Paleoceanography

Supporting Information for

Origin of abyssal NW Atlantic water masses since the Last Glacial Maximum

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Site	Latitude	Longitude	Depth (m)	Age model reference
KNR197/10 GGC17	36°24'N	48°32'W	5010	Keigwin and Swift (2017)
ODP 1059	31°40'N	75°25'W	2985	Grützner et al. (2002)
ODP 1060	30°45'N	74°27'W	3481	Grützner et al. (2002)
ODP 1061	29°58'N	73°58'W	4044	Grützner et al. (2002)
12 JPC	29°04'N	72°54'W	4250	Gutjahr et al. (2008)
AII 107 22GGC	54° 48'S	03°20'W	2768	Keigwin and Boyle (1987)
IODP U1313	41°00'N	32°58'W	3426	Naafs et al. (2013)

Table S1. Location and depth of cores used for this study: Corner Rise (KNR197/10 GGC17) and Blake Ridge (ODP 1059, ODP 1060 and ODP 1061, 12 JPC) cores are used for the Nd isotope depth transect of Fig. 4. The new εNd data are listed in Tab. S3 and S4, respectively. Note that Gutjahr et al. (2008) found Nd isotope leachates offset from seawater data at Blake Ridge sites shallower than 3400 m.

Lab #	Depth (cm) in core	Species	Conv. ^{14}C Age (a)	Error (a)	Calib 7.1 (a)	Calib error (a)
CURL 10499	68-70	N. pachyderma (>150 µm)	21880	100	25790	100

Table S2. New AMS ^{14}C result from AII 107 22GGC calibrated with the standard 400 years reservoir correction. The sample was prepared at the University of Colorado and measured at the University of California, Irvine. Stable carbon isotope data on *C. wuellerstorfi* from the LGM measured at 67 and 69 cm depth give $\delta^{13}C = -0.36 \pm 0.15$ ‰, and $\delta^{18}O = 4.39 \pm 0.23$ ‰.

Depth (cm)	Age (ka)	εNd	2 SE	Depth (cm)	Age (ka)	εNd	2 SE
1.0	0.4	-14.73	0.13	141.0	14.6	-15.53	0.14
9.0	2.1	-14.63	0.11	145.0	15.0	-13.57	0.13
17.0	3.8	-15.18	0.10	149.0	15.1	-11.91	0.12
25.0	5.1	-15.89	0.12	153.0	15.8	-11.12	0.13
33.0	5.9	-16.50	0.12	157.0	16.6	-11.03	0.14
41.0	6.4	-17.80	0.14	161.0	17.3	-10.91	0.15
41.0	6.8	-17.82	0.09	165.0	17.9	-10.87	0.11
49.0	7.7	-20.02	0.12	169.0	18.6	-11.28	0.11
57.0	8.6	-18.34	0.11	173.0	19.2	-11.53	0.12
65.0	9.5	-17.31	0.15	177.0	19.7	-11.85	0.10
69.0	9.9	-17.68	0.12	181.0	20.4	-11.79	0.10
73.0	10.4	-16.48	0.12	185.0	21.1	-11.93	0.10
77.0	10.8	-16.15	0.12	189.0	21.3	-11.78	0.12
81.0	11.3	-15.83	0.12	193.0	21.5	-12.00	0.12
85.0	11.7	-15.14	0.11	197.0	21.7	-12.01	0.12
89.0	12.2	-14.15	0.10	201.0	21.9	-12.12	0.10
93.0	12.6	-14.30	0.11	201.0	21.9	-12.04	0.10
97.0	12.7	-14.13	0.12	205.0	22.1	-12.20	0.09
101.0	12.8	-14.12	0.09	209.0	22.3	-12.02	0.11
105.0	12.9	-14.28	0.13	213.0	22.5	-12.13	0.13
109.0	13.0	-14.00	0.11	217.0	22.7	-11.80	0.15
109.0	13.0	-14.19	0.11	221.0	22.9	-12.04	0.19
113.0	13.1	-14.45	0.09	225.0	23.1	-12.42	0.09
117.0	13.2	-14.43	0.10	229.0	23.3	-12.74	0.09
121.0	13.3	-14.96	0.11	233.0	23.5	-12.38	0.11
125.0	13.4	-15.14	0.09	233.0	23.5	-12.50	0.13
129.0	13.5	-15.37	0.11	237.0	23.7	-12.34	0.10
133.0	13.6	-15.80	0.12	241.0	23.9	-12.35	0.13
137.0	14.2	-16.41	0.11				

Table S3. εNd data of Corner Rise (KNR197/10 GGC17, 36°24.3'N, 48°32.4'W, 5010 m water depth). Denoted errors are the internal 2 sigma standard errors. The external 2 sigma standard deviation is 0.15 ε as described in Section 2.2.

