
The State University of New Jersey

RUTGERS

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NORWEGIAN SEA CRUISE KNR177-2

FINAL CRUISE REPORT

May 18, 2004

LEADING PARTY

Institute of Marine and Coastal Sciences
(IMCS)
Rutgers University

CHIEF SCIENTIST

Dr. Yair Rosenthal
Rutgers University

CRUISE DATES

May 8-18, 2004

FUNDING AGENCY

National Science Foundation
Grant# OCE-0341412

SHIP NAME

R/V Knorr operated by WHOI

PROJECT TITLE: Assessing the effects of calcite saturation on the benthic foraminiferal Mg/Ca-temperature relationship using a homothermal depth transect in the Norwegian Sea

DESCRIPTION OF SCIENTIFIC PROGRAM: The purpose of our cruise to the Norwegian Sea was to collect multi-cores and giant gravity cores that cover a range of calcite saturation levels at constant temperature and salinity. This unusual sample set will be used to assess the effect of calcite saturation on the Mg/Ca – temperature relationship in benthic foraminifera. During the cruise we collected sediments along two transects covering a depth range of ~400-4000 meters. As part of the project we also collected water samples and CTD & XBT data for the core-top/modern comparison. A hydrocast was taken at the deepest station. The surface sediments were preserved so live benthic foraminifera could later be identified. Data and material collected at each station is provided in the station log.

DATA COLLECTED:

Cruise Track: A map with the cruise track is attached to this report (attached in pdf form as file `cruise_track.pdf`). The cruise track was recorded in digitized form on the CD-ROM “Shipboard Data Archive2”.

Site selection: In general, sites cored during this cruise are the same sites used by Andreas Mackensen (Mackensen et al., 1985) for his carbon isotope calibration studies. We have, however, used the ship’s 3.5 kHz sounder (Knudsen 320B/R) and Seabeam Instruments model 2011 multibeam swath mapping system to aid in the final site selection.

Station Log: The Station Log gives the location of all cores, CTDs, and discrete water samples collected, and which is included in this Report (attached as an MS Excel file: `KN177/2_station_log short.xls`).

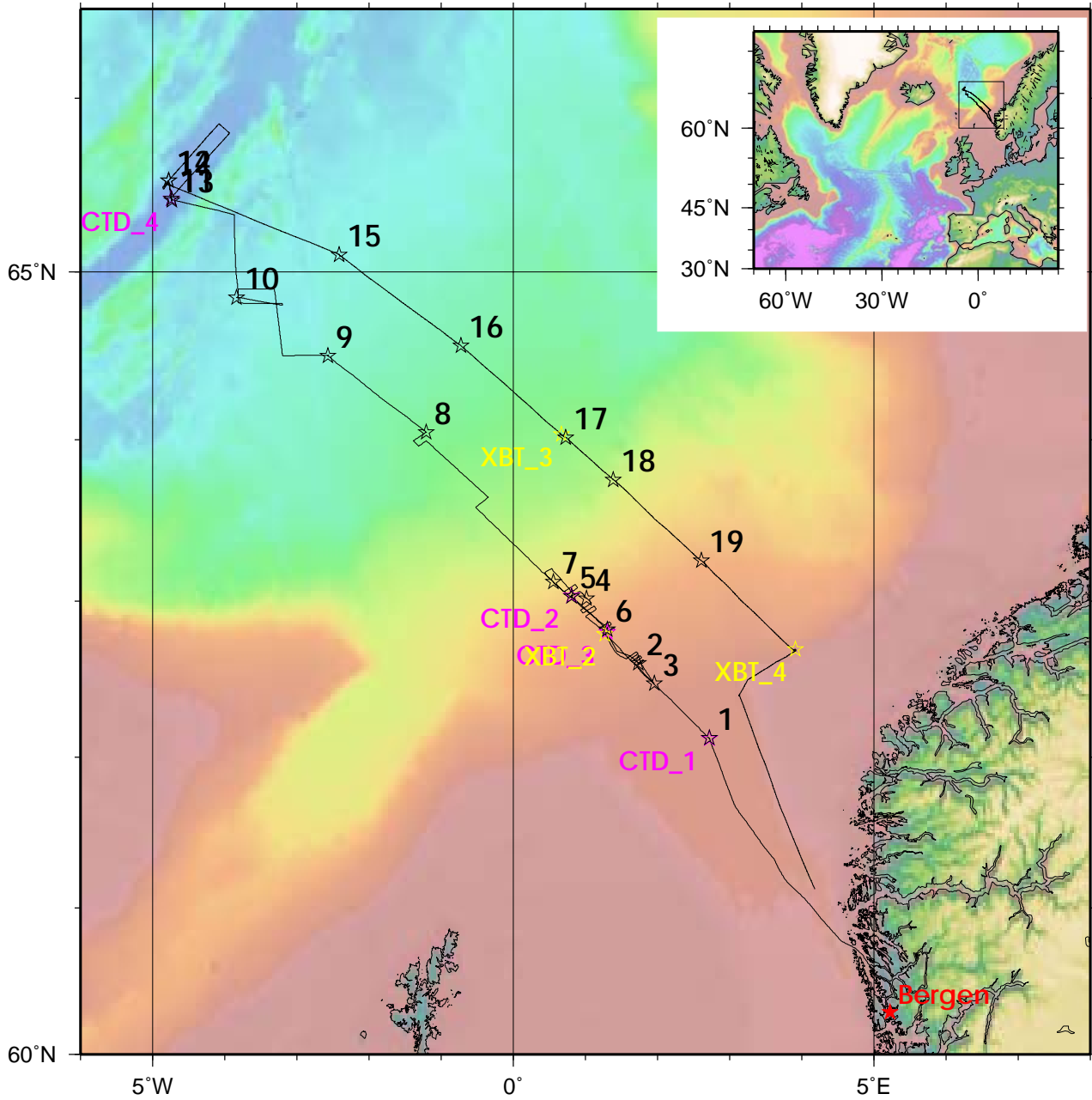
CTD/XBT: A SeaBird Inc. model 911+ CTD profiler was used to measure electrical conductivity, and temperature versus pressure (depth) at 7 locations. We also had a few XBT stations. The CTD and XBT data in M.S. Excel format are on the CD-ROM “Shipboard Data Archive” in the file: `KNR177/2_CTD.xls`.

