DEPARTMENT OF TRANSPORTATION

COAST GUARD

BULLETIN NO. 65

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Report of the International Ice Patrol Service in the North Atlantic Ocean

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SEASON OF 1979

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UNITED STATES COAST GUARD

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Bulletin No. 65

REPORT OF THE INTERNATIONAL ICE PATROL SERVICES IN THE NORTH ATLANTIC OCEAN

Season of 1979

CG-188-34

FOREWORD

Forwarded herewith is Bulletin No. 65 of the International Ice Patrol describing the Patrol's services, and ice observations and conditions during the 1979 season.

D. F. HOLLINGSWORTH
Acting Chief, Office of Operations

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PREFACE

This is the 65th in a series of annual reports on the International Ice Patrol Service in the North Atlantic. It contains information on ice conditions and Ice Patrol operations for 1979.

The Marine Science Branch, Coast Guard Atlantic Area, prepares this report and acknowledges the assistance and information provided by the Canadian Department of the Environment, U.S. National Weather Service, U.S. Naval Weather Service, U.S. Coast Guard Oceanographic Unit and the U.S. Coast Guard Research and Development Center. We thank Lewis Research Center, National Aeronautical and Space Administration for their continuing effort to improve RADAR detection of icebergs.

We extend our sincere appreciation to the staff of Canadian Coast Guard Radio Station St. John's/VON for their excellent support during the 1979 Ice Patrol Season.

INTERNATIONAL ICE PATROL, 1979

The U.S. Coast Guard conducted the 1979 International Ice Patrol Service in the North Atlantic Ocean under the provisions of Title 46, U.S. Code, Sections 738, 738a through 738d, and the International Convention for the Safety of Life at Sea (SOLAS), 1960, regulations 5–8. During the 1979 season, the International Ice Patrol disseminated information to the mariner on the ice conditions in the Grand Banks region of the Northwest Atlantic. To achieve this, the U.S. Coast Guard patrolled the southeastern, southern and southwestern limits of icebergs and maintained a plot on the extent of this dangerous region.

Commander, Coast Guard Atlantic Area is Commander, International Ice Patrol and directed the 1979 operations from the Ice Patrol Office located at Governors Island, NY. The office analyzed ice and environmental data and prepared the daily ice bulletins and facsimile chart. All Coast Guard units deployed on Ice Patrol missions came under the operational control of Commander, International Ice Patrol. Vice Admiral Robert I. Price, U.S. Coast Guard, was Commander, International Ice Patrol. The Ice Patrol Officer was Commander Jerry C. Bacon, U.S. Coast Guard.

Preseason reconnaissance flights in January and February 1979 determined the early season iceberg distributions. Based on these flights the season commenced 6 March 1979. From that date until 21 July 1979, an Aerial Ice Reconnaissance Detachment operated from St. John's, Newfoundland averaging a patrol every other day over the Grand Banks. The season officially closed on 22 July 1979.

During the 1979 season, an estimated 152 icebergs drifted south of 48°N. Table 1 shows monthly estimates of bergs that crossed 48°N.

Table 1—ESTIMATED NUMBER OF ICEBERGS SOUTH OF LATITUDE 48N, SEASON 1979

	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
1979	0	0	0	0	0	5	20	81	34	9	3	0	152
TOTAL 1946–1979	10	2	4	11	64	269	1100	3060	2966	1767	486	100	9839
AVERAGE 1946–1979	0	0	0	0	2	8	32	90	87	52	14	3	285
TOTAL 1900–1979	256	109	110	91	184	721	3202	7905	10,049	5285	1682	489	30,083
AVERAGE 1900–1979	3	1	1	1	2	9	40	99	126	66	21	6	377

AERIAL ICE RECONNAISSANCE

During the 1979 Ice Patrol Season (considered from 1 September 1978 through 31 August 1979) there were 145 aircraft sorties flown in support of International Ice Patrol. These included preseason surveys, ice observation flights and logistic flights. Preseason flights determine iceberg concentrations north of 48°N which are necessary to estimate the time when icebergs will threaten the North Atlantic Shipping Lanes in the vicinity of the Grand Banks. During the active season, ice observation flights map the southwestern, southern and southeastern limits of icebergs. Logistics flights were necessary to rotate ice reconnaissance detachment personnel and for aircraft maintenance. Table 2 shows aircraft utilization during the 1979 season.

U.S. Coast Guard C-130 aircraft, deployed from either Coast Guard Air Station Elizabeth City, North Carolina or Clearwater, Florida, conducted the Aerial Ice Reconnaissance. These aircraft operated from St. John's, Newfoundland.

Table 2—Aerial Ice Reconnaissance
1 September 1978 to 31 August 1979

Ice Recon Flights	*Number of flights*	*Number of hours*
Preseason/ Postseason	16	66.8
In Season	116	472.2
Logistics	13	39.9
Totals	145	578.9

NOTE In season flights include transport of personnel to and from St. John's for normal crew rotation. There were 73 sorties dedicated to ice reconnaissance.

Ice Recon Flights	*Month*	*Flights*
	FEB	2
	MAR	16
	APR	13
	MAY	18
	JUN	16
	JUL	9
Totals		73

COMMUNICATIONS

U.S. Coast Guard Communications Station NMF/NIK Boston, MA was the primary radio station used for the dissemination of the daily ice bulletin and facsimile chart. The Ice Patrol Office in New York prepared the bulletin and chart and sent it to numerous radio stations which broadcast the bulletin to mariners.

As in the past, the Ice Patrol Office requested all ships to report ice sightings, weather and sea surface temperatures to U.S. Coast Guard Communications Stations. Response to this request was good as shown in Table 3. The 10 most frequent contributors of this information were:

M/V BAKKAFOS/TFXO
USCGC EVERGREEN/NRXD
M/V KANSAS GETTY/DSOP
M/V GEM/5LSU
M/V KARA/OIVD
M/V SUSANNE/5DNU
M/V ATLANTIC PREMIER/SFHN
M/V STOVE TRADER/LDGS
M/V VISEU/YODH
M/V WEYROL/HPWO

Appendix A lists all contributors.

Table 3

Number of ships furnishing SST reports	71
Number of SST reports received	397
Number of ships furnishing ice reports	76
Number of aircraft furnishing ice reports	3
Number of ice reports received	183
First Ice Bulletin	060000Z MAR79
Last Ice Bulletin	220000Z JUL79

ICE & ENVIRONMENTAL CONDITIONS

September-December 1978

Figures 1 through 3 illustrate the growth of sea ice during this period. By December ice was as far south as the Strait of Belle Isle and extended 100 miles or more off the Labrador Coast. Iceberg sightings during this period were infrequent with Ice Central Ottawa reporting some icebergs in the waters off the Labrador Coast. Figures 20 through 23 depict surface pressure characteristics that contributed to ice formation and movement. During this period conditions were near normal, with predominately westerly winds and no unusual ice conditions noted.

January-February 1979

Ice formation continued as shown in figures 4 and 5. By mid-February sea ice extended south as far as Cape Bonavista and out to 50 miles off the coast of Newfoundland. In early February the Ice Patrol conducted the first aerial reconnaissance of the 1979 season. Icebergs were sighted off the Coast of Labrador and by late February icebergs were probably crossing 48°N though there were no reconnaissance flights to verify this until early March. The average surface pressures shown in figures 24 and 25 indicate that a strong northerly flow existed in February creating the ideal conditions for moving ice and icebergs south towards the shipping lanes.

March 1979

Limited reconnaissance during January and February led to the Ice Patrol conducting a comprehensive survey of the waters off Newfoundland during the first week of March. Icebergs were observed south of 48°N and as a result the Ice Patrol commenced broadcast of ice conditions on 6 March 1979. Figure 13 shows the estimated ice conditions at that time. Sea ice reached its southern limit during this month as seen from figure 6. However, the approaches to the Strait of Belle Isle and St. John's were covered by as much as seven oktas of sea ice. The ice conditions for 24 March are shown in figure 14. The average surface pressures for March (figure 26) resulted in predominantly westerly air flow which kept the bergs offshore and ensured their clear passage southward. The estimated number of icebergs crossing 48°N for March was 20.

April 1979

April marked the beginning of the sea ice retreat and was also the heaviest single month for icebergs crossing 48°N. An estimated 81 bergs drifted south during this month. Some typical ice conditions are shown in figures 7 and 15. It was during April that significant changes in weather patterns occurred that led to prevailing onshore breezes and the drift of icebergs out of the Labrador Current and towards the coast. This resulted in fewer bergs reaching the Grand Banks and a reduced hazard to shipping. Figure 27 shows the average surface pressures and the low pressure system east of Newfoundland that dominated the weather for April.

May 1979

The unusual weather patterns of April continued to dominate through May. The weak low pressure system was moved east by a ridge of high pressure as seen in Figure 28. The result was a still persistent onshore breeze and a corresponding shoreward drift of ice and icebergs. Sea ice conditions are shown in figure 8; iceberg conditions for 1 May and 31 May are shown in figures 16 and 17. These figures show the trend towards shoreward drift and reduced numbers of icebergs that developed during this month. In May an estimated 34 bergs drifted south of 48°N. However, reconnaissance flights north along the coast of Labrador sighted hundreds of icebergs that would have drifted further south if they had not been blown out of the main stream of the Labrador Current.

June 1979

By June it was apparent that the iceberg threat to shipping was greatly diminished and that few bergs would drift south towards the Grand Banks. Sea ice drifted no further south than the Labrador Coast and only an estimated nine bergs crossed

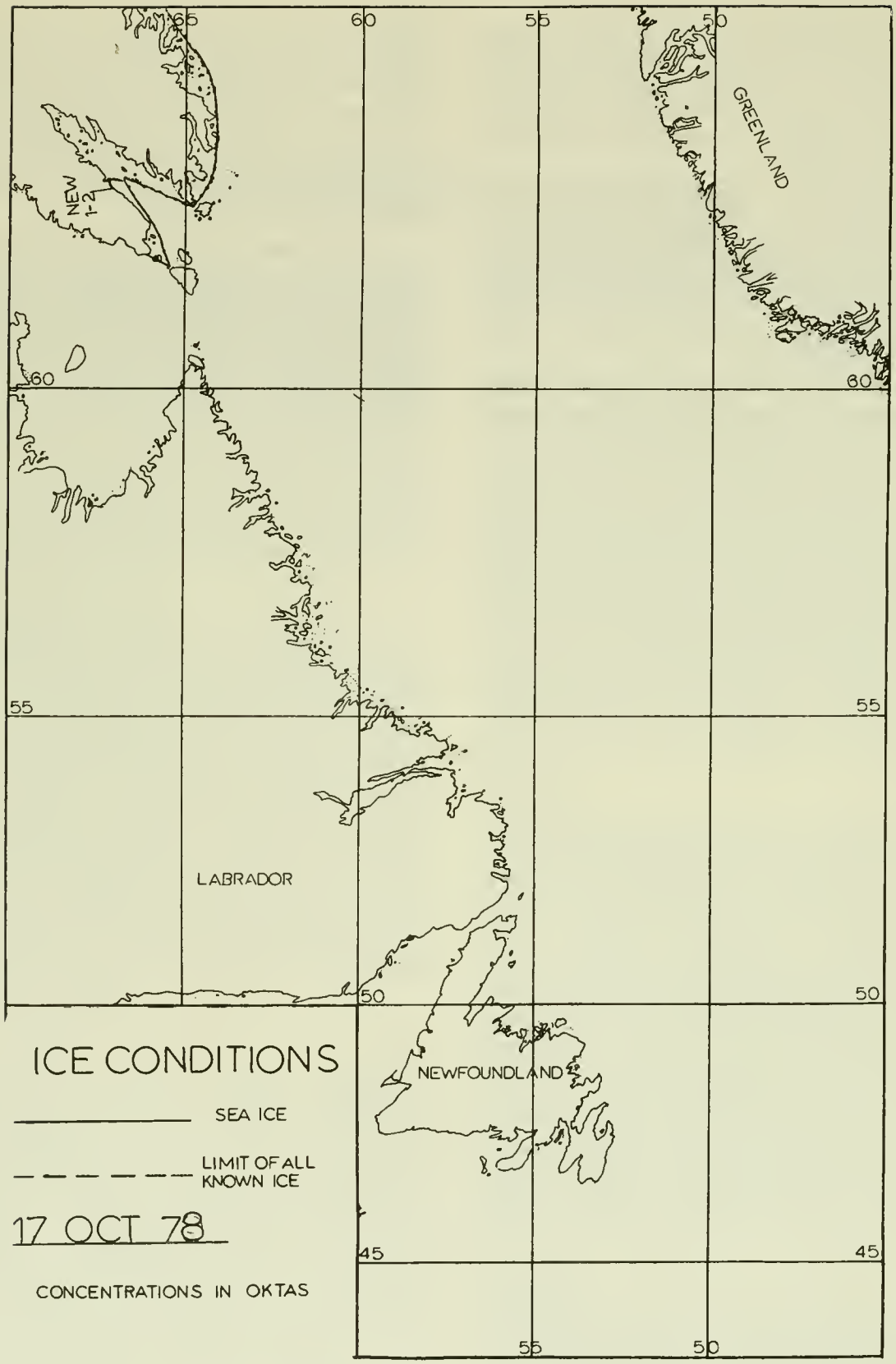
48°N. Ice conditions for 12 and 24 June are shown in figures 9 and 18. These show that most of the ice was well north of the major shipping lanes and with the increased water temperatures in that area few bergs were likely to survive the drift south and become a hazard.

The average surface pressure shown in figure 29 indicate a return to near normal conditions. The onshore breeze was no longer a predominant force but, as mentioned, the higher water temperatures took over where the breeze left off in preventing southward drift.

July-August 1979

July was the last month that Ice Patrol conducted reconnaissance operations; the last flight was made on 19 July with no icebergs sighted in the vicinity of the Grand Banks. An estimated 3 icebergs drifted south of 48°N during July. Sea ice and iceberg conditions for late July are shown in figures 10 and 19. Sea surface pressures are shown in figures 30 and 31. Sea ice conditions for August are in figure 11; the retreat continued as seen in figure 12.

Iceberg reports continued to arrive through August but no bergs were noted south of the approaches to the Strait of Belle Isle. As is quite common, icebergs remained in that area and Ice Patrol forwarded all berg reports to Ice Central Ottawa which broadcast the information to North Atlantic mariners.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ICE CONDITIONS
NEWFOUNDLAND
SEA ICE
LIMIT OF ALL
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CONCENTRATIONS IN OKTAS
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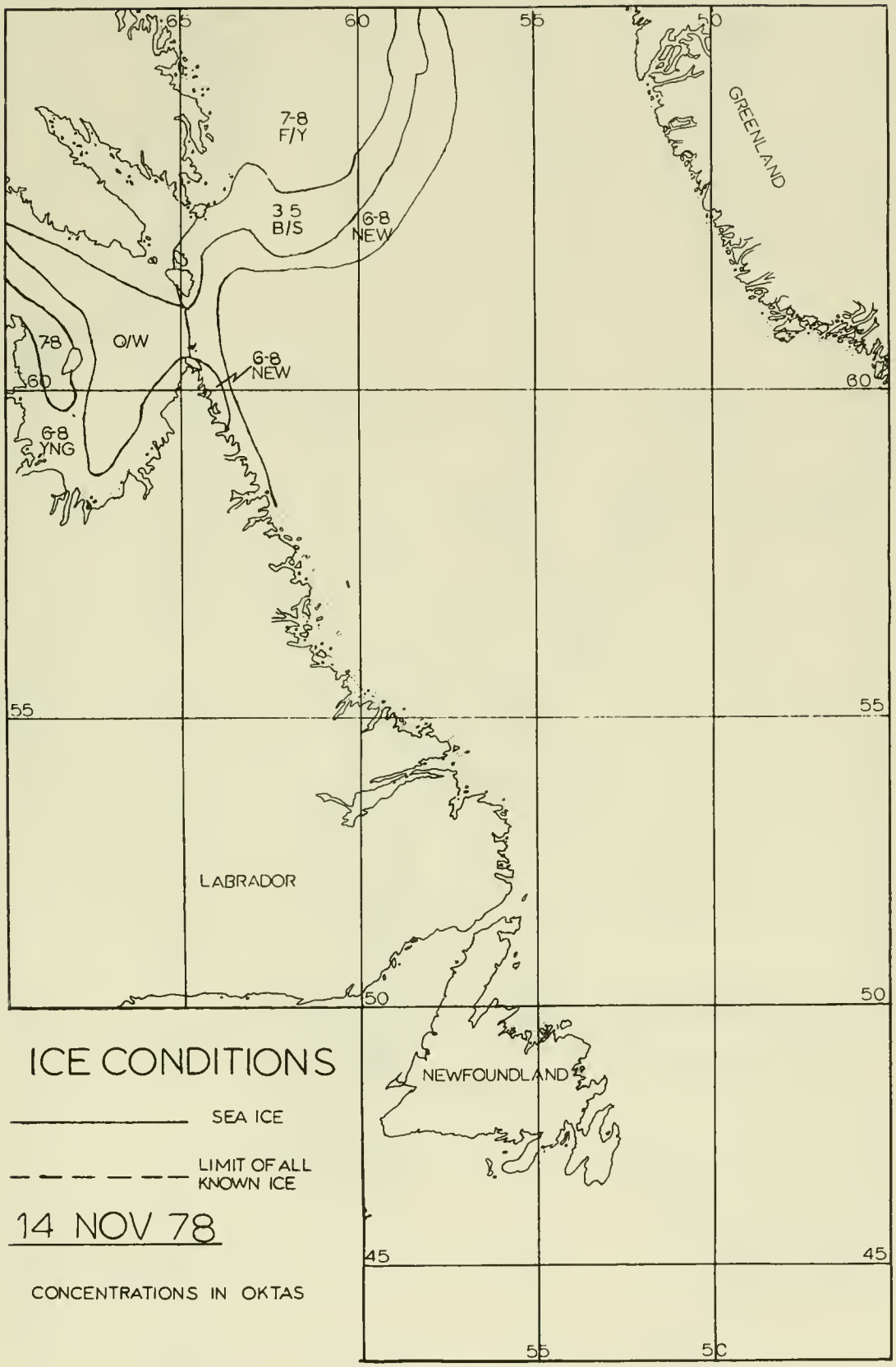
Figure 1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CONCENTRATIONS IN OKTAS
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Figure 2

