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Marine Environmental Data Service Report for 1987/88

by

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A. Introduction

Overall, this year showed increases in data collections and data received at MEDS compared to last year. The largest increases were recorded in current meter and IGOSS data. The only decrease in data was recorded in that collected by drifting buoys. A new table has been added to this report showing the number of surface wave spectra collected in the region.

The next 2 years will show a major change in MEDS. In April of this year, the centre at which we do our computing announced that it will discontinue support for the operating system which supports the database management system in which we keep our archives. This means that MEDS will be forced to convert most of our data holdings to a new scheme, and to convert or replace most of the software that supports its services. Planning is underway now to manage the process. Because there will be a substantial amount of work to do, some delays and disruption in our services is likely. At present, it is not known how serious these will be.

B. 1987 Data Not Yet Received by MEDS

Table 1 presents the data collections known to have taken place in the NAFO area in 1987 but for which the data have not reached MEDS. There are a total of about 5100 stations. This represents a large increase over last year but less of an increase when considered with years prior to 1986. Much of this information has been garnered from cruise reports, NAFO summary sheets and ROSCOP forms. From past experience, much of the data collected by Canadians will reach MEDS either later this year or into next year.

C. 1987 Data Received and Processed

Table 2 records the data collections from the NAFO area in 1987 and that have reached MEDS. The total numbers of stations is up from last year by about 14%. The received data were collected by 2 countries only. A significant portion of these data have still to be fully processed. These delays are caused by reductions in funds for computing, a late arrival date of the data, and much of it being in non-machine readable form.

Table 3 records the data as received from the GTS. Some of these data received are duplicated in other data submissions. As compared to last year, there is a 25% increase in the total number of stations reported in this fashion. This means of receiving data is becoming increasingly important as evidenced by the steady increase each year for the last 4 years.

D. Drifting Buoy Data Received in 1987

Table 4 records the drifting buoy data collected in the NAFO area this past year. Buoys with 5 digit numbers represent those buoys that reported over the GTS. Buoys with 4 digit numbers were deployed by the Bedford

Institute. In total, there is about 53 buoy months of data. This is about a 17% decrease in the data collected in this fashion. The numbers of buoys deployed was roughly the same as last year. This means that the time over which the buoys lasted decreased somewhat from 1986. As the RNODC for drifting buoys, MEDS is endeavoring to identify and acquire all drifting buoy data collected. This is proceeding by contacting those who deploy the buoys and encouraging them to forward their data to us.

E. Current Meter Moorings in 1987

Table 5 records current meter data collections made in the NAFO area this year. Identifiers with "LC" as the first 2 characters, were moorings placed by the Bedford Institute. Other moorings were made by other parties. Where known, the depth of the meter is given as is the mean currents (in m/sec) over the time of the mooring. In total, there were about 207 meter months of data collected. This compares to about 79 meter months in 1986, and represents better than a 150% increase this year over the last. In calculating buoy months, only the time of the mooring during 1987 is counted.

F. Wave Data Collections

Table 6 represents an addition to the report. It records the instrumented wave data collections made in the NAFO area during 1987. These were made both by United States and Canadian instruments. The Canadian measurements used Waverider or WAVEC buoys built by Datawell, while the US buoys were of a variety of types. The number recorded for each buoy, indicates the number of individual spectra calculated. The columns "1-D" and "2-D" indicate if a non-directional (1-D) or directional (2-D) measurement was made. In total there are about 24,000 spectra. While this information was not presented last year, it is believed that this represents an increase in data collected over 1986.

G. Historical Data Acquisitions

Table 7 records the data collected in the NAFO area and received at MEDS from years prior to 1987. There is a slight increase of about 9% over the previous year. This reflects the increased activity at MEDS in recent years to acquire and process historical data. There is still a substantial amount of data held as a backlog which does not appear in this report. This is largely made up of data received from the US NODC. The data volumes and the fact that some unknown fraction duplicates our present holdings has delayed the processing of these data.

H. Review of Environmental Conditions

This review is based on a variety of sources. The first are calculations of surface and subsurface temperature and salinity anomalies based on the technique of optimum interpolation done at MEDS and using data received during 1987. This has been described in previous years. The second are reports from the Bedford Institute describing the "State of the Ocean". These are issued each month and are based on both US sources and data collected by the Bedford Institute. The third source is maps of sea surface temperature anomalies generated within the US and distributed on a monthly basis.

As reported last year, the climatology used as the basis for all of the above reports are different and so results tend to show differences. MEDS calculations of temperature anomalies are still in a process of review with scientists at the Bedford Institute. The review process between Bedford and MEDS is attempting to resolve some of these differences. At present, the climatalogical basis for the Bedford Institutes analyses seems to show lower values than that used by MEDS.

Subarea 0 and 1:

Conditions were below zero with the most intense cold in region 1F during January. These conditions persisted into February and March, but seemed to be moderating somewhat near the end of this period. Into April and May there did not appear to much of a change in conditions. In June, conditions returned to near normal in region 1 but still were colder than

usual in region 0. The warming trend continued into July, with temperatures appearing to be at near normal values in both of these regions. This persisted into August, but with some variation within the regions. Conditions of September were much the same as for August with a tendency to show slightly warmer values than those seen in the previous month. This persisted into October with values near to above normal although conditions in region 1 appeared to be cooler than this. Finally, the last two months of 1987 showed much the same conditions as the previous month.

Subarea 2 and 3:

At the beginning of 1987, temperature in these regions were near normal although there were some fluctuations within these regions. Some warming was seen in region 2 during February although the Grand Banks continued to be a little colder than normal. Ice coverage was average to above average during this time. In March, the various sources were in disagreement whether conditions were colder or warmer than normal. The Bedford Institute analysis claims colder conditions on the Grand Banks. Ice cover tended to be of greater extent than in previous years. In April, both regions experienced near normal conditions. In May, near normal conditions were once more present in these regions. In June, both of these regions showed normal to below normal conditions although there are some differences between the various sources of information. In July, colder than normal conditions seemed to be present in both the Labrador Sea and Grand Banks regions. A large pool of cold water was evident to the south and east of Newfoundland. In August, conditions seemed to be much the same as in July although the Bedford analysis showed very near to normal values. By September conditions seemed to warm to near normal with some colder portions of the regions present. On the Grand Banks, conditions tended to be above normal. In October, on the Labrador Shelf, conditions were near normal with some uncertainty between sources. The Grand Banks showed near normal values although there appeared to be a cold pool offshore to the south. Cold conditions were experienced in both regions in November and this persisted into December.

Subarea 4:

In January, temperatures stood at to above normal over this area. Ice coverage was greater than normal but less than maximum observed values. In February, temperatures appeared to be normal to above average. This region experienced colder than normal conditions in March although not exceedingly cold. Cold conditions persisted into April for all of this region. In May, conditions in this region were near to below normal and ice conditions were similar. The temperatures on the Scotian Shelf were below normal in June, but near normal in the Gulf of St. Lawerence. Temperatures tended to be below normal during July, but this was once more confined largely to the shelf areas. The Bedford analysis was in some disagreement with the other sources, stating that values were near normal. In August conditions were near to below normal. By September, this was reversed so that conditions were near to above normal, again with some disagreement between sources. In October, conditions had once more reversed so that conditions were once more like those of September. Shelf temperatures in November tended to be cooler than normal with warmer values offshore. These conditions seemed to persist into December.

Subareas 5 and 6:

These regions started the year with temperatures near to slightly above normal. In February, there appeared to be colder conditions in the Georges Bank region, but near normal farther offshore. The cold conditions experienced in region 4 extended into these areas as well. This condition seemed to be getting more pronounced as March progressed and persisted into April. In May, temperatures on Georges Bank were below normal but these conditions seemed only to extend to the edge of the shelf. In June, temperatures tended to be near to below normal in both of these regions. The confinement of this condition to the shelf was not evident as in June. July showed near normal to slightly below depending on which source was used. The Bedford analysis indicated conditions at normal values while others put it slightly colder than normal in August. September values were near normal to above in the Gulf of Maine region but further south appeared to tend towards colder values. Into October and through to December, conditions appeared to be below normal in temperature with warmer, near normal temperatures off shore.

