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ARCTIC OCEANOGRAPHIC SURVEY BARROW STRAIT

1983 FIELD REPORT

D.J. BROOKS

OCEANOGRAPHIC DIVISION

OCEAN SCIENCE AND SURVEYS
BAYFIELD LABORATORY FOR MARINE SCIENCE AND SURVEYS
BURLINGTON, ONTARIO

ARCTIC OCEANOGRAPHIC SURVEY

BARROW STRAIT

1983 FIELD REPORT

by

D.J. Brooks

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P.O. Box 5050
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November, 1983

ACKNOWLEDGEMENTS

The success of the 1983 program can be largely attributed to the welcome assistance provided by the following organizations:

1) Polar Continental Shelf Project of Energy Mines and Resources who provided accommodation, equipment along with aircraft, both helicopter and fixed wing.

2) Technical Operations of NWRI who provided transportation of equipment to Montreal, along with technical support in providing two weather stations and installation at the survey location.

3) Ship Division of OSS again, as in the past, provided the personnel most capable in the setting-up and day-to-day operation of the survey camps.

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OVERVIEW

This report describes the third-year field activities for the Barrow Strait project which were carried out in the period February to May, 1983. In March, 1981 the Bayfield Laboratory for Marine Science and Surveys initiated long-term monitoring of ocean properties and transport in Barrow Strait. This study is being carried out to obtain information that is required for decisions on year-round shipping through the Northwest Passage. Both government and industry require the oceanographic knowledge not only for judging the design and operation of the proposed transport systems, but also for addressing safety, environmental protection, and regulatory concerns.

The field work described here collects information on the magnitude of short- and long-term variations in the physical, chemical, and biological properties of the water in a section of the Northwest Passage. The selected study area, Barrow Strait, is shown in relation to the Canadian Arctic Archipelago in Figure 1, and in detail in Figure 2. The area includes the entrances to the contiguous waters of McDougall Sound, Peel Sound, and Wellington Channel. The field work is scheduled for the late March - early May period when a stable ice cover is present. Rotary and fixed-wing aircraft are used to transport equipment and personnel to on-ice observation sites from the main logistics base at Resolute.

The field work is a combination of regional surveys of water structure, intended to delimit spatial variations, and of repeated/continuous measurements at two sites to identify temporal variability in physical, chemical and biological properties, and water movements.

Preliminary processing of CTD and G-UMPS data in the field is used not only to determine if additional data sampling is required, but also to determine the depths used in the biological sampling program. The processed data provides a first glance at possible variations in the oceanographic parameters as compared to previous years. This year's extremely cold weather caused, on the average, one metre of extra ice, which produced a deeper surface mixed layer as well as a higher salinity surface layer. There was a general easterly flow at both ice camps, as was observed in other years. At 40 metres the surface mixed layer stops and a different water mass starts. This change is also seen in the animal population; smaller copepods were found in the surface layer, while larger herbivores occurred in the more saline, deeper waters. Measurements of particulate matter in the third week of March suggested that spring production was still relatively remote. The reproductive season for *Calanus hyperboreus* was well underway, but the amount of eggs and nauplii was not as large in the surface layer as seen in 1982. The ice plant production began in mid-April, reaching the equivalent of 14 mg Chl *a* m^{-2}, which is larger than the plant chlorophyll found in the entire water column. The animal community associated with the ice cover is also diverse, but further physiological research is required to study the plant-animal interrelations of the area to clearly establish production patterns and rates.

