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1.-ADAMS ISLAND E.D.M. ICE MOVEMENT MEASUREMENTS
2.-MULTIYEAR SEA-ICE AND FIRST YEAR SEA-ICE SAMPLING AND
TEMPERATURE MEASUREMENTS AT BORDEN STATION

March 1983 Occupation (A Combined Report)

This Report was prepared for the National Research Council of Canada, supported by Contract

DSS File #24-SR. 31155-2-4492 (Adams Island)

and #24-SR. 31155-2-4493 (Borden Station).

(This Report has 10 pages)

By

Hermann A.R. Steltner

Pond Inlet, N.W.T.

March 31-1983

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I. SUMMARY REPORT

The Borden Station (DFO-OAS) was occupied from March 15 to March 28-1983.

The advance party left Pond Inlet on March 12-1983 and arrived at the Borden Station March 15-1983. - The details of the delay are described in the next chapter. -

Electronic Distance measurements of markers on the sea ice were made around Adams Island as well as from the Borden Peninsula.

Multiyear floe and iceberg samples were collected and shipped to N.R.C., and multiyear floe and first year sea-ice samples were collected and shipped to the A.R.E. in Pond Inlet for further analysis.

Multiyear floe and first year sea-ice temperature measurements were made using implanted thermocouple chains made at the A.R.E.

A tide recorder AANDERAA TG-3A was installed adjacent to the Borden Peninsula.

E.D.M. survey procedures were provided in detail by A.R.E.

A.R.E. further provided services preparing as well as supplying instruments, equipment and accessories and generally looked after logistics, air support, communication and food supplies and instructed Mr. E. Stander, C-CORE, in the methods and use of the E.D.M. equipment, prior to the occupation.

II. FROM THE LOG BOOK:

(Period from March 02-83 to March 14-83 for preparations.)

March 12-83, Saturday; crew departed with three skidoos and two sleds at 1600 hrs. also transporting about 320kg freight.

Crew: C. Ootova, Field Technician II

M. Qillaq, Field Technician I

A. Ootova, Field Technician I

Wind came up about 1830 hrs from the north down Navy Board Inlet and, as it was getting stronger, the crew decided to head for the Saatut camp, arriving there at 2000 hrs after travelling about 70km in 4 hrs.

March 13-83, Sunday; the wind continued all day causing blowing snow conditions and crew had to stay in the camp.

March 14-83, Monday; the wind calmed down at about 1500 hrs and crew left at 1815 hrs and travelled north in Navy Board Inlet. The wind rose again from the north, causing blowing snow by 1900 hrs and the crew stopped at 2030 and built an igloo. - The snow on the surface was soft and they travelled slowly. - Because of the reduced visibility Nunguvik camp could not be found.

March 15-83, Tuesday; crew reported by radio at 0730 hrs that, due to the inclement conditions combined with the freight load, one towing skidoo had broken down and was not repairable in the field. They further reported high gasoline consumption due to the conditions and estimated that they would require additional fuel before they could reach Borden Station.

At 1000 hrs weather conditions started to improve and they noticed that they were just east of the Nunguvik camp on the sea ice, about 3 miles away from that camp. They departed from Nunguvik at 1115 hrs.

Arrangements had been made that the plane returning from the Borden Station would drop 10 gallons of gasoline to the travelling party. This was done near the former Borden Climatic Station and the crew arrived at Borden Station around 1730 hrs. -

As it was not clear in the morning of March 15 whether or not the ground crew would make their way to the Borden Station, arrangements were made for S. Koonoo, Field Technician II, to fly to Borden and stay there for one week. The charter was on schedule and the crew in the camp was as follows:

Dr. R. Frederking, N.R.C.	C. Ootova, A.R.E.
J. Neil, N.R.C.	S. Koonoo, A.R.E.
D. Bradford, D.F.O.-O.A.S.	A. Ootova, A.R.E.
E. Stander, C-CORE	M. Qillaq, A.R.E.