Water Sampling: Water samples were collected at one stations during a CTD hydrocast. A 24x15L Niskin rosette was used for water sampling. Prior to departure the Niskin bottles were all leached in 5% HCl, and all rubber parts were replaced with silicon parts to minimize contamination for trace metals. Water samples were collected for total inorganic carbon (TCO₂), total alkalinity (TAlk), trace metals, nutrient concentrations (PO₄, NO₃), $\delta^{13}\text{C}$, $\delta^{18}\text{O}$, $\delta^{15}\text{N}$ and in a few sites for neodymium (Nd) isotopes. In addition to the hydrocasts, bottom water samples were collected during multicore deployment using a 5L acid leached Niskin bottle attached to the frame.

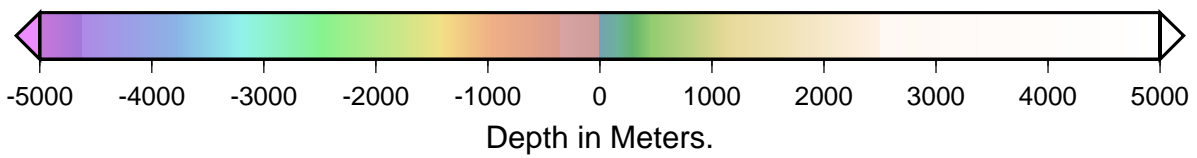
Table 1: List of Cruise Participants

Surname	First Name	Email	Affiliation	Country
Bolmer	Tom	tbolmer@whoi.edu	WHOI	USA
Broda	Jim	jbroda@whoi.edu	WHOI	USA
da Frada	Miguel	mfrada@sapo.pt	Rutgers	USA
de Garidel	Thibault	garidel@imcs.rutgers.edu	Rutgers	USA
Jordan	Kate	Mckay81@hotmail.com	Rutgers	USA
Lavigne	Michele	lavigne@imcs.rutgers.edu	Rutgers	USA
Lear	Caroline	carrie@earth.cf.ac.uk	Cardiff U.	UK
McCarthy	Mike	mmccarthy@whoi.edu	WHOI	USA
Perron-Cashman	Suzzane	perron@imcs.rutgers.edu	Rutgers	USA
Rose	Kathryn	karose@eden.rutgers.edu	Rutgers	USA
Rosenthal	Yair	rosentha@imcs.rutgers.edu	Rutgers	USA
Sosdian	Sindia	sosdian@imcs.rutgers.edu	Rutgers	USA

