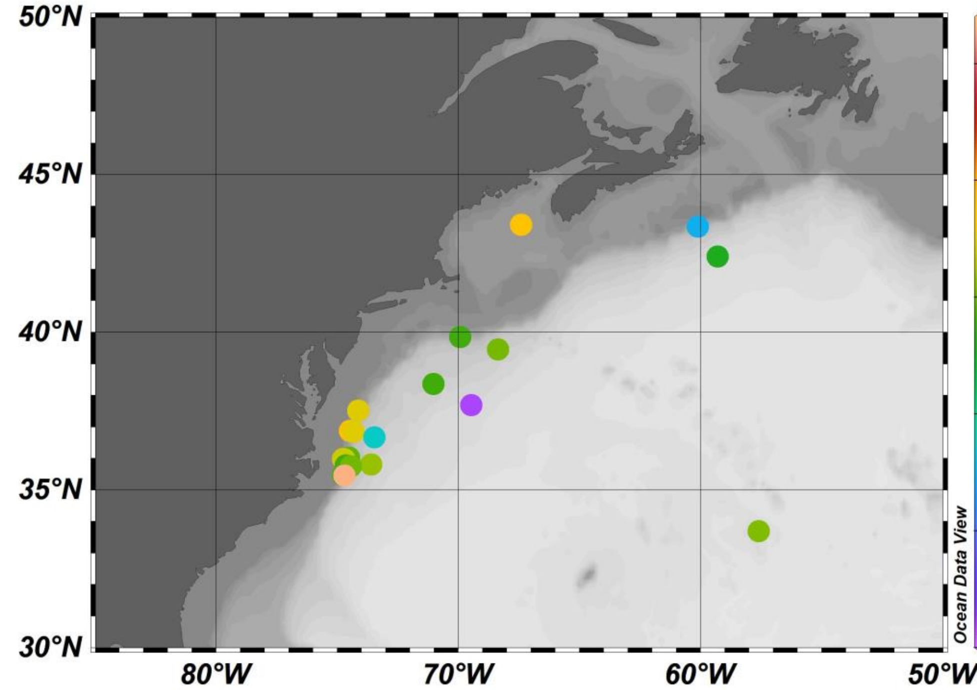

Figure S2. Detrital Nd content (ppm) in selected core-top (0-1 cm) sediments.

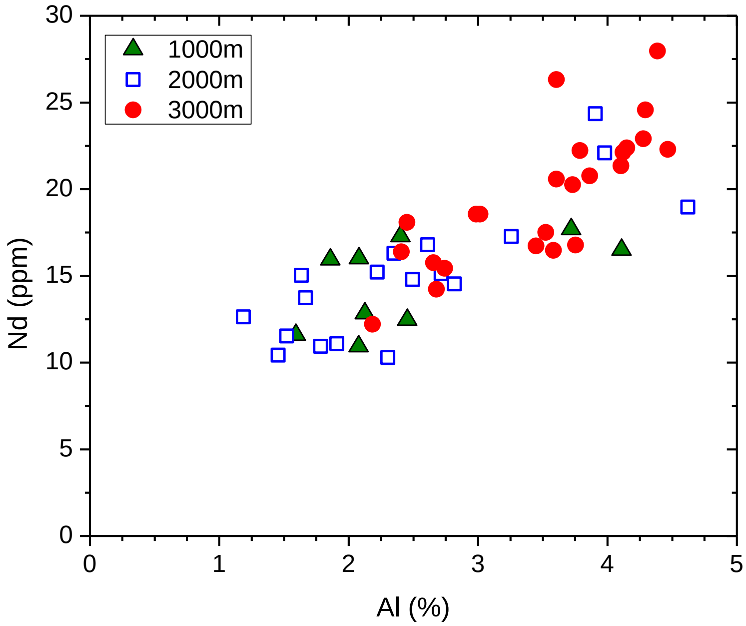

Figure S3. A cross plot of detrital Nd content (ppm) and Al content (%) for sinking particles at Station W.