Table 1: Data collected in the NAFO area in 1987 but not yet received at MEDS. Total = 5153 stations

Ship Name	Cruise Period	NAFO Subarea	Standard Section	Number	Reference
		Canada			
Baffin	23 Feb - 13 Mar	3LMNO		50	C87251I01
A. Needler	9-19 Mar	5Ze		24	C87126Y01
Baffin	14-31 Mar	3LNO		93	C87124Y15
Dawson	19 Mar - 25 May	4X		81	C87145Y01
L. Hammond	23 Mar - 3 Apr	4X,5YZe		28	C87336I05
A. Needler	23 Mar - 1 Apr	4VsW		92	C87246I05
Dawson	8-15 Apr	4X,5Ze		50	C87124Y18
E.E. Prince	15-23 Apr	4X		43	C87336I04
Dawson	29 Apr - 15 Mar	3LNO		77	C87246I11
J.L. Hart	19 May - 5 Jun	4X,5ZeZw		29	C87246I07
Baffin	20-29 May	4T		???	C87149Y01
Dawson	27 May - 6 Jun	4X,5Ze		51	C87246I01
L. Hammond	27 May - 13 Jun	4RST		96	C87246I02
Hudson	14 Jun - 7 Jul	4WVs,6EF		182	C88019I04
E.E. Prince	13-23 Jul	4X		61	ROSCOP
L. Hammond	13-31 Jul	5Ze		???	C87246I08
Dawson	20 Jul - 8 Aug	2J		30	C87246I10
E.E. Prince	27-31 Jul	4W		5	C87245I01
J.L. Hart	27 Jul - 14 Aug	4WX		20	C87335I01
L. Hammond	3-28 Aug	3KLM		305	C87246I03
Hudson	3 Aug -23 Sep	0AB,2GHJ		131	C87124Y07
L. Hammond	31 Aug - 24 Sep	4VnRST		143	C87336I01
Dawson	1-11 Sep	4Vs		???	C87247I01
E.E. Prince	1-11 Sep	5Y		44	C87253I01
Dawson	15-28 Sep	3NO		77	C87337I07
A. Needler	22 Sep - 1 Oct	2		76	C88020I02
L. Hammond	28 Sep - 20 Oct	4X		165	ROSCOP
Dawson	2-9 Oct	4X		20	C87336I03
E.E. Prince	5-14 Oct	4VsW		27	C87334I01
Hudson	9 Oct - 3 Nov	3		67	C87337I05
Dawson	14-29 Oct	3LNO		116	C87341I03
A. Needler	19-30 Oct	4WX		???	C87335I02
E.E. Prince	19 Oct - 11 Nov	4X,5Ze		194	C87337I06
L. Hammond	23 Oct - 1 Nov	4X		49	C88020I01
L. Hammond	2-10 Nov	4X,5YZe		47	C88020I01
Dawson	11-14 Nov	4X		???	C88019I07
L. Hammond	16 Nov - 4 Dec	3		53	C88019I05
Dawson	28 Nov - 8 Dec	4RST		46	C88019I01
		Fed. Rep. Germany			
Poseidon	14 Mar - 2 Apr	1,2,3,4,5,6		346	ROSCOP
W. Herwig	25 Aug - 5 Oct	1			ROSCOP
		Poland			
Wieczno	30 May - 16 Jul	6ABC		297	C87251I10

Table 1 continued: Data collected in the NAFO area in 1987 but not yet received at MEDS. Total = 5153 stations

Ship Name	Cruise Period	NAFO Subarea	Standard Section	Number	Reference
		USA			
Delaware II	Jan - Feb	4,5,6		114	NAFO
Delaware II	5 Jan - 13 Feb	6ABC		134	C87124Y16
Delaware II	18-27 Feb	5Zw		???	C87104Y01
Albatross IV	23 Mar - 3 Apr	5YZe		48	C87251I06
Albatross IV	6-16 Apr	5YZe		100	C87251I05
Delaware II	20-29 Apr	5YZe		32	C87251I07
Albatross IV	20 Apr - 5 May	5YZe		87	C87251I04
Delaware II	5 May - 8 Jun	6ABC		???	C87252I01
Albatross IV	May	6		155	C87251I02
Delaware II	May - Jun	4,5,6		229	NAFO
Delaware II	15-26 Jun	5Ze		93	C87251I08
Albatross IV	6-20 Jul	6ABC		54	C87337I02
Delaware II	20-31 Jul	5Ze		65	C87251I09
Albatross IV	Aug	6A		134	C87335I04
Delaware II	17 Aug - 20 Sep	4X,5YZeZw,6ABC		180	C87341I02
Albatross IV	10-24 Sep	6ABC		52	C87341I01
Albatross IV	28 Sep - 9 Oct	5ZeZw,6A		43	C87338I02
Delaware II	28 Sep - 7 Oct	5ZeZw,6A		63	C87338I01
Albatross IV	13-23 Oct	4X,5YZe		20	C88020I05
Albatross IV	26 Oct - 6 Nov	4X,5YZe		19	C88020I04
Delaware II	Nov - Dec	4,5,6		124	NAFO
		USSR			
F. Nansen	Jul - Sep	1,2,3		40	NAFO
F. Nansen	16 Sep	3	Flemish Cap	7	NAFO
F. Nansen	18 Sep	3	4-A	5	NAFO
F. Nansen	Oct - Dec	2,3		103	NAFO
F. Nansen	1 - 5 Oct	3	CG	19	NAFO
Nansen	30 Oct - 1 Nov	2	8-A	11	NAFO
Nansen	26 - 28 Nov	3	Flemish Cap	7	NAFO

Codes: ROSCOP = Information has been extracted from ROSCOP forms.
NAFO = Information has been extracted from NAFO inventory forms.
C.... = Information has been extracted from CAMDI at MEDS.
Other = Personal communications.

Table 2: Data collected in the NAFO area in 1987 and received by MEDS.
Total = 5190 stations.