In the evening there was a scramble to get the food that the fly-in crew had left in Pond Inlet, plus some spare parts to the aircraft, there being a chance that it could be brought to Borden with a flight originating in Hall Beach via Nanisivik, hopefully the next day.

March 16-83, Wednesday; E.D.M. reflectors were installed on the sea ice and measurements and samples taken from a multiyear floe. - E.D.M. measurements were made. - Skidoo engines were serviced. - The plane with food and motor spare parts arrived at Borden Station around Noon.

March 17-83, Thursday; multiyear ice samples were cut, sea-ice samples were cored, and E.D.M. measurements were made, MY floe was augered.

March 18-83, Friday; E.D.M. measurements, multiyear-floe thermocouple installation, more samples from the multiyear ice were cut, more reflectors were set out and skidoos were serviced, iceberg ice was sampled.

- March 19-83, Saturday; strain gauges installed, more reflectors were set out, the wind charger was installed and E.D.M. measurements made, the TC installed in MY floe.
- March 20-83, Sunday; E.D.M. measurements, tide gauge installation (ice 175cm) and more ice samples were cut.
- March 21-83, Monday; E.D.M. measurements, more samples were cut, multiyear thermocouple measurements; plane arrived 1608 hrs and brought 29 boxes from H.S.V.A.; samples (18 boxes) for Ottawa and one skidoo was loaded and Dr. Frederking and S. Koonoo left with the plane at 1630 hrs to Nanisivik. - The building of double bunk beds was started.
- March 22-83, Tuesday; E.D.M. measurements, MY-TC measurements, installation of #3 and #5 thermocouple chains, as well as core sampling continued making bunk beds.
- March 23-83, Wednesday; E.D.M. measurements, MY #3 and #5 TC measurements, ice samples from cracks, and completing bunk beds (4 double bunks total), some electrical wiring in the radar house.
- March 24-83, Thursday; E.D.M. measurements, MY #3 and #5 TC measurements, garbage disposal from Adams Island, anemograph repaired.
- March 25-83, Friday; E.D.M. measurements, MY #3 and #5 TC measurements, cracks mapping with E.D.M. - Ice drilling for thickness of sea ice nearshore of the Adams Island (20 holes), skidoo engine servicing.
- March 26-83, Saturday; E.D.M. measurements. MY #3 and #5 TC measurements, skidoo servicing.
- March 27-83, Sunday; E.D.M. measurements, MY #3 and #5 TC measurements, collecting all reflectors, cleaning shelter on Adams Island, as well as crew house and radar house on Borden Station, inventory at Adams Island and Borden Station, packing of return items, tide measurements E.S.
- March 28-83, Monday; clean up the houses and finishing packing. Nine pallets were brought to Pond Inlet airport and taken to

the Borden Station by the charter plane.

The plane returned with the crew to Pond Inlet at 1400 hrs and what was destined for A.R.E. was brought down to the Base.

Items needed in Pond Inlet,

but not returned to Pond Inlet:

- Sounding tape and lead
- EDM Instruction Booklet
- T-2 Instruction Booklet
- Tide Recorder Operations Manual
- MANOBS - for weather reportg.
- Two cross bars for scaffold, previously loaned (Nov.82)
- One power distribution bar
- One special multiple switch (loaned for strain gauge)

Missing information:

- Reference measurements tide recorder installation
- Baseline reference #3 and #4, related to #9 on Adams Island
- Surface weather record, second week
- All field notes

Missing equipment: From A.R.E. - one type GPH-1 prism holder

Repair items:

- WILD DI-20, water between sensing lenses,
- two skidoo engines, new crankshaft required,
- one generator engine, new crankshaft required.

E.D.M. accessories: 6 prism holders and 4 prisms belonging to B.P. were found in one of the A.R.E. boxes after return to Pond Inlet.

III. E.D.M. MEASUREMENTS:

The data have been pre-analyzed by computer and the computer printouts and plots are enclosed.

From the pre-analysis, it appears that measurement routines were not uniform and some measurements were made with a cold instrument or that the instrument had cooled out in the transport prior to the measurement.