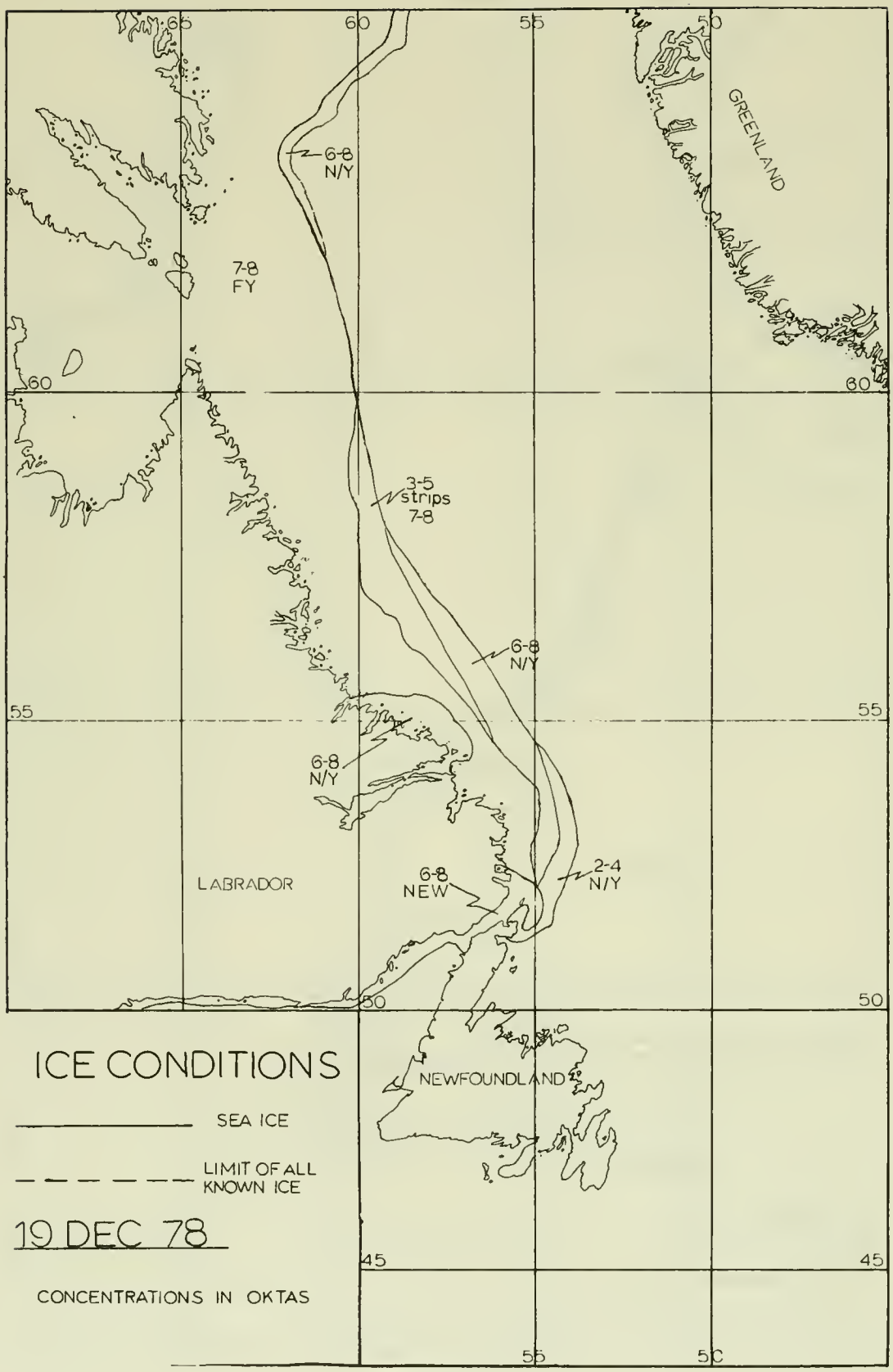
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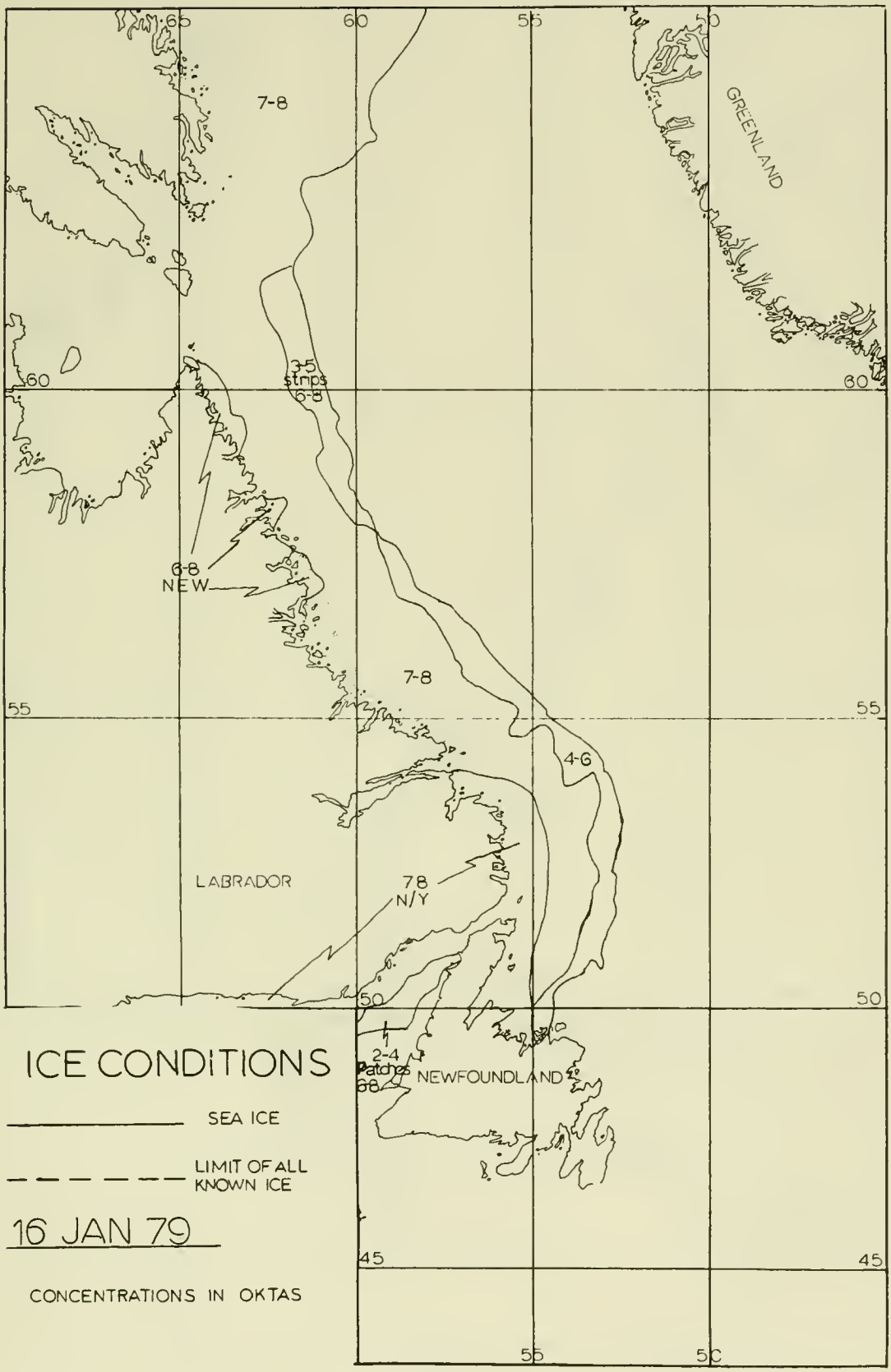
Figure 3


ICE CONDITIONS
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LIMIT OF ALL KNOWN ICE
16 JAN 79
CONCENTRATIONS IN OKTAS
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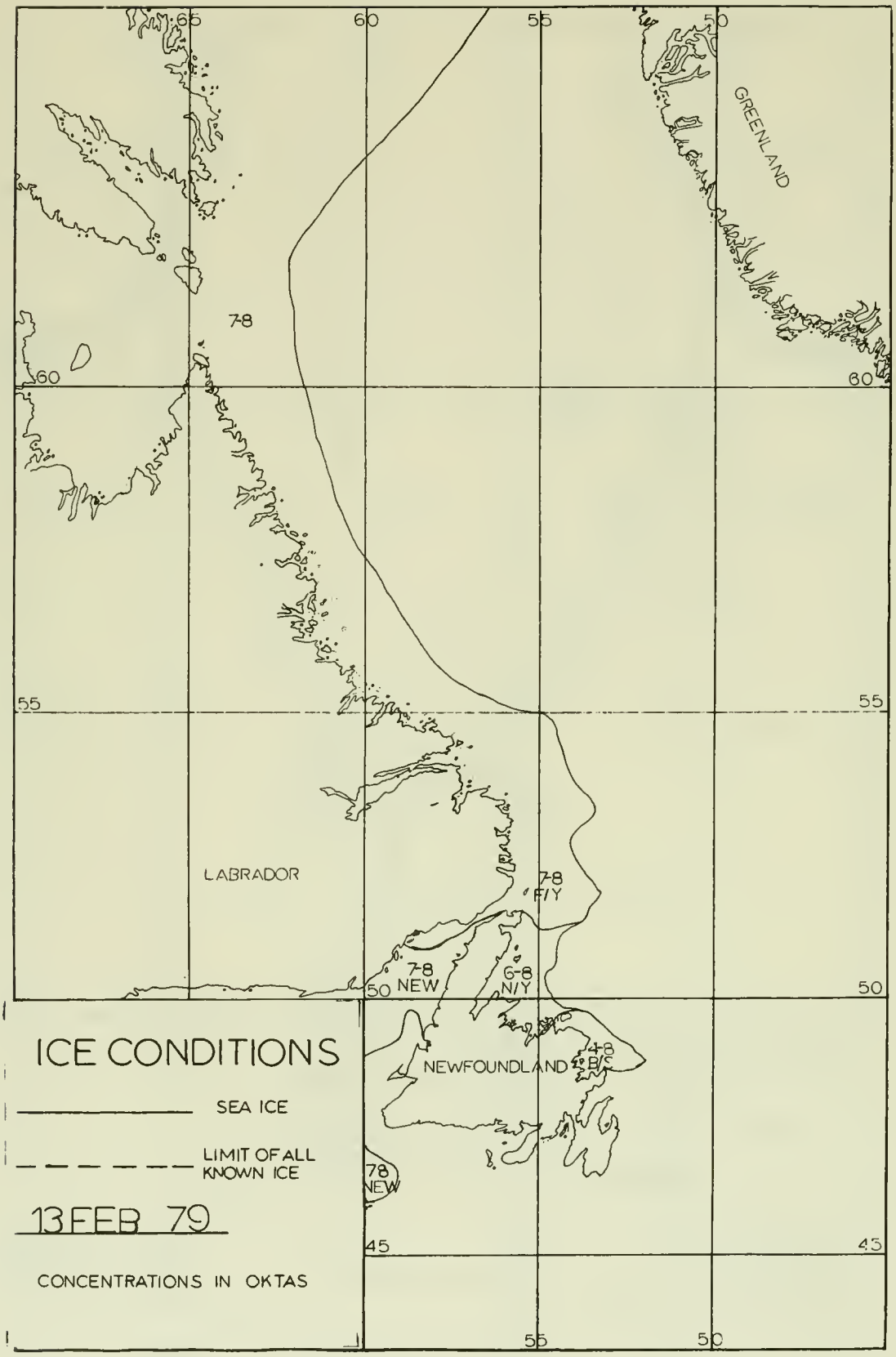
Figure 4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ICE CONDITIONS
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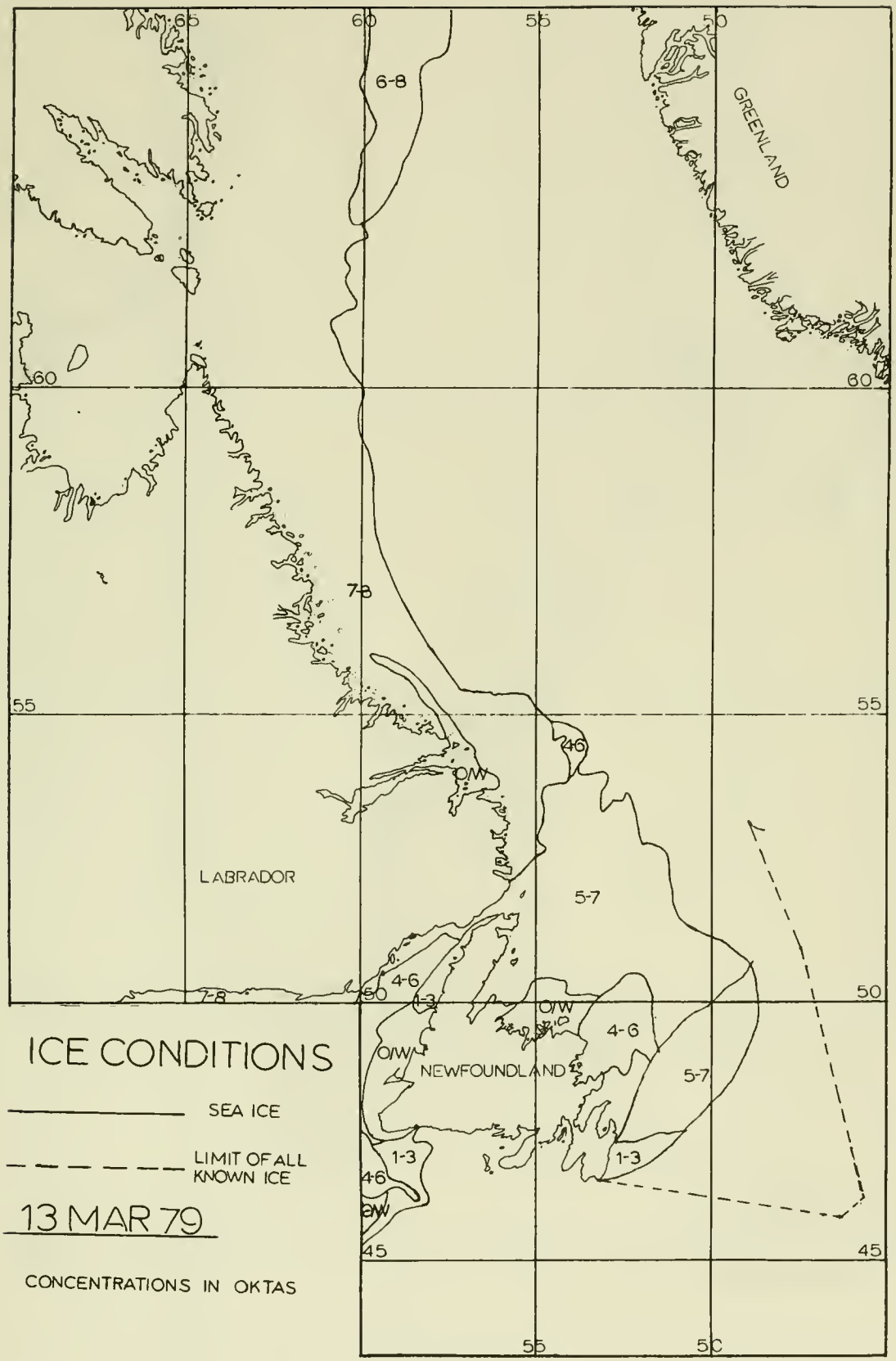
Figure 5