Site	Hole	Core	MCD	Age (ka)	εNd	2 SE
ODP 1059	A	1H3	3.4	17.9	-10.35	0.20
ODP 1059	B	1H4	4.0	20.8	-10.48	0.13
ODP 1059	B	1H4	5.1	22.1	-10.24	0.20
ODP 1059*					**-10.4**	**0.2**
ODP 1060	B	1H3	4.1	18.1	-10.78	0.16
ODP 1060	B	1H3	4.5	18.8	-10.55	0.16
ODP 1060	C	2H1	5.2	20.0	-10.45	0.18
ODP 1060	C	2H1	5.6	20.4	-10.48	0.15
ODP 1060	C	2H1	6	20.8	-10.45	0.17
ODP 1060*					**-10.5**	**0.3**
ODP 1061	C	1H4	4.9	19.7	-10.78	0.15
ODP 1061	C	1H4	5.3	20.6	-10.74	0.18
ODP 1061	C	2H1	6.2	22.7	-10.89	0.15
ODP 1061*					**-10.8**	**0.2**

*Average values, errors are 2 SD.

Table S4. LGM εNd data of the Blake Ridge sites ODP 1059, ODP 1060 and ODP 1061.

Site	Hole	Core	MCD	Age (ka)	εNd	2 SE
U1313	C	1H1	0.07	1.2	-13.74	0.31
U1313	C	1H1	0.14	3.3	-13.75	0.19
U1313	C	1H1	0.28	7.6	-14.65	0.44
U1313	C	1H1	0.35	9.7	-14.15	0.37
U1313	C	1H1	0.49	13.9	-14.25	0.38
U1313	C	1H1	0.63	16.4	-12.69	0.36
U1313	C	1H1	0.69	17.1	-12.07	0.19
U1313	C	1H1	0.97	20.3	-11.41	0.25
U1313	C	1H1	1.04	21.3	-11.51	0.33
U1313	C	1H1	1.25	23.9	-12.17	0.20

Table S5. εNd of IODP Site U1313, complementing the data by Lippold et al. (2016) for Fig. 6. Samples were measured on a Nu Plasma at GEOMAR, Helmholtz Centre for Ocean Research Kiel. The external 2 sigma standard deviation is 0.32 ε.

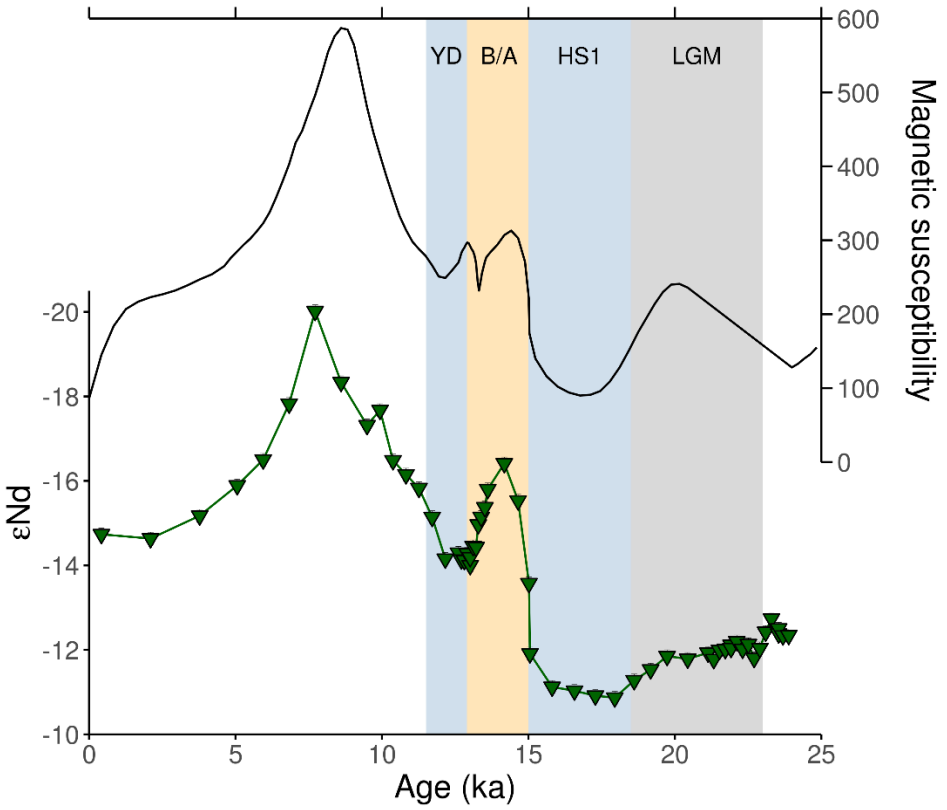

Figure S1. Magnetic susceptibility (top) and εNd (bottom) of KNR197-10 GGC17. Vertical bars indicate the time ranges of the LGM, HS1, B/A and YD. Note the inverted axis of εNd.