Ship Name	Cruise Period	NAFO Subarea	Data Type BT	Bot	CTD	Cruise Number
		Canada				
Margaree	12-15 Jan	4WX	10			181887015
Athabaska	12-14 Jan	4WX	10			181887003
Algonquin	14-20 Jan	4X	9			181887008
Assiniboine	18-22 Jan	4W,6E	10			181887001
Huron	26 Jan - 5 Feb	4X,6E	10			181887013
Algonquin	27 Jan - 23 Feb	4X,6E	13			181887011
Fraser	27 Jan - 25 Mar	4X,5Ze6ABCE	20			181887017
Margaree	27 Jan - 30 Apr	4WX	10			181887019
Assiniboine	27 Jan - 5 Mar	4X,6CE	10			181887002
Athabaska	27 Jan - 10 Mar	4W,6E	6			181887004
Gadus	31 Jan - 21 Feb	3KL	124	2		180587001
W. Templeman	12 Feb - 3 Mar	3LOPs,4VnVs	65	1		180587019
Margaree	16 Feb - 26 Mar	4X,5Ze,6ABCE	19			181887014
A. Needler	20 Feb - 2 Mar	4Vs,6FG	94			180587030
W. Templeman	6-22 Mar	3Ps,4VnVs	100			180587020
L. Hammond	8-15 Mar	3NO	68			180587032
Algonquin	21 Mar - 30 Jul	3L,5Ze,6BC	35			181887012
Sagenay	25 Feb - 12 Mar	3NOPs,4VsWX	37			181887028
Saguenay	16-17 Feb	4X	3			181887029
Saguenay	24 Mar	4X	1			181887030
Cormorant	26-30 Mar	3NO	8			181887026
Gadus	30 Mar - 12 May	3LOPs,4Vs	5	2		180587002
W. Templeman	3-17 Apr	3LNO	121	3		180587021
Margaree	20-24 Apr	4WX	15			181887018
W. Templeman	22 Apr - 4 May	3LO	119	2		180587022
Athabaska	4-5 May	4W	3			181887009
Athabaska	7-8 May	4X	3			181887010
W. Templeman	7-19 May	3LNO	139	2		180587023
Marinus	2-20 May	3L	31			180587014
Nipigon	11 May - 16 Jun	4X,5Ze,6DE	22			181887007
Fraser	11 May - 15 Jun	4X,6E	18			181887016
Gadus	15 May - 1 Jun	3L	29	1		180587003
W. Templeman	21 May - 2 Jun	3L	134	2		180587024
Athabaska	22 May - 17 Jun	4X,5Ze,6DE	15			181887005
Marinus	28 May - 21 Jun	3KL	23			180587015
Annapolis	30 May - 13 Jun	4X,6E	9			181887022
W. Templeman	5-18 Jun	3LOPs,4VnVs	113			180587025
Gadus	5-23 Jun	3KL	110	2		180587004
Huron	15-26 Jun	4WX	32			181887025
Margaree	16 Jun - 2 Jul	3LNO,4VsX	28			181887021
A. Needler	24 Jun - 9 Jul	4WX		104		180387001
Marinus	25 Jun - 13 Jul	3L	121			180587016
Gadus	25 Jun - 6 Jul	3LNO	60	1		180587005
Athabaska	29 Jun - 2 Jul	4WX	15			181887006
Huron	1-26 Jul	4X,6D	6			181887066
Gadus	8-20 Jul	2HJ,3KL	123			180587006
Iroquois	9 Jul - 16 Dec	3KLPs,4VsW	13			181887064
A. Needler	14-22 Jul	4VnVsW		76		180387002
Margaree	15-22 Jul	4W	5			181887020
Marinus	16-23 Jul	3L	27			180587017
Gadus	24-29 Jul	3LOPs,4VnVs	32	1		180587007
Gadus	30 Jul - 11 Aug	3L	113	2		180587008
A. Needler	30 Jul - 6 Aug	3O,4VsW		41		180387003
W. Templeman	2-15 Aug	2J,3KL	60	57	60	180587026
Marinus	5-18 Aug	3L	37			180587018
Nipigon	10-28 Aug	3LPs,4VsW	14			181887024
Gadus	13 Aug - 4 Sep	2GHJ,3KL	189	1		180587009
Annapolis	31 Aug - 9 Oct	3KLMNO,4VsWX	42			181887043
Athabaska	31 Aug - 7 Oct	3KLMOPs,4VsWX	35			181887047
Skeena	31 Aug - 8 Oct	3KLMPs,4VsWX	51			181887052

Table 2 continued: Data collected in the NAFO area in 1987 and received by MEDS.
Total = 5190 stations

Ship Name	Cruise Period	NAFO Subarea	Data Type BT	Bot	CTD	Cruise Number
		Canada				
Margaree	31 Aug - 30 Sep	3KLPs,4VsWX	21			181887062
Fraser	1 Sep - 6 Oct	3KLN,4VsWX	23			181887058
Saguenay	1-9 Sep	3LPs,4VsWX	14			181887027
Saguenay	17 Sep	4X	2			181887038
???	24-26 Sep	3NO	81			180587031
Ottawa	25 Sep	4X	2			181887031
W. Templeman	25 Sep - 12 Oct	2GHJ,3KL	16	5		180587027
Saguenay	25 Sep	4X	1			181887039
Saguenay	28 Sep - 1 Oct	4WX	13			181887040
Ottawa	28 Sep - 2 Oct	4WX	16			181887032
Nipigon	29 Sep - 10 Oct	4STVnW	16			181887059
Ottawa	5-9 Oct	4X	15			181887033
Saguenay	5-9 Oct	4X	14			181887041
Gadus	9-26 Oct	2J,3KL	17	1		180587010
W. Templeman	15 Oct - 1 Nov	3L	169	1		180587028
Annapolis	19-20 Oct	4WX	6			181887045
Athabaska	21-22 Oct	4WX	13			181887048
Annapolis	26-30 Oct	4WX,5Ze	17			181887046
Skeena	26 Oct - 5 Nov	4WX,5Ze	30			181887057
Gadus	28 Oct - 9 Nov	2J,3KL	170	7		180587011
Ottawa	28-30 Oct	4X	5			181887034
Ottawa	2 Nov	4X	2			181887035
Annapolis	2-6 Nov	4WX,5Ze	22			181887050
Quest	4-18 Nov	4X,6DE	38			181887065
Athabaska	5-6 Nov	4W	3			181887049
W. Templeman	6-24 Nov	3LNO	54			180587029
Annapolis	9-12 Nov	4WX	11			181887051
Skeena	9-12 Nov	4WX	12			181887060
Nipigon	11-22 Nov	4WX	30			181887055
Gadus	11-24 Nov	2J,3KL	85	3		180587012
Saguenay	13 Nov - 2 Dec	4WX,5Ze	38			181887042
Annapolis	13-23 Nov	4WX	45			181887044
Ottawa	13-29 Nov	4WX,5Y	23			181887036
Margaree	13-29 Nov	4WX,5ZeZw	54			181887063
Fraser	14-22 Nov	4WX	32			181887056
Fraser	20 Nov	4X	1			181887061
L. Hammond	23 Nov - 1 Dec	3LNO	53			180587033
Gadus	26 Nov - 9 Dec	3KL	99	2		180587013
Ottawa	7-11 Dec	4W	16			181887037
Nipigon	7-8 Dec	4W	5			181887053
Nipigon	10 Dec	4WX	3			181887054
		USSR				
Persey III	10 Mar - 4 Jul	3KLMNO	504			90P387037
K. Shaitanov	11 Sep - 9 Dec	2HJ,3KLMNO,4Vs	242			90KS87001

Table 3: IGOSS data received during 1987.
Total = 6083 stations.

Ship Name	Country	Call Sign	Cruise Period	Message Type BATHY	Message Type TESAC	NAFO Subarea
Dawson	Canada	CGBV	8-13 Apr	1	47	4WX,5Ze
		CGBV	3-12 May		63	3KLMNO
		CGBV	20-22 May		48	4X
		CGBV	22 Jul - 2 Aug		45	2HJ,3K
		CGBV	3-7 Oct		38	4X
		CGBV	16-26 Oct		115	3NO
		CGBV	28 Nov - 8 Dec		47	3Ps,4RSTVn
Baffin	Canada	CGCL	28 Feb - 22 Mar		69	3LMNO
Hudson	Canada	CGDG	22 Apr - 5 May	11		3LNO,4Vs
		CGDG	13 May - 7 Jun	18		3LNO,4Vs
		CGDG	26 Aug - 12 Sep		79	0AB,1ABC
		CGDG	10-14 Oct		13	3MN
		CGDG	22-31 Oct	14	19	3MN
W. Templeman	Canada	CGDV	31 Jan - 22 Mar	287		2J,3KLPs,4VnVs
		CGDV	3 Mar - 6 Jun	442		3KLMNOPs
		CGDV	2-14 Aug	60		2J,3KL
		CGDV	25 Sep - 1 Nov	169		2GH,3KL
		CGDV	6-21 Nov	34		3LNO
Marinus	Canada	CG2680	2-5 May	16		3L
		CG2680	12-20 May	12		3L
		CG2680	25 Jun - 13 Jul	211		3L
		CG2680	5-18 Aug	35		3L
A. Needler	Canada	CG2683	20 Feb - 2 Mar	72		4Vs
		CG2683	11-17 Mar	17		4X,5Ze
		CG2683	24 Mar - 1 Apr	7		4VsW
		CG2683	30 Jun - 22 Jul	23		4VsWX
		CG2683	20-27 Oct	45		3Ps,4VnVsW
L. Cowley	Canada	CG2959	27 Nov - 1 Dec	7		3L
		CG2959	9-22 Dec	5		3LO
Frithjof	FRG	DBFJ	13-16 Jan	15		1F,2J,3KL
W. Herwig	FRG	DBFP	12 Oct - 13 Nov	91		1BCDE
Kiel	FRG	DEOF	19-26 Dec	9		1F
Hannover	FRG	DFPU	1-25 Jan	18		2HJ,3K
Y. Clipper	FRG	DLEZ	11 Jul	4		5Y
Monsoon	USSR	EREA	3 Mar - 5 Apr	97	81	3LMNO,6H
		EREA	4-21 Apr	40	39	3MN,6H
		EREA	14-21 Nov	9	6	3MN
		EREA	24-26 Nov	8	7	3M
		EREA	28 Nov - 8 Dec	21	19	3MN,6H
Volna	USSR	EREB	29 May - 16 Jun	53	52	3MN,6H
		EREB	19-22 Jun	7	6	3M
		EREB	25 Jun - 11 Jul	46	57	3MN,6H
G. Oushakov	USSR	ERET	1-18 Jan	52		3MN,6H
E. Krenkel	USSR	EREU	17-31 Dec	30		3MN,6H