ICE CONDITIONS
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CONCENTRATIONS IN OKTAS
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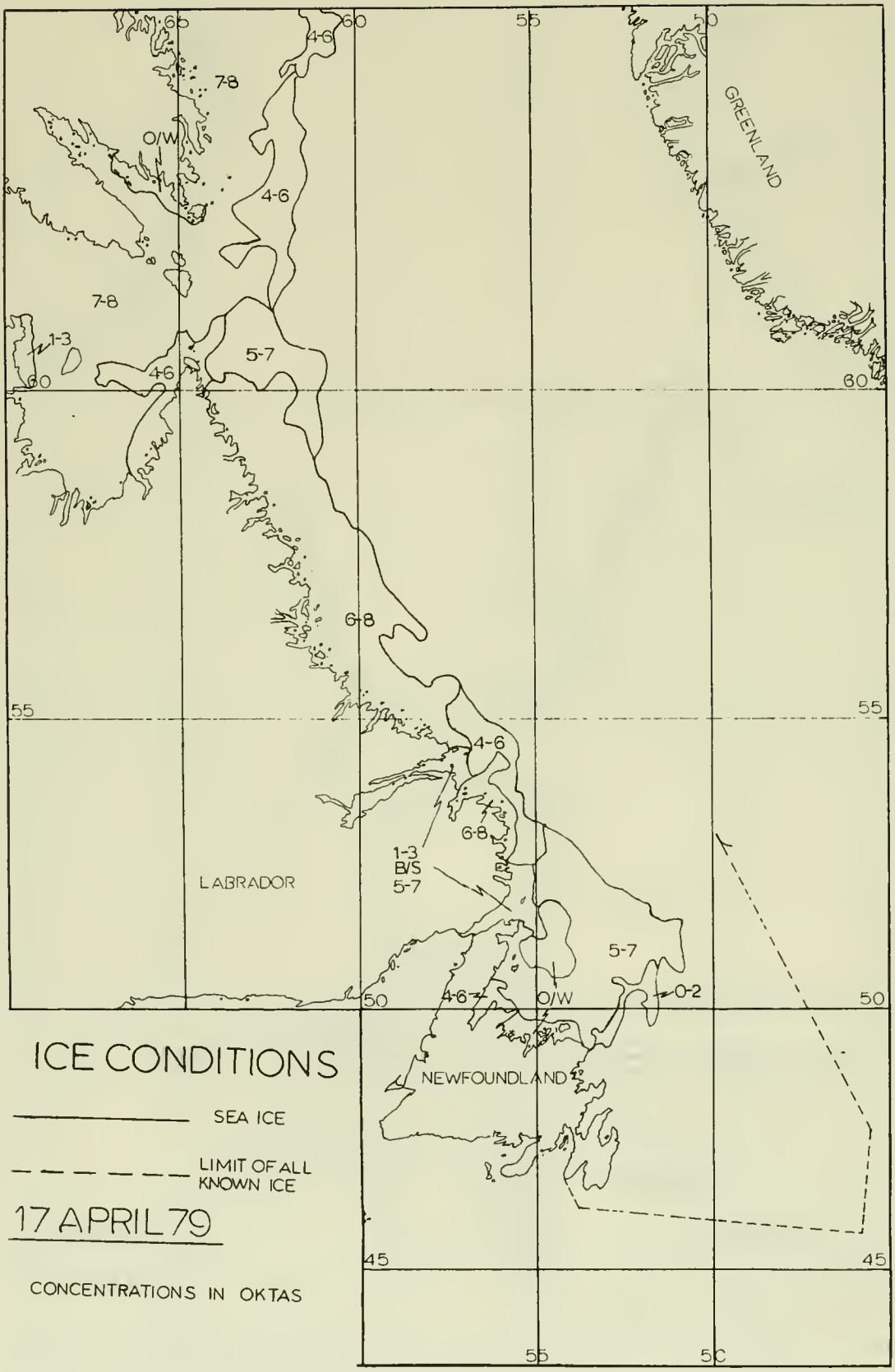
Figure 6


ICE CONDITIONS
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LIMIT OF ALL KNOWN ICE
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CONCENTRATIONS IN OKTAS
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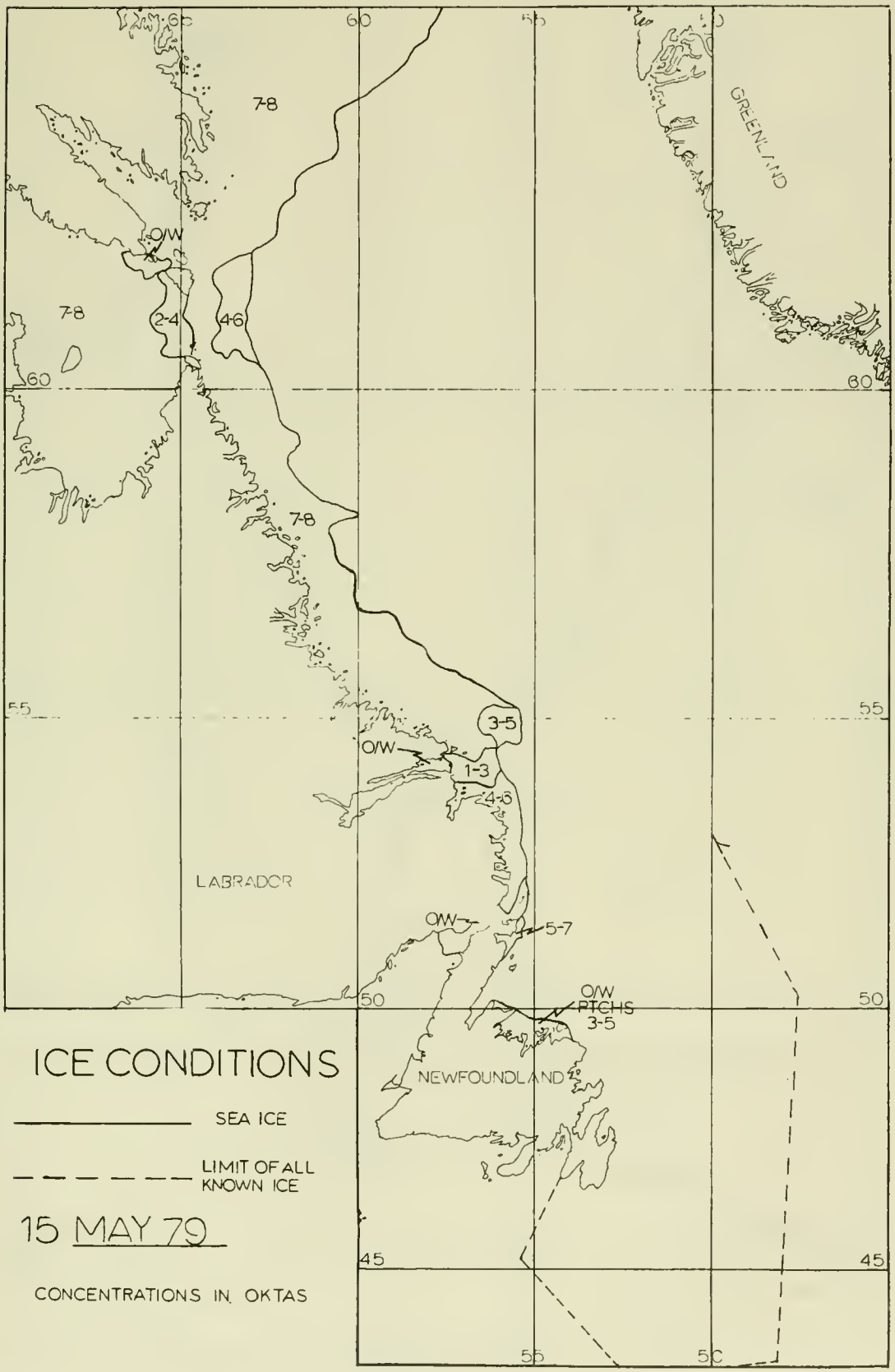
Figure 7


ICE CONDITIONS
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LIMIT OF ALL KNOWN ICE
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CONCENTRATIONS IN OKTAS
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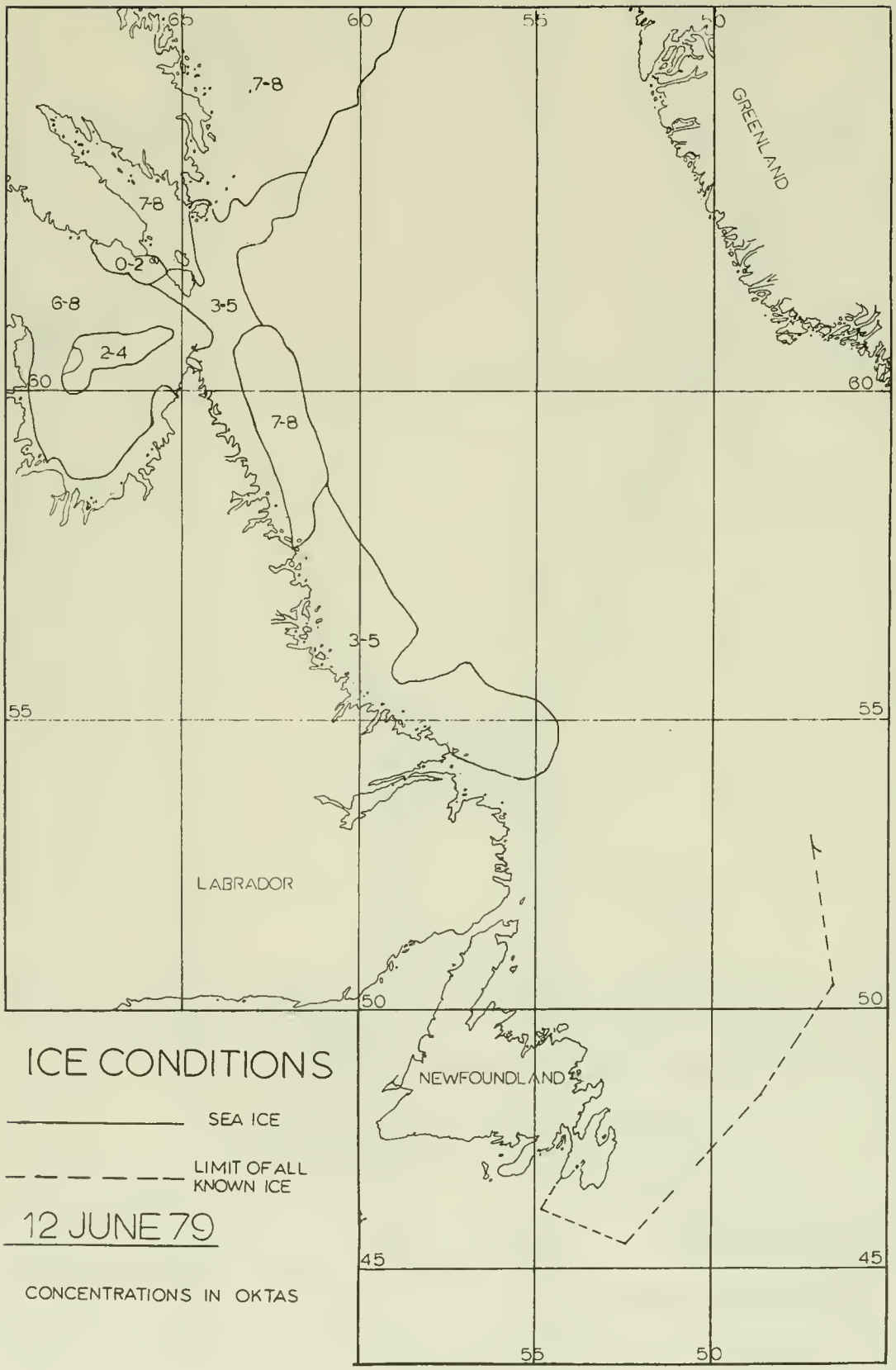
Figure 8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GREENLAND
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ICE CONDITIONS
SEA ICE
LIMIT OF ALL KNOWN ICE
12 JUNE 79
CONCENTRATIONS IN OKTAS

