

Fram Strait September 2002 Cruise on R/V Lance

Cruise Report

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1. General information

The Fram Strait September 2002 cruise was performed with R/V Lance in the period 31 August to 14 September. The purpose of the cruise was to acquire hydrographic data across the Fram Strait (CTD, ADCP) along the monitoring line on 78° 50' N. NPI has previously done this line along 79° 00' N, but it was decided to move this line 10 nm south to adjust to the AWI measurements along this line. The purpose was also to recover the existing four moorings in the East Greenland Current (EGC) and replace them with new ones.

Cruise participants:

Edmond Hansen, NPI (cruise leader, data responsible)

Ole Anders Nøst, NPI

Vladimir Pavlov, NPI

Kristen Fossan, NPI

Pål Erik Isachsen, NPI

Terje Brinck Løyning, NPI

Lance captain was Jan Kr. Jansen.

2. Moorings

2.1 Recovered moorings

Moorings F11-4, F12-4 and F14-4 were recovered in good shape, although the current meters RCM7 SN 9763 and RCM7 SN 11475 on F14 were heavily fouled. Mooring F13-4 was lost. The releaser responded and verified a release, but no mooring surfaced. The conditions were excellent with little ice and good visibility, which rules out the possibility of the mooring having surfaced without this being noticed on the bridge. It is assumed that corrosion or a collision with an iceberg have broken a weak link (chain, shackle, etc.) just above the releaser at some instant during the period since deployment.

The details of the recovered moorings are given in the following four schematics of the mooring configurations, including the lost F13-4 mooring.

Rigg F11-4































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78 59,93N
003 04,32W

Dyp:

Fra bunn:

Ut:

	ES300 DCM12 ARGOS Kevlar	SNR. 45 SNR. 134 SNR. 048 5 m	ID29859	60	2292
	Stålkule 37	SNR.596			
	Svivel				
	2 m Kjetting				
	SEACAT	SNR. 1973		67	2285
	RCM7	SNR.11854		68	2284
					
	20 m Kevlar				
	40 m Kevlar				
	100 m Kevlar				
	3 Glasskuler				
	RCM7	SNR.11059		233	2119
					
	200 m Kevlar				
	500 m Kevlar				
	500 m Kevlar				
	3 Glasskuler				
	RCM7	SNR. 9464		1438	914
					
	500 m Kevlar				
	200 m Kevlar				
	200 m Kevlar				
	4 Glasskuler				
	RCM8	SNR.10071		2343	9
					
	Svivel				
	AR661	SNR. 29	Int Range: Release:		
	5 m Kevlar				
	2 m Kjetting				
	ANKER 1000(930) kg			2352	0

Rigg F12-4

78 59,84N















Dyp:

Fra bunn:

Ned i vann:

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004 05,74W

	ES300 DCM12 ARGOS 5 m Kevlar Stålkule 37	SNR. 37 SNR. 47 SNR. 041	ID29050	65	1822
	SEACAT	SNR.1975		71	1816
	RCM7 40 m Kevlar 200 m Kevlar	SNR.11845		72	1815
	2 Glasskuler				
	RCM7 10 m Kevlar 500 m Kevlar 500 m Kevlar 200 m Kevlar 20 m Kevlar 10 m Kevlar	SNR.10349		317	1570
	2 Glasskuler				
	RCM7 200 m Kevlar 100 m Kevlar	SNR.7718		1567	320
	Microcat 5 m Kevlar	SNR. 226		1872	15
	4 Glasskuler				
	RCM8	SNR.11625		1877	10
	Svivel				
	AR661 5 m Kevlar	SNR. 291	Int Range: Release:		
	2 m Kjetting				
	ANKER 1000/(930) kg			1887	0

Rigg F13-4

























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78 59,59N
005 24,63W

Dyp:

Fra bunn:

Ned i vann:

	ES300	SNR. 34	39	941
	Kevlar	5 m		
	Stålkule 37	SNR. 606		
	Svivel			
	5 m Kevlar			
	RCM7	SNR. 10303	50	930
	SEACAT	SNR. 1254	51	929
	10 m Kevlar			
	20 m Kevlar			
	50 m Kevlar			
	100 m Kevlar			
	4 Glasskuler			
	RCM8	SNR.9765	236	744
	500 m Kevlar			
	200 m Kevlar			
	10 m Kevlar			
	20 m Kevlar			
	4 Glasskuler			
	RCM7	SNR.9706	971	9
	Svivel			
	AR661	SNR. 292	Int Range: Release:	
	5 m Kevlar			
	2 m Kjetting			
	ANKER 1000/(900) kg		980	0

Rigg F14-4

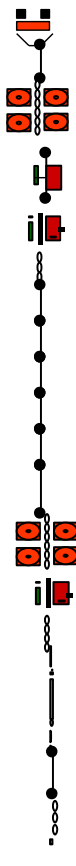
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79 00,61N
006 49,12W

Dyp:

Fra bunn:

Ned i vann:



ES300	SNR. 19	69	224
Kevlar	5 m		
4 Glasskuler			
SEACAT	SNR. 1976	80	213
RCM8	SNR. 9763	81	212
20 m Kevlar			
10 m Kevlar			
20 m Kevlar			
50 m Kevlar			
50 m Kevlar			
50 m Kevlar			
4 Glasskuler			
RCM7	SNR. 11475	281	12
Svivel			
AR661	SNR. 77	Int Range: Release:	
5 m Kevlar			
2 m Kjetting			
ANKER 620/(530) kg		293	0

2. 2 Deployed moorings

Five new moorings were deployed to replace the recovered ones; F11-5 to F14-5. One more mooring was added (FNY), in an effort to check if the EGC is properly resolved with the present mooring array.

The five new moorings were deployed along the $78^{\circ} 50'$ N line, which means that all NPI and AWI moorings in the Fram Strait are now located along the same latitude. The reason for the move from the previous location along the $79^{\circ} 00'$ N line, is to avoid problems with the recirculation components in the flux calculations. The moorings were moved southward along the same depth isobath, to avoid much change in the current time series measurements.

The mooring configurations are illustrated in the following five schematics.

Rigg F11-5

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











78 49,963N

003 16,740W

Dyp:

Fra bunn:

Ut:

	ES300 DCM12 ARGOS Kevlar	SNR. 48 SNR. 17 SNR. 041 5 m	ID23050	41	2319	13:21
	Stålkule 37 Svivel	SNR.603				
	1 m Kjetting					
	SEACAT	SNR. 2413		49	2311	13:21
	RCM9	SNR.834		50	2310	13:21
	10 m Kevlar					
	40 m Kevlar					
	40 m Kevlar					
	100 m Kevlar					
	3 Glasskuler					
	RCM7	SNR.12644		243	2117	13:10
	200 m Kevlar					
	500 m Kevlar					
	500 m Kevlar					
	3 Glasskuler					
	RCM8	SNR.12733		1445	915	12:54
	500 m Kevlar					
	200 m Kevlar					
	200 m Kevlar					
	4 Glasskuler 5 m Kevlar					
	RCM8	SNR.10069		2351	9	12:39
	Svivel					
	AR661	SNR. 577	Int Range: Release:			
	5 m Kevlar					
	2 m Kjetting					
	ANKER 1110/(960) kg			2360	0	

Rigg F12-5

78 49,578N

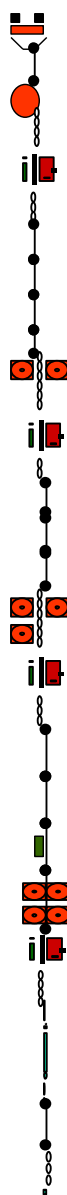
Dyp:

Fra bunn:

Ned i vann:

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004 03,597W



ES300	SNR. 44		46	1783	09:27
DCM12	SNR. 47				
ARGOS	SNR. 048	ID29859			
5 m Kevlar					
Stålkule 37	SNR. 605				
2 m Kjetting					
RCM7	SNR.12646		55	1774	09:27
10 m Kevlar					
40 m Kevlar					
100 m Kevlar					
100 m Kevlar					
2 Glasskuler					
RCM7	SNR.12643		307	1522	09:18
500 m Kevlar					
500 m Kevlar					
200 m Kevlar					
3 Glasskuler					
RCM8	SNR.12587		1509	320	08:49
200 m Kevlar					
100 m Kevlar					
Microcat	SNR. 0443		1814	15	08:38
5 m Kevlar					
4 Glasskuler					
RCM8	SNR.12732		1820	9	07:57
Svivel					
AR861	SNR. 052	Int Range: Release:			
5 m Kevlar					
2 m Kjetting					
ANKER 1110/(960) kg			1829	0	

Rigg F13-5

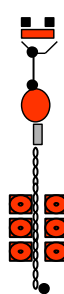
Satt ut 5 SEP 2002, 08:49

78 49,580N
005 00,600W

Dyp:

Fra bunn:

Ned i vann:

	ES300	SNR. 32	43	937	09:48
	DCM12	SNR. 134			
	Kevlar	5 m			
	Stålkule 30	SNR. M882			
	Svivel				
	2 m Kjetting				
	6 Glasskuler				
	SEACAT	SNR. 1974	55	925	09:12
	RCM7	SNR. 9465	56	924	09:12
	20 m Kevlar				
50 m Kevlar					
100 m Kevlar					
10 m Kevlar					
4 Glasskuler					
RCM7	SNR.9708	238	742	08:54	
500 m Kevlar					
200 m Kevlar					
10 m Kevlar					
20 m Kevlar					
4 Glasskuler					
RCM8	SNR.10873	970	10	08:33	
Svivel					
AR661	SNR. 84	Int Range: Release:			
5 m Kevlar					
2 m Kjetting					
ANKER 1020/(900) kg			980	0	

Rigg F14-5

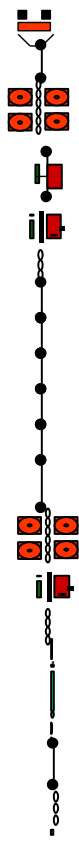
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78 49,152N
006 27,538W

Dyp:

Fra bunn:

Ned i vann:



ES300	SNR. 17	51	231	10:24
Kevlar	5 m			
4 Glasskuler				
SEACAT	SNR. 1253	59	221	10:23
RCM9	SNR. 836	60	220	10:23
20 m Kevlar				
20 m Kevlar				
20 m Kevlar				
50 m Kevlar				
50 m Kevlar				
50 m Kevlar				
4 Glasskuler				
RCM8	SNR. 11889	272	10	10:12
Svivel				
AR661	SNR. 110			Int Range: Release:
5 m Kevlar				
2 m Kjetting				
ANKER 610/(530) kg		282	0	

Rigg FNY

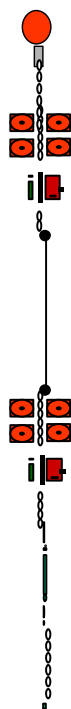
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78 49,951N
005 24,654W

Dyp:

Fra bunn:

Ned i vann:



Stålkule 30

SNR. M597

80

620

Svivel

4 Glasskuler

RCM7

SNR. 11059

95

510

12:16

500 m Kevlar

4 Glasskuler

RCM11

SNR. 117

598

7

12:05

Svivel

AR661

SNR. 290

Int Range:
Release:

4 m Kjetting

ANKER 670/(580) kg

605

0

3. CTD stations

All in all 80 CTD stations were taken. Stations were taken along the 78° 50' N line between 10° 00' E and 15° 00' W, with an additional transect across the EGC and the continental shelf of Greenland along 79° N. As time allowed, the Yermak Plateau transects and the meridional transect were also done. All CTD stations are plotted in Fig. 1. A complete CTD station list is enclosed in Appendix 1.