Knorr 177 Leg 2 Track



GMT 2004 May 17 21:52:08 :by Tom Bolmer:



Date	Hour(GMT)	Sta #	Type	#	Water depth(uncorr)	lat	long
#####	17:40	1	MC	1	416	62 07.3660 N	002 43.0925 E
#####	18:30	1	GGC	2	418,5	62 02.226 N	002 43.2577 E
#####	19:15	1	HC/CTD	3	428	62 07.1760 N	002 43.2897 E
#####	20:39	1	MC	4	418	62 07.187 N	002 43.275 E
#####	08:30	3	XBT	5	943,4	62 47.3434 N	001 16.2881 E
#####	11:18	2	MC	6	695	62 36.261 N	001 44.6185 E
#####	12:10	2	GGC	7	695	62 36.2821 N	001 44.6374 E
#####	14:24	3	MC	8	528	62 28.5510 N	001 57.1866 E
#####	15:06	3	GGC	9	528,2	62 28.5499 N	001 57.18 E
#####	22:05	4	CTV	10A	1200	63 01.0427 N	001 00.8791 E
#####	22:35	4	PT	10B	1211	63 01.3341 N	000 59.7712 E
#####	04:41	5	MC	11	1285	63 01.80 N	000 48.3247 E
#####	06:12	5	MC	12	1285	63 01.8946 N	000 48.40 E
#####	07:27	5	CTD	13	1285	63 01.8941 N	000 48.415 E
#####	11:40	6	MC	14	965	62 49.1149 N	001 18.0249 E
#####	12:38	6	CTD	15	965	62 49.11 N	001 18.02 E
#####	13:48	6	MC	16	967	62 49.2553 N	001 18.1600 E
#####	14:35	6	GGC	17	968	62 49.25 N	001 18.1645 E
#####	18:27	7	MC	18	1461	63 07.188 N	000 33.173 E
#####	19:45	7	GGC	19	1460	63 07.2088 N	000 33.1816 E
#####	20:45	7	MC	20	1462	63 07.2691 N	000 33.3154 E
#####	06:33	8	MC	21	2640	64 02.7072 N	001 12.3877 W
#####	09:24	8	GGC	22	2640	64 02.7 N	001 12.37 W
#####	10:47	8	MC	23	2641	64 02.717 N	001 12.37 W
#####	16:47	9	MC	24	3036	64 30.239 N	002 34.02 W
#####	18:54	9	GGC	25	3035	64 30.248 N	002 34.00 W
#####	20:28	9	MC	26	3035	64 30.2407 N	002 34.0230 W
#####	07:11	10	MC	27	3341	64 50.9691 N	003 50.0797 W

#####	09:33	10	GGC	28	3340	64 50.9601 N	003 50.1435 W
#####	11:04	10	MC	29	3340	64 50.9601 N	003 50.1431 W
#####	14:43	12	MC	31	3873	65 31.9220 N	004 46.6836 W
#####	11:44	12	GGC	32	3874	65 31.9225 N	004 46.6863 W
#####	21:40	12	MC	33	3868	65 31.9397 N	004 46.6871 W
#####	00:35	12	MC	34	3868	65 31.94 N	004 46.69 W
#####	04:32	13	MC	35	3924	65 25.5283 N	004 44.3089 W
#####	07:59	13	MC	36	3970	65 25.52 N	004 44.31 W
#####	11:00	13	GGC	37	3924	65 25.5500 N	004 44.3076 W
#####	12:55	13	MC	38	3925	65 25.5393 N	004 44.2965 W
#####	14:57	13	MC	39	3920	65 25.3997 N	004 44.1771 W
#####	19:53	14*	MC	40	3876	65 31.89 N	004 46.66 W
#####	22:56	14*	MC	41	3882	65 31.6446 N	004 47.2606 W
#####	07:58	15	MC	42	3185	65 06.1803 N	002 24.9242 W
#####	10:18	15	GGC	43	3185	65 06.1868 N	002 24.8977 W
#####	11:54	15	MC	44	3185	65 06.1988 N	002 24.8878 W
#####	19:13	16	MC	45	2799	64 33.9111 N	000 43.4230 W
#####	21:16	16	GGC	46	2799	64 33.88 N	000 43.40 W
#####	22:42	16	MC	47	2799	64 33.87 N	000 43.416 W
#####	05:55	17	MC	48	2402	64 00.6981 N	000 43.513 E
#####	08:01	17	MC	49	2402	64 01.16 N	000 41.93 E
#####	12:38	18	MC	50	1906	63 45.29 N	001 23.20 E
#####	14:14	18	GGC	51	1905	63 45.3066 N	001 23.2052 E
#####	15:16	18	MC	52	1905	63 45.2978 N	001 23.2145 E
#####	09:20	19	MC	53	1104	63 15.22 N	002 36.32 E
#####	22:21	19	GGC	54	1103	63 15.2254 N	002 36.3156 E
#####	23:03	19	MC	55	1103	63 15.2258 N	002 36.3127 E
#####	10:42	20	MC	56	380	62 24.135 N	003 08.215 E
#####	11:33	20	GGC	57	380	62 24.13 N	003 08.22 E