Figure 9

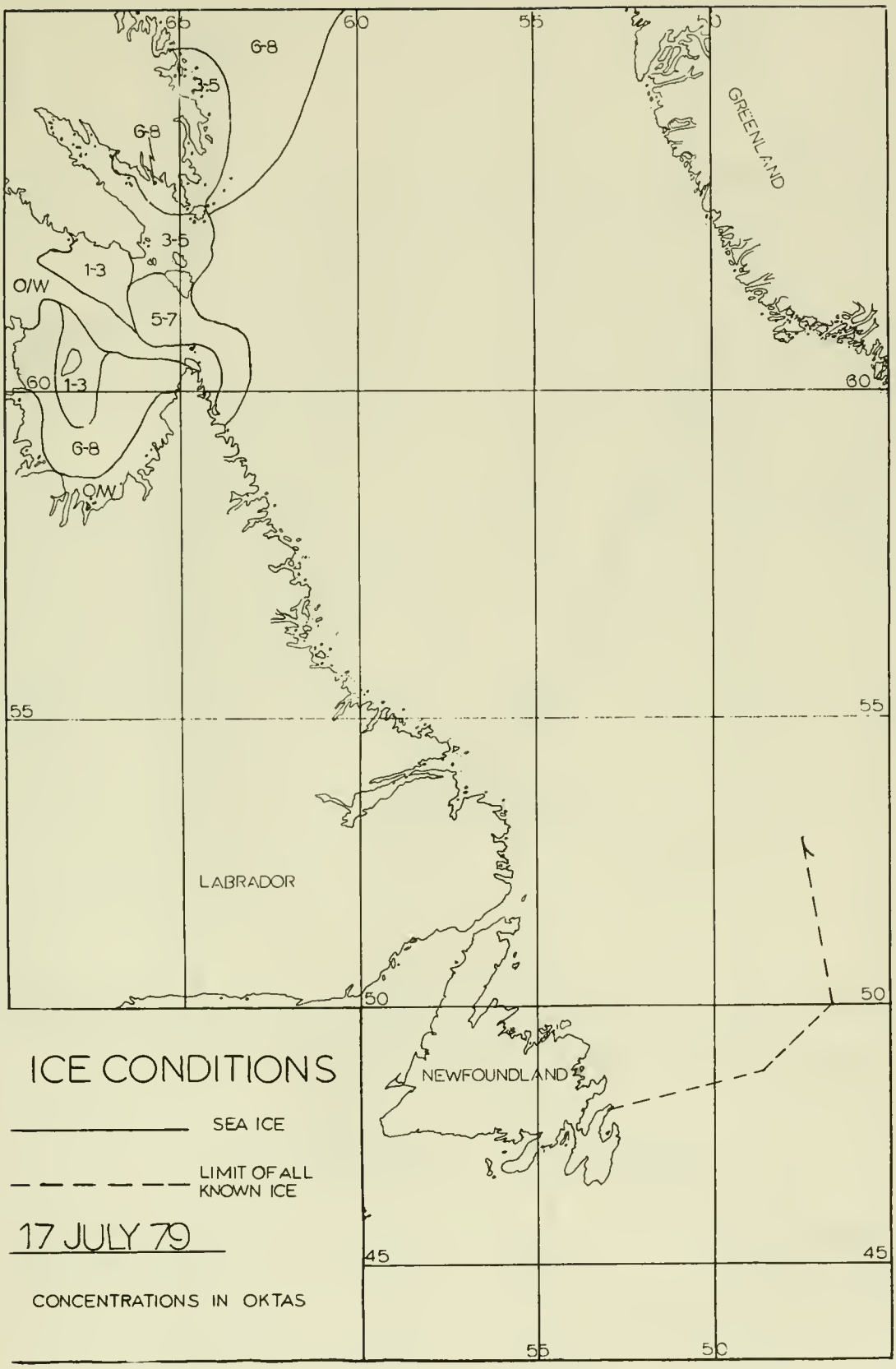
ICE CONDITIONS
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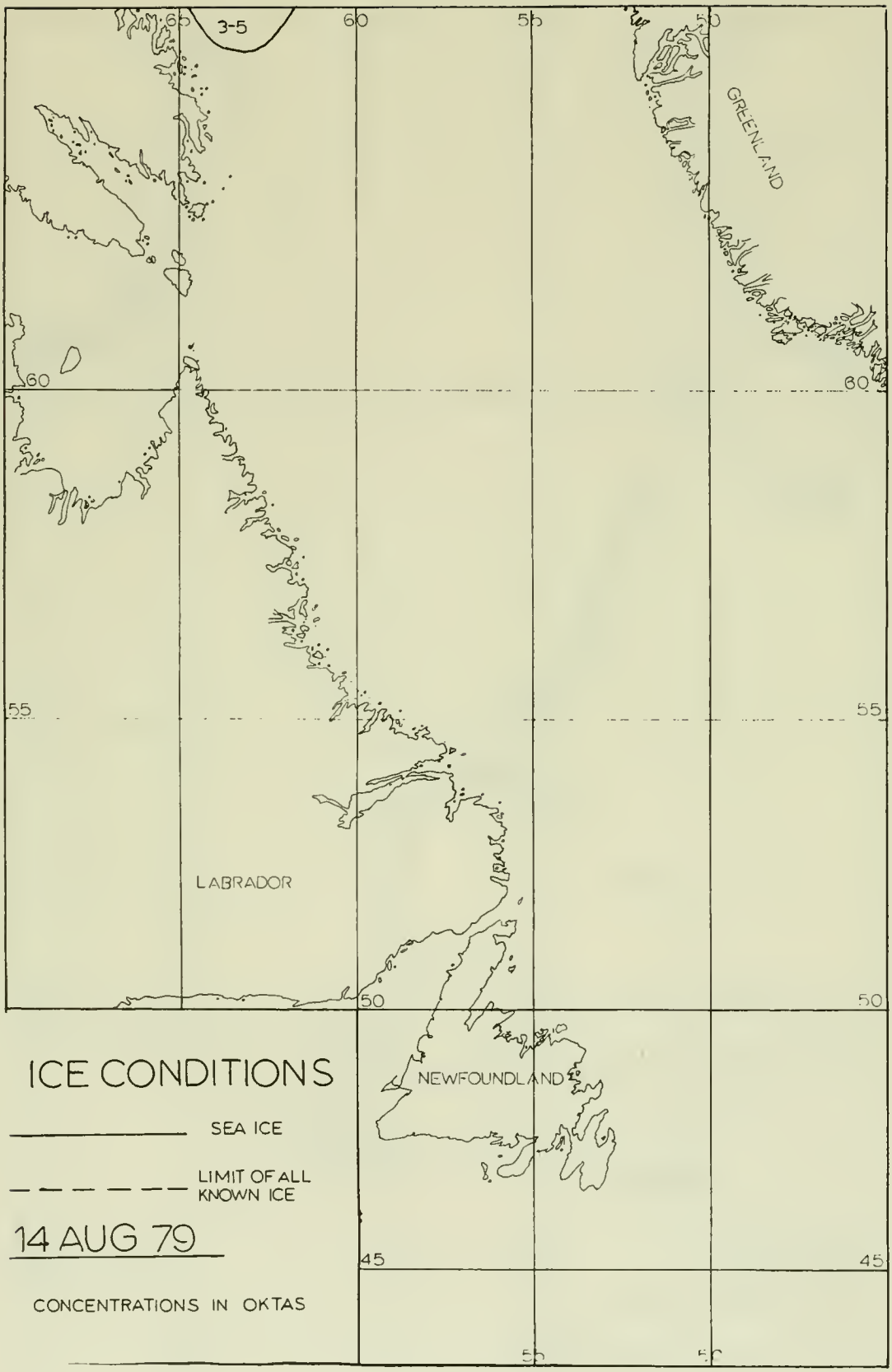
Figure 10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ICE CONDITIONS
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LIMIT OF ALL KNOWN ICE
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CONCENTRATIONS IN OKTAS
NEWFOUNDLAND
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Figure 11

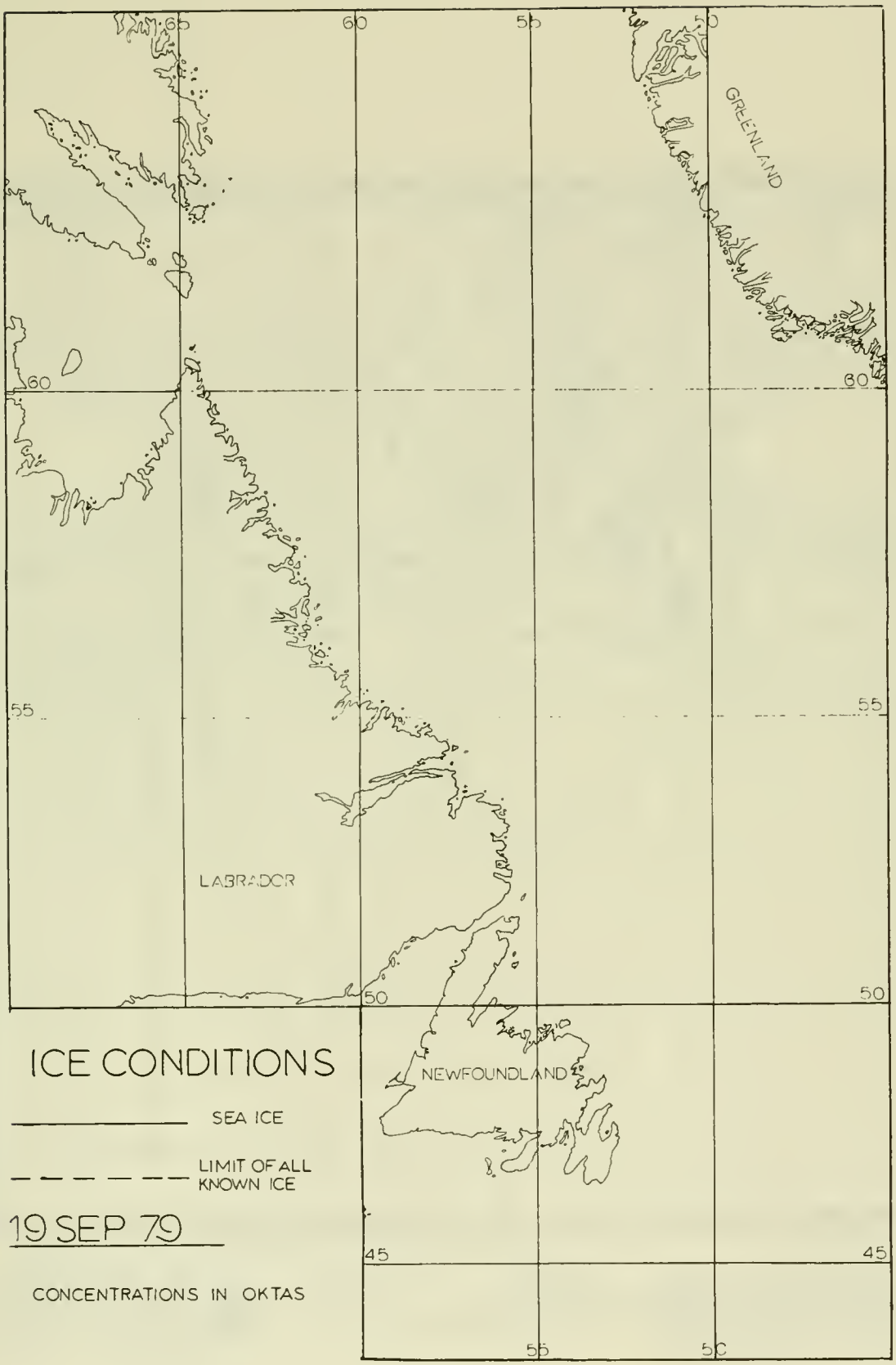
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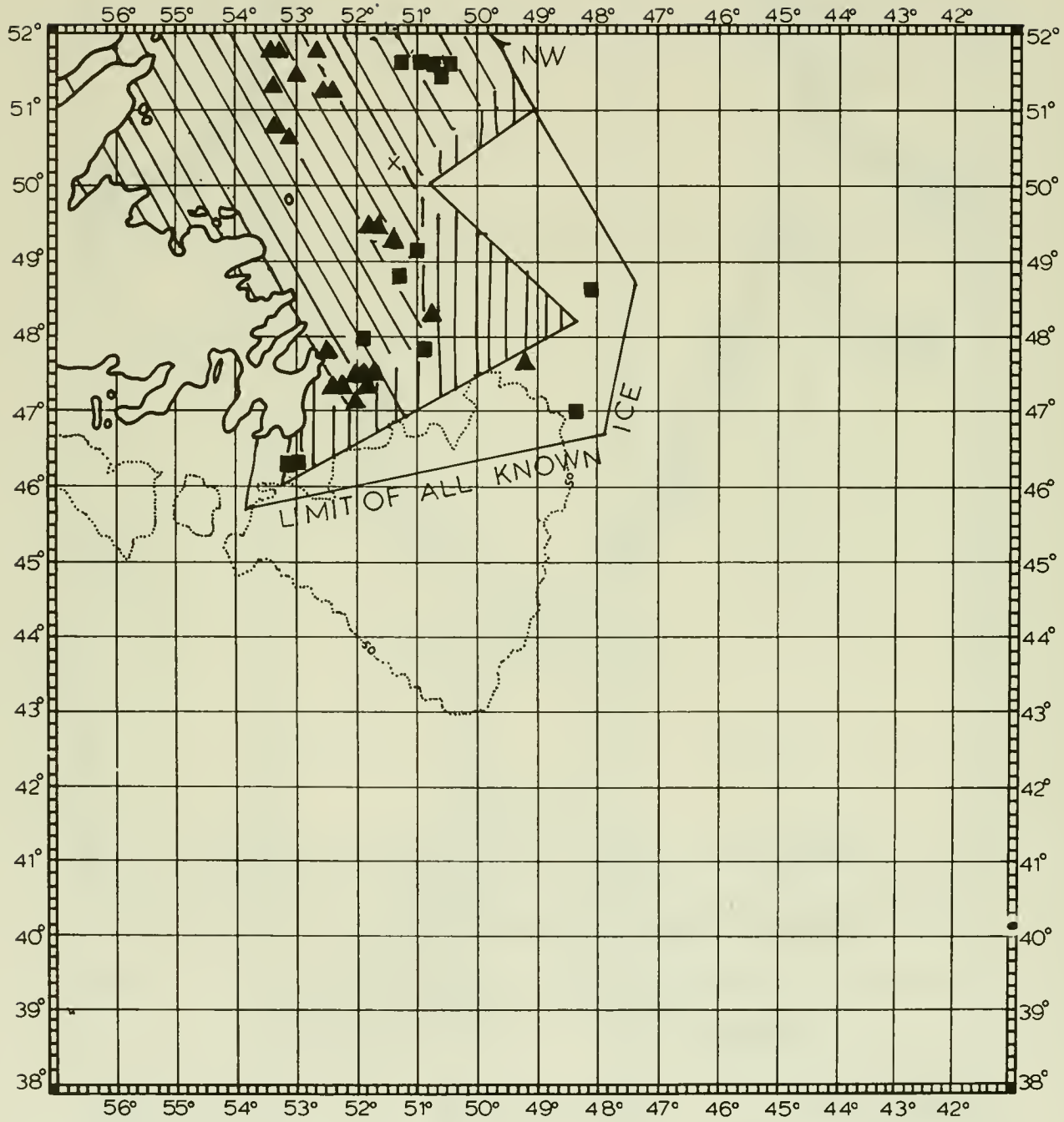
Figure 12



ICE CONDITIONS
FOR 1200 GMT 6 MARCH 1979
BASED ON OBSERVED AND
FORECAST CONDITIONS.

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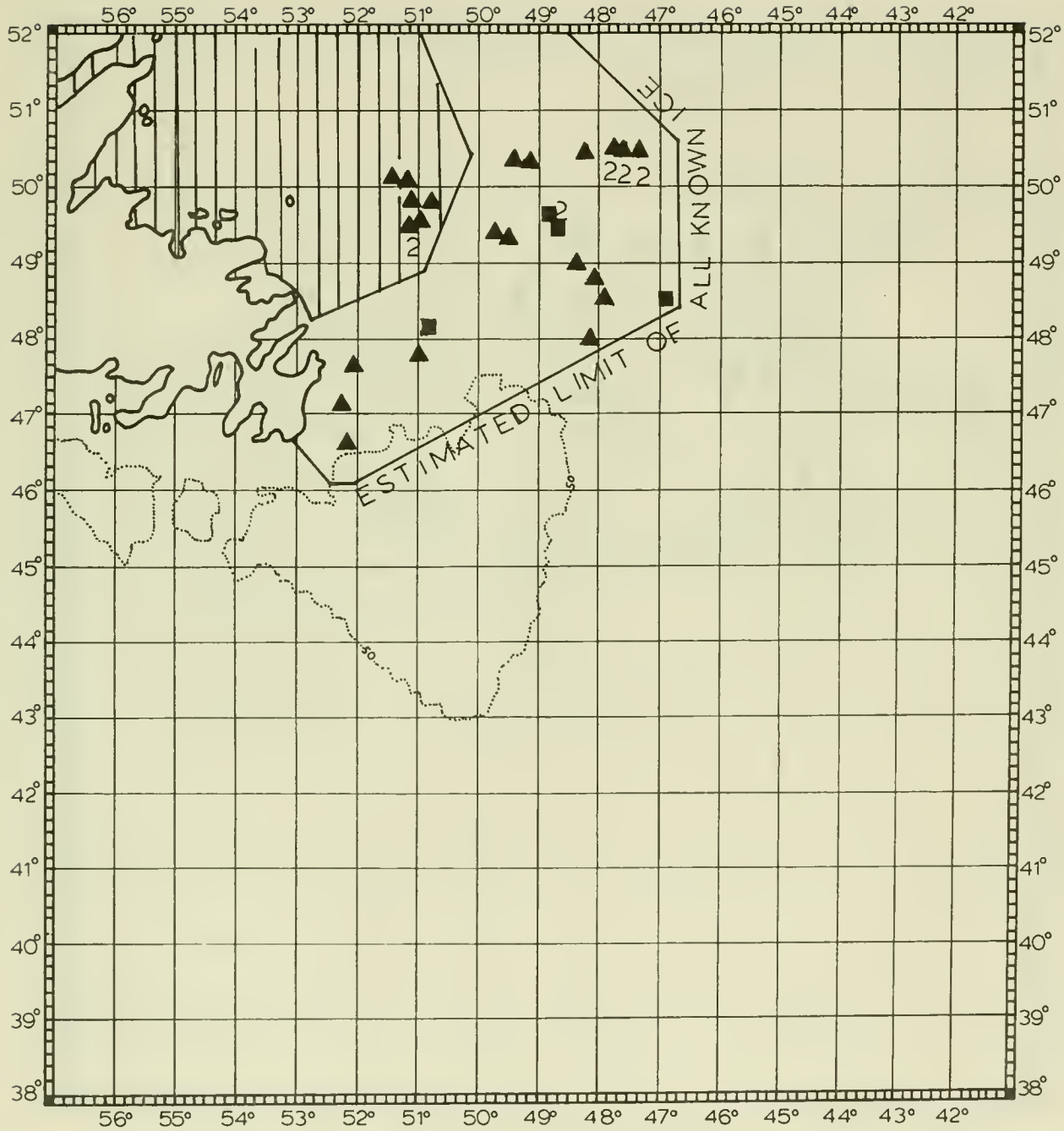
× RADAR TARGET

SEA ICE CONCENTRATION
LESS THAN 6 OKTAS
6 OKTAS OR MORE

Figure 13



ICE CONDITIONS
FOR 1200 GMT 24 MARCH 79
BASED ON OBSERVED AND
FORECAST CONDITIONS.

