

WHOI-88-8

**Cesium and Strontium Isotopes in the Northwestern  
North Atlantic and Arctic Ocean, 1981-1985**

by

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**Technical Report**

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ABSTRACT

This report is a follow-up to Woods Hole Oceanographic Institution Technical Report WHOI-84-40. It contains  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  data from seawater samples collected on four cruises in the northwestern North Atlantic, Arctic Ocean, and Barents Sea during 1981 to 1985, and radionuclide data ( $^{137}\text{Cs}$ ,  $^{90}\text{Sr}$  and  $^{239}\text{Pu}$ ) from samples collected on a cruise to the Norwegian-Greenland Seas in 1979. Also included are data from four ice stations in the Arctic from 1979 to 1985. The sample collections were made possible through collaborative efforts with several laboratories. The radionuclide analyses were done at WHOI.

INTRODUCTION

The data in this report represent an extension to those which appeared in WHOI-84-40, "Radiocesium and Other Nuclides in the Norwegian-Greenland Seas 1981-1982." In that report we have detailed background information on the input to the Arctic Ocean and use of Cs and Sr isotopes as circulation tracers. Also in that report we give information on radiochemical methods employed and the format of the results presentation.

Basically this report extends the data in WHOI-84-40 into the Arctic Ocean north of Fram Strait, into the Labrador Sea south of Denmark Strait, into the northeast Barents Sea, and completes the Norwegian/Greenland Sea data from the 1982 winter cruise by the R/V HUDSON. The data are presented in sections for each cruise or ice-station. A short summary of each field program precedes the relevant data sets.

#### ACKNOWLEDGEMENTS

A great deal of help was provided by many individuals and institutions in the collection of the samples for which data are presented in this report. We appreciate all this help and recognize the generous spirit of cooperation that it represents.

The R/V METEOR 52 samples were collected on this cruise for us by Dr. Peter Koltermann of the Deutsches Hydrographisches Institut in Hamburg, FRG. The R/V KNORR 89, Leg 6 samples were part of the Transient Tracers in Oceanography North Atlantic Study. Drs. J. H. Swift and V. E. Lee were instrumental in obtaining the R/V HUDSON samples. We collected the 1984 R/V POLARSTERN samples on the ARKTIS II/3 cruise organized by the Alfred-Wegener-Institute for Polar and Marine Research, Bremerhaven, FRG. Dr. Lars Midttun of the Institute of Marine Research, Bergen, Norway, kindly arranged for the collection of water samples from the eastern Barents Sea on a regular cruise of the Norwegian Fisheries' R/V MICHAEL SAARS.

The samples from the LOREX and CESAR ice-stations were collected through the good offices of Dr. Robert Moore of Dalhousie University, Halifax, N.S., Canada. The FRAM-4 samples were obtained through the efforts of Drs. P. J. Stern and A. Baggeroer of MIT. The AIWEX ice-camp samples were collected by G. C. Anderson of Scripps Institution of Oceanography through arrangements made there by Dr. J. H. Swift.

We thank Marilyn R. Hess for her excellent secretarial assistance throughout this project and in the production of this report. Support for the program came from the U.S. National Science Foundation under grant OCE-8402849 and is acknowledged with thanks.

R/V METEOR CRUISE 52

This cruise occupied stations in the Norwegian and Greenland Seas in 1979. Several stations were at locations occupied in 1972 during the GEOSECS expedition and again in 1981 during the Transient Tracers in Oceanography North Atlantic Study.

CRUISE-STATION#      POSITION      COLLECTION DATE      BOTTOM DEPTH  
 ME52-364      65   0.0   N      08/13/79      3121 M  
                  1   59.3   W

TEMPS ARE IN SITU - NOT POTENTIAL

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS137 e	SR90 e	PU239 e	AM241 e
11	34.929	9.830		22.7 0.3	10.0 0.2	0.030 0.010	
75		9.910		22.2 0.3	13.4 1.2	0.048 0.009	
148		8.150		22.0 0.4	11.0 1.0	0.150 0.020	
267				22.4 0.4	14.3 0.3	0.110 0.010	
500	34.836	0.600		20.4 0.3	9.7 1.0	0.140 0.020	
600	34.090			15.8 0.3	9.0 0.4	0.140 0.010	
800	34.887	-0.200		10.8 0.3	7.8 0.3	0.150 0.020	
900	34.871	-0.400		10.3 0.2	8.7 0.4	0.091 0.011	
1100	34.839			7.1 0.3	5.3 0.4	0.104 0.012	
1400		-0.880		4.1 0.3	0.1 0.8	0.060 0.010	
1700		-0.880		2.8 0.3	1.1 0.4	0.080 0.020	
2000		-0.910			0.0 1.1	0.153 0.020	
2300				2.9 0.4	0.4 0.5	0.100 0.020	

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE



CRUISE-STATION      POSITION      COLLECTION DATE      BOTTOM DEPTH  
 MES2-367      69 50.0 N      08/15/79      3090 M  
                  1 19.1 W