12:00 20 MC 58 379 62 24.13 N 003 08.22 E

Date	Hour(GMT)	Sta #	Type	#	Water depth(uncorr)	lat	long
#####	17:40	1	MC	1	416	62 07.3660 N	002 43.0925 E
#####	20:39	1	MC	4	418	62 07.187 N	002 43.275 E
#####	11:18	2	MC	6	695	62 36.261 N	001 44.6185 E
#####	14:24	3	MC	8	528	62 28.5510 N	001 57.1866 E
#####	04:41	5	MC	11	1285	63 01.80 N	000 48.3247 E
#####	06:12	5	MC	12	1285	63 01.8946 N	000 48.40 E
#####	11:40	6	MC	14	965	62 49.1149 N	001 18.0249 E
#####	13:48	6	MC	16	967	62 49.2553 N	001 18.1600 E
#####	18:27	7	MC	18	1461	63 07.188 N	000 33.173 E
#####	20:45	7	MC	20	1462	63 07.2691 N	000 33.3154 E
#####	06:33	8	MC	21	2640	64 02.7072 N	001 12.3877 W
#####	10:47	8	MC	23	2641	64 02.717 N	001 12.37 W
#####	16:47	9	MC	24	3036	64 30.239 N	002 34.02 W
#####	20:28	9	MC	26	3035	64 30.2407 N	002 34.0230 W
#####	07:11	10	MC	27	3341	64 50.9691 N	003 50.0797 W
#####	11:04	10	MC	29	3340	64 50.9601 N	003 50.1431 W
#####	14:43	12	MC	31	3873	65 31.9220 N	004 46.6836 W
#####	21:40	12	MC	33	3868	65 31.9397 N	004 46.6871 W
#####	00:35	12	MC	34	3868	65 31.94 N	004 46.69 W
#####	04:32	13	MC	35	3924	65 25.5283 N	004 44.3089 W
#####	07:59	13	MC	36	3970	65 25.52 N	004 44.31 W
#####	12:55	13	MC	38	3925	65 25.5393 N	004 44.2965 W
#####	14:57	13	MC	39	3920	65 25.3997 N	004 44.1771 W
#####	19:53	14*	MC	40	3876	65 31.89 N	004 46.66 W
#####	22:56	14*	MC	41	3882	65 31.6446 N	004 47.2606 W
#####	07:58	15	MC	42	3185	65 06.1803 N	002 24.9242 W
#####	11:54	15	MC	44	3185	65 06.1988 N	002 24.8878 W
#####	19:13	16	MC	45	2799	64 33.9111 N	000 43.4230 W

#####	22:42	16	MC	47	2799	64 33.87 N	000 43.416 W
#####	05:55	17	MC	48	2402	64 00.6981 N	000 43.513 E
#####	08:01	17	MC	49	2402	64 01.16 N	000 41.93 E
#####	12:38	18	MC	50	1906	63 45.29 N	001 23.20 E
#####	15:16	18	MC	52	1905	63 45.2978 N	001 23.2145 E
#####	09:20	19	MC	53	1104	63 15.22 N	002 36.32 E
#####	23:03	19	MC	55	1103	63 15.2258 N	002 36.3127 E
#####	10:42	20	MC	56	380	62 24.135 N	003 08.215 E
#####	12:00	20	MC	58	379	62 24.13 N	003 08.22 E