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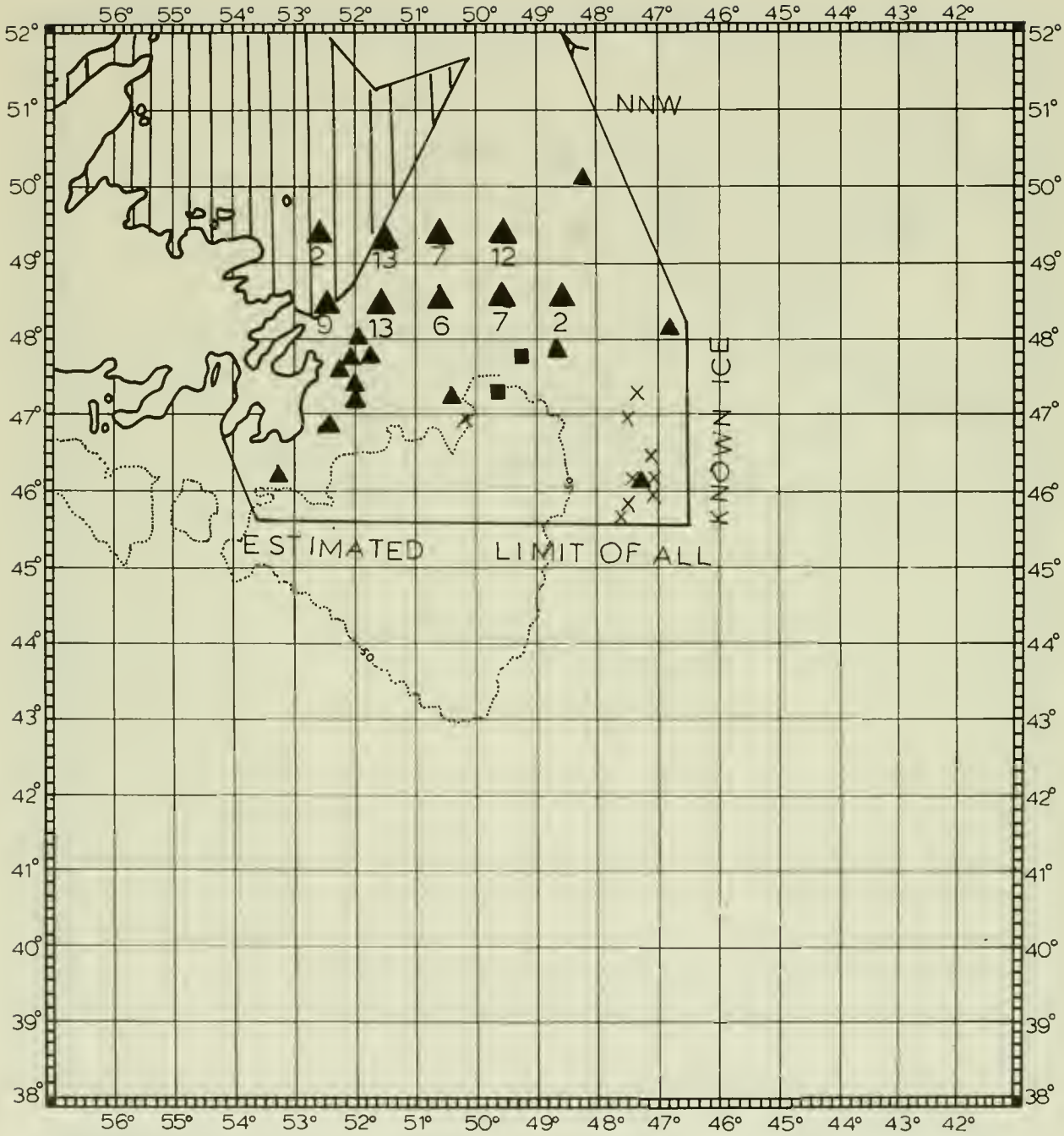
■ GROWLER
× RADAR TARGET

SEA ICE CONCENTRATION
LESS THAN 6 OKTAS
6 OKTAS OR MORE

Figure 14



ICE CONDITIONS
FOR 1200 GMT 06 APRIL 79
BASED ON OBSERVED AND
FORECAST CONDITIONS.

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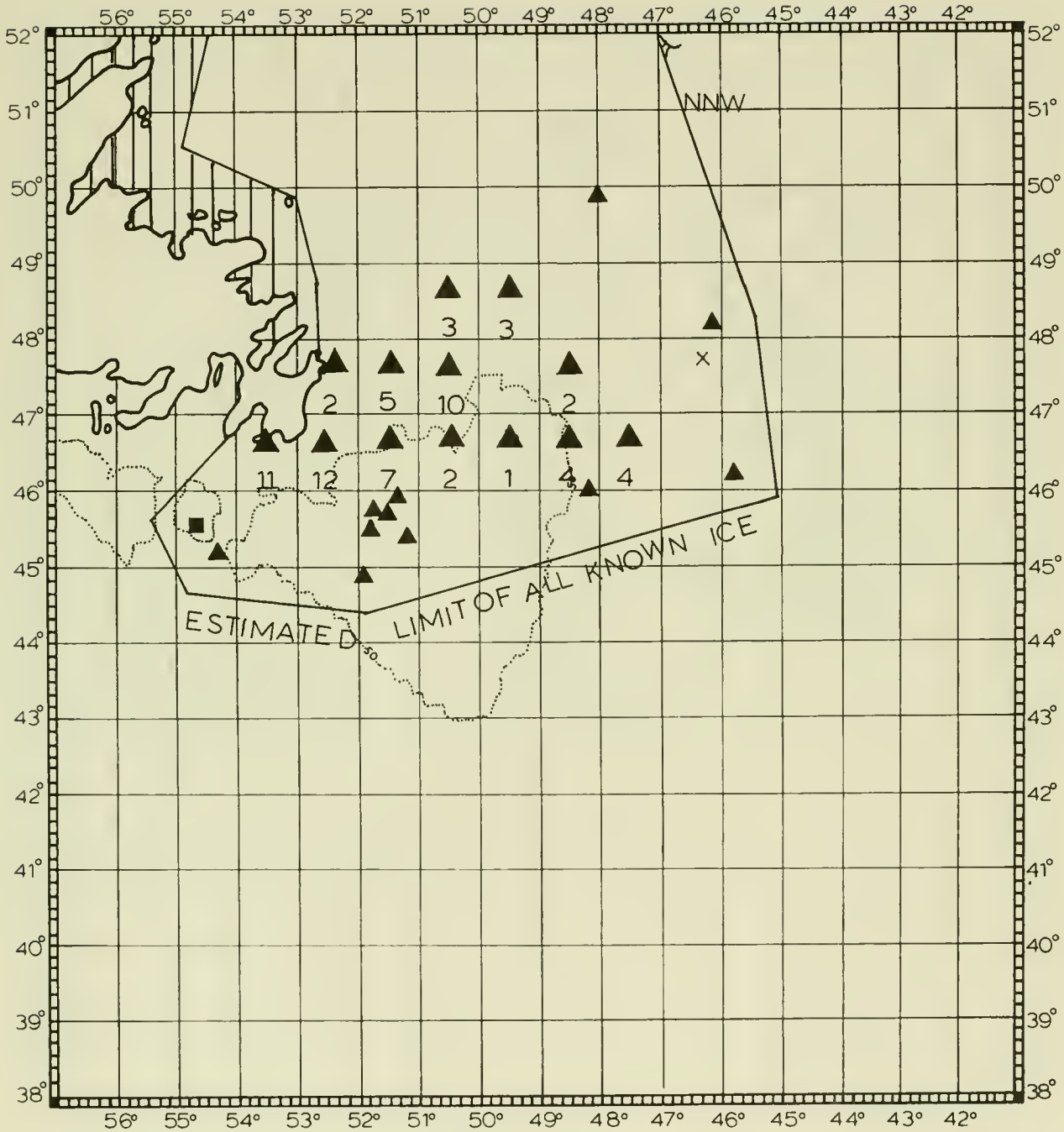
■ GROWLER
× RADAR TARGET

SEA ICE CONCENTRATION
LESS THAN 6 OKTAS
6 OKTAS OR MORE

Figure 15



ICE CONDITIONS
FOR 1200 GMT 1 MAY 1979
BASED ON OBSERVED AND
FORECAST CONDITIONS.

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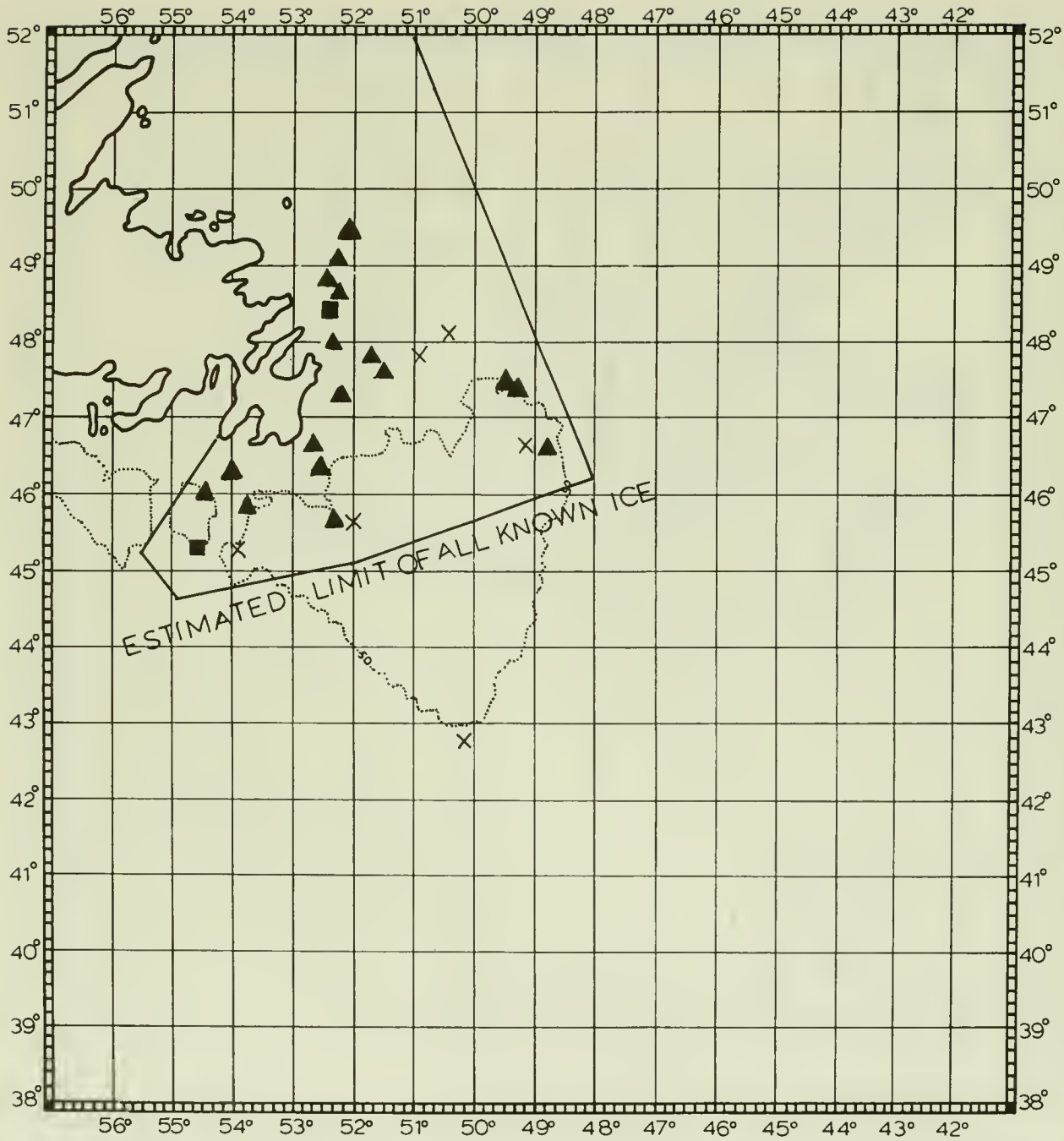
■ GROWLER
× RADAR TARGET

SEA ICE CONCENTRATION
LESS THAN 6 OKTAS
6 OKTAS OR MORE

Figure 16



ICE CONDITIONS FOR 1200 GMT 31 MAY 1979 BASED ON OBSERVED AND FORECAST CONDITIONS.

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× RADAR TARGET

SEA ICE CONCENTRATION
LESS THAN 6 OKTAS
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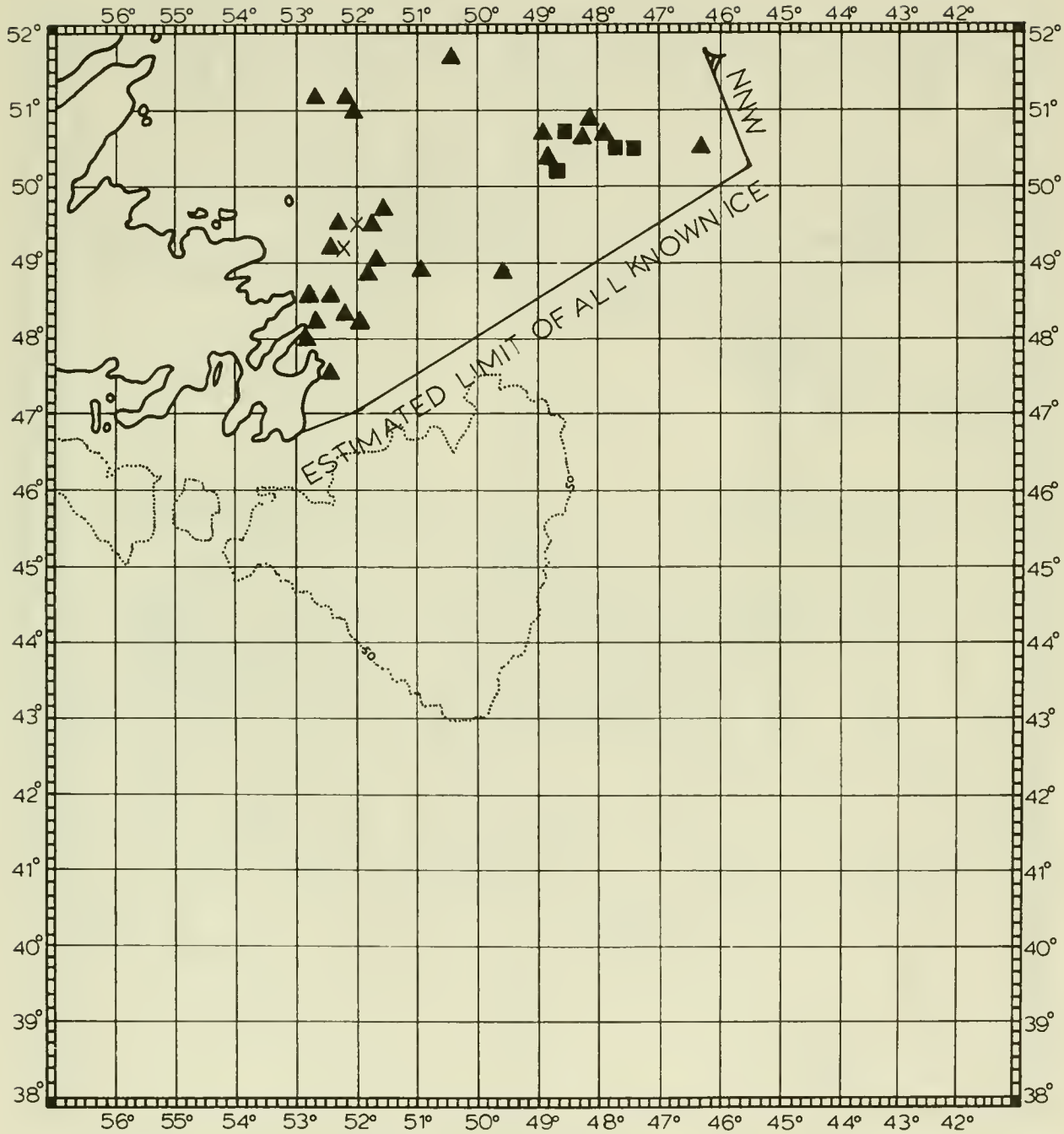
Figure 17



ICE CONDITIONS
FOR 1200 GMT 24JUNE 79
BASED ON OBSERVED AND
FORECAST CONDITIONS.