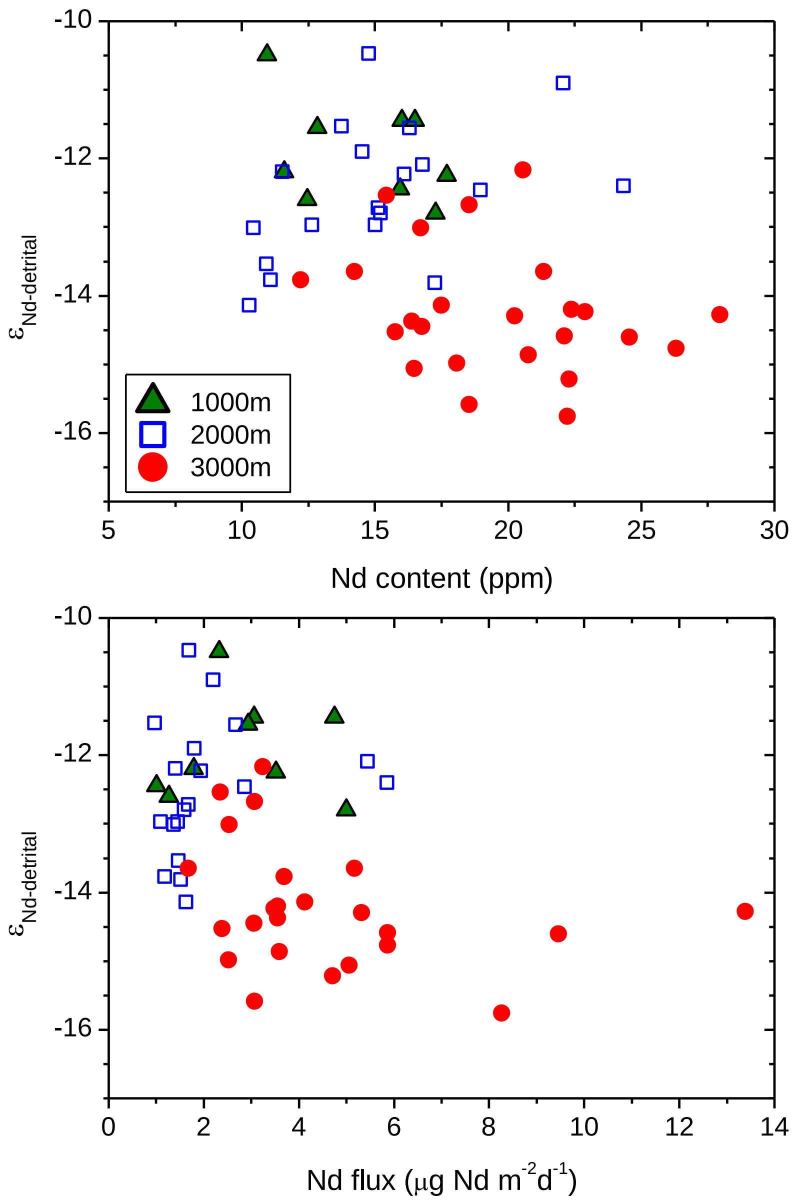

Figure S4. Cross plots of a) $\varepsilon_{Nd\text{-}detrital}$ versus Nd content (ppm) and b) $\varepsilon_{Nd\text{-}detrital}$ versus Nd flux (in μg $m^{-2}d^{-1}$) of sinking particles at Station W.