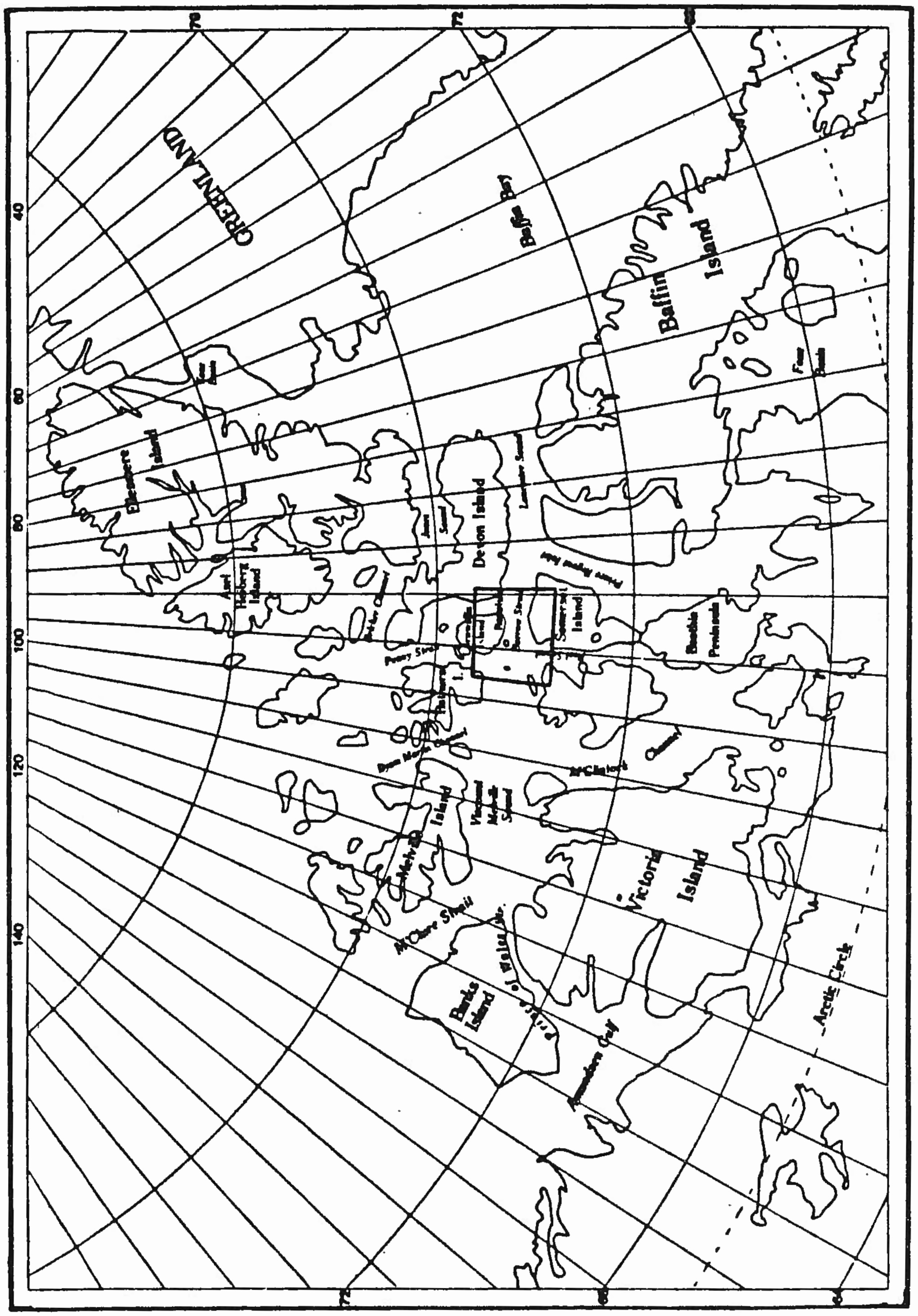


Figure 1. The Canadian Arctic

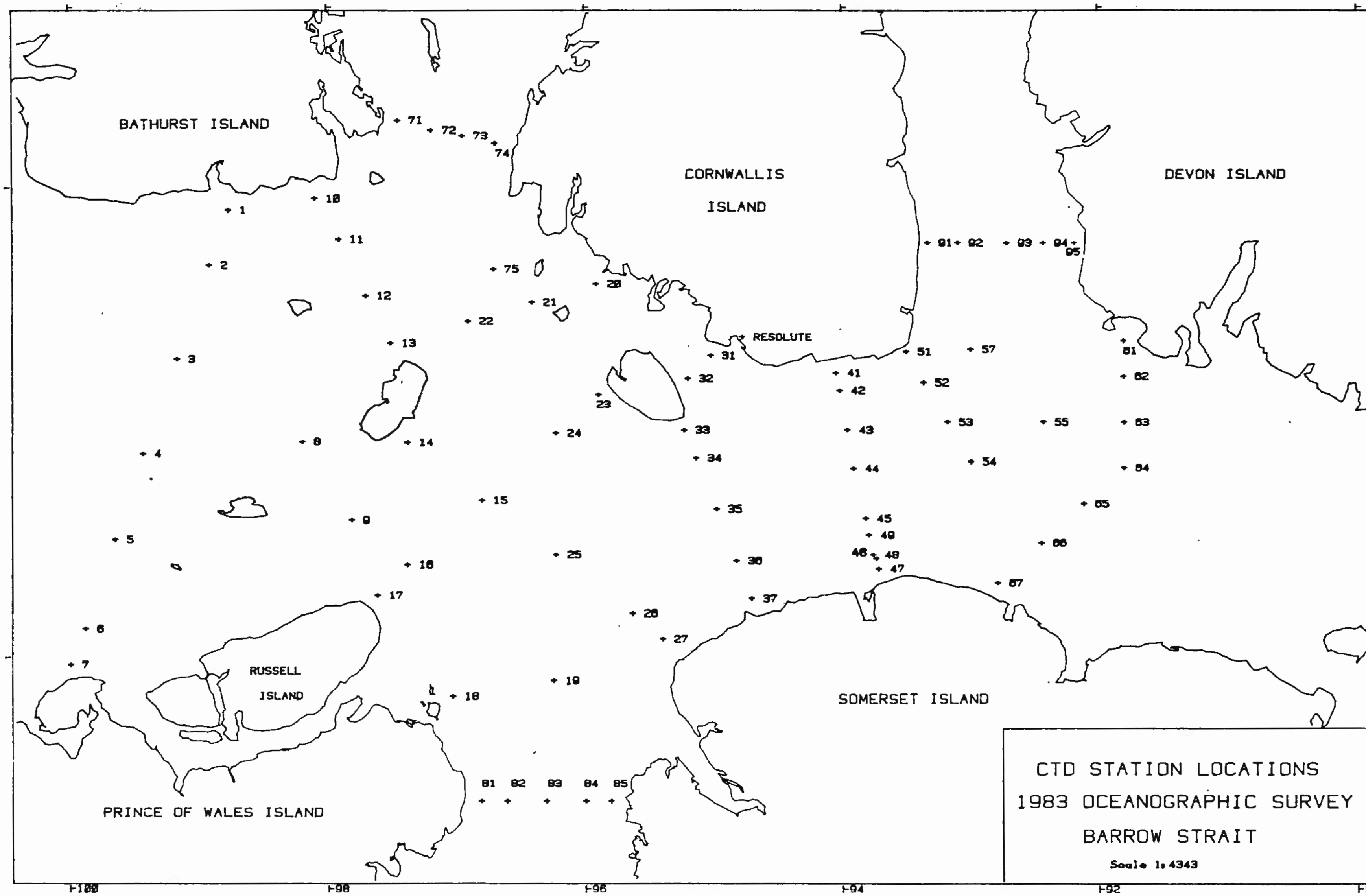


Figure 2: CTD Station Locations

ARCTIC 1983 SURVEY EQUIPMENT LIST

BELL JET RANGER 206 B	2
BELL JET RANGER 206 L	1
DE HAVILLAND TWIN OTTER	2
SKIDOO	2
GMC CREW CAB	1
CTD PROBE MARK IV	2
CTD DECK UNIT	3
PC-10 TAPE DECK 28V-110 - TEAK	3
REEL-TO-REEL TAPE DECK - TEAK	1
PORTABLE TRANSLATING SYSTEM - AANDERAA	1
WINCH - PORTABLE CTD SAMPLING	2
AUGER - JIFFY, GAS POWERED	9
SOUNDER - ECHO, FURUNO	1
G-UMPS POWER SUPPLY	4
G-UMPS WINCH, SAMPLING	2
G-UMPS PROBE, SAMPLING	3
G-UMPS DECK UNIT	2
G-UMPS TRANSLATOR	2
ACOUSTIC RELEASE DEVICE	6
ACOUSTIC RELEASE RANGING UNIT	1
ACOUSTIC RELEASE TRANSMITTED	1
RCM-4 CURRENT METER	23
WINCH, 2-TON DC	1
WINCH, 2-TON AC	2
SUBSURFACE FLOAT - INTEROCEANS, OVAL, 540 LB BUOYANCY	2

SUBSURFACE FLOAT - INTEROCEANS, SPHERICAL, 300 LB BUOYANCY	2
RADIO - PT-400, PORTABLE	8
RADIO - SBX-11, PORTABLE	2
WATER LEVEL RECORDER	3
MET. STATION - TEMP., WIND DIR., WIND SPEED	2
SOLAR METER	1
CALCULATOR - 9825A	2
PRINTER - 9866B	2
PLOTTER - 9872A	1
MINIRANGER REMOTE READOUT	1
MINIRANGER CONSOLE	2
MINIRANGER TRANSPONDER	4
MINIRANGER R/T	2
SAMPLE BOTTLES - VAN DORNS - WILDCO 3 ℓ	6
ZOOPLANKTON NETS - CLOSING, 0.5 M/20, 30, 100, 202, 500 μ	5
SEDIMENT TRAPS	12
LIGHT METER - LICOR MOD	1
ICE CORER	2
SALINOMETER - GUILDLINE AUTOSAL	1
FILTRATION SYSTEM - MILLIPORE	1
SOUNDER - 200/30 KH, ATLAS-DESO	1
HURRITENT	1
ARCTIC TENT - WEATHERPORT	1
ARCTIC TENT - "CELL"	6
PARCOLL - 5-SECTION	1
HEATER - OIL STOVE 35,000 B.T.U.	6
GENERATOR 7.5 KW	2
GENERATOR 3.0 KW	2

WELDER - ELECTRIC, ROUGHNECK	1
WELDER - GAS	1
MICROWAVE OVEN	2
UNDER ICE VIDEO SYSTEM - INHOUSE NWRI	1
SCUBA TANKS - COMPRESSED AIR	4
REGULATORS - SINGLE HOSE	2
REGULATORS - DOUBLE HOSE	2
AIR COMPRESSOR - BAUER, ELECTRIC - 7 CFM	1

PERSONNEL

D.J. BROOKS	Officer-in-Charge	Mar 1 - Apr 29
S.J. Prinsenberg	Scientist	Mar 25 - Apr 26
E.O. Lewis	Manager, Program Support	Mar 8 - Mar 22
S.D. Baird	Ocean Instrumentation	Mar 18 - Apr 30
D. Robertson	Instrumentation Technologist	Mar 4 - Apr 30
D. Moore	Operations Technologist	Feb 22 - Apr 30
R. Gammon	Technical Assistant	Feb 22 - Apr 5
R. Gay	Technical Assistant	Feb 22 - Apr 12
S. Galbraith	Technical Assistant	Apr 5 - May 6
J. Anning	Biologist	Mar 4 - May 6
G. Cota	Biologist	Mar 22 - May 6
D. Sosnoski	Data Processing	Mar 18 - Apr 30
Lyn Ho	Pilot (Quasar Aviation)	Mar 4 - May 6
J. Bowker	Diver (Can Dive)	Mar 23 - Mar 29
R. Conover	Biologist (BIO)	Mar 25 - Apr 1
		Apr 15 - Apr 25
Erica Head	Biologist (BIO)	Mar 22 - Apr 1
		Apr 15 - Apr 25
L. Harris	Biologist-Technician (BIO)	Mar 22 - Apr 1
		Apr 15 - Apr 25
E. Smith	Technical Operations	Mar 29 - Apr 1
M. Foster	Photographer (DFO)	Apr 12 - Apr 19

Visitor:

J. Roff	University of Guelph

CHRONOLOGY OF EVENTS

February 12 - Equipment readied for shipment north and forwarded to Montreal.

February 22 - Advance party to Resolute.

March 4 - Commenced readying survey equipment.
- Helicopter arrived.

March 7 - Readied equipment for Ice Stations 42 and 46.

March 10 - Set up Station 46.

March 17 - Set up Station 42.

March 22 - Commenced mooring line installation utilizing DART (Station 46).
- Commenced working with G-UMPS.

March 24 - Short-term mooring completed Station 46.
- Commenced biology program.

March 26 - Mooring line installations completed utilizing DART at Station 42.

March 28 - Short-term mooring installation completed at Station 42.

March 29 - Surface referenced moorings placed at Stations 41, 42, 44, 46 and 47.

April 1 - Weather Station installations at Stations 42 and 46 completed.

April 2	- Commenced CTD station sampling.
April 6	- Commenced preparations for yearlong moorings.
April 22	- Yearlong mooring Station 42B installed.
April 23	- Mooring 46A retrieved.
April 24	- Yearlong mooring 46B installed.
April 25	- Mooring 42A retrieved. - Commenced clearing up ice Stations 42 and 46.
April 27	- Retrieved surface reference CM^s 41, 42, 44, 46 and 47. - Completed cleanup at Station 46.
April 28	- Completed cleanup at Station 46.
April 28	- Completed cleanup at Station 42. - Parcoll for biology remained.
April 29	- Equipment forwarded south. - Personnel commenced retiring from field. - Biology survey continued.
May 4	- Completed biology program. - Closed down Station 42.
May 6	- All personnel returned to Burlington.

SURVEY OPERATIONS

In previous years emphasis had been placed on collecting CTD data with a gradual shift towards expanding into the biological field. At the same time current meter data were collected on a short-term (30 days) near surface basis, with this activity expanding to collecting long-term (yearlong) data throughout the water column.

During 1983 emphasis was placed on an extensive biological program, along with expanding the physical aspects of the program and concentrating in one area of Barrow Strait (the 40^{s} line). This entailed the collecting of continuous short-term data (CTD and currents) which utilized the G-UMPS system, along with short- and long-term current meter installations.