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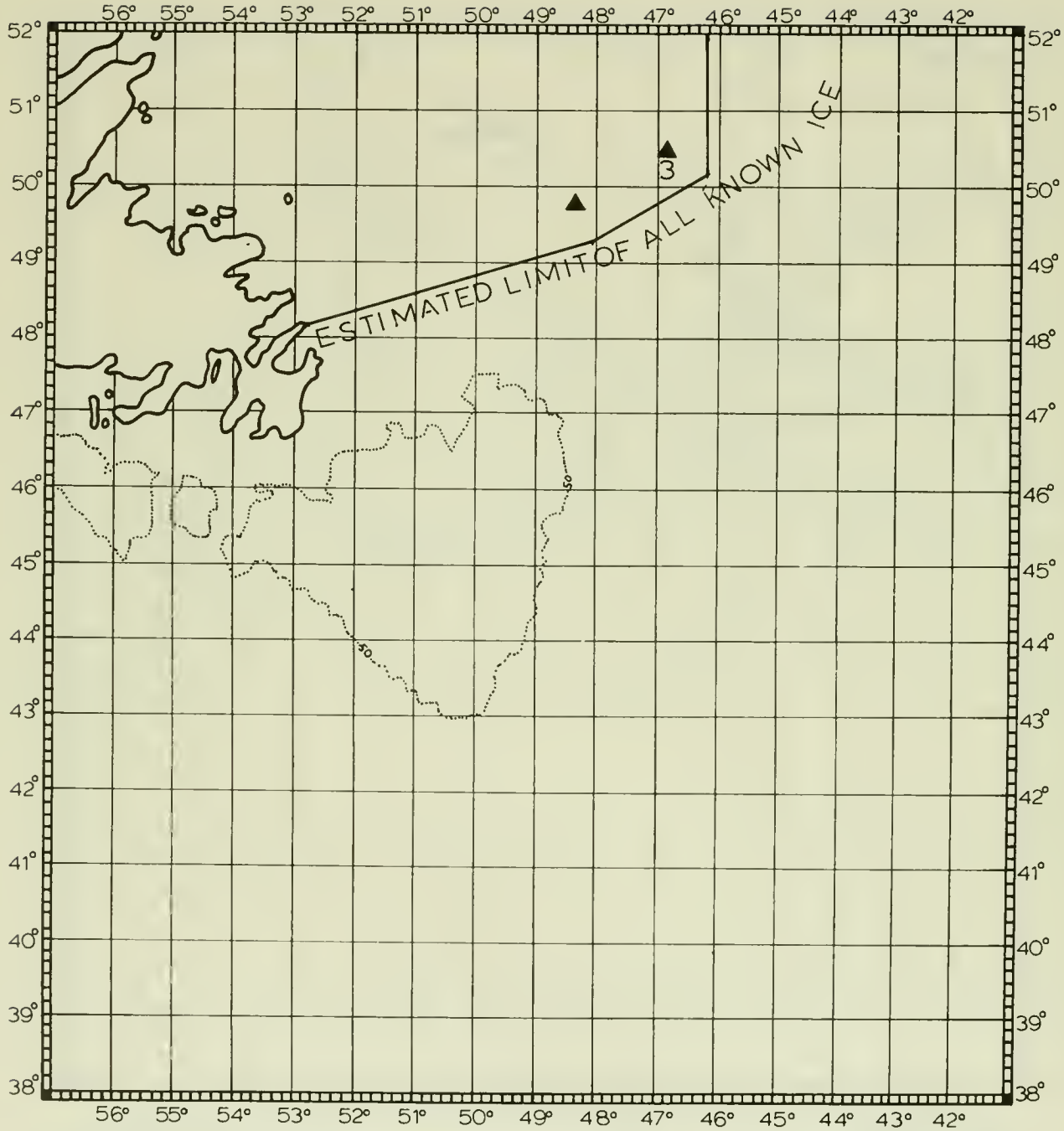
× RADAR TARGET

SEA ICE CONCENTRATION
LESS THAN 6 OKTAS
6 OKTAS OR MORE

Figure 18



ICE CONDITIONS
FOR 1200 GMT 21 JULY 79
BASED ON OBSERVED AND
FORECAST CONDITIONS.