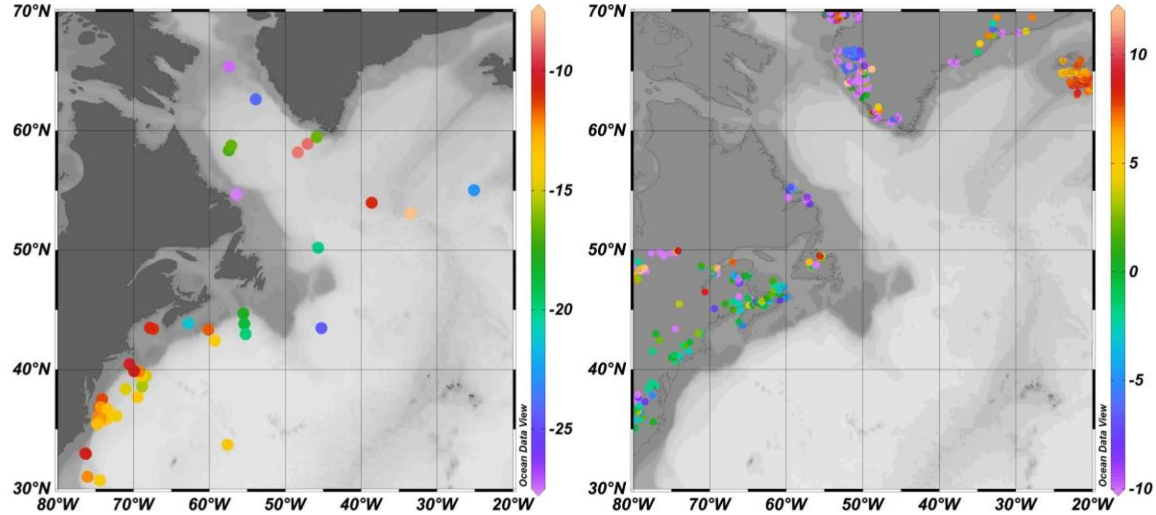

Figure S5. Detrital Nd isotope compositions (expressed as ε_{Nd} values) of core-top (0-1 cm) sediments in the northwest Atlantic (left) and outcrops (right). Note the different color bar scales. Nd isotope composition data from McLennan et al. (1990) and Innocent et al. (1997) are also shown. The outcrop Nd isotope data were obtained from GEOROC website (http://georoc.mpch-mainz.gwdg.de/georoc/).