CS AND SR DOB CORRECTED; TEMPS ARE IN SITU

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS137		SR90		PU239		AM241
				e		e		e		e
0	35.015	8.060		44.9	0.4	18.4	0.5	0.090	0.020	
75	35.055	5.390		54.7	0.6	19.0	0.5	0.150	0.020	
150	35.019	4.420		64.4	0.4	20.1	0.8	0.180	0.020	
300	35.001	3.770		48.0	0.6	17.0	0.8	0.190	0.020	
500	34.994	3.330		42.1	0.3	18.7	0.7	0.150	0.020	
600	34.966	2.920		39.2	0.6	17.5	0.3	0.220	0.020	
800	34.915	0.510		19.6	0.3	11.1	0.4	0.200	0.020	
900		0.220		16.8	0.5	9.6	1.0	0.180	0.020	
1100	34.899	-0.300		11.4	0.3	7.4	0.4	0.160	0.020	
1400				5.0	0.7	3.1	0.6	0.090	0.020	
1700	34.921	-0.800		2.9	0.6	1.8	0.4	0.120	0.030	
2000	34.921	-0.900		2.9	0.8	3.3	0.6	0.045	0.015	
2300	34.913			3.5	0.2	3.6	0.2	0.060	0.020	
2600	34.915	-0.920				1.3	0.5	0.110	0.010	
2800	34.917	-0.920		3.2	0.6	1.4	0.4	0.090	0.020	
3000	34.915	-0.920		3.4	0.5	1.5	0.3	0.090	0.020	

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION      POSITION      COLLECTION DATE      BOTTOM DEPTH  
 ME52-371      74 59.3 N      08/17/79      3755 M  
                  0 36.3 E

TEMPS ARE IN SITU - NOT POTENTIAL

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS137 e	SR90 e	PU239 e	AM241 e
0				29.0			
150	34.834	-1.590		24.9 0.6	15.8 1.6	0.130 0.010	
300	34.861	-1.290		15.3 0.4	8.7 0.3	0.140 0.020	
500	34.895	-1.250		14.0 0.5	8.1 0.3	0.130 0.020	
600	34.883	-1.240		13.8 0.5	8.8 0.2	0.130 0.020	
800	34.891	-1.120		14.0 0.4	6.8 0.4	0.150 0.020	
900	34.897	-1.110		10.4 0.6	5.9 0.3	0.130 0.020	
1200	34.905	-1.080		10.0 0.8	4.8 0.2	0.120 0.020	
1400	34.901	-1.080		7.7 0.5	3.5 0.3	0.100 0.020	
1500	34.899	-1.080		9.0 0.7	5.2 0.5	0.120 0.020	
2000	34.907	-1.060		6.0 0.7	4.1 0.2	0.110 0.020	
2500	34.901	-1.070		6.7 0.7	3.0 0.5	0.100 0.020	
3000	34.901	-1.090		6.1 0.6	4.0 0.4	0.100 0.020	
3300	34.901	-1.080		5.7 0.5	3.0 0.4	0.090 0.020	
3600	34.895			6.0 0.4	4.8 0.9	0.084 0.016	

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

R/V KNORR 89, Leg 6

Data in this section come from samples from stations occupied on Leg 6 of the Transient Tracers in Oceanography (North Atlantic Study) expedition. This leg occupied stations south of Denmark Strait and in the Labrador Sea. The southward advection path of water masses forming North Atlantic Deep Water were a major focus of the sampling strategy.

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
KN89-177	58	40.0	N	08/26/81	3174 M
	38	15.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
0				17.7	3.4				
9	34.573	8.250	26.901	16.0	0.4	9.3	0.8	1.72	0.15
300	34.782	3.070	27.705	14.5	0.2	10.1	0.2	1.44	0.03
498	34.809	3.200	27.714	15.1	0.1				
597	34.817	3.200	27.720						
747	34.824	3.210	27.725	21.6	2.0				
996	34.841	3.253	27.734	13.3	0.2	9.4	0.5	1.41	0.08
1510	34.886	3.285	27.767	14.9	0.1				
2106	34.950	3.188	27.827	8.3	0.3	4.5	0.4	1.84	0.18
2403	34.949	2.927	27.851	9.8	0.1				
2905	34.934	2.450	27.881	9.1	0.2	4.5	0.5	2.02	0.23
3076	34.893			20.0	0.1				
3126	34.885	1.355	27.928	18.2	0.5	9.1	1.0	2.00	0.23

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
KN89-179	59	15.0	N	09/27/81	2900 M
	40	0.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
681	34.838	3.290	27.729						
2759	34.877	1.419	27.917	19.2	0.3	8.0	0.6	2.40	0.18

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
KN89-181	59	39.0	N	08/27/81	2444 M
	40	42.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
0				26.2	6.9				
1									
255	34.952	4.470	27.698						
752	34.874	3.550	27.732	15.2	0.3	8.4	0.3	1.81	0.07
1443	34.922	3.404	27.784	10.9	0.2	6.9	0.5	1.58	0.12
1937	34.925	2.698	27.852	12.0	0.2	8.2	0.2	1.46	0.04
2300	34.882	1.731	27.898	18.0	0.1				
2379	34.879	1.490	27.914	18.7	0.3	10.1	0.1	1.85	0.03
2418	34.880	1.448	27.917	18.7	0.3	9.9	0.5	1.89	0.10