Although it is quite acceptable to extract the barometric pressure afterwards from a recorder, this cannot be done with the temperature because the short-term variations of the temperatures in the field are too extensive and could cause unacceptable errors.

Some baseline measurements were missing and should be made during the next occupation for data verification.

IV. TIDE RECORDING:

With a next occupation, reference measurements need to be made for the exact difference in elevation of the tide benchmark and the recorder as well as the sea-ice surface. - One working day with hourly measurements should be provided.

V. THERMOCOUPLE MEASUREMENTS:

#3 and #5 thermocouple chain readings were not right and it appears at this time that the trouble is in the connector. - This can be rectified in the field during the next occupation.

VI. CLIMATOLOGICAL RECORDS:

Records from November and December 1982 were recovered and will be extracted.

The records are:

1. Wind direction and velocity Borden Station
2. Temperature Borden Station
3. Barometric Pressure Borden Station.

VII. OPERATIONAL EXPERIENCE:

- 1.) The concept of the advance ground party to Borden Station is solely to assure safe landing conditions for the aircraft. For this occupation, I deviated from this concept in the spirit of assisting the increased activities, which came about after all occupation details had already been settled, by freighting cargo over the ice to the Borden Station. - The penalty for piggy-backing the sole task of the ground party was severe, as two skidoo engines (Citation 4500) became unserviceable and major parts will have to be replaced.
- 2.) One person should be designated for the overall responsibility of everything that is going on including a daily data review for the detection of malfunctions and/or errors, and completeness of information and data, disposition of equipment, instruments, accessories and supplies, etc. - By delegation the ensuing work load is not unduly heavy for the responsible person, but for proper communication purposes it is essential that one person carries the responsibility.

VIII. ACKNOWLEDGEMENTS:

The Department of Fisheries and Oceans, Bayfield Laboratory, owns the facilities at the Borden Station and the use of these is herewith gratefully acknowledged.

continued page 10.....

DATA SUBMISSION WITH REPORT

DSS File # 24-SR.31155-2-4492 & 4493

	Data Sheets	Plots	Pages	Total
1.) Multiyear Floe				
Station 7.5 (107.5)				
Temperature Measure-				
ments	1	-	1	1
Salinity Measurements	1	-	1	1
Density Measurements	2	-	2	2
2.) Sea-Ice Salinity				
Stations # 7 & 8	2	2	4	4

		Total		8

ARCTIC RESEARCH ESTABLISHMENT

Pond Inlet, N.W.T.

~~BORDEN~~

~~Lillase Sound~~, N.W.T., Station # 7

Sampling Date	832203
Snow Depth	M
Ice Depth	168.1
Ice Bottom	M
Ice Freeboard	M
Average Snow Salinity p.p.t.	0.00
Average Ice Salinity p.p.t.	5.79
Number of Ice Segments	66
Number of Snow Segments	0