Unfortunately, this year adverse weather conditions created a situation whereby priorities had to be placed on much of the work. Some mooring stations along with sampling stations, both physical and biological, had to be omitted in order to complete more important aspects of the program. The weather conditions this year created a 30% loss in flying time where it is normally anticipated no more than 15% will be lost due to weather. Nineteen eighty-three also proved to be a very cold year, which was indicated by the ice thickness encountered early in March. Approximately 100% increase in ice thickness was measured, compared with the last two years, thus creating additional slow-downs in preparing ice holes for moorings or setting up ice stations for sampling. Ice thickness averaged two (2) metres during the month of April across Barrow Strait.

March was originally scheduled for setting up the two major sampling stations numbers 42 and 46, along with the placement of current meter moorings along the 40^{s} line across Barrow Strait. April was then to be the main sampling period which would extend into

May, permitting biological data to be collected in a time frame more conducive to their requirements.

With the program changes created by the weather and ice conditions, mooring work did extend into April, but this was mainly the installation of the yearlong moorings. The elimination of some moorings permitted the commencement of the sampling program by April 2.

By the end of April all short-term moorings were retrieved, equipment packed, and with the exception of some biology sampling to be completed during the first week of May the survey was successfully concluded. By the end of the first week of May the biologists also completed their survey requirements and all staff returned to Burlington.

MOORINGS

In previous years the placing of bottom-referenced moorings necessitated the drilling of three ice holes and joining these holes with lines to enable the moorings to be placed in a known direction. Various methods had been used to join these holes with only marginal or no success. The use of divers was the most reliable method but this required the drilling of extra ice holes for safety reasons and became a very costly and time consuming way to achieve the desired results.

This year an opportunity presented itself whereby a tethered mini-submarine (DART) was used to join the ice holes. As DART could "see", it was hoped this unit could home in on the light from an ice hole 80 metres away. The sensitivity of the television system in DART was below that necessary to "see" the desired distance, but it was discovered that by scraping off a small square of snow from the ice every three to four metres a line of light was permitted to shine through the ice, thus creating a dotted line of light the DART operator could use to steer by.

This method of steering to locate the next ice hole was most successful and made the joining of ice holes quite simple for all remaining operations.

The only other major problem with moorings this year was due to ice thickness. Normally ice holes were drilled using 9" dia. ice augers and experienced staff to ring a hole to the right diameter. This method is not too difficult in three to four feet of ice, but in ice thickness of five feet plus, the work is very time-consuming and very difficult. Fortunately there was an ice melting unit made available by IOS and, after manufacturing a melting ring of the required diameter, was used very successfully for most of the later moorings. The yearlong moorings retrieved a year ago had only 300 lbs buoyancy and data collected indicated the mooring was rather "soft." This prompted the increase of buoyancy to 500 lbs, which of course necessitated an increase in anchor weight. Other than the need to increase the mooring hole size there were very few other requirements to accommodate this change. Handling equipment this year was much the same as for last year, with the exception of a gypsy winch being utilized on the tripod.

CTD AND G-UMPS

The CTD system used this year was the same as previous years with little or no modifications, and again worked quite successfully without major incident. Eighty-five stations were sampled during the survey and their locations are shown in Figure 2.

The G-UMPS system which has been going through various transition periods worked quite well at times; however, minor problems did occur, which was to be expected with this type of equipment. Most problems were cleared up as they developed, and a fairly high percentage of data were collected. Two G-UMPS systems were used; one at CTD station #42 and one at station #46 (Fig. 2).

BIOLOGICAL SAMPLING

As noted previously, biological sampling was a major undertaking this year, and as such two major stations (42 and 46) were set up using Parcolls and outfitting each with sampling winches, generators and other various equipment to carry out this task. However, it became more desirable after initial investigation to concentrate the greatest efforts at only one station which was closest to Resolute (number 42). The tasks carried out by the various biologists involved with sampling during the survey period are noted later, along with some preliminary results.

The 1983 biological field program concentrated on four aspects of the ice biota. A temporal survey of zooplankton was also conducted during a spring tide (14 to 15 April, 1983). The latter temporal survey generated 58 zooplankton samples, 158 nutrient samples and 45 salinity samples; the salinity samples were analyzed in Resolute and the computed values are on file (HP 9825). The Atlas echo sounder charts proved to be rather monotonous, with little, if any, change in the depths of the two signal layers.

Work on the ice biota included temporal development of the community at three snow depths (~3 to 25 cm), primary production of the ice algae, size and chemical fractionation of the community and two visitations to the Dundas Island polynya system. Seven sets of samples were collected at station 42 to follow the development of the epontic community; routine samples at the location with the lightest snow cover (typically 3 to 5 cm) included chlorophyll (CHL), particulate organic carbon/nitrogen (POC/N), water for direct microscopic counts, adenosine triphosphate (ATP), bacteria (INT), and nutrients (NUTS). At medium (8 to 14 cm) and heavy (18 to 25 cm) snow depths, the last three types of samples above were not taken. All CHL samples have been analyzed and the data are on file. Furthermore, two snow depth surveys were conducted to assess the communities under 0 to 30 cm of snow in early June.