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
KN89-183	59	55.0	N	08/28/81	1916 M
	41	22.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
0				40.4	4.0				
108	35.035	5.960	27.585						
1271	34.917	3.374	27.783						
1740	34.920	2.746	27.844						
1839	34.916	2.559	27.857						
1890	34.904	2.376	27.864						

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
KN89-186	60	5.0	N	08/29/81	242 M
	42	11.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
29	33.446	1.410	26.769						
150	34.457	2.860	27.464	23.8	0.3	13.1	0.1	1.82	0.03

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
KN89-189	60	9.0	N	08/30/81	2966 M
	49	19.0	W		

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
0									
1									
205	34.953	4.790	27.662						
405	34.931	4.250	27.704	16.7	0.1				
605	34.887	3.740	27.723						
702	34.868	3.560	27.726	16.2	0.3	9.4	1.0	1.72	0.19
900	34.880	3.580	27.733						
1633	34.914	3.303	27.788	13.2	0.1				
2227	34.926	2.778	27.846	11.2	0.3	6.7	0.6	1.67	0.16
2522	34.908	2.333	27.870	14.2	0.2	9.9	0.7	1.43	0.10
2718	34.902	2.128	27.883	14.3	0.1				
2920	34.884	1.501	27.917	18.9	0.3	11.8	0.4	1.60	0.06
2953	34.883	1.495	27.917	18.3	0.2	11.0	0.2	1.66	0.04

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION      POSITION      COLLECTION DATE      BOTTOM DEPTH  
KN09-193      58 39.0 N      09/01/81      3518 M  
                 52 44.0 W

700M:STAS 193&4 AVE HYDRO

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e	e	e	e	e	e
0				20.7	2.0				
1									
203	34.843	3.560	27.706	16.7	0.3	13.9	0.2	1.20	0.03
501	34.823	3.230	27.722	17.4	0.3				
700	34.825	3.240	27.728	23.6	4.1				
1096	34.831	3.153	27.736	16.6	0.3				
1490	34.881	3.357	27.756	11.4	0.2	7.8	0.5	1.46	0.10
1757	34.899	3.284	27.778						
2354	34.931	2.979	27.832	9.0	0.2	6.0	0.2	1.50	0.06
2898	34.924	2.525	27.868	8.6	0.1				
3408	34.880	1.320	27.927	18.5	0.2	9.7	0.5	1.91	0.10
3486	34.881	1.229	27.934	20.5	0.2	12.1	0.4	1.69	0.06

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE



CRUISE-STA#	POSITION	COLLECTION DATE	BOTTOM DEPTH
KN89-197	56 54.0 N	09/03/81	1986 M
	57 34.0 W		

SURF FROM STA 196

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
0						
202	34.812	3.620	27.675			
402	34.851	3.620	27.706	16.5 0.3	10.6 0.4	1.56 0.07
605	34.860	3.570	27.718	15.7 0.2	14.6 0.2	1.08 0.02
1003	34.870	3.421	27.741	15.9 0.2	10.8 0.1	1.47 0.02
1300	34.895	3.379	27.765	12.6 0.3	7.5 0.2	1.68 0.06
1700	34.915	3.155	27.803	13.1 0.3	7.5 0.5	1.75 0.12
1947	34.920	2.852	27.835	10.4 0.2	7.1 0.2	1.46 0.05

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION	COLLECTION DATE	BOTTOM DEPTH
KN89-199	56 36.0 N 59 20.0 W	09/03/81	434 M

SURF FROM STAS 198-200

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
0				35.8	5.0	
66	32.946	0.180	26.439			
153	33.664	0.450	27.004			
353	34.751	3.660	27.622			

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION	COLLECTION DATE	BOTTOM DEPTH
KN89-202	56 34.0 N 47 59.0 W	09/05/81	3626 M

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
0				21.2	1.3	
102	34.649	3.230	27.583	18.7	0.3	
350	34.788	3.170	27.700	15.4	0.3	10.6 0.3 1.45 0.05
895	34.824	3.190	27.727	15.9	0.2	10.7 0.3 1.49 0.05
1486	34.882	3.365	27.756	11.0	0.2	
1974	34.926	3.299	27.798	9.1	0.2	6.0 0.7 1.52 0.18
2861	34.937	2.654	27.866	7.4	0.4	6.5 0.8 1.14 0.15
3353	34.896	1.897	27.896	14.7	0.4	9.2 0.2 1.60 0.06
3596	34.876	1.294	27.926	20.1	0.4	11.3 1.0 1.78 0.16

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION	COLLECTION DATE	BOTTOM DEPTH
KN89-205	54 35.0 N 41 54.0 W	09/07/81	3636 M