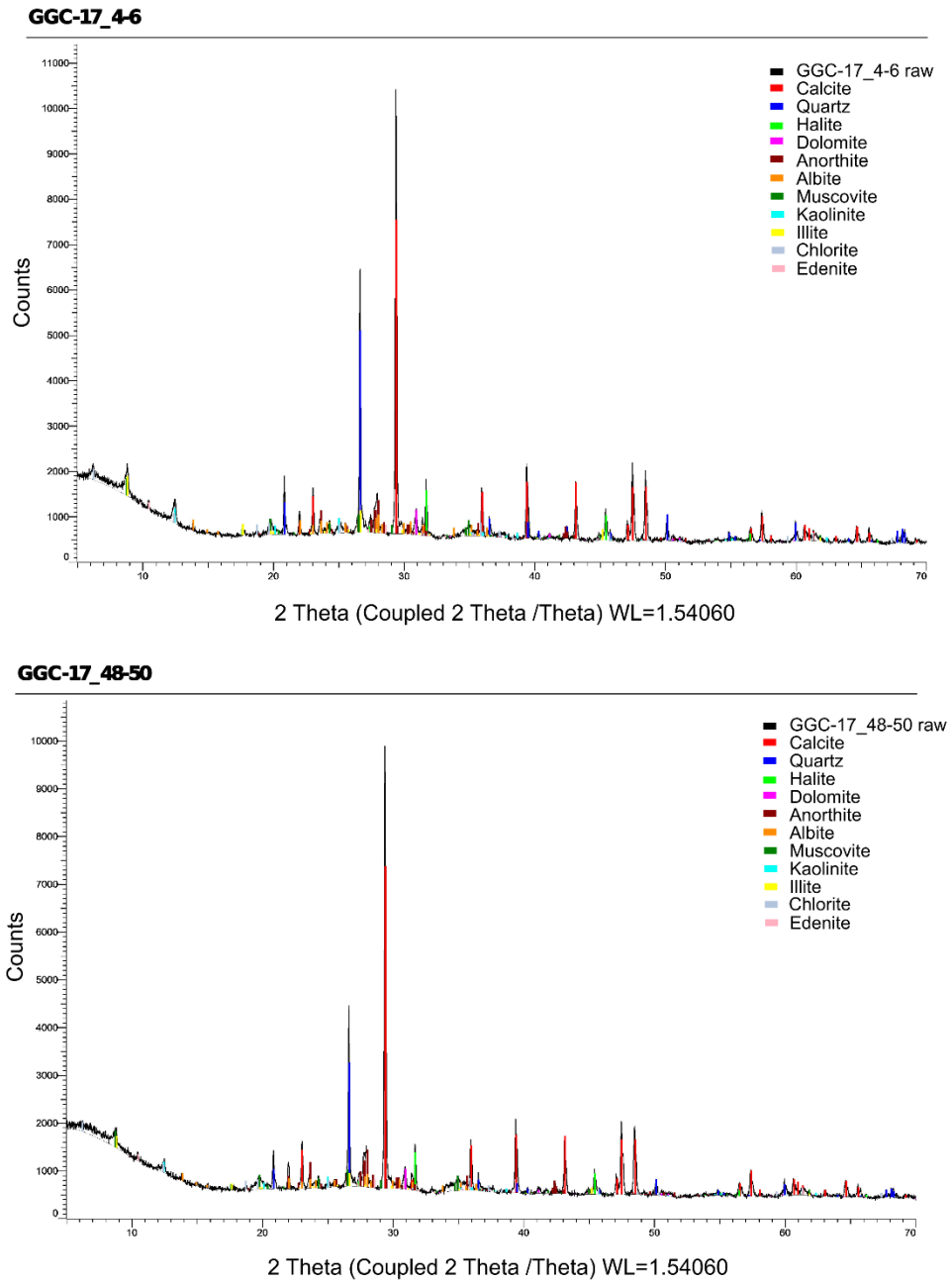

Figure S2. XRD spectra showing main mineral composition of KNR197-10 GGC17 measured with a Bruker D8 Advance eco XRD-scanner at the Institute of Earth Sciences, Heidelberg University. Top: depth interval from 4 to 6 cm (0.8 ka). Bottom: depth interval from 48 to 50 cm (7.7 ka). The difference of the Nd isotopic composition between both intervals is ΔεNd = 5.5. Both depth intervals are mainly dominated by Quartz and Calcite with different clay minerals being present only in small amounts. Except for Calcite (mainly biogenic $CaCO_3$) there are no significant changes in the sedimentary composition between all depth intervals (this figure and Fig. S3).