Depth (m)	Cup #	cup open date (mm-dd-yy)	cup open interval (days)	mass flux <1mm (mg $m^{-2}d^{-1}$)	$\Delta^{14}C$ (‰)	Al flux (mg $m^{-2}d^{-1}$)	$^{143}Nd/^{144}Nd$	$\varepsilon_{Nd\text{-}detrital}$	[Nd] (ppm)
968	1	06-27-04	23.38	233	+53	1.1	0.512011	−12.23	ND
968	2	07-20-04	23.38	154	+22	2.5	0.512013	−12.19	11.60
968	3	08-12-04	23.38	142	ND	2.2	ND	ND	ND
968	4	09-05-04	23.38	66	ND	ND	ND	ND	ND
968	5	09-28-04	23.38	213	ND	4.4	0.512100	−10.49	10.94
968	6	10-21-04	23.38	397	ND	ND	ND	ND	ND
968	7	11-14-04	23.38	289	+4	6.9	0.511982	−12.80	17.28
968	8	12-07-04	23.38	191	+7	4.0	0.512051	−11.45	16.01
968	9	12-31-04	23.38	116	ND	3.0	ND	ND	ND
968	10	01-23-05	23.38	96	ND	ND	ND	ND	ND
968	11	02-15-05	23.38	288	ND	11.8	0.512051	−11.45	16.50
968	12	03-11-05	23.38	253	ND	ND	ND	ND	ND
968	13	04-03-05	23.38	282	+28	2.0	0.512055	−11.37	ND
1011	6	11-06-05	25.77	229	+26	4.9	0.512046	−11.55	12.84
1011	7	12-02-05	25.77	199	−21	7.4	0.512010	−12.25	17.69
992	2	07-23-06	26.08	63	+42	1.2	0.512000	−12.45	15.95
992	11	03-14-07	26.08	102	−43	2.5	0.511992	−12.60	12.46
1976	1	06-27-04	14.48	132	+13	1.9	0.511971	−13.01	10.43
1976	2	07-11-04	14.48	71	−3	1.2	0.512047	−11.53	13.74
1976	3	07-25-04	14.48	112	ND	2.3	ND	ND	ND
1976	4	08-09-04	14.48	47	ND	ND	ND	ND	ND
1976	5	08-23-04	14.48	135	ND	2.4	0.511944	−13.54	10.93
1976	6	09-07-04	14.48	301	ND	ND	ND	ND	ND
1976	7	09-21-04	14.48	122	−1	1.9	0.512013	−12.19	11.52
1976	8	10-06-04	14.48	164	+9	3.9	0.512046	−11.56	16.31
1976	9	10-20-04	14.48	124	+5	3.5	0.512028	−11.90	14.53
1976	10	11-04-04	14.48	324	+10	8.5	0.512018	−12.09	16.79
1976	11	11-18-04	14.48	97	+15	1.6	0.511973	−12.97	15.02
1976	12	12-03-04	14.48	158	−9	3.6	0.511913	−14.14	10.29
1976	13	12-17-04	14.48	89	−10	1.9	ND	ND	ND
1976	14	01-01-05	14.48	115	−14	2.9	0.512101	−10.48	14.78
1976	15	01-15-05	14.48	111	−11	3.0	0.511986	−12.72	15.12
1976	16	01-30-05	14.48	100	−41	4.0	0.512079	−10.90	22.08
1976	17	02-13-05	14.48	266	ND	14.9	ND	ND	ND
1976	18	02-28-05	14.48	137	ND	ND	ND	ND	ND
1976	19	03-14-05	14.48	107	ND	2.0	0.511932	−13.77	11.09
1976	20	03-29-05	14.48	374	ND	ND	ND	ND	ND
1976	21	04-12-05	14.48	383	+33	4.8	0.511939	−13.64	ND
1968	14	01-24-06	15.95	104	−3	2.3	0.511982	−12.80	15.22
1968	16	02-25-06	15.95	121	−15	6.3	0.512011	−12.23	16.10
1968	21	05-16-06	15.95	240	−38	9.4	0.512002	−12.41	24.34
1949	9	11-03-06	16.14	87	+1	1.0	0.511973	−12.97	12.64
1949	14	01-22-07	16.14	151	−7	7.0	0.511999	−12.46	18.96
1949	17	03-12-07	16.14	88	−44	2.9	0.511930	−13.81	17.26
2938	1	06-27-04	14.48	128	+5	3.1	0.511908	−14.24	ND
2938	2	07-11-04	14.48	211	−42	9.4	0.511858	−15.22	22.30
2938	3	07-25-04	14.48	152	−9	4.0	0.511893	−14.53	15.76
2938	4	08-09-04	14.48	118	−18	3.2	0.511938	−13.65	14.23
2938	5	08-23-04	14.48	307	−34	11.0	0.511866	−15.06	16.47

2938	6	09-07-04	14.48	166	−13	5.0	0.511839	−15.59	18.55
2938	7	09-21-04	14.48	140	+15	3.4	0.511870	−14.98	18.08
2938	8	10-06-04	14.48	385	−41	16.5	0.511889	−14.61	24.56
2938	9	10-20-04	14.48	372	−45	14.1	0.511830	−15.76	22.22
2938	10	11-04-04	14.48	263	−24	9.8	0.511905	−14.30	20.25
2938	11	11-18-04	14.48	406	−52	18.1	0.511908	−14.20	ND
2938	12	12-03-04	14.48	265	−24	10.9	0.511890	−14.59	22.12
2938	13	12-17-04	14.48	173	−37	6.7	0.511876	−14.86	20.76
2938	14	01-01-05	14.48	183	−16	6.9	0.511897	−14.45	16.77
2938	15	01-15-05	14.48	158	−15	5.7	0.512014	−12.17	20.57
2938	16	01-30-05	14.48	152	−43	6.5	0.511908	−14.24	22.90
2938	17	02-13-05	14.48	159	−49	6.6	0.511910	−14.20	22.38
2938	18	02-28-05	14.48	152	−30	5.2	0.511971	−13.01	16.72
2938	19	03-14-05	14.48	153	−14	4.2	0.511995	−12.54	15.44
2938	20	03-29-05	14.48	303	+14	6.6	0.511932	−13.77	12.21
2938	21	04-12-05	14.48	399	+30	6.8	0.511931	−13.80	ND
2930	9	11-05-05	15.95	235	+10	8.3	0.511913	−14.14	17.51
2930	10	11-21-05	15.95	217	+43	5.2	0.511901	−14.38	16.39
2930	21	05-16-06	15.95	243	−42	10.0	0.511938	−13.65	21.34
2911	2	07-13-06	16.14	166	+22	5.0	0.511988	−12.68	18.55
2911	5	08-30-06	16.14	479	−80	21.0	0.511906	−14.28	27.96
2911	9	11-03-06	16.14	223	−58	8.0	0.511881	−14.77	26.31