2765M AVE OF 6 HYDRO

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
0				22.9	2.6	
151	34.749	4.080	27.578			
601	34.823	3.580	27.688	16.0	0.1	
747	34.829	3.390	27.712			
994	34.840	3.333	27.726	14.6	0.2	9.0 0.2 1.62 0.04
2467	34.952	2.917	27.854	6.1	0.3	4.5 0.8 1.36 0.25
2765	34.958	2.750	27.874	9.3	1.6	
2956	34.960	2.638	27.886	7.3	0.2	
3443	34.934	2.286	27.895	11.0	0.1	
3538	34.927	2.183	27.898	9.3	0.3	6.9 0.8 1.35 0.16

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION	COLLECTION DATE	BOTTOM DEPTH
KN89-211	47 39.0 N 37 50.0 W	09/11/81	4559 M

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
0				24.5	1.1	
1190	34.926	4.116	27.715			
2400				9.9	1.0	
3274	34.938	2.633	27.869			
4399	34.902	1.841	27.906			
4497	34.909	1.842	27.911			

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
KN89-214	50	59.0	N	09/14/81	4278 M
	43	0.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
				e		e		e	
7				22.4	0.2				
201	35.754	13.180	26.942	20.7	0.4	11.2	0.5	1.85	0.09
397	35.673	12.580	26.998	19.7	0.1				
591	35.078	8.230	27.300	10.1	0.3	6.4	0.3	1.58	0.09
975	34.888	4.080	27.688	12.4	0.3	7.6	0.8	1.63	0.18
1356	34.919	3.814	27.741	8.7	0.1				
1540	34.913	3.623	27.755	11.5	0.2	8.1	0.5	1.42	0.09
2349	34.939	3.195	27.818	10.8	0.1				
2672	34.934	2.906	27.841	7.8	0.3				
3163	34.931	2.441	27.880	6.7	0.4	3.8	0.5	1.76	0.25
3753	34.904	1.911	27.902	9.4	0.2	6.0	0.7	1.57	0.19
4098	34.892	1.664	27.911	14.9	0.2				
4198	34.881	1.522	27.913	15.2	0.3	8.6	0.6	1.77	0.13
4244	34.880	1.470	27.916	15.4	0.3	8.7	0.5	1.77	0.11

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION	COLLECTION DATE	BOTTOM DEPTH
KN89-216	50 24.0 N 45 41.0 W	09/15/81	3383 M

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
7				27.5	1.7	

CRUISE-STA#	POSITION	COLLECTION DATE	BOTTOM DEPTH
KN89-218	49 45.0 N 48 35.0 W	09/16/81	2132 M

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
7				23.9	1.7	

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

THE UNITED STATES OF AMERICA

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THE UNITED STATES OF AMERICA

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R/V HUDSON WINTER CRUISE TO THE GREENLAND SEA, 1982

This cruise, in late winter 1982, was designed to sample the Greenland Sea in winter conditions to attempt to observe deep convective mixing in action.

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
HUD82-71	74	32.1	N	03/20/82	1494 M
	15	15.7	E		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
					e		e		e
7	35.078	4.665	27.776	69.7	0.3				
47	35.077	4.653	27.777	85.3	0.8	25.0	0.7	3.41	0.10
116	35.085	4.186	27.835	60.5	0.6				
185	35.063	3.659	27.871	61.0	0.7	19.5	0.6	3.13	0.10
275	35.066	3.404	27.899	69.9	0.6				
385	35.050	2.931	27.931	61.3	0.7	25.3	0.5	2.42	0.06
547	34.939	1.380	27.970	37.7	0.6				
742	34.912	-0.390	28.055	11.2	0.4	5.7	0.4	1.96	0.15
919	34.909	-0.703	28.067	7.0	0.3				
1118	34.912	-0.904	28.078	6.1	0.3	3.5	0.4	1.74	0.22
1266	34.909	-0.985	28.079	3.2	0.2				
1416	34.910	-1.029	28.082	6.0	0.6	3.3	0.4	1.82	0.29
1486	34.909	-1.063	28.082	3.2	0.3	3.1	0.5	1.03	0.19

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION	COLLECTION DATE	BOTTOM DEPTH
HUD82-84	70 1.4 N 16 34.1 E	03/22/82	1790 M

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
5	34.712	5.468	27.391	189.0 0.5	43.0 1.0	4.40 0.10
130				108.7 0.7	34.1 0.5	3.19 0.05
337	35.145	5.821	27.690	59.8 0.5	22.0 0.3	2.72 0.04
692	34.938	1.411	27.967	30.2 0.5	11.3 0.5	2.67 0.13
1073	34.912	-0.697	28.069	9.2 0.4		
1265	34.911	-0.870	28.076	6.6 0.8	2.9 0.3	2.28 0.36
1413	34.910	-0.922	28.077	5.2 0.6	4.0 0.3	1.30 0.18
1616	34.911	-0.984	28.081	6.1 0.7	3.8 0.4	1.61 0.25
1716	34.909	-1.030	28.081	6.0 0.6		

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

DATE	DESCRIPTION	AMOUNT	CHECK NO.	BANK	BALANCE
1950-01-01	OPENING BALANCE	100.00			100.00
1950-01-15	PAYROLL	50.00	101		50.00
1950-01-31	RENT	25.00	102		25.00
1950-02-15	UTILITIES	15.00	103		10.00
1950-02-28	CLOSING BALANCE				10.00

Prepared by: [Name]  
Checked by: [Name]

ARKTIS II-3: R/V POLARSTERN 1984 CRUISE IN NORTHERN FRAM STRAIT

This cruise provided an opportunity to sample Atlantic water circulating in the Nansen Basin, Eurasian Basin Deep Water, and deep water flowing into the northern Greenland Sea from the Arctic Basin.