STATION #42

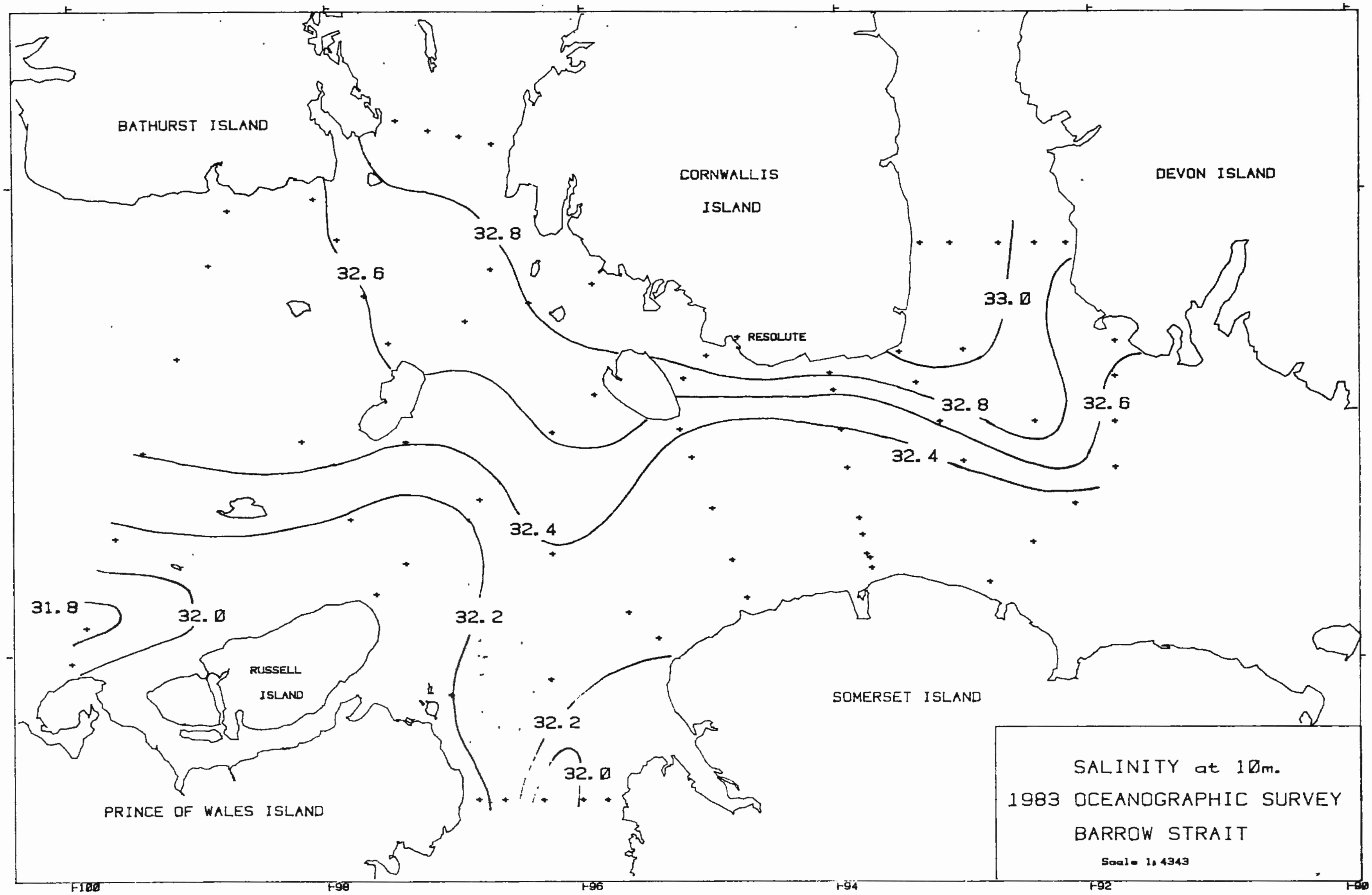


Figure 3: Hourly Current Vectors Measured at Indicated Depths

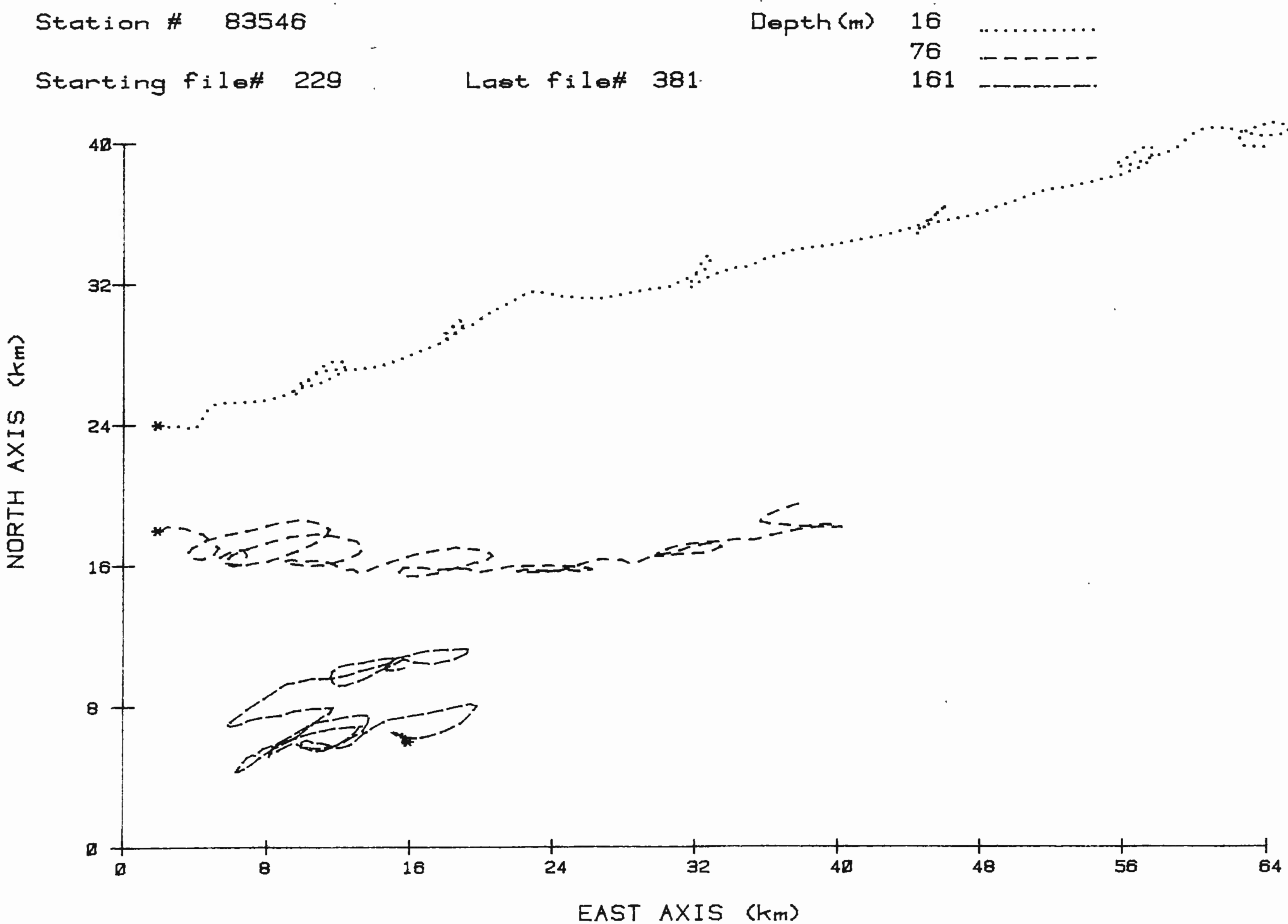


Figure 4: Progressive Vector Diagrams from Station #46
Covering a 152-Hour Period

PRELIMINARY RESEARCH RESULTS AND RECOMMENDATIONS

1. Bayfield Laboratory Physical Oceanographic Studies

As stated before, the extreme cold weather of 1982/83 winter produced a two-metre thick ice cover, one metre more than found on previous surveys. The surface layer salinity content was higher as a result of increased ice production but did not reveal any different relative distribution patterns (Fig. 3). As in previous years, the surface layer moves eastwards again with stronger mean currents in the southern parts of Barrow Strait. On both sides of Bathurst Island, well mixed surface water comes down from Sverdrup Basin and joins or moves under the surface layer coming into the area from Viscount Melville Sound and Peel Sound. The progressive vector diagram (Fig. 4) of a G-UMPS data run of station #42 shows the eastward surface flow at three of the eighteen observed depths. At deeper depths the flow decreases and even reverses (as seen at station #46) and indicates the intrusion of Baffin Bay bottom water into the area.

2. Bayfield Laboratory Biological Studies

An intercalibration was conducted on our (CCIW) fluorometer and Bedford Institute's (BIO) instrument. In addition, we made several comparisons with CHL samples extracted in absolute methanol or 90% acetone; CHL values appeared to be very similar with both solvents; however, as expected, phaeophytin levels were lower in methanol.

Primary production experiments (^{14}C) were run on six dates. Small subsamples of ice cores were used in all experiments, except two cases where the material was melted and diluted to facilitate size fractionations of CHL, ATP and ^{14}C-POC. Size fractions employed were

>202 μm, < 202 μm to 76 μm, <76 μm to 20 μm, < 20 μm to GF/C (~0.5 μm) and the total size range (>0.5 μm). Total CHL concentration was around 220 μg/ℓ and about 75% of the CHL was >20 μm; large pennate diatoms and/or chains of pennate diatoms were apparent dominants in all samples examined microscopically.

Additional size and chemical fractionations of ice biota were done on two dates in collaboration with Erica Head and Les Harris of BIO. CHL, ATP, POC/N, particulate proteins, carbohydrates (soluble, insoluble, and total) and lipids were collected in four small size fractions (i.e., >20 μm, < 20 μm to 10 μm, < 10 μm to 1 μm and < 1 μm to GF/F (~0.3 μm). Again we found about 75% of the CHL was >20 μm.

On two separate occasions we sampled the ice water (0 to 0.5 m) downstream of the Dundas Island polynya system (Wellington Channel); samples were taken for CHL, NUTS and microscope counts. In mid-April (11 to 13 April, 1983) we found CHL levels of around 0.5 μg/ℓ just downstream from the open water. These levels decreased rapidly over a distance of 3 to 5 km to about 0.01 μg/ℓ which was typical of the values we recorded in Barrow Strait around this time under solid ice cover (~2 m thick). In late April (30 April, 1983), we revisited the polynya system, but there was considerably more open water. There was not an obvious downstream gradient, although CHL levels were generally several times higher than comparable samples from Barrow Strait.

Numerous and varied attempts were made to collect sufficient numbers of amphipods for experimental work. The two trap systems (i.e., baited minnow trap and light trap) were set immediately under the ice, at an interface (~35 to 40 m) between water layers and just above the bottom. Only one amphipod was caught with the traps. Net tows in the water column with hoop nets were marginally successful (maximum one to three animals/tow) on a few occasions. Tows with the new under-ice net were most successful (maximum three to four animals/tow) before heavy snow drifts developed around the Parcoll. Nevertheless, multiple day collections would have been necessary to conduct experiments with any replication.

The underwater video camera system proved to be a highly useful instrument for several purposes. We were able to film the operation(s) of several pieces of equipment. Film footage was assembled on the performance of the ice auger, ice corer, ice scraper and the new under-ice net. We also filmed the placement of the racks used for in situ incubations of the primary production experiments (nothing compares with the excitement of a photosynthesis tournament). In addition, we were able to view epontic amphipods crawling (browsing?) along the under surface of the ice. We saw from zero to five animals/field (~1 square metre) in late April, and no animals were observed over many square metres on our second trip in early June.

3. BIO Biological Studies

Marine Ecology Laboratory scientists interacted with scientists from the Bayfield Laboratory OSS Central Region during two periods, March 18 to April 4 and April 15 to May 8, 1983 in Barrow Strait off Resolute Bay, NWT. Field operations were carried out only at Station 42 during the 1983 season. It was our intention to extend the research activities on the physiology and biochemistry of Arctic herbivores begun in 1982 further into the productive season than was previously possible. The experiments were carried out in cooperation with Bayfield scientists, Jeff Anning and Glenn Cota.

Measurements of particulate matter in the water column in the third week of March suggested that the start of spring production was still relatively remote. Chlorophyll concentrations were barely detectable, although there were occasional relatively high concentrations of particulate carbohydrate recorded. As observed in 1982, the reproductive season for Calanus hyperboreus was well underway, but unlike the previous year's observations, the eggs and nauplii were not especially prevalent in the near surface waters. Detailed observations of the water structure in the vicinity of Station 42, supplied by Simon Prinsenberg and based on G-UMP's profiles, emphasized the presence of a strong vertical discontinuity, a fresher, colder near-ice layer overlying deeper, more saline Arctic Ocean waters. The surface layers were shown to be dominated by smaller copepods such as Pseudocalanus sp. and Oithona similis, while the larger herbivores including C. hyperboreus, C. glacialis and Metridia longa, occurred in the more saline waters below 30 to 40 m.