Table S1. Sampling date, detrital $^{143}Nd/^{144}Nd$ ratio, $\varepsilon_{Nd\text{-}detrital}$, and Nd content of sinking particle samples. The measurement uncertainty (2σ) for detrital $^{143}Nd/^{144}Nd$ ratio, $\varepsilon_{Nd\text{-}detrital}$, and Nd content was $5\sim15\times10^{-6}$, 0.3 in epsilon units, and 0.5 %, respectively. Total mass flux (< 1 mm), $\Delta^{14}C$ values and Al flux data have been reported in Hwang et al. (2009a). ND denotes no data.

Cruise	core #	water depth (m)	Lat. (°N)	Lon. (°W)	$^{143}Nd/^{144}Nd$	$\varepsilon_{Nd\text{-detrital}}$	[Nd] (ppm)	$^{87}Sr/^{86}Sr$	$\Delta^{14}C$ (‰)
KNR178	MC4	3865	36.123	72.28	0.511902	−14.36	ND	0.7270	−303
KNR178	1A 0-1cm	3361	35.817	73.594	0.511932	−13.77	30.80	ND	−270
KNR178	MC14 0-1cm	2607	35.931	74.103	0.511978	−12.87	ND	0.7239	−173
KNR178	22A 0-1cm	1800	36.028	74.508	0.512042	−11.63	29.73	ND	−202
KNR178	MC25 0-1cm	1443	36.06	74.613	0.512007	−12.31	ND	0.7255	−174
KNR178	31A 0-1cm	1005	35.976	74.712	0.512011	−12.23	32.04	ND	−158
KNR178	35A 0-1cm	590	35.983	74.76	0.512011	−12.23	31.80	ND	−138
KNR178	41A 0-1cm	1069	35.785	74.658	0.512178	−8.97	29.03	ND	−181
KNR178	47A 0-1cm	2000	35.762	74.442	0.512001	−12.43	30.09	ND	−176
KNR178	MC50 0-1cm	439	35.435	74.819	0.511979	−12.86	ND	0.7201	−129
KNR178	52A 0-1cm	980	35.483	74.765	0.511957	−13.28	29.02	0.7270	−93
KNR178	54A 0-1cm	1742	35.464	74.714	0.511961	−13.21	41.48	ND	−165
KNR178	57A 0-1cm	1387	36.879	74.486	0.512047	−11.53	34.24	ND	−212
KNR178	60A 0-1cm	1018	37.516	74.138	0.512052	−11.43	32.18	ND	−227
KNR178	67A 0-1cm	1956	36.849	74.325	0.512003	−12.39	32.19	ND	−240
KNR178	74A 0-1cm	3022	38.373	71.032	0.511882	−14.75	28.97	ND	−221
KNR178	76 0-1cm	3065	39.105	68.8	0.511867	−15.04	ND	ND	−298
KNR140	GGC 62 0-1cm	906	32.989	76.400	0.512149	−9.54	ND	0.7104	ND
KNR140	GGC56 0-1cm	1400	32.939	76.297	0.512097	−10.55	ND	0.7122	ND
KNR140	GGC43 0-1cm	2590	31.017	76.067	0.512012	−12.21	ND	0.7163	ND
KNR140	GGC30 0-1cm	3433	30.734	74.468	0.511911	−14.18	ND	0.7216	ND
EN407	MC1 0-1cm	2044	39.701	69.200	0.511841	−15.55	ND	0.7223	−248
EN407	St3 MC9 0-1cm	2958	39.461	68.371	0.511865	−15.08	30.14	ND	−248