▲ BERG
■ GROWLER
× RADAR TARGET

SEA ICE CONCENTRATION
LESS THAN 6 OKTAS
6 OKTAS OR MORE

Figure 19

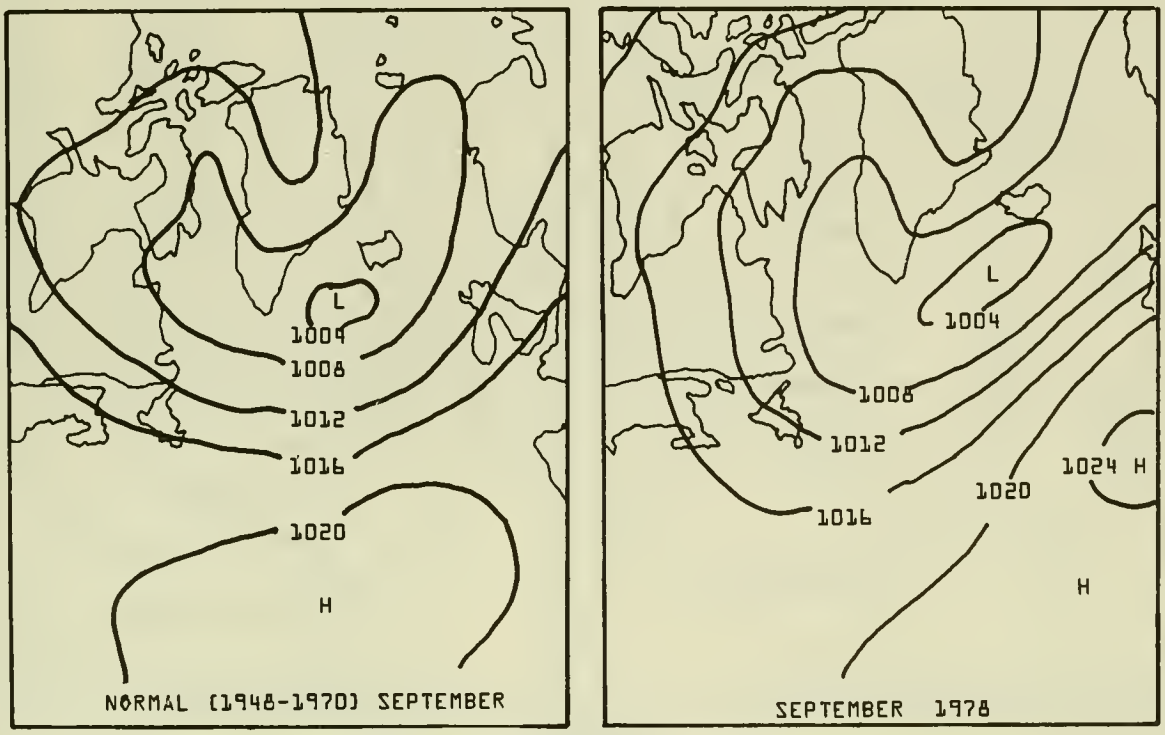


Figure 20
September 1978—Normal and Monthly Average Suface Pressure in MB

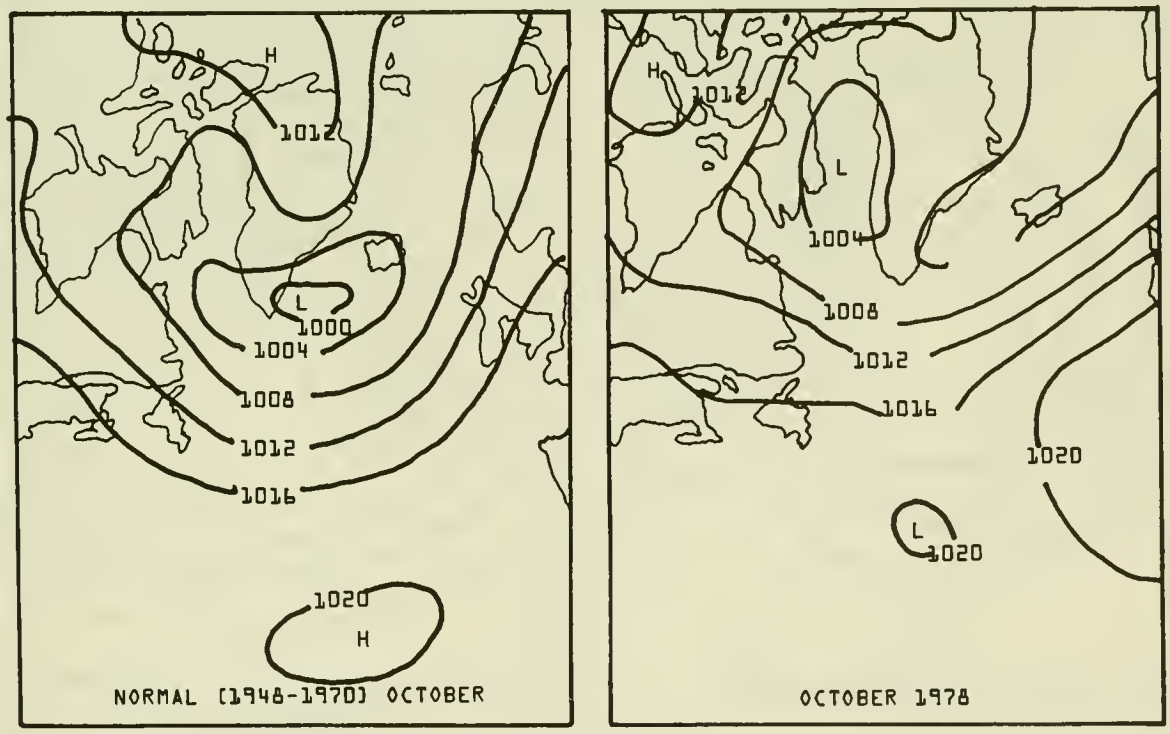


Figure 21
October 1978—Normal and Monthly Average Suface Pressure in MB

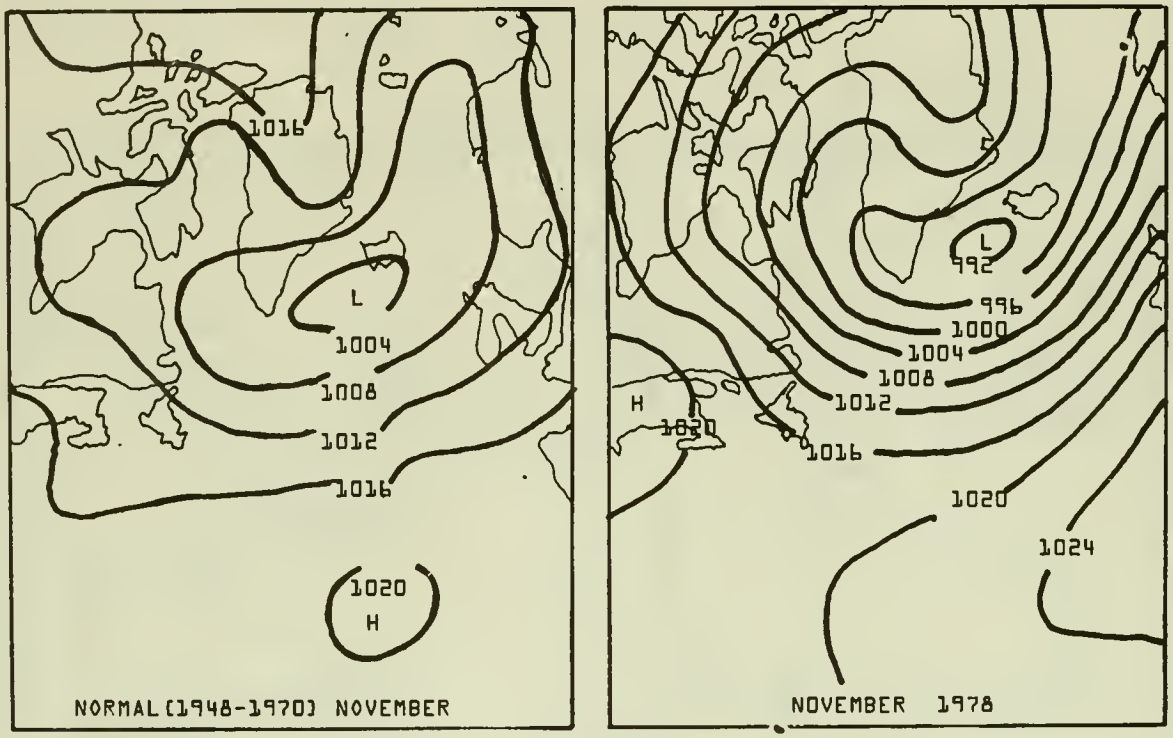


Figure 22
November 1978—Normal and Monthly Average Suface Pressure in MB

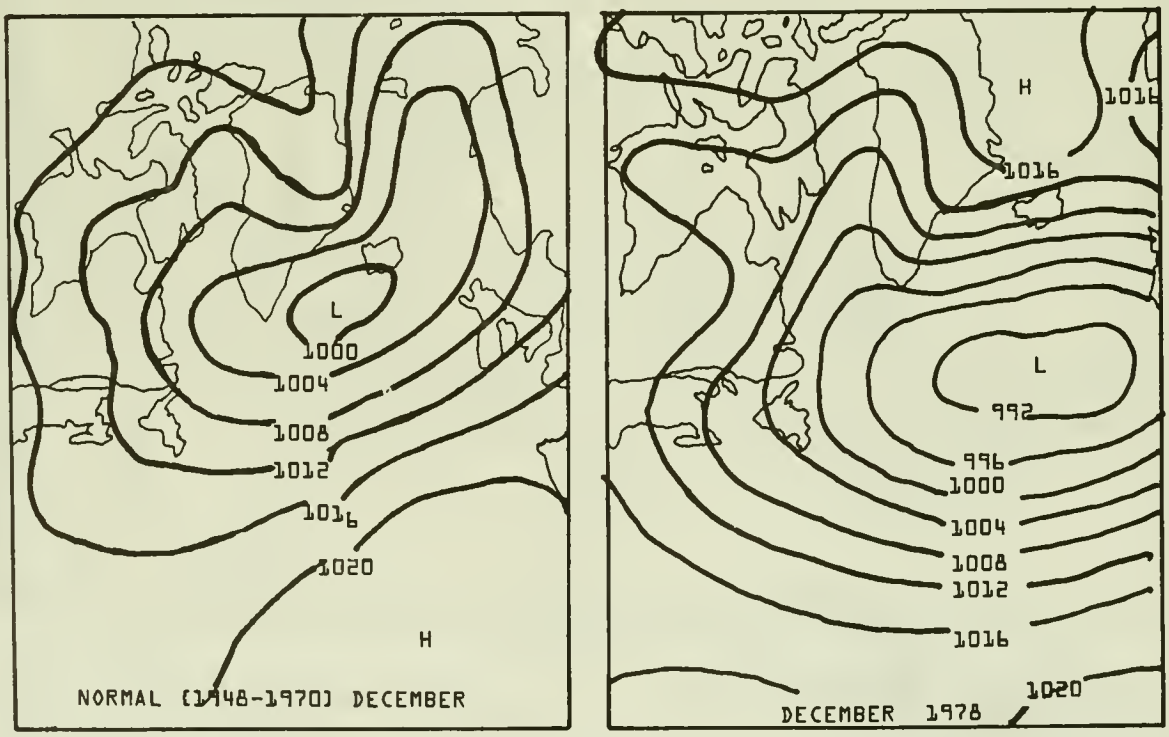


Figure 23
December 1978—Normal and Monthly Average Suface Pressure in MB

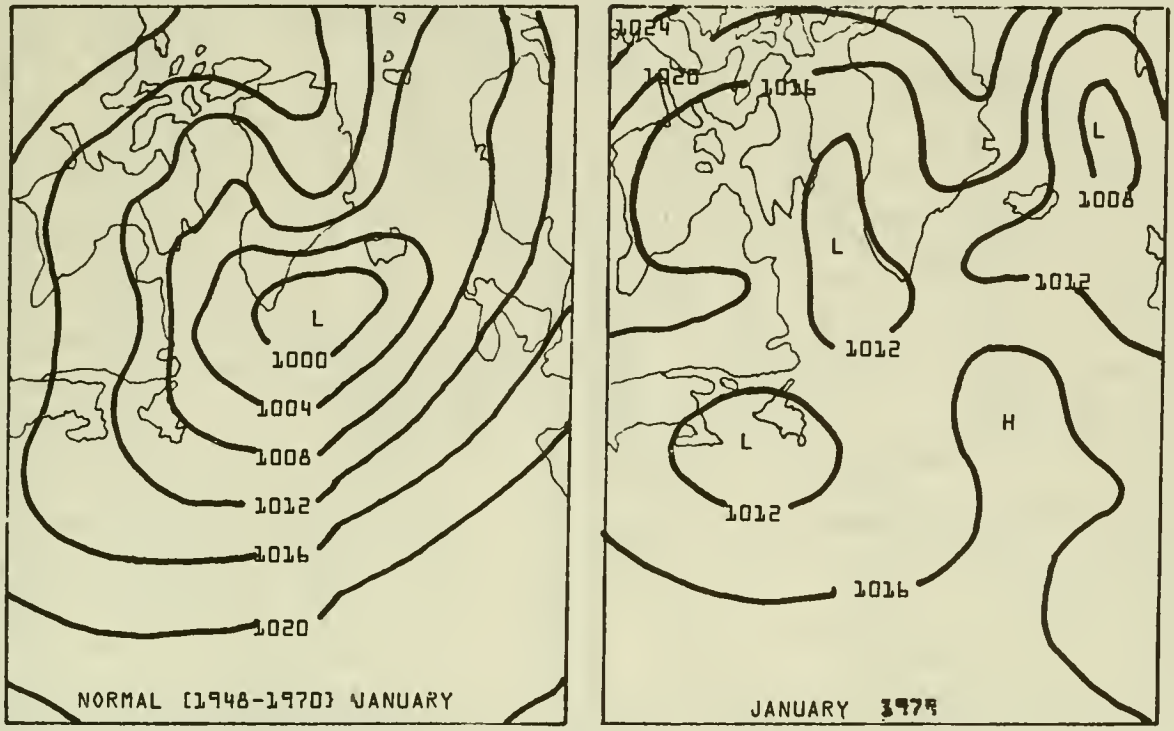


Figure 24
January 1979—Normal and Monthly Average Suface Pressure in MB

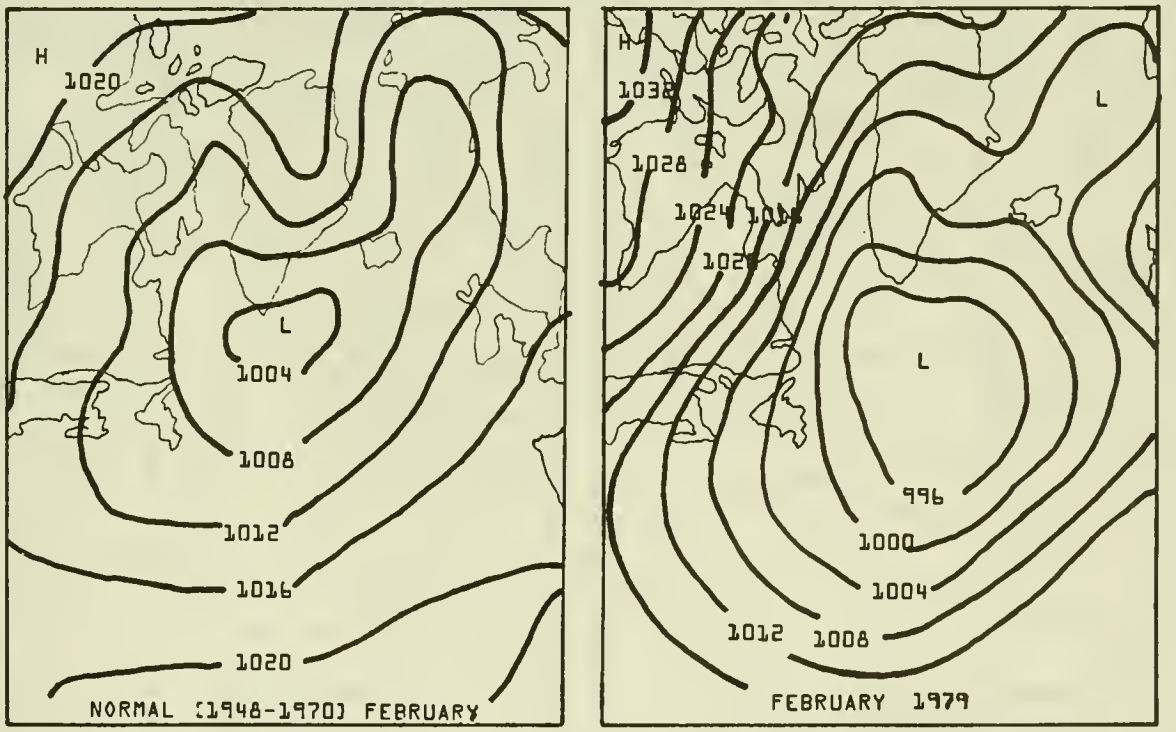


Figure 25
February 1979—Normal and Monthly Average Suface Pressure in MB

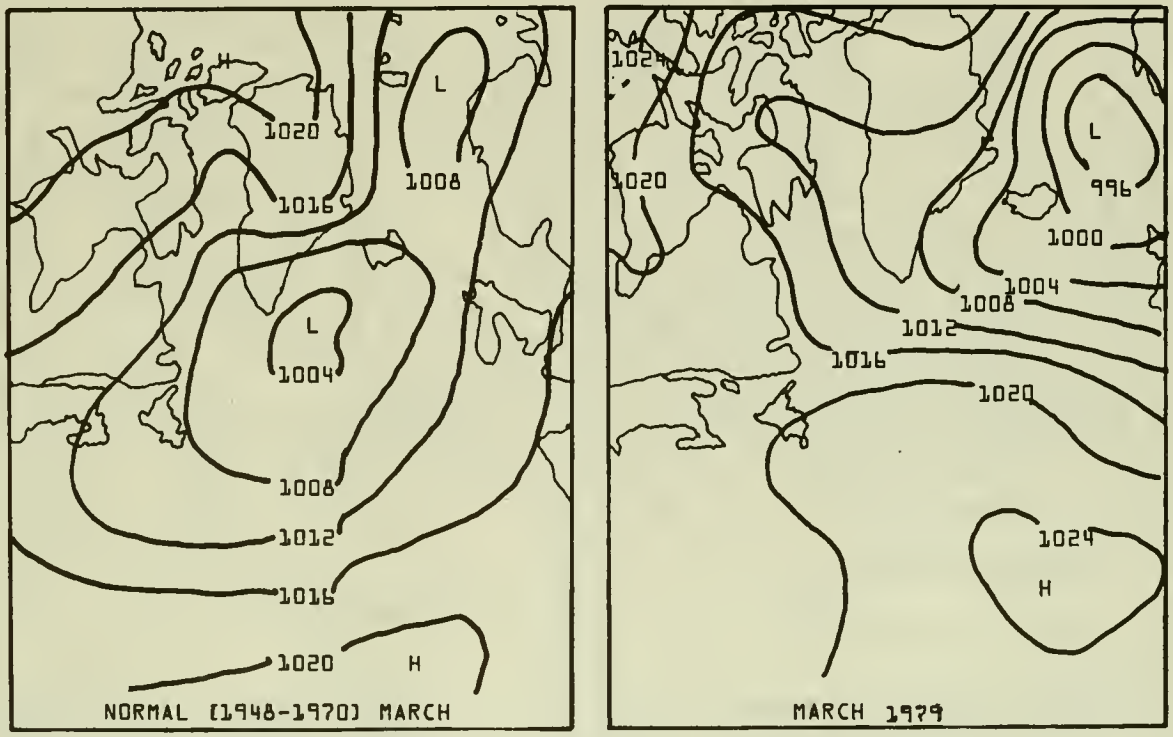


Figure 26
March 1979—Normal and Monthly Average Suface Pressure in MB

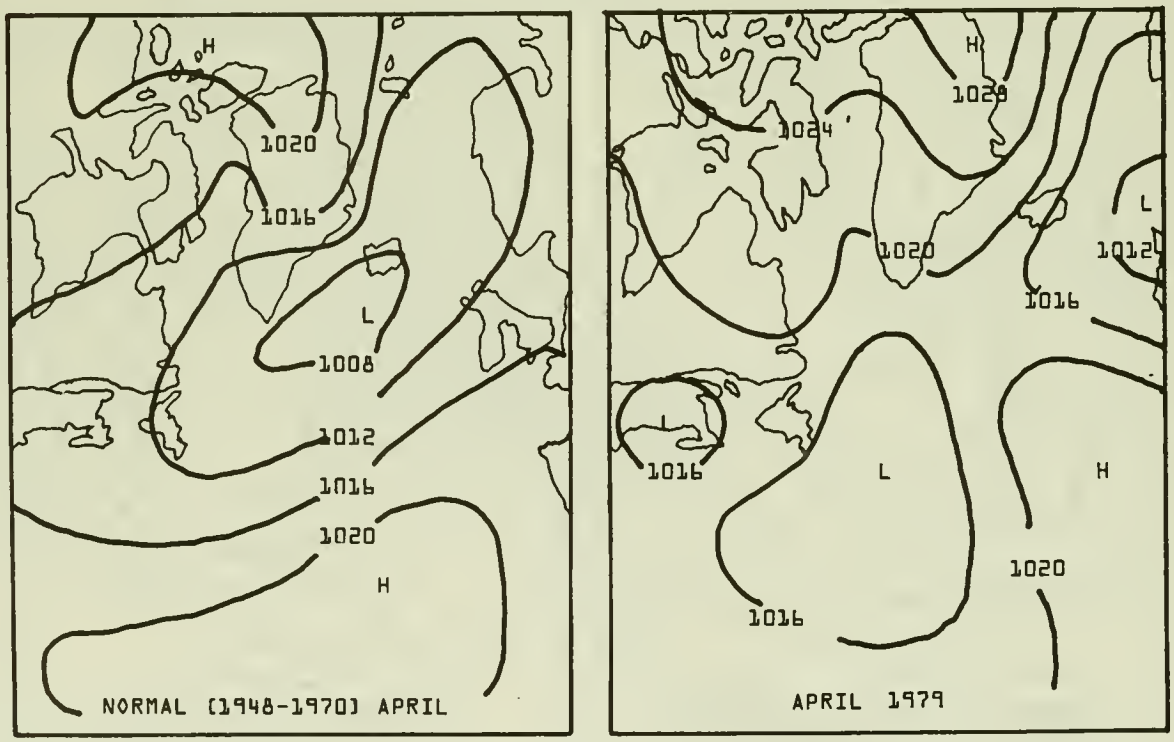


Figure 27
April 1979—Normal and Monthly Average Suface Pressure in MB

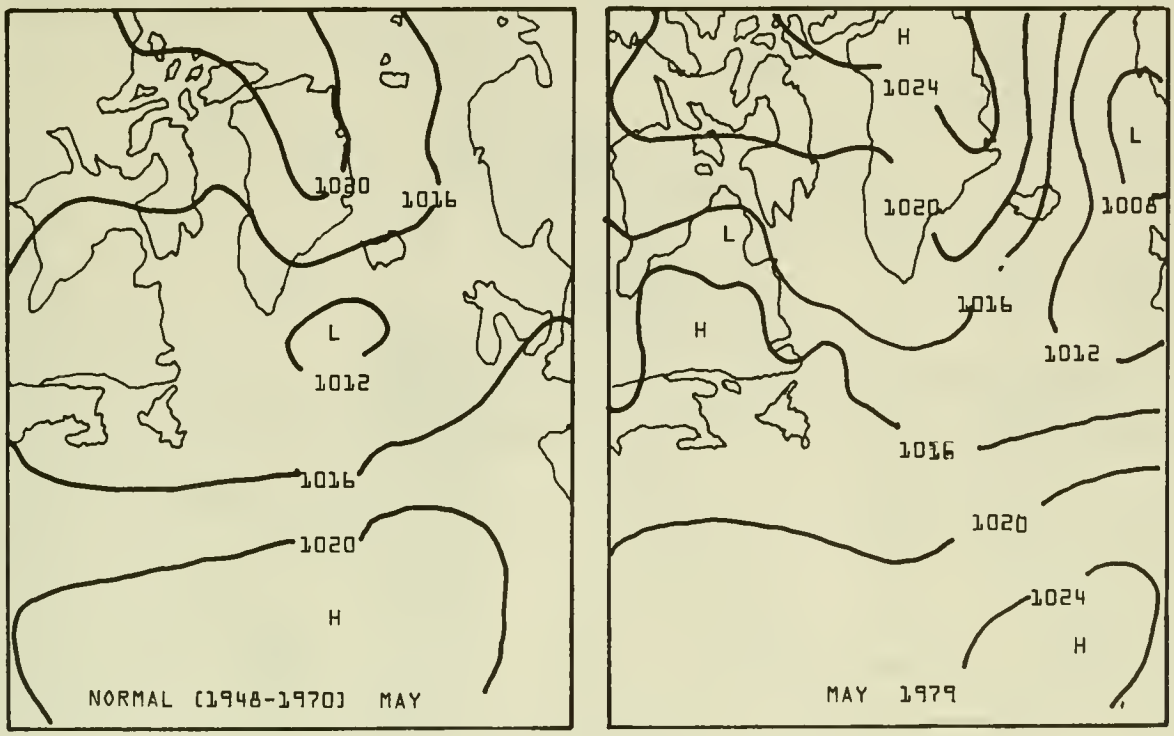


Figure 28
May 1979—Normal and Monthly Average Suface Pressure in MB

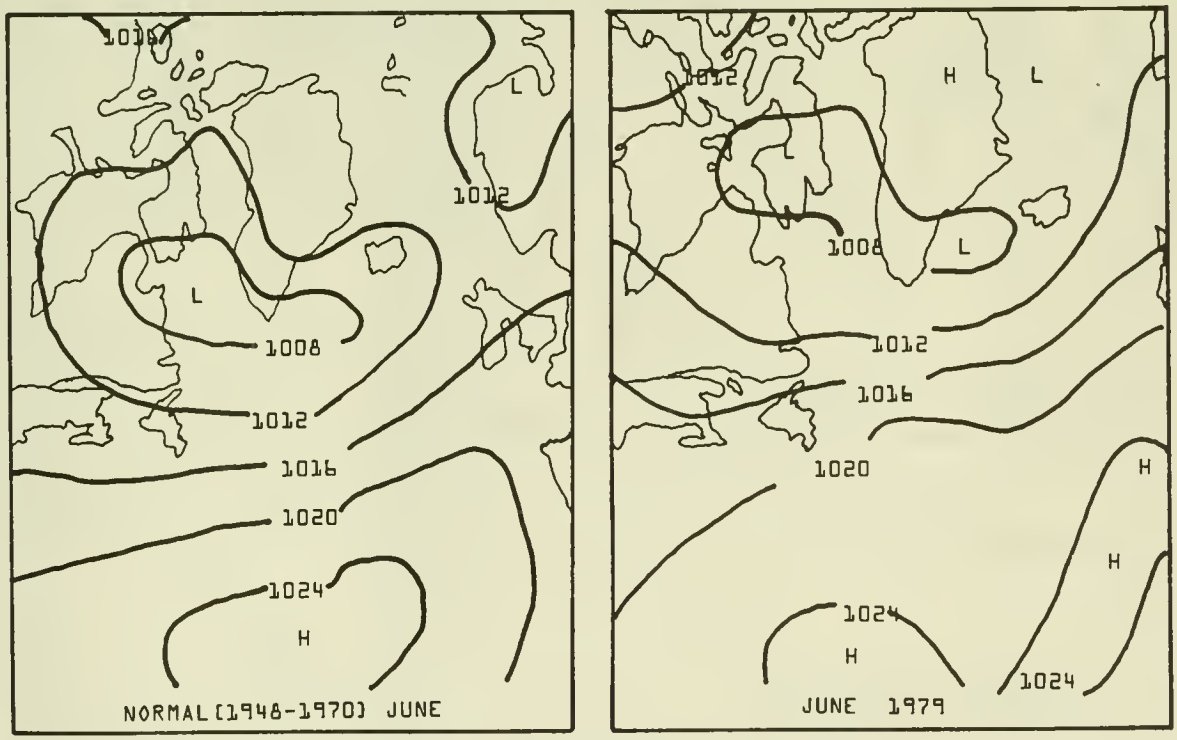


Figure 29
June 1979—Normal and Monthly Average Suface Pressure in MB

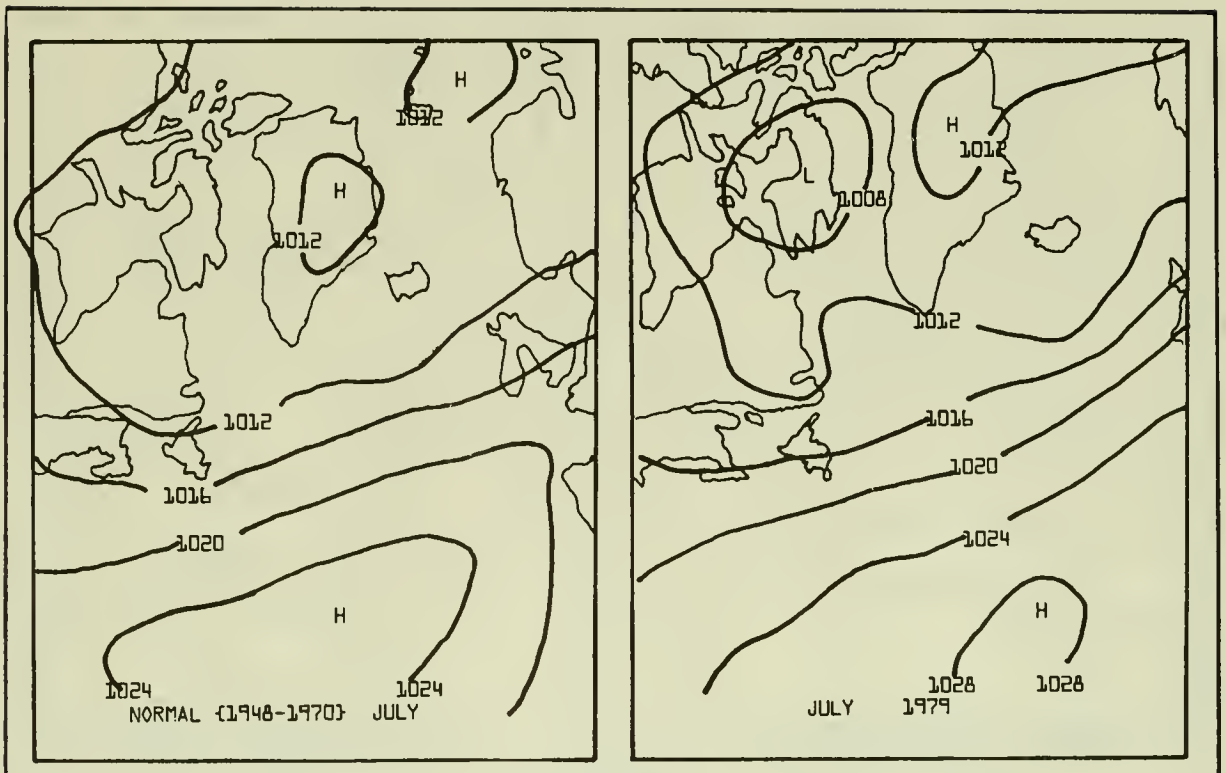


Figure 30
July 1979—Normal and Monthly Average Suface Pressure in MB

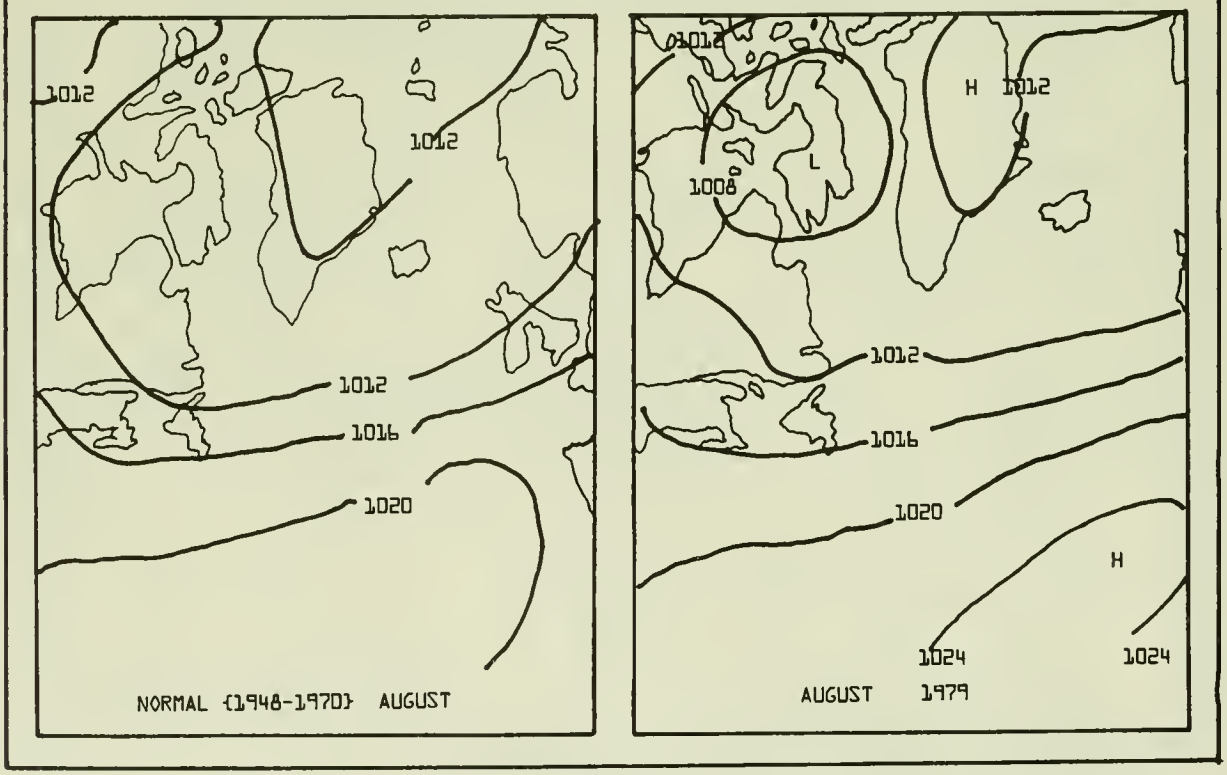


Figure 31
August 1979—Normal and Monthly Average Suface Pressure in MB

APPENDIX A
CONTRIBUTING VESSELS

SHIP'S NAME	*COUNTRY OF REGISTRY*	*ICE REPORTS*	*SST REPORTS*
Nememcha	Algeria		3
Petimata	Bulgaria	1	
Algonquin	Canada	2	4
Bartlett	Canada	1	
Breton Shore	Canada	1	
Federal Avalon	Canada	2	
Hudson	Canada	3	
Imperial Arcadia	Canada	1	
Janie B.	Canada	1	
Kathy C.	Canada	1	
Mare Placido	Canada		1
NFLD Cont	Canada	3	
Nonia	Canada	3	
Hadan	Cyprus	1	
Belgium	Czechoslovakia	1	
Artic Skou	Denmark	3	
Kara	Finland	1	19
Peter	Finland		5
Atlantic Cognac	France	1	
Denmarch	France	2	
Anne Marie Krueger	Germany	2	2
Balder Alver	Germany		2
Danis Getty	Germany		1
Fjellnes	Germany	1	
Koeln Express	Germany	3	
Dynamic Sailor	Greece	1	5
Evpo Sailor	Greece	2	
Irenes Ideal	Greece		1
Konkar Indomitable	Greece	1	2
Meltemi 2	Greece		4
Zannis Machlos	Greece		2
Tenadores	Honduras		3
Bakkafoss	Iceland	18	52
Joekulfell	Iceland	1	
Selfoss	Iceland		5
Skaftafell	Iceland	1	
Studlafoss	Iceland	2	
Jayagayatri	India	2	4
Jhanskirani	India		1
Loknanya	India		1
Samratashok	India		6

SHIP'S NAME	COUNTRY OF REGISTRY	ICE REPORTS	SST REPORTS
Jordan Kanikolova	Indonesia		2
Mezada	Israel	2	
Adria Maru	Japan		6
Miho Maru	Japan		1
Teruoku Maru	Japan		10
Amax Miner	Liberia	2	
Artadi	Liberia	4	4
Corner Brook	Liberia		3
Eastern Hazel	Liberia		5
Federal Hudson	Liberia	1	
Garden Gate	Liberia		3
Gem	Liberia	3	22
Gemini Pioneer	Liberia	2	
Kansas Getty	Liberia		25
Kathleen	Liberia		7
Liberian Albertwill	Liberia		2
Lupus	Liberia		1
Magic Sun	Liberia	1	
Navios Courier	Liberia		8
Pilot Trader	Liberia	1	
Ploto	Liberia		5
Ralu	Liberia		3
Santal	Liberia	1	
Torrent	Liberia		9
Weser	Liberia		6
World News	Liberia		1
Dryso	Norway	1	1
Jacara	Norway		2
Norwegian Laurita	Norway	1	1
Norwegian Tamesis	Norway	3	3
Stove Trader	Norway	4	11
Charlotte Bastian	Panama	3	4
Discoverer Seven Seas	Panama		6
Margitta	Panama	1	
Weyroc	Panama		11
Ammbrow	Poland	1	
Stefan Batory	Poland	10	
Zambrze	Poland	1	
Ziemia Olsztynska	Poland	1	
Viseu	Romania	6	6
Hinrich Oldendorff	Singapore		1
Macarena	Singapore	1	3
Marques DeBolarque	Spain	1	
Atlantic Premier	Sweden	13	3
Atlantic Saga	Sweden	3	3
Atlantic Wasa	Sweden	4	5
Ivan Gorthan	Sweden	1	
Marine Atlantica	Sweden	1	
Stolt Castle	Sweden	1	
Susanne	Sweden		17
Romandie	Switzerland		5

SHIPS NAME	COUNTRY OF REGISTRY	ICE REPORTS	SST REPORTS
Silveretta	Switzerland		1
Asian Reward	United Kingdom		1
Athel Monarch	United Kingdom		1
Atlantic Prosper	United Kingdom	1	1
British Wasa	United Kingdom		4
Cast Seal	United Kingdom	1	
C.P. Discoverer	United Kingdom	1	
C.P. Trader	United Kingdom	4	
C.P. Voyager	United Kingdom	2	
Fort Hamilton	United Kingdom	5	
Kayeson	United Kingdom		3
Kildare	United Kingdom		6
La Costa	United Kingdom		4
La Ensenada	United Kingdom		6
Manchester Concept	United Kingdom	2	
Manchester Concorde	United Kingdom	3	2
Manchester Renown	United Kingdom	6	
Reynoulds	United Kingdom	1	
Roebuck	United Kingdom	1	1
Rubens	United Kingdom	1	
Salters Gate	United Kingdom	1	4
Tsuru Arrow	United Kingdom	1	6
W.M. Neal	United Kingdom	1	
Detroyat	USSR		1
Martha Progress	USSR		2
Evergreen (USCGC)	USA	7	26
Pioneer Crusader	USA	1	
Sealift Indian Ocean (USNS)	USA	1	
Sealand Galloway	USA	1	
Westwind (USCGC)	USA	3	
	TOTAL	180	397

APPENDIX B

OCEANOGRAPHIC CONDITIONS

LT J. J. MURRAY, U.S. Coast Guard

BACKGROUND

The 1979 season witnessed significant changes to the Ice Patrol mode of operation. In February 1979 a new computer model to predict the drift of icebergs was accepted as operational by Commander, International Ice Patrol (CIIP) and was used throughout the season. The IIP current file used in this model was also updated to include information obtained since its establishment in 1964. Perhaps most significantly, traditional standard oceanographic surveys were replaced with satellite tracked buoys as the primary method of measuring currents and verifying the IIP current file.

A NEW ICEBERG DRIFT PREDICTION MODEL

During the 1979 ice season a new computer model was used to predict the drift of icebergs. The drift model, termed IBERG, was developed at the Coast Guard Oceanographic Unit during the fall of 1977, and was tested during the 1978 ice season. The model was then integrated into the operational Ice Patrol system and accepted for operational use in February 1979.

IBERG forecasts the drift of an iceberg by solving differential equations of motion that express the forces acting on the iceberg. The forces included are the Coriolis force, the wind drag, the water drag, and a gravitational component due to the slope of the sea surface. The equations are solved by a fourth order Runge-Kutta method using a variable time step to insure a convergent solution.