At the beginning of our second visit to Station 42 in mid-April 1983 there was still virtually no evidence for plant production in the water column, although the epontic algal bloom had begun. However, between April 17 when the observations were initiated and May 3 when sampling ceased, there was a remarkable proliferation of plants and animals. In the bottom centimeter or so of ice the algal concentration reached the equivalent of 14 mg Chl a m^{-2}, more than the equivalent amount of chlorophyll in the entire pelagic water column. Interestingly the epontic algae were dominated by relatively large forms and chains, more than 70% of their chlorophyll being retained by 20 μm mesh bolting cloth. Picoplankton (<1 μm) contributed 1% or less of the chlorphyll. Primary production in the ice at the beginning of May was 350 times greater than that for the remaining water column. Nonetheless, substantial increase in particulate matter and chlorophyll appeared in the water beneath the ice even below the pycnocline, during the last weeks of April. While some of the organic matter may have broken away from the epontic layer in the proximity of Station 42, the possibility that some was generated in polynyas to the north can not be eliminated. The under-ice layers also supported a diverse community of animals including harpaticoid copepods, protozoans, nematodes and larval polychaete annelids and bivalve molluscs.

Although the principal zooplankton species in the area were all in or near reproductive condition, there was little evidence of feeding either in the water column or in the under-ice layer. When ice algal material was melted and suspended for feeding, measurable rates were observed but they were relatively low compared with those observed by Huntley (1981) during the spring bloom in the Labrador Sea. Digestive enzyme levels in Calanus hyperboreus were higher than those found in diapausing animals in Emerald Basin off Nova Scotia, but considerably lower than concentrations found in the same animals after several weeks of feeding on laboratory phytoplankton cultures. Respiration and excretion rates were consistently lower than measurements for the same species (C. hyperboreus, C. glacialis, M. longa) found during the July to August 1980 cruise of CSS Hudson in the eastern Arctic. None of the developmental stages of C. hyperboreus taken during April molted during the investigation, giving further proof that growth had not been initiated prior to the beginning of May. Fecundity in the same species over the same period was moderately low and apparently decreasing. Many females were nearly spent and most of the others taken back to the laboratory produced only a single batch of eggs (up to ≈300 per individual) even though they appeared to have some energy reserves remaining. Several females showed no signs of maturation.

It seems imperative to continue the physiological investigation of the plant-animal interrelations in the Barrow Strait region at least into June, to clearly establish production patterns and rates in the area.

EQUIPMENT EVALUATION AND RECOMMENDATIONS

Helicopters

The use of 206B Bell helicopters continues, but this year more hours were required moving equipment and personnel by Twin Otter due to the nature of the program. Excellent cooperation was received from the Quasar staff and pilots but one aircraft and pilot was not adequate, and the use of two aircraft was the normal order of the day. It was appreciated that the assigned helicopter and pilot (Lyn Ho) remained with the survey in its entirety, which saved much time in retraining midway through the project.

DART

The opportunity to utilize DART to string underwater lines was very helpful and negated the requirement for divers. DART seemed to be able to operate in the area currents, which was a major problem with past systems. Technique seemed to be the major stumbling block, which was soon overcome with personnel becoming more efficient with each operation.

Hole Melting Equipment

The equipment supplied by IOS personnel to drill adequate holes to place moorings was most useful, and even with the bulkiness and weight of this equipment it ultimately saved much time and effort. Upgrading and modification of this equipment would make the operation much easier but the principle is excellent and requires no real change. Modular units would enhance the overall operation by reducing the bulk.

G-UMPS

Although G-UMPS continues to improve, the system also becomes heavier and bulkier, creating a situation whereby larger on-ice facilities are required. Power fluctuations or power supply problems caused most of the shutdowns as there is no backup system to overcome these situations. However, data acquisition worked quite well, causing little or no problems in this area after the initial bugs were corrected. The main problem encountered was with the micro processor, which would shut off and start up again during a cast, due to major line voltage fluctuations. A regulator for the micro processor (or battery) could overcome this problem.

REFERENCE

Huntley, M. 1981. Nonselective non-saturated feeding by three calanid copepod species in the Labrador Sea. Limnol. Oceanogr. 26:831-842.

APPENDIX I

CTD Station Listings

LISTING OF STATIONS' INFORMATION AND LOCATION

STATION #			GMT Day	Hr	Min	LATITUDE		LONGITUDE		DEPTH(m) Bottom	Ice	STD
83025	1	41	105	15	55	74	13.1	96	14.0	230.0	2.0	225.0
83019	1	42	105	16	36	73	57.0	96	15.0	214.0	2.1	210.0
83018	1	43	105	19	26	73	55.0	97	2.0	329.0	2.0	325.0
83081	1	44	105	20	22	73	41.6	96	49.0	246.0	2.1	241.0
83082	1	45	105	20	55	73	41.6	96	37.0	210.0	2.1	206.1
83085	1	46	105	22	37	73	41.6	95	48.2	172.0	2.0	164.1
83084	1	47	105	23	9	73	41.6	96	0.0	250.0	1.9	246.1
83083	1	48	105	23	55	73	41.6	96	18.5	240.0	2.2	235.0
83008	1	49	107	17	38	74	27.5	98	12.0	130.0	2.2	125.1
83013	1	50	107	18	27	74	40.0	97	31.0	180.0	1.8	175.2
83022	1	51	107	19	5	74	42.8	96	55.0	210.0	1.9	205.1
83021	1	52	107	19	45	74	45.2	96	25.0	120.0	2.0	115.1
83020	1	53	107	20	55	74	47.6	95	55.0	126.0	1.7	121.1
83042	2	54	107	21	50	74	34.0	94	1.1	129.0	1.7	128.1
83095	1	55	111	15	4	74	52.8	92	11.0	66.0	2.2	51.0
83094	1	56	111	15	40	74	52.8	92	25.8	133.0	2.2	128.1
83093	1	57	111	16	10	74	52.8	92	43.0	126.0	1.6	126.1
83092	1	58	111	16	44	74	52.8	93	6.0	152.0	1.5	147.1
83091	1	59	111	17	17	74	52.8	93	20.0	173.0	1.8	169.1
83074	1	60	111	20	3	75	5.5	96	42.2	191.0	2.0	187.0
83073	1	61	111	20	36	75	6.5	96	57.4	277.0	1.9	253.0
83072	1	62	111	21	8	75	7.2	97	12.0	200.0	1.7	198.1
83071	1	63	111	21	40	75	8.5	97	27.3	114.0	2.5	113.2
83041	2	64	112	14	18	74	36.2	94	2.8	92.0	1.8	87.0
83042	3	65	112	14	50	74	34.0	94	1.1	134.0	1.8	129.2
83043	2	66	112	15	23	74	29.0	93	57.5	146.0	2.0	140.1
83044	2	67	112	15	54	74	24.1	93	54.7	156.0	2.0	151.1
83045	2	68	112	16	34	74	17.7	93	49.0	167.0	2.0	158.0
83049	2	69	112	17	7	74	15.6	93	47.5	177.0	2.1	172.1
83046	4	70	112	17	39	74	13.1	93	45.5	160.0	1.6	155.1
83047	2	71	112	19	28	74	11.3	93	43.0	80.0	1.8	76.2
83048	2	72	112	19	58	74	12.6	93	44.0	153.0	2.0	148.1
83023	1	73	115	14	43	74	33.4	95	54.0	154.0	2.0	148.1
83024	1	74	115	15	19	74	28.6	96	14.0	179.0	2.0	164.2
83015	1	75	115	15	57	74	20.0	96	48.5	156.0	2.2	148.1
83017	1	76	115	19	3	74	7.9	97	37.0	164.0	2.0	156.2
83016	1	77	115	19	43	74	11.8	97	23.0	220.0	2.0	215.2
83009	1	78	115	20	24	74	17.5	97	49.0	187.0	1.5	180.1
83014	1	79	115	21	13	74	27.4	97	23.0	120.0	2.0	115.4
83051	1	80	116	13	32	74	38.9	93	30.0	84.0	1.7	80.1