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-319	80	34.0	N	07/20/84	734 M
	7	12.0	E		

DEPTH M	SALINITY	POT. T	SIGMA $\sigma$	CS-137 e		SR-90 e		CS/SR e	
150	34.959	2.440	27.900	39.6	0.3				

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-325	81	18.0	N	07/22/84	2272 M
	15	23.0	E		

DEPTH M	SALINITY	POT. T	SIGMA $\sigma$	CS-137 e		SR-90 e		CS/SR e	
5	32.952			59.3	0.9	15.8	0.9	3.75	0.22
67	34.637	1.006	27.753	52.0	0.7	15.3	0.4	3.40	0.10
143	34.901	2.412	27.858	55.9	1.5	16.2	0.3	3.45	0.11
190	34.872	1.888	27.878	57.6	0.8	16.3	1.6	3.53	0.35
362	35.000	2.567	27.924	45.0	0.9				
590	34.959	1.388	27.985	38.8	0.7				
787	34.926	0.314	28.029	20.6	0.4	9.4	0.3	2.19	0.08
987	34.920	-0.320	28.058	12.2	0.3	6.2	0.3	1.97	0.11
1300	34.922			7.4	0.2				
1600	34.922			7.8	0.1				
1601				8.1	0.2	4.4	0.1	1.84	0.06
2090	34.929			3.0	0.2	1.2	0.2	2.50	0.45

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION	COLLECTION DATE	BOTTOM DEPTH
PS84-327	80 8.5 N 4 43.7 E	07/23/84	1028 M

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
5	34.849			69.7 0.4	19.9 0.4	3.50 0.07

CRUISE-STA#	POSITION	COLLECTION DATE	BOTTOM DEPTH
PS84-329	81 46.2 N 10 41.4 W	07/26/84	211 M

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
5	31.739			33.1 0.3	23.5 0.2	1.41 0.02

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-331	81	56.0	N	07/26/84	2450 M
	10	0.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
5	31.637			31.2	0.3	23.2	0.2	1.34	0.02
161	34.510	-0.349	27.728	19.6	0.4	11.7	0.3	1.68	0.06
202	34.744	0.308	27.883	20.5	0.3	12.0	0.7	1.71	0.10
230	34.800	0.387	27.923	13.0	0.4	8.1	0.5	1.60	0.11
300	34.860	0.571	27.960	15.1	0.4	9.2	0.4	1.64	0.08
498	34.884	0.329	27.994	7.0	0.4	4.8	0.9	1.46	0.29
796	34.896	0.034	28.020	7.1	0.3	4.5	0.2	1.58	0.10
1150	34.909			9.0	0.2				
1525	34.925			10.0	0.2	4.8	0.1	2.08	0.06
2150	34.935								
2350	34.931			7.0	0.2	2.8	0.2	2.50	0.19

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-332	82	4.7	N	07/26/84	2806 M
	9	31.6	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
600	34.889			7.8	0.2				
1000	34.908			6.3	0.2				

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE



CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-334	82	32.0	N	07/27/84	4343 M
	6	9.1	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
5	32.179			43.2	0.3	25.4	0.5	1.70	0.04
236	34.885	1.579	27.912	46.6	0.4	15.9	0.4	2.93	0.08
266	34.852	0.989	27.927	32.0	0.4	15.4	0.5	2.08	0.07
304	34.931	1.540	27.952	38.3	0.5	14.8	0.4	2.59	0.08
393	34.915	1.046	27.974	29.5	0.4	10.2	1.2	2.89	0.34
504	34.923	0.852	27.993	26.5	0.4	9.7	1.5	2.73	0.42
991	34.918	-0.319	28.056	13.8	0.3	8.1	0.5	1.70	0.11
1400	34.921			6.8	0.1				
1401				6.2	0.2	3.9	0.2	1.59	0.10
2400	34.926			3.6	0.1				
2401				3.0	0.2	1.9	0.2	1.58	0.20

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-335	82	44.0	N	07/28/84	3253 M
	9	56.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
240	34.919			45.3	0.3				

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-354	81	29.0	N	07/29/84	3154 M
	2	2.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
285	34.944	1.947	27.931	46.4	0.3	14.1	0.2	3.29	0.05
370	34.974			36.6	0.3				