Table 3 continued: IGOSS data received during 1987.
Total = 6083 stations.

Ship Name	Country	Call Sign	Cruise Period	Message Type BATHY	Message Type TESAC	NAFO Subarea
Persey III	USSR	ESGU	10 Mar - 19 Apr		154	3KLMNO
		ESGU	24 Apr - 13 May		108	3KLM
		ESGU	16 May - 6 Jun		101	2J,3KLNO
		ESGU	14 Jun - 4 Jul		104	3LMNO
Cryos	France	FNBA	4-9 Feb	23		3Ps
		FNBA	16-25 Feb	40		3Ps
		FNBA	28 Feb - 6 Mar	32		3Ps
Farnella	UK	GPHH	1-5 May	5		6C
E. Queeny	USA	KEOC	18-19 Oct	12		6AB
		KEOC	8-9 Nov	15		6ABC
		KEOC	30 Nov - 1 Dec	25		6ABC
Delaware II	USA	KNBD	21-27 Apr	28		4X,5YZeZw
		KNBD	15-22 May	8		5Ze
		KNBD	11-29 Jul	35		5Ze
		KNBD	18 Aug - 17 Sep	17		6AB
		KNBD	3-23 Nov	10		6ABC
Eagle	USA	NRCB	12-13 Sep	6		6BC
Northwind	USA	NRFJ	20 Jul - 17 Aug	38		1ABCDEF,2G
		NRFJ	22 Aug - 3 Sep	23		1F,2J,3K,4W,5Ze,6C
Oleander	Netherlands	PJYG	9 Jan	15		6AB
		PJYG	6-7 Feb	16		6ABD
		PJYG	6-7 Mar	19		6ABD
		PJYG	8-14 May	32		6ABD
		PJYG	5-7 Jun	28		6ABD
		PJYG	15 Jul	9		6AB
		PJYG	19-20 Aug	12		6AB
		PJYG	4 Sep	14		6AB
		PJYG	22-23 Oct	13		6AB
		PJYG	9-10 Dec	16		6ABD
Bakkafoss	Iceland	TFXQ	2-3 Mar	6		3M
		TFXQ	19-20 Jun	9		1F,2J,3K
		TFXQ	1-2 Sep	6		1F,2J,3K
K. Shaitanov	USSR	UFYN	10 Sep - 7 Oct	7	55	0B,1DE,2GH,3KLN
		UFYN	15-18 Oct		11	0B
		UFYN	1-13 Nov	2	17	2GHJ,3K
		UFYN	19 Nov - 4 Dec		39	3KLN
F. Nansen	USSR	UTSZ	5-18 Sep		33	2HJ,3KLM
		UTSZ	22 Sep - 24 Oct		66	3LNO,4Vs,6H
		UTSZ	30 Oct - 4 Dec		71	2J,3KLMN
C. Roger	Canada	VCBT	7-13 Feb	8		2J,3K
		VCBT	5-26 Mar	18		3KLNO
		VCBT	5 Apr - 2 May	29		2J,3KLN
		VCBT	13-22 May	20		3LNO
		VCBT	7-9 Oct	6		3N
		VCBT	2-27 Nov	33		3LNO
		VCBT	14-31 Dec	8		2HJ,3LO
Unknown	Canada	VCLG	8-15 Mar	68		3NO
		VCLG	23 Nov - 1 Dec	53		3NO
C. Briar	Canada	VCTF	12-18 Oct	7		3LN

Table 3 continued: IGOSS data received during 1987.
Total = 6083 stations.

Ship Name	Country	Call Sign	Cruise Period	Message Type BATHY	Message Type TESAC	NAFO Subarea
C. Fox	Canada	VC8057	12-19 Jan	11		2J,3K
G. Atlantica	Canada	VC9450	15 May - 1 Jun	29		3LNO
		VC9450	13 Aug - 1 Sep	161		2HG,3L
		VC9450	9 Oct - 9 Dec	256		2HJ,3KL
Aircraft	Unknown	VP45	8 Apr	24		5Ze,6BD
Aircraft	Unknown	VP49	18 Feb	24		4Vs,6CDEF
		VP49	12 Mar	13		4Vs,6F
		VP49	19-20 Mar	23		5Ze,6BD
		VP49	2 Apr	26		4Vs,6EF
		VP49	15 Apr	26		4VsW,6EFG
		VP49	22-23 Apr	27		5Ze,6BDE
		VP49	7 May	14		4W,6BDE
		VP49	10 Jun	19		6DE
		VP49	24-25 Jun	30		4VsW,6DEF
		VP49	1 Jul	27		4VsWX,6E
		VP49	8 Jul	27		4VsW,6DEF
		VP49	15-16 Jul	29		4VsW,6DEF
		VP49	22 Jul	29		4VsWX,6EF
		VP49	29-30 Jul	17		4VsW,6F
Aircraft	USA	VP56	19 Aug	27		4VsW,6FG
		VP56	26 Aug	28		4VsW,6F
		VP56	23 Sep	9		4Vs,6EF
		VP56	21 Sep	23		5Ze,6BDE
		VP56	31 Oct	8		5Ze,6BD
		VP56	11 Nov	27		4VsWX,6DF
		VP56	19 Nov	28		4VsWX,6DEF
		VP56	27 Nov	27		4W,5Ze,6EF
		VP56	3 Dec	21		4WX,5Ze,6CDE
		VP56	9 Dec	27		4VsWX,6DE
Aircraft	USA	VXN	6-10 May	111		4VsWX,5Ze,6BCDEF
		VXN	26-28 May	77		4VsW,5Ze,6BCEF
Aircraft	USA	VXN-8	14-15 Jan	61		4VsW,5Ze,6DEF
		VXN-8	30 Apr	26		4VsW,6EF
		VXN-8	27-28 May	46		4VsW,6BCFG
		VXN-8	7 Jun	6		6BC
R. Conrad	USA	WHBA	16-18 Aug	13		6ABC
Albatross 4	USA	WMVF	24 Mar - 16 Apr	82		5ZeZw,6ABC
		WMVF	24 Apr - 2 May	16		5Ze
		WMVF	3-11 Jun	9		5Ze
		WMVF	6-19 Jul	54		5Ze,6ABC
		WMVF	25-30 Jul	18		5Ze
		WMVF	5-9 Aug	9		5Ze
		WMVF	11 Sep - 8 Oct	75		5ZeZw,6ABC
		WMVF	14-22 Oct	27		5ZeZw
		WMVF	27 Oct - 2 Nov	16		5ZeZw
Ferrel	USA	WTEZ	4-14 Nov	34		6BC