Station#	MC #	Date	Hour(GMT)	lat	long	water depth
		1	8-mai-04	17:41 62°07.3660 N	002°43.0925 E	417
1		4	8-mai-04	20:51 62°07.187 N	2°43.275 E	418
2		6	9-mai-04	11:36 62°36.2610 N	001°44.6185 E	695
3		8	9-mai-04	14:39 62°28.5510 N	001°57.1866 E	528
5		11	10-mai-04	5:10 63°01.80 N	000°48.3247 E	1285
5		12	10-mai-04	6:40 63°01.89N	000°48.40 E	1285
6		14	10-mai-04	12:01 62°49.1180N	001°18.0179E	965
6		16	10-mai-04	14:09 62°49.25N	001°18.15E	967
7		18	10-mai-04	18:59 63°07.2096N	000°33.1825E	1460
7		20	10-mai-04	21:17 63°07.2095N	000°33.3280E	1461
8		21	11-mai-04	8:09 64°02.7077N	001°12.3869W	2640
8		23	11-mai-04	11:41 64°02.7051N	001°12.3696W	2641
9		24	11-mai-04	17:47 64°30.2395N	002°34.0204W	3036
9		26	11-mai-04	21:30 64°30.2404 N	002°24.0239W	3035
10		27	12-mai-04	8:19 64°50.9708 N	003°50.1262W	3340
10		29	12-mai-04	12:20 64°50.9623 N	003°50.1715W	3340
11	HC-CTD30-1	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-4	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-6	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-7	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-9	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-11	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-12	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-13	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-15	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-17	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-18	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-19	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-20	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-21	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-22	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
11	HC-CTD30-24	12-mai-04	18:46	65°25.5526 N	004°44.3078	3924
12		33	13-mai-04	23:05 65°31.9123 N	004°46.6871 W	3868
13		36	14-mai-04	09:26 65°25.52 N	004°44.30	3970
13		38	14-mai-04	14:15 65°25.4115	004°44.1776	3922
14		40	14-mai-04	21:16 65°31.7185 N	004°46.775 W	3876
15		42	15-mai-04	09:04 65°06.1804N	002°24.88282 W	3185
15		44	15-mai-04	13:00 65°06.1778N	002°24.8688 W	3185
16		45	15-mai-04	20:16 64°33.88 N	000°43.405 W	2800
17		48	16-mai-04	06:46 64°00.69976 N	000°43.51805 E	2403
18		50	16-mai-04	13:17 63°45.29 N	001°23.20 E	1906
19		53	16-mai-04	21:58 63°15.226 N	002°36.316 E	1103
20		56	17-mai-04	10:51 62°24.13 N	003°08.22 E	379
20		58	17-mai-04	12:11 62°24.13 N	003°08.22	379

CO2/alk (box/bottle) salinity-surface 18O-surface 18O-Niskin 15N-Niskin 13C-Niskin

	X	X			
30/470	X	X	X	X	X
30/474	X	X	X	X	X
30/463	X	X	X	X	X
30/464			X	X	X
	X	X	X	X	X
					X
30/473	X	X	X	X	X
					X
30/466	X	X	X	X	X
30/468					X
	X	X	X	X	X
					X
30/467	X	X	X	X	X
					X
47/1096			X	X	X
47/1094			X	X	X
47/1091			X	X	X
47/1089			X	X	X
47/1100			X	X	X
47/1103			X	X	X
47/1090			X	X	X
47/1104			X	X	X
47/1097			X	X	X
47/1101			X	X	X
47/1098			X	X	X
47/1092			X	X	X
47/1095			X	X	X
47/1093			X	X	X
47/1102			X	X	X
47/1099			X	X	X
30/478	X	X	X	X	X
	X	X			
30/469			X	X	X
30/475	X	X	X	X	X
			X	X	X
30/476	X	X	X	X	X
30/477	X	X	X	X	X
30/472	X	X	X	X	X
	X	X	X	X	X
/5529	X	X	X	X	X

Comments

Wire caught on corer, cores came up upside down

Did not sample Niskin; Contaminated; Sampled all from overlying water

Trace metal: Spilled half of sample/acidified accordingly

Trace metal: Spilled, but MC 12 is duplicate

trace metal not taken

trace metal not taken

trace metal not taken

trace metal not taken

only samples taken from surface water; niskin removed from multicore; particulate filled overlying water

sampled the fluffy layer labeled MC-56 -A fluffy layer

sampled the fluffy layer labeled MC-58-A fluffy layer