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-361	80	42.0	N	07/30/84	2984 M
	5	12.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
286	34.781	0.528	27.899	20.7	0.2				
400				7.0	0.2				

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-362	77	32.0	N	08/01/84	501 M
	5	41.0	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
182	34.883	1.540	27.913	39.1	0.5				

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION	COLLECTION DATE	BOTTOM DEPTH
PS84-363	77 40.0 N 4 56.0 W	08/01/84	1129 M

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
5	31.989			41.1 0.3	30.4 0.7	1.35 0.03
177	34.892	1.698	27.909	37.4 0.6		
316	34.992	1.785	27.982	40.5 0.6		

CRUISE-STATION	POSITION	COLLECTION DATE	BOTTOM DEPTH
PS84-364	77 34.0 N 4 43.0 W	08/02/84	1539 M

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
5	32.176			42.6 0.4	27.2 0.3	1.57 0.02
91	34.361	-0.815	27.628	28.0 0.7		
215	34.973	2.241	27.930	44.4 0.4	14.6 0.8	3.04 0.17
314	34.909	1.151	27.962	25.8 0.7		
342	35.013	1.982	27.983	42.3 1.5		
554	34.936	0.605	28.020	23.2 0.6		
772	34.905	-0.271	28.043	28.1 0.5		
837	34.912	-0.431	28.057	15.3 0.2		
1237	34.922			9.7 0.2		

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-370	77	39.3	N	08/03/84	3061 M
	0	22.9	W		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
5	34.770			36.8	0.7	14.3	0.2	2.57	0.06
141	35.040	2.119	27.994	38.9	0.5	12.2	0.5	3.19	0.14
310	35.033	1.960	28.001	45.2	0.8	12.8	0.6	3.53	0.18
746	34.885	-0.756	28.050	25.5	0.4	12.4	0.5	2.06	0.09
1162	34.895	-0.964	28.067	16.1	0.3	7.4	0.4	2.18	0.12
1968	34.908	-1.091	28.082	6.9	0.2	4.0	0.2	1.73	0.10
2811	34.899	-1.217	28.081	7.0	0.2	5.2	0.2	1.35	0.06
2811	34.899			6.8	0.1				

CRUISE-STATION	POSITION			COLLECTION DATE	BOTTOM DEPTH
PS84-381	77	40.0	N	08/04/84	3531 M
	7	33.0	E		

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e		SR-90 e		CS/SR e	
1500	34.913			7.2	0.1				
2500	34.911								
2501				4.5	0.3	2.6	0.2	1.73	0.18

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION	COLLECTION DATE	BOTTOM DEPTH
PS84-382	77 39.9 N 8 29.5 E	08/04/84	2153 M

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
5	35.048			53.4 0.3	22.5 0.4	2.37 0.04
46	35.064	5.281	27.693	57.0 0.8	16.2 0.5	3.52 0.12
78	35.083	4.053	27.847	51.1 0.5	19.2 0.8	2.66 0.11
294	35.061	2.846	27.948	46.1 0.3	17.7 0.8	2.60 0.12
490	35.031	2.087	27.990	41.2 0.4	20.3 0.2	2.03 0.03
739	34.903	-0.081	28.032	29.6 0.3	10.8 0.7	2.74 0.18
983	34.898	-0.643	28.055	17.4 0.3	8.8 0.2	1.98 0.06

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

DATE	DESCRIPTION	AMOUNT	CHECK NO.	BANK	BALANCE	CHECK NO.	AMOUNT	BALANCE
10/10	...	...	...	...	...	...	...	...
10/15	...	...	...	...	...	...	...	...
10/20	...	...	...	...	...	...	...	...
10/25	...	...	...	...	...	...	...	...
10/30	...	...	...	...	...	...	...	...
11/05	...	...	...	...	...	...	...	...
11/10	...	...	...	...	...	...	...	...
11/15	...	...	...	...	...	...	...	...
11/20	...	...	...	...	...	...	...	...
11/25	...	...	...	...	...	...	...	...
11/30	...	...	...	...	...	...	...	...

...

R/V MICHAEL SAARS: FALL 1985 CRUISE TO NORTHEAST BARENTS SEA

This cruise - courtesy of Dr. Lars Middtun of Bergen, Norway - offered the opportunity to sample dense water formed on the northeast Barents Sea shelf and which is thought to contribute to shelfwater ventilation of the Arctic basins.