Table 4: Data collected by drifting buoys in the NAFO area in 1987.
Total = 53 buoy months

Buoy Number	Period	NAFO Subarea	SST	AP	AT	WS	WD	TC
44501	6 Mar - 11 May	3LN	X					
44503	11 Mar - 30 Jun	3KLM	X					
44504	11 Mar - 28 May	3KM	X					
44505	1 May - 19 Jun	3KMN	X					
44506	1 May - 6 Aug	3KLN	X					
44508	6 May - 31 Jul	3LM	X					
44509	30 Jun - 30 Sep	3KLM	X					
44511	25 Aug - 31 Dec	2GHJ,3KLM	X					
44512	25 Aug - 31 Dec	2GHJ,3KL	X					
44612	17 Aug - 30 Sep	1F	X					
44723	17 Aug - 30 Sep	2J,3K	X	X	X			
44724	8 Sep - 30 Sep	3K	X	X	X			
44725	8 Sep - 30 Sep	3K	X	X	X			
44726	4 - 31 Dec	1F,2J	X	X	X			
64525	1 Aug - 8 Sep	1EF		X	X			
65561	1 Jan - 25 Feb	1F	X	X				
65570	1 Feb - 25 May	1F	X	X				
2423	26 Aug - Nov	5Ze						
2427	26 Aug - 10 Sep	4W						
2430	Aug	5Ze						
2759	25 Mar - Apr	3L						
2488	25 Mar - Apr	3L	X					X
2375	1 Feb - May	3L						
2379	Feb	2J						
2378	1 Feb - Mar	3M						
2751	Mar	3L						
2758	Mar	3L						
2750	Mar	3L						

Codes: SST = Sea surface temperature
AP = Air pressure
AT = Air temperature
WS = Wind speed
WD = Wind direction
TC = Thermistor chain

Table 5: Current meter moorings in the NAFO area in 1987.

ID	N Lat	W Long	Depth	Period	Area	East Mean	North Mean
Golconda	46.89	47.67	<181	5 Oct/'86 - Feb/'87	3L		
LC0886-40	51.67	52.99	360	27 Jul/'86 - 22 Jul/'87	3K	0.013	0.023
LC0886-28	54.05	50.74	211	2 Aug/'86 - 24 Jul/'87	2J	0.072	-0.155
LC0886-29	54.05	50.74	411	2 Aug/'86 - 18 Jan/'87	2J	0.049	-0.118
LC0886-30	54.05	50.74	996	2 Aug/'86 - 24 Jul/'87	2J	0.024	-0.078
LC0886-31	54.18	50.15	183	2 Aug/'86 - 24 Jul/'87	2J	0.033	-0.149
LC0886-32	54.18	50.15	383	2 Aug/'86 - 17 Jan/'87	2J	0.043	-0.127
LC0886-33	54.18	50.15	983	2 Aug/'86 - 21 May/'87	2J	0.033	-0.126
LC0886-34	54.18	50.15	2468	2 Aug/'86 - 24 Jul/'87	2J	0.047	-0.091
LC0886-36	53.73	53.62	200	3 Aug/'86 - 23 Jul/'87	2J	0.034	-0.052
LC0886-35	53.73	55.45	200	4 Aug/'86 - 30 Jul/'87	2J	0.089	-0.049
LC0886-37	53.84	55.83	80	4 Aug/'86 - 28 Jun/'87	2J	-0.007	-0.008
LC0886-38	53.84	55.18	147	4 Aug/'86 - 30 Jul/'87	2J	-0.126	-0.054
LC0886-39	54.46	55.44	200	5 Aug/'86 - 31 Jul/'87	2J	-0.018	0.105
LC0886-47	70.99	60.04	204	15 Aug/'86 - 9 Sep/'87	1A	0.003	0.035
LC0886-48	70.99	60.04	304	15 Aug/'86 - 9 Sep/'87	1A	0.008	0.051
LC0886-49	70.99	60.04	504	15 Aug/'86 - 9 Sep/'87	1A	0.008	0.064
LC0886-53	70.92	60.69	154	15 Aug/'86 - 9 Sep/'87	1A	0.000	-0.003
LC0886-54	70.92	60.69	454	15 Aug/'86 - 21 Jan/'87	1A	0.007	0.013
LC0886-55	70.92	60.69	954	15 Aug/'86 - 9 Sep/'87	1A	0.003	0.019
LC0886-50	74.92	67.13	175	18 Aug/'86 - 12 Sep/'87	0A	-0.041	0.015
LC0886-51	74.92	67.13	475	18 Aug/'86 - 12 Sep/'87	0A	-0.067	0.026
LC0886-52	74.92	67.13	975	18 Aug/'86 - 12 Sep/'87	0A	-0.136	0.029
LC0886-44	75.03	66.68	199	18 Aug/'86 - 12 Sep/'87	1A	-0.023	-0.006
LC0886-45	75.03	66.68	299	18 Aug/'86 - 12 Sep/'87	1A	-0.012	-0.000
LC0886-46	75.03	66.68	499	18 Aug/'86 - 12 Sep/'87	1A	0.019	0.005
LC0886-43	46.42	47.27	401	14 Sep/'86 - 8 May/'87	3L	-0.011	-0.142
LC0886-42	47.86	51.71	89	13 Oct/'86 - 8 May/'87	3L	-0.013	-0.006
LC0790-11	46.89	46.67	20	2 Jan - 4 Feb	3L	0.055	-0.174
LC0790-12	46.89	46.67	90	2 Jan - 4 Feb	3L	0.027	-0.155
LC0790-13	46.89	46.67	160	2 Jan - 4 Feb	3L	0.069	-0.158
Bonne Bay	46.53	48.19		3 Feb - 18 Jul	3L		
LC0817-1	46.95	51.88	33	19-27 Mar	3L	-0.027	-0.067
LC0817-2	46.95	51.88	23	19-27 Mar	3L	-0.038	-0.068
LC0817-7	44.35	51.84	74	5-7 Apr	4Vs	-0.008	-0.017
LC0817-8	47.32	49.00	74	12-14 Apr	3L	-0.021	0.002
Como	43.85	60.83		17 May - 2 Jul	4W		
LC0817-16	46.38	62.99	2	2 Jun - 13 Jul	4T	-0.002	0.005
LC0817-17	46.26	62.45	3	3 Jun - 1 Oct	4T	-0.008	0.005
LC0817-18	44.44	64.30	4	4 Jun - 24 Sep	4X	0.005	-0.001
LC0817-19	44.35	64.34	2	5 Jun - 24 Sep	4X	-0.003	0.001
Panuke	43.80	60.77		2 Jul - 22 Aug	4W		
LC0817-4	43.18	65.73	10	5-10 Jul	4X	-0.069	-0.026
LC0817-5	43.20	65.72	10	5-10 Jul	4X	-0.074	-0.039
LC0817-6	43.19	65.71	10	5-10 Jul	4X	-0.057	-0.026
Narwhal	44.31	53.75		3 Aug - 19 Sep	3O		
LC0817-9	44.68	63.62	10	14-16 Sep	4W	0.129	0.058
LC0817-10	44.68	63.62	12	14-16 Sep	4W	0.031	-0.010
LC0817-11	44.68	63.62	13	14-16 Sep	4W	0.027	-0.015
LC0817-12	44.68	63.62	10	14-16 Sep	4W	0.054	0.009

Table 6: Locations of instrumented wave data collections
Total = 24677 spectra.