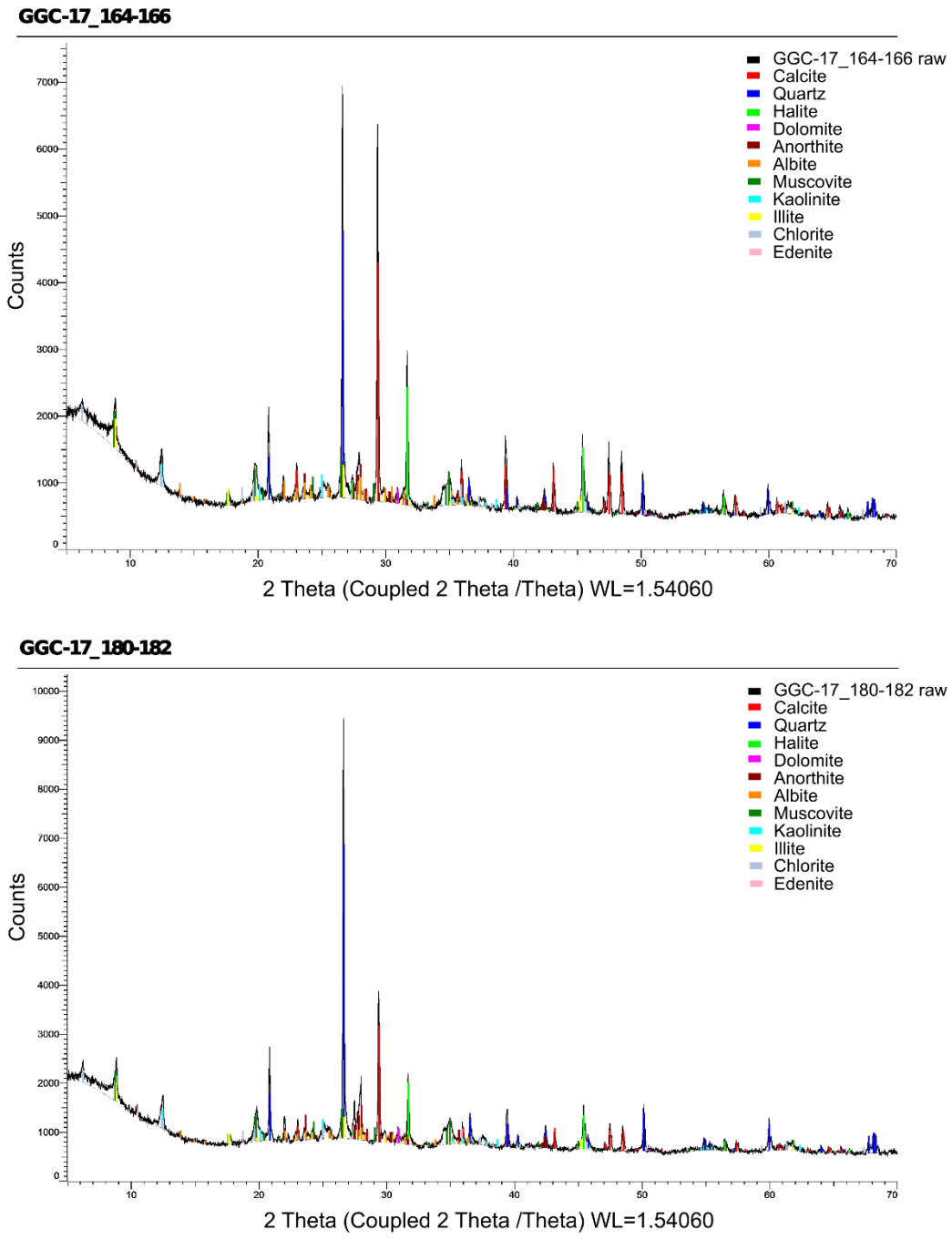

Figure S3. Same as Fig. S2, but depth intervals 164-166 cm (top; 17.9 ka) and 180-182 cm (bottom; 20.3 ka). ΔεNd between both depth intervals is about 1.