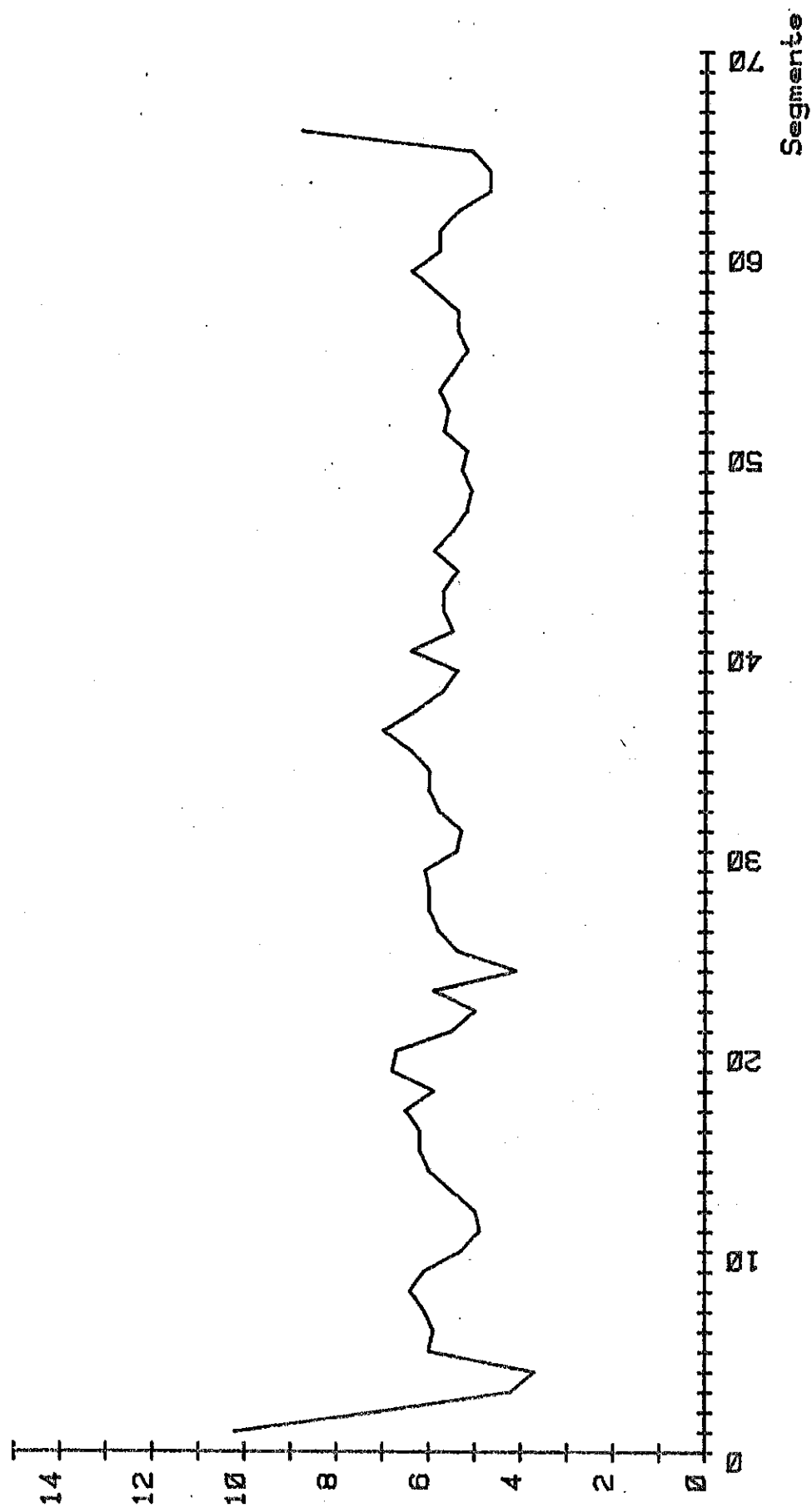
ICE

Segments	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.
1 - 10	10.2	7.1	4.2	3.7	6.0	5.9	6.1	6.4	6.1	5.3
11 - 20	4.9	5.0	5.5	6.0	6.2	6.2	6.5	5.9	6.8	6.7
21 - 30	5.5	5.0	5.9	4.1	5.4	5.8	6.0	6.0	6.1	5.4
31 - 40	5.3	5.8	6.0	6.0	6.4	7.0	6.3	5.7	5.4	6.4
41 - 50	5.5	5.7	5.7	5.4	5.9	5.5	5.2	5.1	5.3	5.2
51 - 60	5.7	5.6	5.8	5.5	5.2	5.4	5.4	5.9	6.4	5.8
61 - 70	5.8	5.4	4.7	4.7	5.1	8.8				

BORDEN
Date 832203, Station # 7

Salinity p.p.t.

Sea Ice Salinity



ARCTIC RESEARCH ESTABLISHMENT

Pond Inlet, N.W.T.