LISTING OF STATIONS' INFORMATION AND LOCATION

STATION #			GMT Day	Hr	Min	LATITUDE		LONGITUDE		DEPTH(m) Bottom	Ice	STD
83075	1	1	80	20	35	74	49.5	96	43.0	223.0	1.8	220.0
83041	1	2	92	15	0	74	36.2	94	2.8	93.0	1.8	91.0
83042	1	3	92	16	16	74	34.0	94	1.1	132.0	1.8	128.1
83043	1	4	92	17	14	74	29.0	93	57.5	146.0	1.8	145.8
83046	1	5	92	18	17	74	13.1	93	45.5	162.0	1.6	150.7
83031	1	6	92	21	15	74	38.4	95	1.1	119.0	1.5	118.0
83032	1	7	92	22	0	74	35.5	95	11.8	111.0	1.7	107.0
83047	1	8	94	14	34	74	11.3	93	43.0	81.0	1.7	79.1
83048	1	9	94	15	35	74	12.6	93	44.0	155.0	2.0	153.1
83046	2	10	94	17	20	74	13.1	93	45.5	162.0	1.6	158.2
83046	3	11	94	18	23	74	13.1	93	45.5	162.0	1.6	161.1
83049	1	12	94	18	41	74	15.6	93	47.5	178.0	1.8	177.1
83045	1	13	94	19	21	74	17.7	93	49.0	168.0	1.9	166.0
83044	1	14	94	20	13	74	24.1	93	54.7	158.0	2.0	156.1
83031	2	15	96	18	7	74	38.4	95	1.1	106.0	1.8	101.1
83032	2	16	96	18	54	74	35.5	95	11.8	110.0	1.8	106.1
83033	1	17	96	19	33	74	29.0	95	13.6	130.0	1.7	128.2
83034	1	18	96	20	15	74	25.4	95	8.0	146.0	1.8	140.1
83037	1	19	96	22	10	74	7.5	94	42.0	113.0	1.8	108.0
83036	1	20	96	22	43	74	12.3	94	49.0	168.0	2.0	163.1
83035	1	21	96	23	20	74	18.9	94	58.4	174.0	1.9	169.0
83067	1	22	98	14	42	74	9.5	92	47.5	140.0	1.8	135.0
83066	1	23	98	15	19	74	14.6	92	27.0	173.0	1.9	168.1
83065	1	24	98	15	56	74	19.6	92	7.0	184.0	2.0	178.0
83064	1	25	98	16	34	74	24.2	91	48.0	309.0	2.1	296.2
83061	1	26	98	18	22	74	40.3	91	48.0	137.0	2.0	132.1
83062	1	27	98	18	58	74	35.8	91	48.0	136.0	1.9	132.2
83063	1	28	98	19	35	74	30.0	91	48.0	172.0	2.0	170.0
83007	1	29	104	15	38	73	59.0	100	0.0	76.0	2.0	72.1
83006	1	30	104	16	10	74	3.6	99	53.0	123.0	2.1	118.0
83005	1	31	104	17	34	74	15.0	99	39.0	110.0	2.1	105.0
83004	1	32	104	18	12	74	26.0	99	26.0	185.0	1.9	185.0
83003	1	33	104	18	53	74	38.0	99	10.0	212.0	2.2	207.0
83002	1	34	104	19	34	74	50.0	98	55.0	160.0	2.0	155.1
83001	1	35	104	20	17	74	57.0	98	46.0	28.0	2.0	22.6
83010	1	36	104	21	12	74	58.5	98	6.0	104.0	1.9	100.0
83011	1	37	104	21	40	74	53.3	97	55.0	66.0	1.9	60.1
83012	1	38	104	22	8	74	46.1	97	42.5	132.0	1.9	127.6
83027	1	39	105	14	40	74	2.3	95	23.8	196.0	2.0	191.0
83026	1	40	105	15	17	74	5.6	95	38.0	172.0	2.0	167.1

LISTING OF STATIONS' INFORMATION AND LOCATION

STATION #			GMT Day	Hr	Min	LATITUDE		LONGITUDE		DEPTH(m) Bottom	Ice	STD
83052	1	81	116	14	0	74	35.0	93	22.0	173.0	1.8	169.1
83053	1	82	119	0	6	74	30.0	93	11.0	152.0	2.0	147.0
83054	1	83	119	0	40	74	25.0	93	0.0	162.0	2.0	158.2
83055	1	84	119	1	14	74	30.0	92	26.0	163.0	2.0	157.1
83057	1	85	119	1	54	74	39.2	93	0.0	132.0	1.5	130.0

APPENDIX II

Mooring Station Summary

CURRENT METER AND TIDE GAUGE MOORING SUMMARY

Stn #	Location	Dates	Water Depth	CM Depth
83C41	74°36.2' 94°02.8'	March 29 - April 27	93 M	10 M
83C42A	74°34.0' 94°01.1'	March 29 - April 28	129 M	10,40,60, 80,120 M*
83C44	74°24.1' 93°54.1'	March 31 - April 28	158 M	10 M*
83C46A	74°13.1' 93°45.5'	March 29 - April 27	162 M	10,40,60, 80,152 M*
83C47	74°11.3' 93°43.0'	March 29 - April 27	81 M	10 M
		YEARLONG MOORING INSTALLATIONS		
83C42B	74°34'04" 94°01'14"	April 22, 1983	129 M	40,80,110 M
83C46B	74°13'05" 93°45'35"	April 24, 1973	162 M	40,80,145 M

* Moorings include Tide Gauge

APPENDIX III

Current Meter Mooring Launching Logs

LAUNCHING	REGION BARROW STR.	MOORING No. 83-C-46-A	PLATFORM ______	DATE 24-3-83

POSITION(Instrument)

N 74°13.1 W 93°45.5

SOUNDING 162 m

SYSTEM COORDINATES

MOORING TYPE		ATTITUDE	
Current Meter	✓	Bottom Referenced	✓
Tide Gauge	✓	Surface Referenced	✓

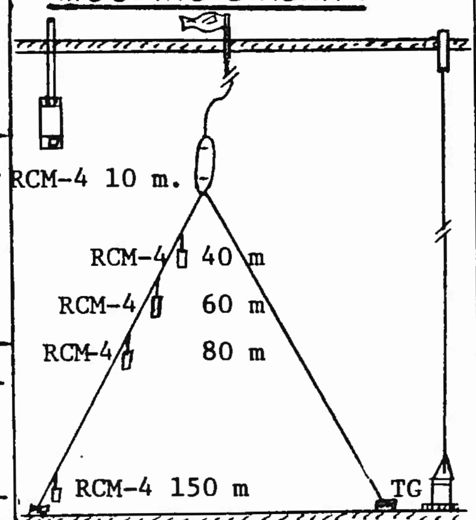
Depth meters	Instr. Type	Instr. No.	Time Subm.	Time in Position	Date Str. Recording	Monitor Times	Readings						Instr Hdg Mag or True
10	AAND	3498	29 1704Z	29 1705Z									347 T
40	AAND	6185	24 2035Z	2225Z									262 T
60	AAND	1736	24 2030Z	2225Z									262 T
80	AAND	4181	24 2028Z	2225Z									262 T
150	AAND	4960	24 2024Z	2225Z									262 T
162	TG	339	29 1640Z	29 1641Z	22 01:15 20	0130	531	543	10	714			
						0145	531	566	10	711			

REMARKS RELEASE DEVICE USED IN LOWERING WEST ANCHOR UNSERVICEABLE AND LEFT ATTACHED TO MOORING. RED LINE (0 of METER) FACING WESTERLY.

BOTTOM REF. CM SUN SHOT 1626Z ∠ =-68° April 7

SURF. REF. CM SUN SHOT 1632Z ∠= +15° April 7

MOORING DIAGRAM



OBSERVATIONS

Wind Dir. ______ °
Wind Spd. ______ kts
Air Temp. ______ °
Water Temp. ______ °

Waves: height ______ m
period ______ sec
Ice: thickness ______ cm
snow ______ cm

Surface Buoy No. ______
Subsurface Buoy:
Depth ______ m
Direction ______ °
Distance ______ m

LAUNCHING COMPLETED 1710 Hrs(GMT) 29 (Day) March (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS SENT ON ______ Day ______ Month ______ Year

LAUNCHING	REGION BARROW STR. MOORING No. 83-C-47 PLATFORM ICE DATE 29/3/83

POSITION (Instrument)	SYSTEM COORDINATES	MOORING TYPE	ATTITUDE
N 74°11.3 W 93°43.0		Current Meter ✓	Bottom Referenced
SOUNDING 81 m		Tide Gauge	Surface Referenced ✓

Depth meters	Instr. Type	Instr. No.	Time Subm.	Time in Position	Date Str. Recording	Monitor Times	Readings						Instr Hdg Mag or True
10	RCM 4	5806	29 1808Z	29 1809Z									350 T

REMARKS

SUN SHOT APRIL 7 1602Z ∠ = +16°

OBSERVATIONS

Wind Dir. ______ °
Wind Spd. ______ kts
Air Temp. ______ °
Water Temp. ______ °

Waves: height ______ m
period ______ sec
Ice: thickness ______ cm
snow ______ cm

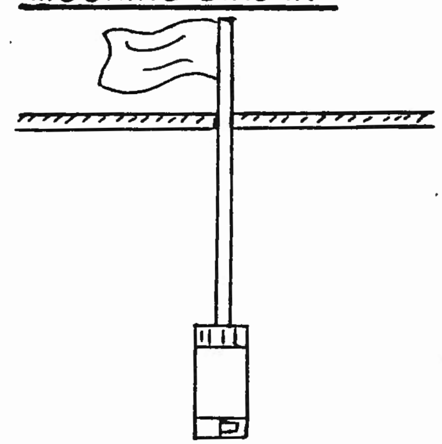
Surface Buoy No. ______
Subsurface Buoy:
Depth ______ m
Direction ______ °
Distance ______ m

LAUNCHING COMPLETED 1809 Hrs (GMT) 29 (Day) March (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS SENT ON ______ Day ______ Month ______ Year

MOORING DIAGRAM



RCM-4 10 m

LAUNCHING	REGION Barrow Str.	MOORING No. 83 C 42A	PLATFORM ICE	DATE 28-3-83

POSITION(Instrument)	SYSTEM COORDINATES	MOORING TYPE	ATTITUDE
N74°34.0 W 94°01.1		Current Meter ✓	Bottom Referenced ✓
SOUNDING 129 m		Tide Gauge ✓	Surface Referenced ✓

Depth meters	Instr. Type	Instr. No.	Time Subm.	Time in Position	Date Str. Recording	Monitor Times	Readings					Instr Hdg Mag or True
10	RCM-4	1735	29 1930Z	29 1932Z								353 T
40	RCM-4	6184	28 2000Z	2100Z								243 T
60	RCM-4	5807	28 1957Z	2100Z								243 T
80	RCM-4	5794	28 1952Z	2100Z								243 T
120	RCM-4	3495	28 1948Z	2100Z								243 T
TG	AAND	337	28 2134Z	28 2135Z	20 0115:20	0130 0145Z	529 529	529 556	63 63	752 750		

REMARKS 0 OF INSTRUMENTS FACING A WESTERLY DIRECTION WHEN INSTALLED

SUN SHOT 1730Z April 7 ∠ = 104° BOTTOM REF.