EN407	MC16 0-1cm	3502	38.595	68.896	0.511840	−15.57	ND	0.7272	−338
EN407	MC20 0-1cm	2521	39.501	68.996	0.511915	−14.10	ND	0.7136	−274
OCE400	MC48 0-1cm	281	43.41	67.41	0.512067	−11.14	34.01	ND	−214
OCE426	MC1A 0-1cm	1491	39.85	69.24	0.512015	−12.15	ND	0.7282	ND
OCE426	MC21E 0-1cm	75	40.4602	70.547	0.512119	−10.12	ND	0.7198	ND
OCE 422	BC1 0-1cm	280	43.4921	67.838	0.512080	−10.88	ND	0.7293	ND
OCE326	MC29B 0-1cm	249	43.885	62.795	0.511547	−21.28	ND	0.7266	ND
OCE326	MC21B 0-1cm	1336	44.683	55.525	0.511719	−17.93	ND	0.7282	ND
OCE326	MC19E 0-1cm	3380	43.842	55.387	0.511676	−18.77	ND	0.7285	ND
OCE326	GGC16 0-1cm	4303	42.979	55.253	0.511617	−19.92	ND	0.7288	ND
AT-16-1	MC-11 0-1cm	1080	43.36	60.13	0.512038	−11.7	22.34	ND	ND
AT-16-1	MC-26 0-1cm	4444	42.4	59.3	0.511927	−13.87	27.94	ND	ND
AT-16-1	MC-41 0-1cm	1150	39.86	69.93	0.512092	−10.65	28.94	ND	ND
AT-16-1	MC-51 0-1cm	4510	37.69	69.48	0.51192	−14.01	15.84	ND	ND
AT-16-1	MC-78 0-1cm	3051	36.68	73.47	0.511963	−13.17	23.67	ND	ND
OCE326	BC9C 0-1 cm	4517	33.693	57.612	0.511943	−13.56	30.35	ND	ND
OCE326	BC9C 1-2 cm	4517	33.693	57.612	0.511948	−13.46	33.61	ND	ND
OCE326	BC9C 2-3 cm	4517	33.693	57.612	0.511918	−14.04	32.96	ND	ND
OCE326	BC9C 3-4 cm	4517	33.693	57.612	0.511876	−14.86	31.78	ND	ND

OCE326	BC9C 4-5 cm	4517	33.693	57.612	0.511886	−14.67	32.67	ND	ND
OCE326	BC9C 5-6cm	4517	33.693	57.612	0.511875	−14.88	31.38	ND	ND
OCE326	BC9C 8-9 cm	4517	33.693	57.612	ND	−12.66	ND	ND	ND
OCE326	BC9C 9-11 cm	4517	33.693	57.612	0.511851	−15.35	31.54	ND	ND
OCE326	BC9C 21-23 cm	4517	33.6933	57.612	0.511864	−15.10	31.69	ND	ND

Table S2. The isotopic composition and content of detrital Nd, and $\Delta^{14}C$ values of bulk organic carbon in core-top sediments in the northwest Atlantic margin and downcore samples at Bermuda Rise. The measurement uncertainty (2σ) for detrital $^{143}Nd/^{144}Nd$ ratio, $\varepsilon_{Nd\text{-}detrital}$, Nd content, and $^{87}Sr/^{86}Sr$ ratio was 5~15×10^{-6}, 0.3 in epsilon units, 0.5 %, and 25×10^{-6} respectively. The $\Delta^{14}C$ values have been reported in Griffith et al. (2010). ND denotes no data.