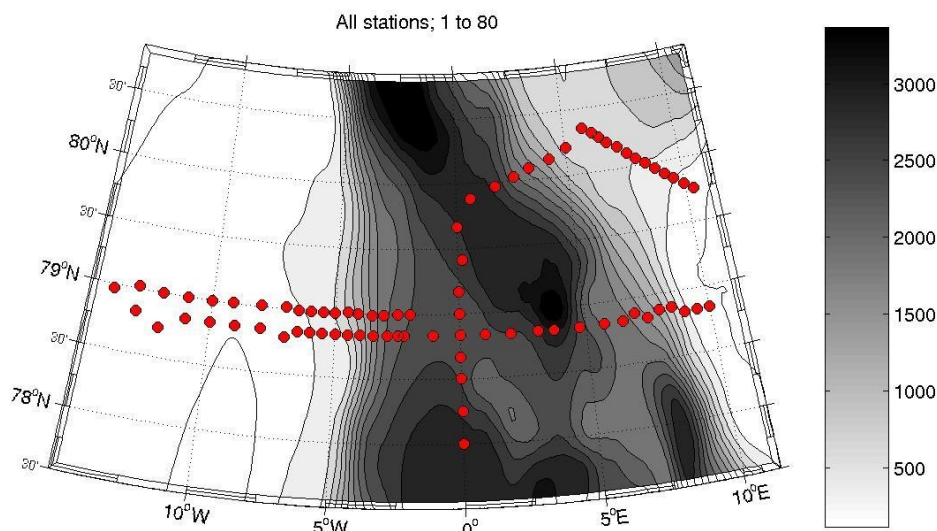


Figure 1. The position of all CTD stations

The measurements were taken with a standard Seabird SBE 9 CTD with a SBE 11+ deck unit. The temperature and conductivity sensors came directly from calibration. There were no major problems with the equipment. Two to three salinity samples were taken on each station for calibration purposes.

4. ADCP

Due to a leakage in the ADCP window in the hull of Lance, the salinity around the transducer head is not exactly known. The rate of exchange of water with the surroundings is also unknown. The ADCP data from the cruise should therefore be treated with care. A salinity content which is “typical” or average for the sailing route could be used, provided a proper analysis of the sensitivity of the results to such a procedure is carried out.

5. Cruise log

Date	Activity
Sat 31/8	Departure Longyearbyen 1000 UTC Steaming towards F11
Sun 1/9	Arrival F11 0600 UTC. F11 on deck 0820 UTC Arrival F12 1245 UTC. F12 on deck 1410 UTC CTD stations 001 to 006
Mon 2/9	Arrival F13 0645. Dredging for F13 0810-1335 UTC Arrival F14 1805 UTC. F14 on deck 18:35 UTC

	CTD stations 007 to 011
Tue 3/9	Southwards along heavy pack ice 0630 UTC CTD stations 012 to 024
Wed 4/9	New F14 deployed 1000-1030 UTC FNY deployed 1200-1310 UTC Dredging for old F13 1450-2000 UTC. Ice and fog CTD stations 025 to 029
Thu 5/9	New F13 deployed 0820-0940 UTC CTD stations 030 to 032
Fri 6/9	CTD stations 033 to 040
Sat 7/9	New F12 deployed 0750 to 1040 UTC New F11 deployed 1230 to 1325 UTC CTD stations 041 to 042
Sun 8/9	CTD stations 043 to 054
Mon 9/9	CTD stations 055 to 070
Tue 10/9	CTD stations 071 to 078
Wed 11/9	CTD stations 078 to 080 Steaming towards Tromsø from 0600 UTC
Thu 12/9	Steaming
Fri 13/9	Steaming
Sat 14/9	Steaming Arrival Tromsø 0700 UTC