~~BORDEN~~
~~Ellice Sound~~, N.W.T., Station # 8

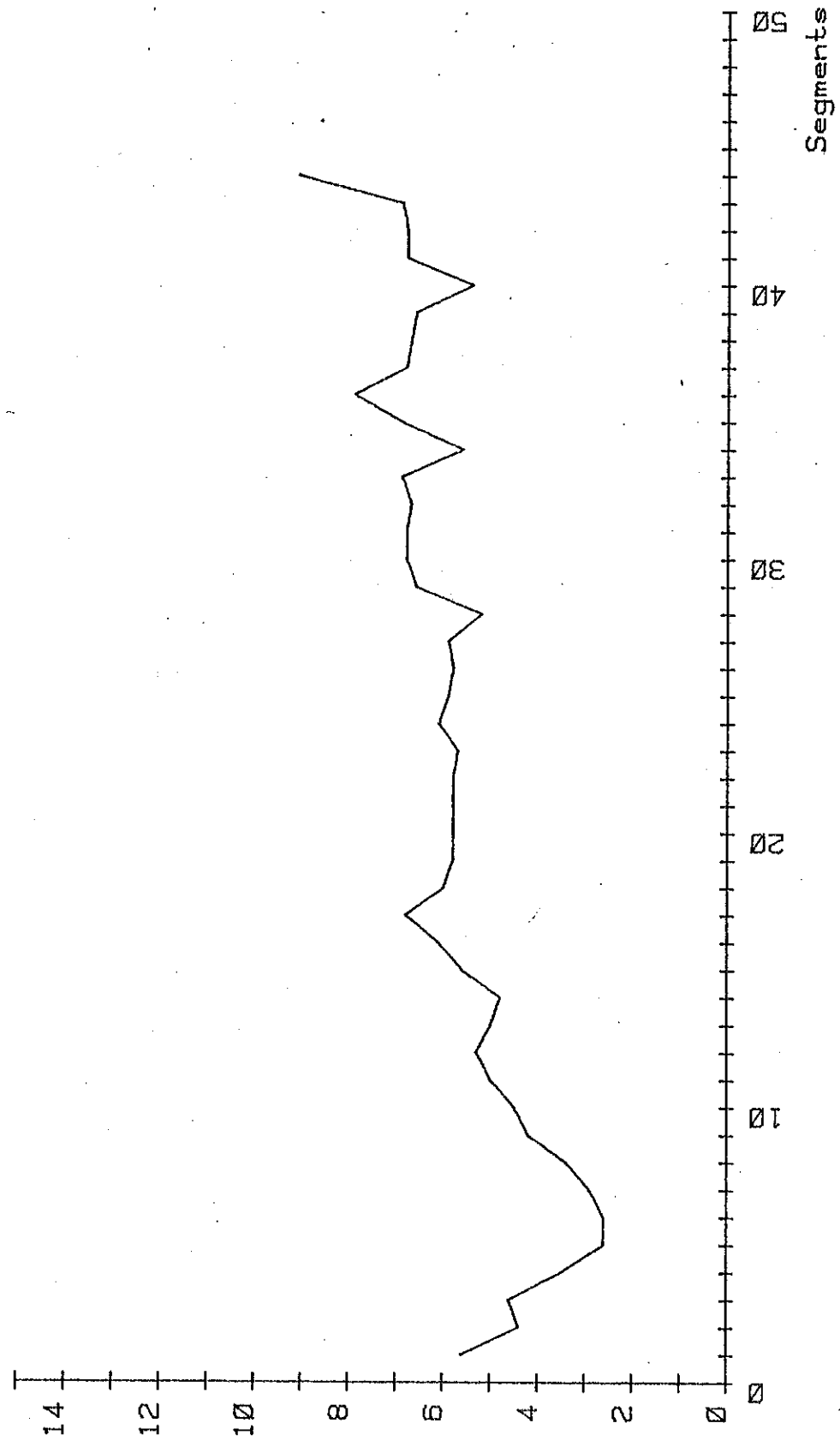
Sampling Date	832213
Snow Depth	M
Ice Depth	114.0
Ice Bottom	1.5
Ice Freeboard	M
Average Snow Salinity p.p.t.	0.00
Average Ice Salinity p.p.t.	5.68
Number of Ice Segments	44
Number of Snow Segments	0