CRUISE-STA#      POSITION      COLLECTION DATE      BOTTOM DEPTH

MS85-A          73 51.0 N          09/00/85  
                  51 53.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
1	34.270			118.7	1.1	27.3	0.2	4.35	0.05
237	34.941			116.2	0.8	24.4	0.3	4.76	0.07

CRUISE-STA#      POSITION      COLLECTION DATE      BOTTOM DEPTH

MS85-B          78 0.0 N          09/00/85  
                  46 0.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
1	33.983			80.6	3.1	18.1	0.2	4.45	0.18
260	34.942					23.3	0.4		

CRUISE-STA#      POSITION      COLLECTION DATE      BOTTOM DEPTH

MS85-C          74 30.0 N          09/00/85  
                  46 0.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
1	34.681			111.2	0.9	27.9	0.3	3.98	0.05

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE



CRUISE-STATION POSITION COLLECTION DATE BOTTOM DEPTH

MS85-D 77 45.0 N 09/00/85  
56 0.0 E

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
1	34.006			91.1 1.0	21.6 0.2	4.22 0.06
285	34.902			45.4 0.4	22.8 0.3	1.99 0.03

CRUISE-STATION POSITION COLLECTION DATE BOTTOM DEPTH

MS85-E 77 45.0 N 09/00/85  
60 0.0 E

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
1	32.409			79.5 3.3	21.7 3.7	3.66 0.64
330	34.882			87.4 2.5	24.1 0.2	3.63 0.11

CRUISE-STATION POSITION COLLECTION DATE BOTTOM DEPTH

MS85-F 75 21.0 N 09/00/85  
54 17.0 E

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137 e	SR-90 e	CS/SR e
1	34.251			122.0 1.4	28.0 0.2	4.36 0.06
200	34.878			113.0 2.0	27.6 0.2	4.09 0.08

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#      POSITION      COLLECTION DATE      BOTTOM DEPTH

MS85-G      76 30.0 N      09/00/85  
             50 0.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
1	33.722			82.6	0.8	19.9	0.8	4.14	0.17
270	34.940			81.4	0.8	19.1	0.5	4.26	0.12

CRUISE-STA#      POSITION      COLLECTION DATE      BOTTOM DEPTH

MS85-H      78 0.0 4      09/00/85  
             44 0.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
310	34.968			77.3	0.8	17.9	0.4	4.31	0.11

CRUISE-STA#      POSITION      COLLECTION DATE      BOTTOM DEPTH

MS85-I      75 30.0 N      09/00/85  
             50 0.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
255	34.882			112.0	0.9	27.3	0.4	4.10	0.07

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION POSITION COLLECTION DATE BOTTOM DEPTH

MS85-J 76 30.0 N 09/00/85  
56 0.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
1	34.179			102.6 1.0	23.1 0.4	4.44 0.08

CRUISE-STATION POSITION COLLECTION DATE BOTTOM DEPTH

MS85-K 78 0.0 N 09/00/85  
50 0.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
1	32.795			73.3 0.8	21.4 0.2	3.43 0.05
195	34.871				22.5 0.2	

CRUISE-STATION POSITION COLLECTION DATE BOTTOM DEPTH

MS85-L 76 30.0 N 09/00/85  
46 0.0 E

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
1	34.122			90.0 0.6	20.2 0.5	4.46 0.11
255	34.902			90.0 0.8	21.4 0.2	4.20 0.05

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
MS85-M	78	30.0	N	09/00/85	
	56	0.0	E		

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
1	32.876			74.2	0.8	20.7	0.3	3.59	0.06
220	34.881			81.7	0.5	21.3	0.3	3.83	0.06

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
MS85-N	75	30.0	N	09/00/85	
	40	0.0	E		

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
1	34.484			81.7	0.6	21.6	0.4	3.78	0.08

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
MS85-O	77	30.0	N	09/00/85	
	40	0.0	E		

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
1	33.450			66.4	0.1	21.7	0.1	3.06	0.01

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STATION	POSITION	COLLECTION DATE	BOTTOM DEPTH
MS85-P	76 30.0 N 40 0.0 E	09/00/85	

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
1	33.742			71.3 0.5	21.8 0.3	3.28 0.05

CRUISE-STATION	POSITION	COLLECTION DATE	BOTTOM DEPTH
MS85-Q	75 30.0 N 42 0.0 E	09/00/85	

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137	SR-90	CS/SR
M				e	e	e
280	34.967				19.9 0.3	

e:1 SIGMA COUNTING UNCERTAINTY  
CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

STATE OF TEXAS  
COUNTY OF DALLAS  
I, \_\_\_\_\_, County Clerk, do hereby certify that the within and foregoing is a true and correct copy of the \_\_\_\_\_ as the same appears from the records of the County of Dallas, State of Texas.

WITNESSED my hand and the seal of said County at Dallas, Texas, this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_.

STATE OF TEXAS  
COUNTY OF DALLAS  
I, \_\_\_\_\_, County Clerk, do hereby certify that the within and foregoing is a true and correct copy of the \_\_\_\_\_ as the same appears from the records of the County of Dallas, State of Texas.

WITNESSED my hand and the seal of said County at Dallas, Texas, this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_.

ATTEST:  
COUNTY CLERK

ARCTIC ICE-STATIONS: 1979-1985

This section contains data from four ice-stations occupied in 1979-1985 in the Eurasian and Canadian Basins.