Appendix 1: CTD station list

Station	YYYY	MM	DD	HH(UTC)	MIN	Lat	Lon	Depth
1	2002	9	1	9	16	78.990	-3.067	2398
2	2002	9	1	14	38	78.997	-4.092	1911
3	2002	9	1	17	12	78.985	-3.518	2220
4	2002	9	1	20	6	79.007	-4.490	1662
5	2002	9	1	21	54	78.998	-5.025	1292
6	2002	9	1	23	22	79.000	-5.500	960
7	2002	9	2	15	0	79.000	-6.000	553
8	2002	9	2	16	22	79.000	-6.508	306
9	2002	9	2	19	32	79.017	-7.013	245
10	2002	9	2	21	23	79.008	-8.023	186
11	2002	9	2	23	5	79.003	-9.170	260
12	2002	9	3	0	30	79.000	-10.000	273
13	2002	9	3	1	50	79.000	-11.000	236
14	2002	9	3	3	5	79.000	-12.000	191
15	2002	9	3	5	3	79.022	-13.008	145
16	2002	9	3	8	34	78.965	-13.988	100
18	2002	9	3	12	7	78.828	-13.000	197
19	2002	9	3	13	45	78.733	-12.000	155
20	2002	9	3	16	14	78.833	-10.993	332
21	2002	9	3	17	50	78.833	-10.000	278
22	2002	9	3	19	36	78.833	-9.005	219
23	2002	9	3	21	13	78.833	-7.987	225
24	2002	9	3	23	16	78.783	-7.000	231
25	2002	9	4	0	47	78.833	-6.483	285
26	2002	9	4	1	53	78.833	-6.000	345
27	2002	9	4	3	3	78.833	-5.500	536
28	2002	9	4	4	9	78.833	-5.000	1020
29	2002	9	4	6	24	78.833	-4.490	1500
30	2002	9	5	13	4	78.833	-4.000	1888
31	2002	9	5	19	29	78.833	-3.480	2280
32	2002	9	5	22	1	78.833	-2.903	2498
33	2002	9	6	1	6	78.833	-2.500	2601
34	2002	9	6	3	41	79.000	-2.500	2517
35	2002	9	6	6	14	79.000	-2.000	2603
36	2002	9	6	8	56	78.833	-2.250	2652
37	2002	9	6	11	47	78.833	-1.083	2447
38	2002	9	6	14	38	78.833	-0.000	2553
39	2002	9	6	17	33	78.833	1.000	2415
40	2002	9	6	20	32	78.833	2.000	2473
41	2002	9	7	20	32	78.833	3.087	2394
42	2002	9	7	22	54	78.833	3.750	2218
43	2002	9	8	1	33	78.833	4.750	2568
44	2002	9	8	4	10	78.833	5.750	2491
45	2002	9	8	6	56	78.833	6.507	1919
46	2002	9	8	9	26	78.883	7.007	1370
47	2002	9	8	11	14	78.833	7.500	1135
48	2002	9	8	12	44	78.883	8.000	1026
49	2002	9	8	14	12	78.883	8.500	485
50	2002	9	8	15	18	78.833	9.000	214
51	2002	9	8	16	12	78.833	9.500	172
52	2002	9	8	17	5	78.833	10.000	68
53	2002	9	8	22	21	79.752	10.343	116
54	2002	9	8	23	6	79.803	9.958	390
55	2002	9	9	0	1	79.855	9.583	455
56	2002	9	9	0	56	79.905	9.217	460

57	2002	9	9	1	53	79.957	8.845	477
58	2002	9	9	2	55	80.008	8.467	491
59	2002	9	9	3	52	80.060	8.092	501
60	2002	9	9	5	14	80.110	7.712	532
61	2002	9	9	6	34	80.165	7.345	544
62	2002	9	9	7	43	80.212	6.905	549
63	2002	9	9	8	50	80.263	6.563	559
64	2002	9	9	9	48	80.302	6.287	559
65	2002	9	9	10	49	80.347	5.867	558
66	2002	9	9	12	21	80.217	5.050	840
67	2002	9	9	14	1	80.140	4.217	1390
68	2002	9	9	15	46	80.088	3.275	2205
69	2002	9	9	18	8	80.030	2.567	2576
70	2002	9	9	20	51	79.967	1.743	3062
71	2002	9	10	0	41	79.883	0.617	2390
72	2002	9	10	4	15	79.667	0.000	2751
73	2002	9	10	7	34	79.412	0.167	2930
74	2002	9	10	10	54	79.167	0.000	2662
75	2002	9	10	13	28	79.000	0.000	2535
76	2002	9	10	16	10	78.833	0.000	2578
77	2002	9	10	19	2	78.668	-0.008	1751
78	2002	9	10	21	8	78.502	-0.005	2712
79	2002	9	11	0	5	78.250	-0.000	2965
80	2002	9	11	3	1	78.000	-0.000	3025