ICE

Segments	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.	Sal.
1 - 10	5.6	4.4	4.6	3.5	2.6	2.6	2.9	3.4	4.2	4.5
11 - 20	5.0	5.3	5.0	4.8	5.6	6.1	6.8	6.0	5.8	5.8
21 - 30	5.8	5.8	5.7	6.1	5.9	5.8	5.9	5.2	6.6	6.8
31 - 40	6.8	6.7	6.9	5.6	6.9	7.9	6.8	6.7	6.6	5.4
41 - 50	6.8	6.8	6.9	9.1						

BORDEN
Date 832203, Station # 8

Salinity p.p.t. Sea Ice Salinity



BORDEN MULTIYEAR FLOE
TEMPERATURE MEASUREMENTS

ARCTIC RESEARCH ESTABLISHMENT
POND INLET, N. W. T.

DATE OF INSTALLATION: MAR. 19-1983

NOTE: SENSOR #1 & 2 NOT IN HOLE

SPACING = 3.5 CM

DATE:

MARCH 1983

SENSOR #	21	22	23	24	25	26	27
1	28.70	31.17	30.06	31.11	30.64	28.84	29.26
2	29.21	33.34	30.41	31.14	33.14	29.82	29.93
3	29.65	29.43	30.19	30.86	32.69	30.52	30.24
4	27.75	27.89	27.67	28.09	29.43	32.10	28.17
5	26.50	26.31	26.03	26.59	27.75	28.75	26.53
6	25.25	24.92	24.62	25.12	25.89	26.76	25.04
7	24.18	23.73	23.46	23.84	24.64	23.73	23.71
8	22.88	22.49	22.22	22.60	23.35	22.36	22.27
9	21.56	21.29	20.82	21.48	22.11	21.12	21.12
10	20.27	19.86	19.36	20.14	20.66	19.73	19.54
11	18.91	18.55	18.15	18.61	19.35	18.31	18.34
12	17.79	17.44	16.68	17.49	18.39	17.20	17.03
13	16.65	16.17	15.60	16.33	17.22	15.90	15.92
14	15.65	14.95	14.63	15.09	16.25	14.82	14.71
15	14.74	13.90	13.44	14.04	15.28	13.82	13.69
16	13.58	12.69	12.00	12.88	13.95	12.50	12.18
17	12.72	11.97	10.96	11.67	13.09	11.51	11.22
18	11.78	10.93	10.37	10.71	12.05	10.55	10.23
19	11.11	10.43	9.03	9.99	11.57	9.91	9.49
20	10.53	9.86	7.84	9.41	10.85	9.17	9.19
21	9.86	9.22	6.99	8.71	10.45	8.18	8.16

NOTE: ALL TEMPERATURES ARE MINUS DEGR. CELSIUS

MULTIYEAR FLOE - BORDEN

MARCH 19-1983 - SALINITY

LENGTH OF CORE : 382.5 cm

ARCTIC RESEARCH ESTABLISHMENT

POND INLET, N. W. T.