Station Name	Latitude	Longitude	Area	Period	Number	1-D	2-D
Golconda	46.89	47.63	3L	1-25 Jan	150	X	
Logy Bay	47.66	52.50	3L	1 Jan - 22 Nov	1400	X	
Osborne Head	44.49	63.40	4W	1 Jan - 2 Nov	1350	X	
Hibernia	46.67	48.67	3L	1 Jan - 1 Nov	1350	X	
Hotel	38.50	70.70	6B	14 Jan - 31 Dec	2600	X	
G. of Maine	42.70	68.30	5Y	14 Jan - 31 Dec	2600	X	
Portland	43.50	70.10	5Y	14-30 Jan	115	X	
Nantucket	40.50	69.40	5Ze	14 Jan - 31 Dec	2600	X	
Delaware Bay	38.50	74.60	6B	14 Jan - 31 Dec	2600	X	
Georges Bank	41.10	66.60	5Ze	14 Jan - 31 Dec	2600	X	
Boston	42.40	70.80	5Y	14-30 Jan	98	X	
Quest (LEWEX)	49.96	47.61	3K	14-20 Mar	207		X
Ste Therese	48.39	64.41	4T	13 May - 14 Oct	1219	X	
Ste Therese	48.38	64.42	4T	15 May - 29 Sep	991		X
Como	43.85	60.80	4W	18 May - 2 Jul	276	X	
Panuke	43.80	60.75	4W	2 Jul - 22 Aug	306	X	
Dawson	44.18	58.92	4Vs	5-9 Sep	55		X
Torbay	47.63	52.50	3L	14-31 Oct	390	X	
Shearwater	44.48	63.42	4W	16 Oct - 31 Dec	3770	X	

Code: number = number of spectra collected
1-D = non-directional wave data
2-D = directional wave data

Table 7: Historical data received in MEDS in 1987.
Total = 14,252 stations

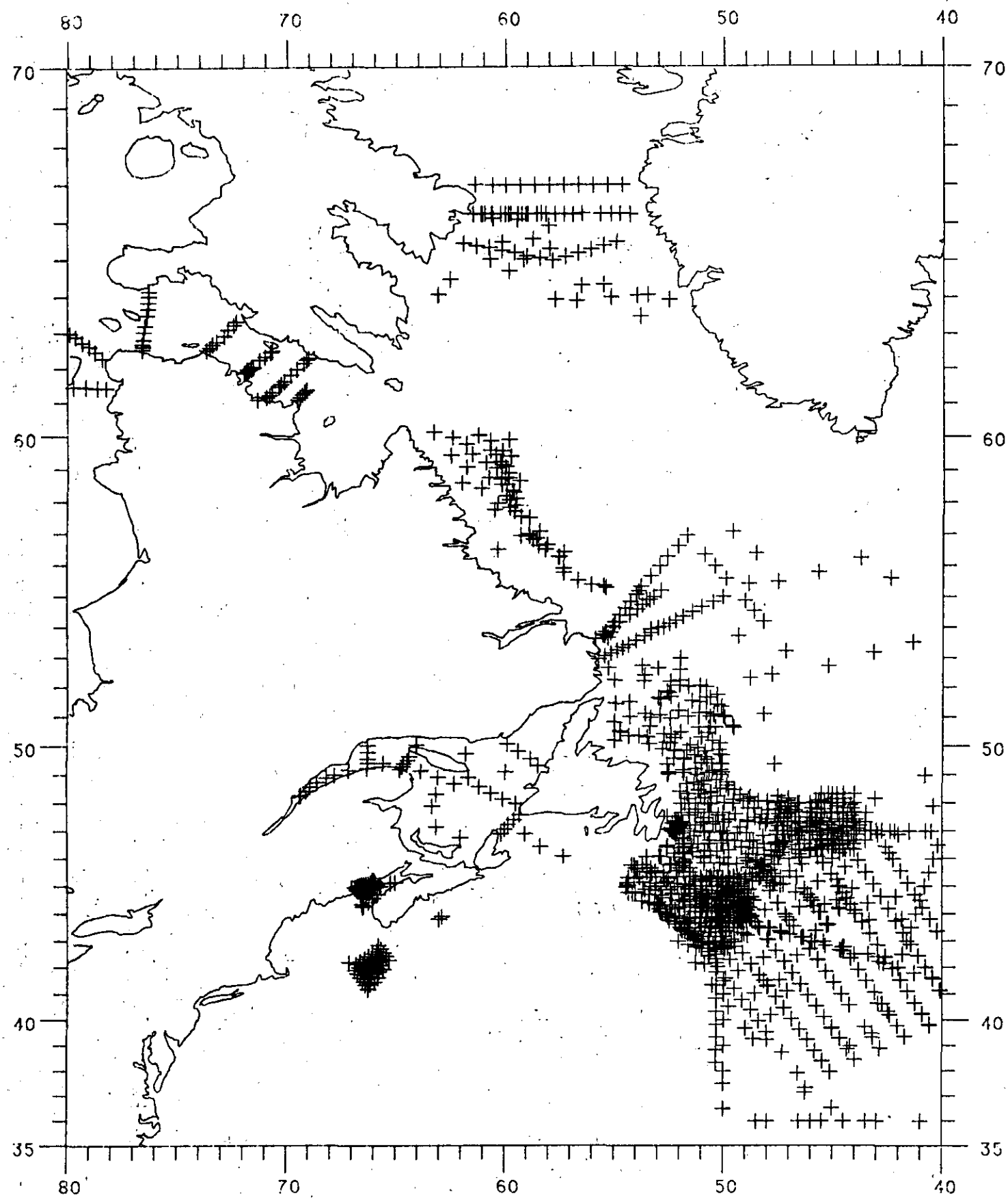
Ship Name	Cruise Period	NAFO Subarea	Number	Reference
		Canada		
Dawson	23-28 Jun/'70	3N,6H	17	181070023
Dawson	6-13 May/71	3NO,6GH	17	181071016
Baffin	1-10 Mar/'72	4R	193	181072005
Dawson	25 Apr - 20 May/'73	3Ps,4RSTVnW	463	181073012
Sackville	15 Jun - 4 Jul/'73	4ST	54	181073016
Sackville	16-25 Nov/'73	3KLPs	104	181073035
Navicula	10-16 Sep/'73	4T	353	181073167
Dawson	8-17 Jan/'74	4RST	93	181074001
Dawson	28-29 Jan/'74	4W	19	181074004
Dawson	31 Mar -13 May/'74	3Ps,4RSTVn	1131	181074006
Dawson	11-22 Jun/'74	4Vs	26	181074020
Dawson	5-12 Sep/'74	4Vs	60	181074031
Dawson	4-15 Jan/'75	4RST	408	181075001
Dawson	27-31 Jan/'75	4WX,6E	35	181075003
Dawson	15-30 Apr/'75	4Vs	155	181075008
Dawson	4-6 Mar/'75	4W	25	181075010
Dawson	7-14 May/'75	3Ps,4Vn	211	181075013
Dawson	26 Jun - 21 Jul/'75	4T	1284	181075016
Dawson	31 Jul - 4 Aug/'75	4T	500	181075019
Dawson	21-27 Nov/'75	4RSTVn	95	181075031
Dawson	10-14 Dec/'75	4VsW	17	181075033
Dawson	5-13 Apr/'76	4W	56	181076005
Hudson	23-28 Apr/'76	4T	250	181076006
Dawson	29 Apr - 4 May/'76	4ST	139	181076007
Hudson	29 Apr - 4 May/'76	4T	350	181076008
Hudson	17-23 May/'76	4W	42	181076013
Dawson	4-7 Jun/'76	4Vs	18	181076015
Dawson	28 Sep - 7 Oct/'76	4W	452	181076030
Dawson	14-21 Oct/'76	4W	30	181076033
Dawson	3-7 Nov/'76	4Vs	13	181076034
Dawson	17-21 Nov/'76	4RSTVn	91	181076036
Dawson	29 Jun - 11 Jul/'76	4WX	76	181076020
Dawson	1-2 Jun/'77	4W	28	181077013
???	5-14 Jul/'77	4WX	51	181077017
Dawson	22 Aug - 1 Sep/'77	4X,5YZe	358	181077023
Dawson	20-27 Sep/'77	4WVs	447	181077028
Dawson	7-14 May/'78	3NO,4Vs,6GH	18	181078011
Dawson	14-19 Jun/'78	4ST	70	181078017
Dawson	23-29 Sep/'78	4ST	78	181078030
Hudson	14-28 Jan/'79	3LNO	133	181079001
Dawson	18-24 May/'79	4ST	88	181079010
Dawson	2-6 Sep/'79	4ST	88	181079024
Dawson	14-28 Aug/'80	4X	81	181080022