1. LOREX-79: This station, on the Lomonosov Ridge, was at a location on the mid-basin ridge close to the North Pole. Deep samples were collected on both sides of the ridge.
2. FRAM-4: This camp, northeast of Fram Strait on the eastern flanks of the Yermak Plateau, obtained samples of young Atlantic inflow water and deep Nansen Basin water.
3. CESAR: This station was part of the Canadian Scientific Expedition to the Alpha Ridge. Samples were collected from a part of the Canadian Basin where mixing and ventilation are relatively slow.
4. AIWEX-3: This station, north of Prudhoe Bay, was part of the Arctic International Wave Experiment. It offered the opportunity to sample water masses circulating around the margins of the Canadian Basin.

CRUISE-STATION#      POSITION      COLLECTION DATE      BOTTOM DEPTH  
 LOREX-79      89    0.0    N      04/00/79      3000 M  
                  120    0.0    W

POSITION (LONG.) IS AVE.; SEE MANUSCRIPT

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS137		SR90		PU239		AM241	
				e		e		e		e	
2	30.000	-1.600		39.2	0.5	31.6	0.7	0.082	0.013	0.042	0.011
75	32.000	-1.600		33.6	0.4	33.1	4.4	0.098	0.012	0.031	0.007
110	33.500	-1.500		25.5	0.5	25.5	1.0	0.045	0.008	-0.005	0.007
500	34.880	0.510		7.3	0.4	4.5	0.1	0.110	0.010	0.025	0.006
1000	34.901	-0.170		6.6	0.3	3.8	0.3	0.061	0.014	0.019	0.005
1500	34.920	-0.520		18.5	0.4	8.7	0.1	0.068	0.007	0.018	0.005
2497	34.940	-0.850		7.3	0.2	4.8	0.7	0.035	0.006	0.003	0.002
3000	34.953	-0.460		0.9	0.3	0.6	0.3	0.012	0.005	0.004	0.002

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE



CRUISE-STATION	POSITION	COLLECTION DATE	BOTTOM DEPTH
FRAM-4	83 33.0 N 15 17.0 E	04/15/82	3800 M

SALINITY MAX AT 230 M

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
				e		e		e	
180				47.1	0.4	26.0	2.0	1.81	0.14
230				52.1	0.2	16.8	0.5	3.10	0.09
330				43.0	0.3	20.4	0.8	2.11	0.08
500				25.0	0.3	10.8	1.2	2.31	0.26
600				17.4	0.2	7.4	0.4	2.35	0.13
800				11.5	0.3	5.4	0.6	2.13	0.24
900				11.4	0.3	7.0	1.0	1.63	0.24
1000				10.5	0.3	6.0	1.0	1.75	0.30
1300				7.2	0.3	4.2	1.0	1.71	0.41
1400				4.1	0.2				
1500				3.0	0.1	2.1	0.3	1.43	0.21
1700				2.9	0.1	2.2	0.2	1.32	0.13
2000				2.0	0.3				
3600				0.4	0.2	0.4	0.3	1.00	0.90

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
CESAR	86	0.0	N	04/15/83	
	130	0.0	W		

TEMP NOT POT. TEMP

DEPTH M	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
				e		e		e	
2	31.831			31.5	0.9				
172	34.116	-1.040		27.6	0.4	18.4	0.4	1.50	0.04
240	34.613			14.3	0.3	8.9	0.7	1.61	0.13
602	34.891			2.5	0.5				
800	34.901	-0.035		2.0	0.2	1.7	1.5	1.18	1.05
1000	34.917	-0.090		2.7	1.0				
1300	34.937			0.5	0.2	1.0	1.0	0.50	0.54
1400	34.938			0.7	0.2	1.9	0.6	0.37	0.16
1500	34.934	-0.250		0.5	0.7	3.0	0.0	0.17	0.24

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE

CRUISE-STA#	POSITION			COLLECTION DATE	BOTTOM DEPTH
AIWEX-3	74	8.4	N	04/08/85	3707 M
	144	39.2	W		

DEPTH	SALINITY	POT. T	SIGMA $\theta$	CS-137		SR-90		CS/SR	
M				e		e		e	
5	30.286	-1.420	24.343	45.4	0.3	32.6	0.3	1.39	0.02
155	32.911	-1.460	26.474	27.0	0.3	18.2	0.6	1.48	0.05
197	33.319	-1.500	26.807	23.7	0.3	16.2	0.3	1.46	0.03
237	33.922	-1.100	27.283	13.3	0.2	8.0	0.8	1.66	0.17
388	34.795	0.384	27.919	5.6	0.2	2.5	0.2	2.24	0.20
506	34.859	0.450	27.967	4.6	0.2	2.2	0.3	2.09	0.30
725	34.891	0.226	28.006	7.5	0.2	3.0	0.4	2.50	0.34
843	34.895	0.072	28.017	6.9	0.2	4.5	0.2	1.53	0.08
1233	34.913	-0.275	28.050	8.0	0.3	3.0	0.4	2.67	0.37
1931	34.942	-0.516	28.085	2.4	0.3	1.5	0.3	1.60	0.38
3663	34.953	-0.514	28.094	0.2	0.2	0.3	1.0	0.67	2.33

e:1 SIGMA COUNTING UNCERTAINTY  
 CONCENTRATIONS ARE DPM/100 KG AS OF COLLECTION DATE



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