SEGM.	‰	SEGM.	‰	SEGM.	‰	SEGM.	‰	SEGM.	‰
1	1.7	34	1.3	66	1.0	98	0.4	130	3.0
2	1.7	35	1.7	67	1.1	99	0.5	131	0.9
3	1.7	36	1.3	68	1.5	100	0.3	132	1.6
4	2.7	37	1.2	69	1.1	101	0.1	133	1.5
5	2.7	38	0.8	70	1.2	102	2.0	134	1.4
6	1.7	39	1.0	71	0.5	103	1.3	135	1.8
7	1.5	40	1.0	72	0.5	104	1.5	136	1.3
8	1.5	41	1.1	73	0.5	105	1.4	137	1.3
9	1.4	42	1.3	74	0.7	106	1.5	138	1.6
10	1.8	43	1.5	75	0.8	107	1.4	139	1.7
11	2.2	44	0.9	76	0.9	108	1.0	140	1.6
12	2.0	45	1.0	77	0.5	109	2.1	141	1.5
13	1.3	46	1.2	78	0.5	110	2.3	142	1.5
14	1.9	47	1.0	79	0.6	111	2.5	143	2.3
15	1.4	48	1.2	80	0.8	112	2.1	144	3.0
16	1.4	49	0.8	81	0.6	113	1.8	145	3.0
17	1.0	50	0.9	82	0.1	114	1.5	146	2.2
18	1.1	51	1.8	83	0.2	115	2.0	147	2.5
19	1.1	52	2.1	84	0.3	116	1.6	148	2.6
20	1.2	53	2.1	85	0.1	117	1.3	149	2.5
21	1.4	54	2.0	86	0.8	118	1.6	150	3.0
22	1.1	55	1.4	87	0.8	119	2.0	151	2.5
23	1.6	56	0.9	88	0.5	120	2.1		
24	2.6	57	0.7	89	0.2	121	2.7		
26	1.3	58	1.2	90	0.9	122	2.1		
27	2.7	59	1.1	91	0.6	123	2.7		
28	2.1	60	1.5	92	0.2	124	2.5		
29	2.0	61	1.2	93	0.4	125	2.3		
30	1.6	62	1.6	94	0.4	126	2.0		
31	1.5	63	1.2	95	0.2	127	2.0		
32	1.5	64	1.5	96	0.2	128	1.8		
33	2.0	65	1.1	97	0.4	129	2.8		

46 0250

ARCTIC RESEARCH ESTABLISHMENT

Sea Ice Density Measurements

Location: Borden Station.1-99

Date 831903

Station # 7.5

Core length 382.5

No of segments 99

Salinity analysis: Yes

Temp. measurement: Yes

Freeboard (cm) N

Icebottom (cm) N

Segment#	1	2	3	4	5	6	7	8	9	10
Density(gm/cm ³)	N	0.901	0.903	0.897	0.892	N	0.907	0.893	0.893	N
Variation(%)	N	0.005	0.006	0.008	0.006	N	0.005	0.005	0.006	N
Segment#	11	12	13	14	15	16	17	18	19	20
Density(gm/cm ³)	N	N	N	N	N	N	N	N	N	N
Variation(%)	N	N	N	N	N	N	N	N	N	N
Segment#	21	22	23	24	25	26	27	28	29	30
Density(gm/cm ³)	0.889	N	0.908	0.892	N	0.895	0.888	0.909	0.898	0.905
Variation(%)	0.008	N	0.005	0.004	N	0.004	0.007	0.007	0.005	0.006
Segment#	31	32	33	34	35	36	37	38	39	40
Density(gm/cm ³)	N	N	N	N	N	N	N	0.865	N	N
Variation(%)	N	N	N	N	N	N	N	0.006	N	N
Segment#	41	42	43	44	45	46	47	48	49	50
Density(gm/cm ³)	N	N	N	0.872	0.868	N	N	0.880	N	0.860
Variation(%)	N	N	N	0.004	0.005	N	N	0.010	N	0.006
Segment#	51	52	53	54	55	56	57	58	59	60
Density(gm/cm ³)	N	N	N	N	N	0.866	0.877	N	N	N
Variation(%)	N	N	N	N	N	0.008	0.007	N	N	N
Segment#	61	62	63	64	65	66	67	68	69	70
Density(gm/cm ³)	N	N	N	N	N	N	N	N	N	N
Variation(%)	N	N	N	N	N	N	N	N	N	N
Segment#	71	72	73	74	75	76	77	78	79	80
Density(gm/cm ³)	N	N	N	0.891	N	N	N	N	0.872	N
Variation(%)	N	N	N	0.008	N	N	N	N	0.010	N
Segment#	81	82	83	84	85	86	87	88	89	90
Density(gm/cm ³)	N	N	0.826	N	N	0.858	0.850	N	N	0.847
Variation(%)	N	N	0.013	N	N	0.008	0.005	N	N	0.004
Segment#	91	92	93	94	95	96	97	98	99	
Density(gm/cm ³)	0.849	N	N	0.882	0.863	0.840	0.863	0.845	N	
Variation(%)	0.005	N	N	0.005	0.003	0.010	0.007	0.006	N	