Table 7 continued: Historical data received in MEDS in 1987.
Total = 14,252 stations

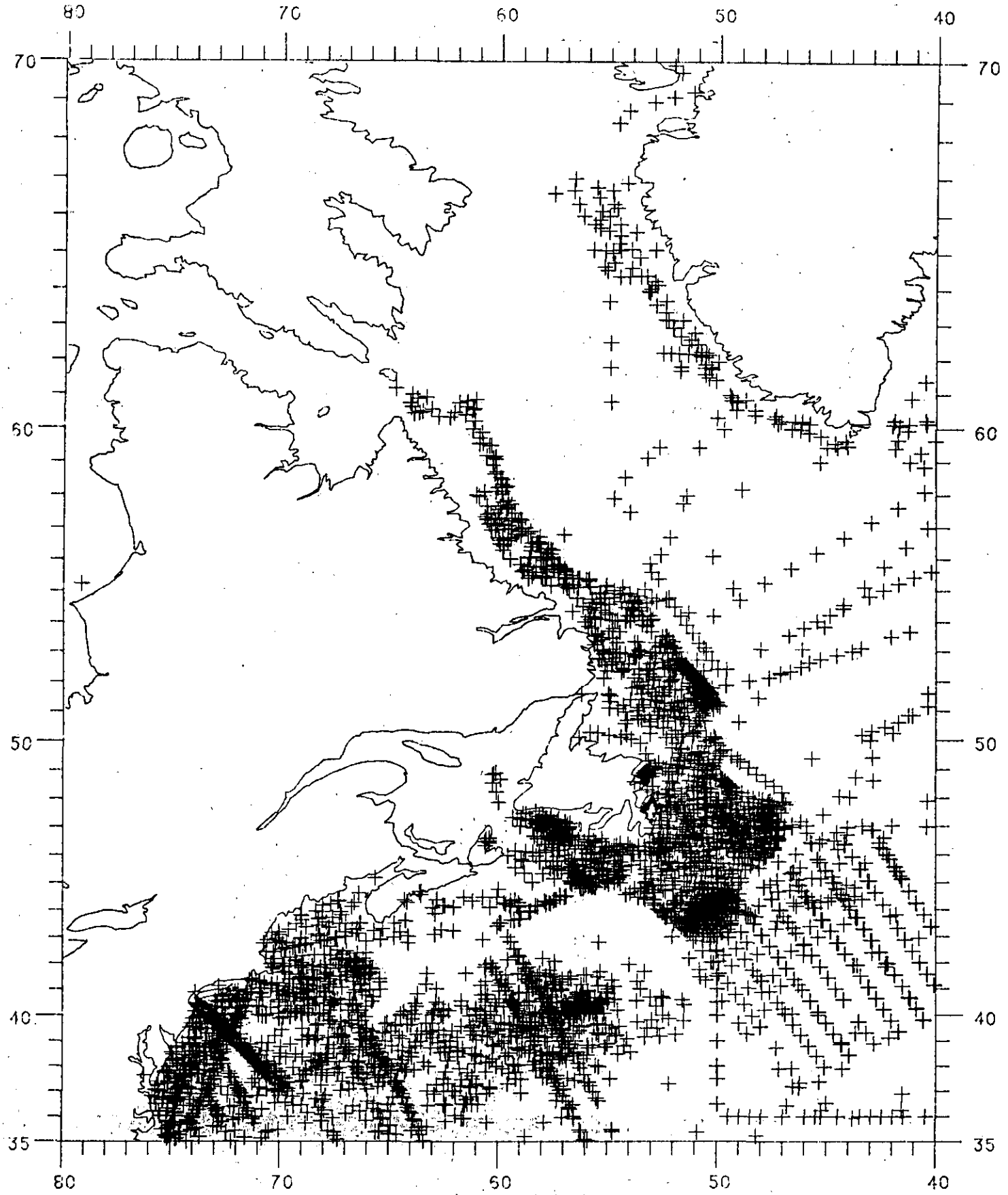
Ship Name	Cruise Period	NAFO Subarea	Number	Reference
		Canada		
Dawson	5-7 Nov/'80	4WX	12	181080038
Dawson	28 Nov - 2 Dec/'80	4RST	11	181080040
Pandora II	26 Jun - 5 Jul/'81	3LM	48	181081024
Gadus	25 Apr - 11 May/'81	3LMNO	65	180581044
Gadus	7-27 Jul/'82	2HJ,3KL	152	180582015
Shamook	18 May - 15 Jun/'83	3L	55	180583012
Gadus	6-17 Sep/'83	3KL	15	180583026
W. Templeman	5-9 Feb/'84	3L	21	180584021
A. Needler	9-17 Apr/'84	3OPs	94	180584031
A. Needler	28 Apr - 9 May/'84	3NO	116	180584032
A. Needler	18-21 May/'84	3L	36	180584033
Dawson	11-14 Jul /'84	4X	138	181084025
Hudson	25 Jun - 3 Jul/'84	2HJ	36	181084026
Dawson	14-26 Nov/'84	4X	57	181084043
???	2-6 Dec/'84	4RSTVn	66	181084048
E.E. Prince	17-27 Jun/'84	3O,4Vs	78	181684038
A. Needler	9-17 Sep/'85	4VsWX,5Ze,6DEF	65	183185002
???	21 Nov/'85	3L	1	181085040
A. Needler	8-17 Jul/'86	4WX	19	180386003
A. Needler	23-28 Jul/'86	3Ps,4VnVsW	8	180386004
Gadus	29 Nov - 12 Dec/'86	3KL	80	180586040
Jackie	2-30 May/'86	3L	21	180586041
Nipigon	30 Sep - 17 Oct/'86	3NOPs,4VsW	49	181886025
Nipigon	27 Oct - 13 Nov/'86	4WX,5YZe	42	181886026
Nipigon	2-4 Dec/'86	4WX	6	181886027
Athabaska	8-15 Dec/'86	4WX	36	181886028
Huron	19 Aug - 13 Oct	1F,2J,3KLO,4VsW	158	181886029
Assiniboine	19 Jun - 14 Oct/'86	1F,2J,3KLO,4VsW	90	181886030
Assiniboine	27-28 Oct/'86	4W	3	181886031
Assiniboine	28 Oct - 13 Nov/'86	3OPs,4VsW	27	181886032
Fraser	20-24 Oct/'86	4WX	15	181886033
Fraser	27-31 Oct/'86	4WX	19	181886034
Fraser	6-9 Dec/'86	4W	18	181886035
Fraser	13-17 Dec/'86	4VsW	35	181886036
Saguenay	31 Jul - 3 Dec/'86	1F,2J,3KLO,4VsW,5Ze	173	181886037
Margaree	8-18 Sep/'86	4WX	24	181886038
Margaree	21-22 Oct	4WX	3	181886039
Margaree	27 Oct - 13 Nov/'86	4WX,5YZe	34	181886040
Athabaska	12-20 Jan/'86	3L	163	181086041
Algonguin	20-24 Oct/'86	4WX	16	181886042
Cormorant	29 Aug - 30 Sep/'86	0AB,2G	36	181886043