SUN SHOT 1734Z April 7 ∠ = -5° SURF. REF.

OBSERVATIONS

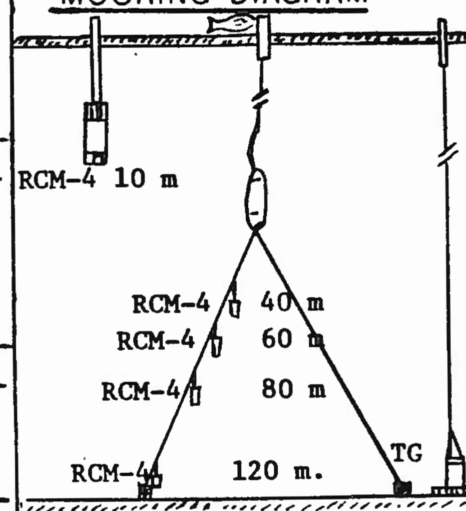
Wind Dir. ____ °	Waves: height ____ m	Surface Buoy No. ____
Wind Spd. ____ kts	period ____ sec	Subsurface Buoy: Depth ____ m
Air Temp. ____ °	Ice: thickness ____ cm	Direction ____ °
Water Temp. ____ °	snow ____ cm	Distance ____ m

LAUNCHING COMPLETED 1932 Hrs(GMT) 29 (Day) March (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS SENT ON ____ Day ____ Month ____ Year

MOORING DIAGRAM



LAUNCHING	REGION BARROW STR.	MOORING No. 83-C-41	PLATFORM ICE	DATE 29/3/83

POSITION (Instrument)	SYSTEM COORDINATES	MOORING TYPE	ATTITUDE
N 74°36.2 W 94°02.8		Current Meter ✓	Bottom Referenced
SOUNDING 93 m		Tide Gauge	Surface Referenced ✓

Depth meters	Instr. Type	Instr. No.	Time Subm.	Time in Position	Date Str. Recording	Monitor Times	Readings	Instr Hdg Mag or True
10	RCM 4	3496	29 2035Z	29 2036Z				336 T

REMARKS

SUN SHOT APRIL & 1740Z ∠ = -18°

OBSERVATIONS

Wind Dir. ______ °
Wind Spd. ______ kts
Air Temp. ______ °
Water Temp. ______ °

Waves: height ______ m
period ______ sec
Ice: thickness ______ cm
snow ______ cm

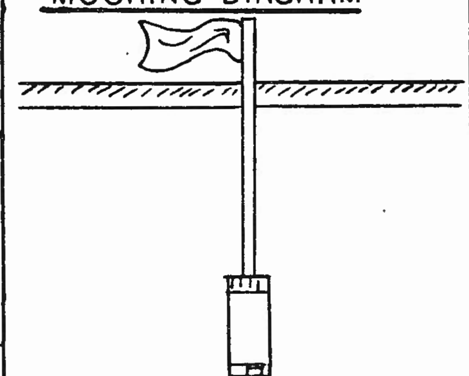
Surface Buoy No. ______
Subsurface Buoy:
Depth ______ m
Direction ______ °
Distance ______ m

LAUNCHING COMPLETED 2036 Hrs(GMT) 29 (Day) March (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS SENT ON ______ Day ______ Month ______ Year

MOORING DIAGRAM



LAUNCHING	REGION BARROW STR. MOORING No. 83-C-44 PLATFORM ICE DATE 29/3/83

POSITION(Instrument)

N 74°24.1 W 93°54.1

SOUNDING 158 m

SYSTEM COORDINATES

MOORING TYPE		ATTITUDE	
Current Meter	✓	Bottom Referenced	✓
Tide Gauge	✓	Surface Referenced	✓

Depth meters	Instr. Type	Instr. No.	Time Subm.	Time in Position	Date Str. Recording	Monitor Times	Readings						Instr Hdg Mag or True
10	RCM 4	5808	29 1849Z	29 1850Z									005 T
	TG 3A	223	31 2039Z	31 2040Z	31 1600Z	1600:19Z	93	608	1003	34			
						1615:14Z	93	608	1023	98			

REMARKS

SUN SHOT APRIL 7 1658Z L = +26°

OBSERVATIONS

Wind Dir. ________ °

Wind Spd. ________ kts

Air Temp. ________ °

Water Temp. ________ °

Waves: height ________ m

period ________ sec

Ice: thickness ________ cm

snow ________ cm

Surface Buoy No. ________

Subsurface Buoy:

Depth ________ m

Direction ________ °

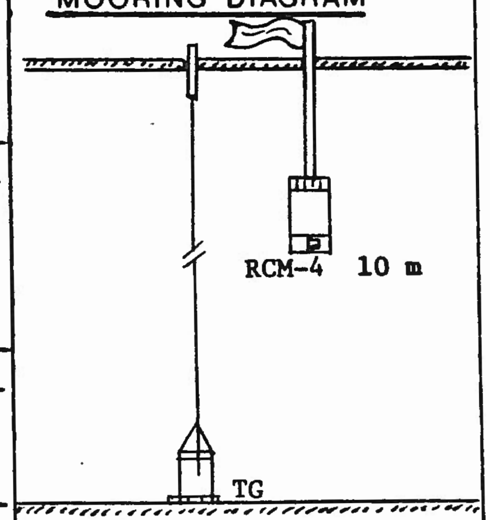
Distance ________ m

LAUNCHING COMPLETED 2040 Hrs(GMT) 31 Day March Month 1983 Year

IN CHARGE D.J. Brooks

NOTICE TO MARINERS SENT ON ________ Day ________ Month ________ Year

MOORING DIAGRAM



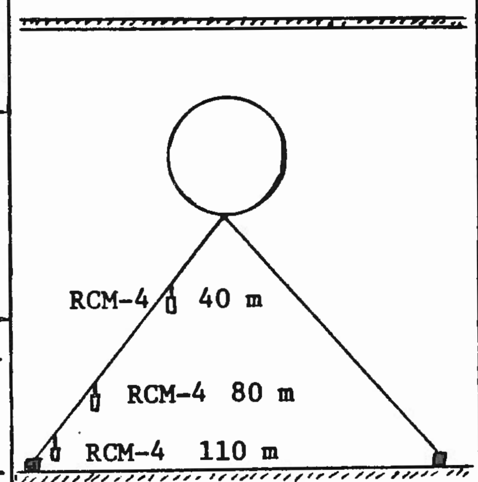
LAUNCHING	REGION BARROW STR. MOORING No. 83-C-42B PLATFORM ICE DATE April 22/83

POSITION (Instrument)	SYSTEM COORDINATES			MOORING TYPE		ATTITUDE	
		KATE	61H6	Current Meter	✓	Bottom Referenced	✓
N 74°34'04" W 94°01'14"	West	21220M	14840M	Tide Gauge		Surface Referenced	
SOUNDING 129 m	East	21292M	14705M				

Depth meters	Instr. Type	Instr. No.	Time Subm.	Time in Position	Date Str. Recording	Monitor Times	Readings						Instr Hdg Mag or True
40	RCM-4	5796	22 1959Z	2238Z									275° T
80	RCM-4	4183	22 1954Z	2238Z									275° T
110	RCM-4	3606	22 1950Z	2238Z									275° T

REMARKS RELEASE DEVICE ON INST. OR WESTERLY LEG OF MOORING RELEASE CODE AEFH INTERROGATE 11.5KHZ REPLY 9 KHZ

MOORING DIAGRAM



OBSERVATIONS

Wind Dir. ________ °

Wind Spd. ________ kts

Air Temp. ________ °

Water Temp. ________ °

Waves: height ________ m

period ________ sec

Ice: thickness ________ cm

snow ________ cm

Surface Buoy No. ________

Subsurface Buoy:

Depth ________ m

Direction ________ °

Distance ________ m

LAUNCHING COMPLETED 2238 Hrs(GMT) 22 (Day) April (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS SENT ON ________ Day ________ Month ________ Year