Table 7 continued: Historical data received in MEDS in 1987.
Total = 14,252 stations

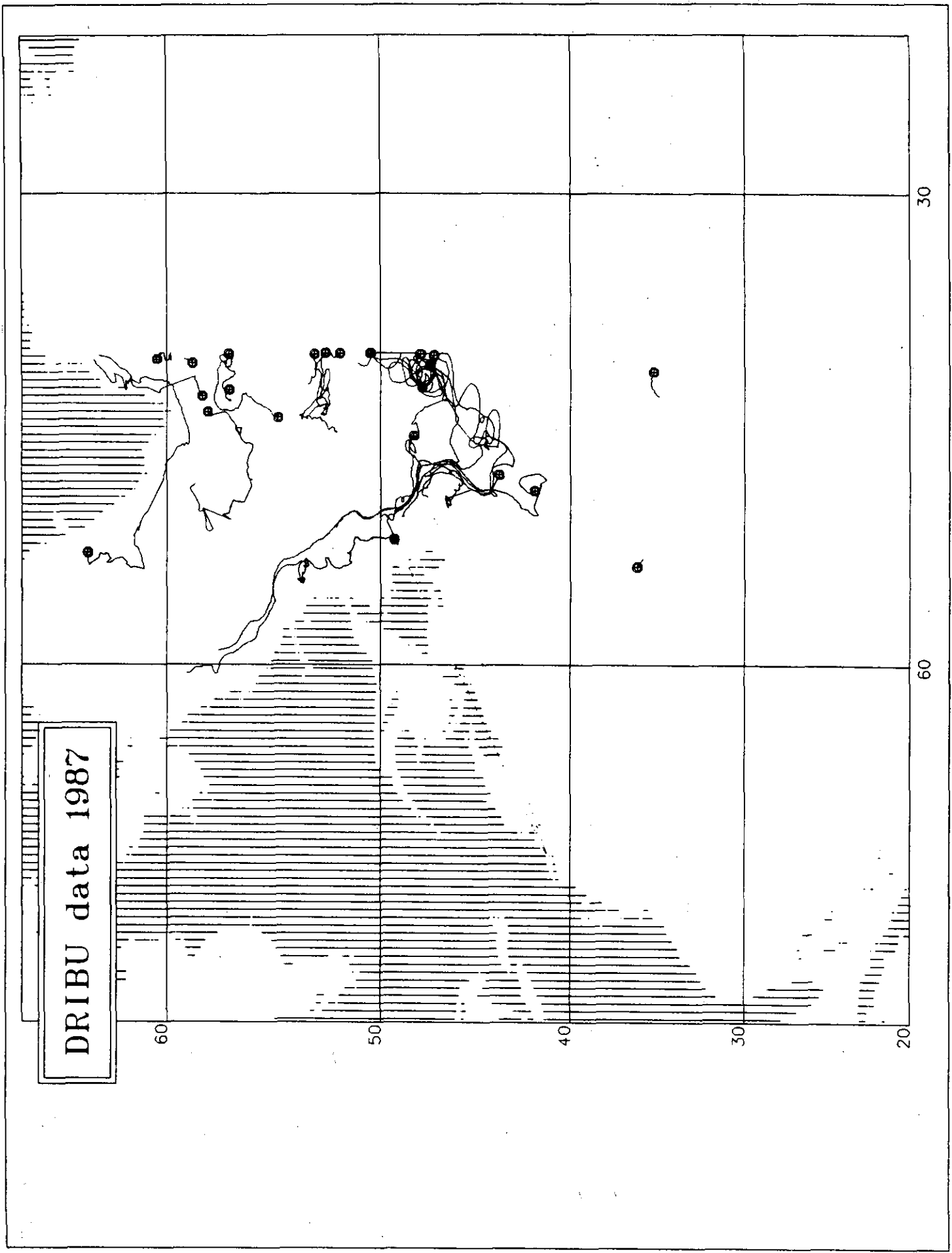
Ship Name	Cruise Period	NAFO Subarea	Number	Reference
		Denmark		
A. Jensen	14 Jan - 11 Nov/'82	1BCDE	155	26AJ82001
		Fed. Rep. Germany		
Gauss	15 Jul - 22 Sep/'59	1A	287	06GA59001
A. Dohrn	3 Jul - 4 Aug/'65	0B,1CDE,2GHJ,3K	53	06AD65088
Trawler	12 Jun - 23 Aug/'65	0B,1AB,2GHJ,3KL	61	069965001
W. Herwig	5 Jan - 15 Feb/'66	2HJ,3LOPs,4VsVnW	88	06HW66013
A. Dohrn	27 Sep - 30 Oct/'66	1CDF	35	06AD66100
W. Herwig	4 Oct - 12 Nov/'67	0AB,1CDEF,2GHJ	116	06HW67021
W. Herwig	15 Jul - 25 Aug/'68	1CDEF	132	06HW68024
W. Herwig	11 Jan - 20 Feb/'68	2J,3KLOPs,4VsVnWX,5Ze	108	06HW69027
W. Herwig	20 Feb - 15 Apr/'69	1BCDE,2GHJ	64	06HW69028
W. Herwig	29 Sep - 27 Nov/'69	0B,1BCDEF,2GHJ,3LPs, 4VnWX,5ZeZw	148	06HW69031
W. Herwig	16 Feb - 30 Mar/'70	1CDF,2GHJ,3K	54	06HW70032
W. Herwig	1 Jun - 15 Aug/'70	4WX,5YZeZw	232	06HW70034
W. Herwig	18 Oct - 18 Dec/'71	1DEF,2J,3KL,4X,5YZeZw	157	06HW71039
W. Herwig	1 Mar - 6 Apr/'72	3Ps,4VsVn	39	06HW72042
A. Dohrn	17 Oct - 17 Dec/'72	1BCDEF,2GHJ,3K,4VsVnWX, 5YZwZe	219	06DA72165
A. Dohrn	29 Nov - 11 Dec/'74	1F,2J	42	06DA74178
W. Herwig	29 Jul - 15 Aug/'75	1CDEF	55	05HW75064
chartered	28 Aug - 27 Sep/'80	1EF	5	069980001
W. Herwig	9 Jun - 25 Jul/'80	1BCDEF	12	06HW80085
		USA		
Lynch	25-29 Sep/'69	5Zw,6ABC	172	31LY69003
		USSR		
Artemida	1-24 Nov/'73	2J,3K	34	90AZ73006
A. Knipovitch	1 Jun - 28 Jul/'81	2J,3KLMNO	176	90KN81004
Proshion	22 Sep - 5 Nov/'81	2J,3KLMNO	140	90PH81024
Persey III	2 Dec/'81 - 27 Jan/'82	1E,2GHJ,3KLMNO,4VsW	102	90P381026
Suloy	16 Apr - 4 Aug/'83	3KLMNO	316	90C583027
Suloy	16 Oct/'83 - 29 Jan/'84	1EF,2GHJ,3KLMNO,4VsWX	159	90C583029
Suloy	29 Mar - 20 Jul/'84	3KLMNO	468	90C584030
Poisk	29 Mar - 31 May/'84	3LMNO	202	90PK84049
Lensk	6-8 Jun/'84	3MN	133	90RI84018
Vilnjus	20 Jun - 24 Aug/'84	3LMNO,4Vs,FGH	139	90VJ84002
Suloy	14 Sep - 13 Nov/'84	1DEF,2GHJ,3KLMNO,4VsW	65	90C584031
Shaitanov	31 Oct/'84 - 15 Jan/'85	2HJ,3KLMNO	99	90KS84009



MEDS EAST COAST TESAC STATIONS FOR 1987



MEDS EAST COAST BATHY STATIONS FOR 1987


DRIBU data 1987
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