LAUNCHING	REGION BARROW STR.	MOORING No. 83-C-46B	PLATFORM ICE	DATE 24/4/83

POSITION(Instrument)	SYSTEM COORDINATES		MOORING TYPE	ATTITUDE
N 74°13'05" W 93°45'35"	ORANGE BOX	IVY	Current Meter ✓	Bottom Referenced ✓
SOUNDING 162 m	East 9.947KMS	7.024KMS	Tide Gauge	Surface Referenced
	West 10.112KMS	7.085KMS		

Depth meters	Instr. Type	Instr. No.	Time Subm.	Time in Position	Date Str. Recording	Monitor Times	Readings						Instr Hdg Mag or True
40	RCM-4	6199	24 1845Z	24 2032Z									296° T
80	RCM-4	4964	24 1841Z	24 2032Z									296° T
145	RCM-4	802	24 1838Z	24 2032Z									296° T
REL	INTER OCEAN	115 464											

REMARKS

RELEASE DEVICE CODE ABCG

INTERROGATE FREQ. 11.5 KHZ REPLY 8 KHZ

OBSERVATIONS

Wind Dir. ______ °
Wind Spd. ______ kts
Air Temp. ______ °
Water Temp. ______ °

Waves: height ______ m
period ______ sec
Ice: thickness ______ cm
snow ______ cm

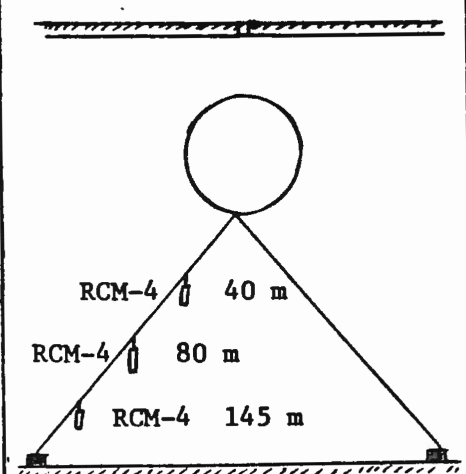
Surface Buoy No. ______
Subsurface Buoy:
Depth ______ m
Direction ______ °
Distance ______ m

LAUNCHING COMPLETED 2032 Hrs(GMT) 24 (Day) 4 (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS SENT ON ______ Day ______ Month ______ Year

MOORING DIAGRAM



APPENDIX IV

Current Meter Mooring Retrieval Logs

RETRIEVAL | REGION BARROW STR. MOORING No. 83-C-47 PLATFORM ICE DATE 27/4/83

POSITION (Instruments)	SYSTEM COORDINATES	MOORING TYPE	ATTITUDE
N 74°11.3 W 93°43.0		Current Meter ✓	Bottom Referenced
SOUNDING 81 m		Tide Gauge	Surface Referenced ✓

Depth Meters	Instr. Type	Instr. No	Time Surface	Instr. No Date Surf.	Time Stop Recording	Readings							Instr. Hdg Mag or True
10	RCM-4	5806	1509Z	5806 / 27/4/83									350° T

OBSERVATIONS
Wind Dir. ____ °
Wind Spd. ____ kts
Air Temp. ____ °
Water Temp. ____ °

Waves:
height ____ m
period ____ sec

Ice:
thick ____ cm
snow ____ cm

SUBSURFACE BUOY
Depth ____ m
Direction ____ °
Distance ____ m

Remarks

RETRIEVAL COMPLETED 1509 Hrs (GMT) 27 April 1983
Day Month Year

IN CHARGE D.J. Brooks

NOTICE TO MARINERS CANCELLED on ____ ____ ____
Day Month Year

RETRIEVAL	REGION Barrow Str.	MOORING No. 83-C-46A	PLATFORM Ice	DATE 23/4/83

POSITION (Instruments)

N 74°13.1 W 93°45.5

SOUNDING 162 m

SYSTEM COORDINATES

MOORING TYPE		ATTITUDE	
Current Meter	✓	Bottom Referenced	✓
Tide Gauge	✓	Surface Referenced	✓

Depth Meters	Instr. Type	Instr. No	Time Surface
10	RCM-4	3498	1537Z
40	RCM-4	6185	23 2217
60	RCM-4	1736	23 2227
80	RCM-4	4181	23 2233
150	RCM-4	4960	23 2253
162	TG	339	1530Z

Instr. No / Date Surf.	Time Stop Recording	Readings						Instr Hdg Mag or True
3498 / 27/4/83								347° T
6185 / 23/4/83								262° T
1736 / 23/4/83								262° T
4181 / 23/4/83								262° T
4960 / 23/4/83								262° T
339 / 27/4/83	28/0200							

OBSERVATIONS

Wind Dir. ____ °

Wind Spd. ____ kts

Air Temp. ____ °

Water Temp. ____

Waves: height ____ m

period ____ sec

Ice: thick ____ cm

snow ____ cm

SUBSURFACE BUOY

Depth ____ m

Direction ____ °

Distance ____ m

Remarks

COMMENCE MOORING RETRIEVAL 2147Z. RELEASE DEVICE SYSTEM LEFT DURING INSTALLATION RETRIEVED

RETRIEVAL COMPLETED 1530 Hrs (GMT) 27 (Day) April (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS CANCELLED on ____ Day ____ Month ____ Year

RETRIEVAL	REGION BARROW STR. MOORING No. 83-C-41 PLATFORM ICE DATE 27/4/83

POSITION (Instruments)

N 74°36.2 W 94°02.8

SOUNDING 93 m

SYSTEM COORDINATES

MOORING TYPE		ATTITUDE	
Current Meter	✓	Bottom Referenced	
Tide Gauge		Surface Referenced	✓

Depth Meters	Instr. Type	Instr. No	Time Surface	Instr. No / Date Surf.	Time Stop Recording	Readings						Instr. Hdg Mag or True
10	RCM-4	3496	1713Z	3496 / 27/4/83								336° T

OBSERVATIONS

Wind Dir. ____ °

Wind Spd. ____ kts

Air Temp. ____ °

Water Temp. ____ °

Waves:

height ____ m

period ____ sec

Ice:

thick ____ cm

snow ____ cm

SUBSURFACE BUOY

Depth ____ m

Direction ____ °

Distance ____ m

Remarks

RETRIEVAL COMPLETED 1713 Hrs (GMT) 27 (Day) April (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS CANCELLED on ____ Day ____ Month ____ Year

RETRIEVAL	REGION BARROW STR.	MOORING No. 83-C-42A	PLATFORM ICE	DATE 25/4/83

POSITION (Instruments)

N 74°34'0" W 94°01.1

SOUNDING 129 m

SYSTEM COORDINATES

MOORING TYPE		ATTITUDE	
Current Meter	✓	Bottom Referenced	✓
Tide Gauge	✓	Surface Referenced	✓

Depth Meters	Instr. Type	Instr. No	Time Surface
10	RCM-4	1735	1406Z
40	RCM-4	6184	1637Z
60	RCM-4	5807	1644Z
80	RCM-4	5794	1650Z
120	RCM-4	3495	1700Z
TG	AaND	337	0007Z

Instr. No / Date Surf.	Time Stop Recording	Readings	Instr. Hdg Mag or True
1735 / 27/4/83			353° T
6184 / 25/4/83			243° T
5807 / 25/4/83			243° T
5794 / 25/4/83			243° T
3495 / 25/4/83			243° T
337 / 28/4/83	28/0215Z		

OBSERVATIONS

Wind Dir. ____ °

Wind Spd. ____ kts

Air Temp. ____ °

Water Temp. ____ °

Waves: height ____ m, period ____ sec

Ice: thick ____ cm, snow ____ cm

SUBSURFACE BUOY

Depth ____ m

Direction ____ °

Distance ____ m

Remarks

COMMENCE MOORING RETRIEVAL 1550Z

NO PROBLEMS ENCOUNTERED

RETRIEVAL COMPLETED 0007 Hrs (GMT) 28 April 83 (Day Month Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS CANCELLED on ____ ____ ____ (Day Month Year)

RETRIEVAL	REGION BARROW STR.	MOORING No. 83-C-44	PLATFORM ICE	DATE 27-4-83

POSITION (Instruments)	SYSTEM COORDINATES	MOORING TYPE	ATTITUDE
N 74°24.1 W 93°54.1		Current Meter ✓	Bottom Referenced ✓
SOUNDING 158 m		Tide Gauge ✓	Surface Referenced ✓

Depth Meters	Instr. Type	Instr. No	Time Surface	Instr. No / Date Surf.	Time Stop Recording	Readings						Instr Hdg Mag or True
10	RCM-4	5808	1603Z	5808 / 27/4/83								005° T
TG	TG	223	2057Z	223 / 28/4/83	2901152							

OBSERVATIONS

Wind Dir. ____ °

Wind Spd. ____ kts

Air Temp. ____ °

Water Temp. ____ °

Waves: height ____ m period ____ sec

Ice: thick ____ cm snow ____ cm

SUBSURFACE BUOY

Depth ____ m

Direction ____ °

Distance ____ m

Remarks

RETRIEVAL COMPLETED 2057Z Hrs (GMT) 28 (Day) April (Month) 1983 (Year)

IN CHARGE D.J. Brooks

NOTICE TO MARINERS CANCELLED on ____ Day ____ Month ____ Year

Closeup of Ice Melting Equipment

Station #46

Hole Melting Equipment