The primary improvement over past modeling efforts is in the calculation of the water drag, which is usually the dominant forcing term. The water drag is proportional to the iceberg cross-sectional area and the square of the velocity of the ice relative to the water. The water current used is the sum of a mean value and a wind driven component that is derived from a solution to a time dependent Ekman equation using a 96 hour wind history. The average Ekman current in each of four layers of the water column is determined. The water drag in each layer is calculated and the results are summed to yield the total drag over the iceberg. This approach allows different sizes of icebergs to be modeled by varying the cross-sectional area in each layer. Small icebergs float in the near surface layer which is strongly affected by the local wind, while large icebergs have much of their area below the wind-influenced layers. Seven iceberg sizes are allowed in the operational form of IBERG.

A continuing evaluation of IBERG is being conducted. Observed iceberg drift tracks are compared to model generated paths to estimate the model accuracy. Initial results suggest that the primary limitation to accurate forecasts lies in the inputs to the model, most notably the current and wind fields used in the drag calculations.

IIP CURRENTS

The IIP current file extends from 40°N to 52°N and from 39°W to 57°W. Within this area are two regions. The currents are best known in the first region in the proximity of the Labrador Current where standard oceanographic surveys were conducted under the auspices of CIIP every season from 1934 to 1978 (except during World War II). Usually 2 or 3 surveys were made each season. These surveys yielded a large data base which was used in 1964 (Soule, 1964) to compile "normal" dynamic topography charts representing the average dynamic heights observed up to that time. From these charts normal geostrophic velocities were calculated. The normal values are useful because the general oceanic circulation in the Ice Patrol area is similar from year to year. The normals were reviewed and updated in 1976 (Scobie and Schultz, 1976) and it is basically these updated currents which were used during the 1979 season. The second region is composed of all other

currents within the IIP current file. They were compiled by CIIP from various sources constituting a much lower quality data base then that used for the first region.

Contained in Appendix A is a listing of the 1979 IIP current file. The current direction in degrees true and the speed in cm/s (51 cm/s = 1 knot) are listed for every 20 minutes of latitude and longitude except in the vicinity of the Labrador Current where the longitude spacing is 10 minutes. This finer grid encompasses all of region 1 and a small part of region 2. Region 1 currents in Appendix A are indicated by asterisks (*). There was only one current file for the entire 1979 season as opposed to four files which were previously used, one each for April, May, June and July. It was felt that monthly variation of currents within a given season was not large enough to warrant more than one IIP current file.

SATELLITE TRACKED BUOYS

The Oceanographic Unit began examining the feasibility of using satellite tracked drifting buoys to measure currents as early as 1975. In 1976, 1977, and 1978 satellite tracked buoy transmitting terminals (BTT's) were deployed in the Ice Patrol area and tracked using the NIMBUS-6 satellite system. Positions obtained were analyzed to determine currents. The results of these tests were so successful that the Oceanographic Unit presented a position paper at the 1978 IIP Planning Conference stating that BTT's could replace standard oceanographic surveys as the method for gathering current information to evaluate the IIP currents. This idea was accepted by CIIP and 1979 became the first season since 1948 during which no oceanographic surveys were made by a Coast Guard vessel in support of IIP operations.

The satellite system used during the 1979 Ice Patrol season was TIROS-N. When the satellite is within sight of a BTT it records the data being transmitted on 416.65 MHz. This information is processed and encoded by the TIROS information processor and retransmitted almost instantaneously on the spacecraft beacon frequency, 136.77 MHz. The ground receiving station and the BTT must both be within line of sight of the satellite for this retransmission to be received at the ground station. In the fall of 1978 a prototype Local User Terminal (LUT) was established at the Oceanographic Unit to allow relatively independent and near real-time data reception. It is capable of receiving the transmissions of both the NIMBUS-6 and TIROS-N satellites and processing them to obtain position and sensor data. With its present location in Washington, D.C., in the TIROS-N mode the LUT normally receives information from 2 satellite passes daily with the capability of locating BTT's anywhere within the IIP area. The maximum accuracy of the system with the incorporation of adequate reference beacons is about ±3 km (1.6 nautical miles).

The cornerstone of the new current measuring scheme is the BTT's themselves. All BTT's used are in what is called the TIROS Oceanographic Drifter (TOD) configuration (Figure 1). This includes the basic buoy, window shade drogue, the drogue sensor, temperature sensor and battery monitor. The drogue extends from about 12 to 24 m below the sea surface and is designed to reduce buoy leeway as much as possible. The temperature sensor is accurate to within ±1.0°C and provides valuable sea surface temperature data. During the 1979 season all BTT's were air deployed from Coast Guard HC-130 aircraft (although they can be ship deployed) utilizing a special air deployment package (Figures 1 and 2). The system is designed so that the BTT on a pallet is slid out the rear cargo door of the aircraft and parachutes to the sea surface. Water-activated explosive cutters cut away the parachute, and the specially designed hardware connecting the pallet to the BTT dissolves causing the pallet to fall away and the drogue to deploy. The entire process normally takes only a few minutes.

1979 OPERATIONS

During the 1979 season 5 BTT's were deployed in support of IIP operations (Table 1). Three BTT's, 2605, 2600 and 2604, were deployed in the Labrador Current, BTT 2601 was deployed to the east of the Labrador Current and BTT 2602 was deployed northeast of Flemish Cap. All 5 BTT's functioned well throughout the season. A total downtime of 18 days (7.7% of the season) was experienced on the LUT due largely to its developmental nature. Accuracy of positions was not as good as the 3 km normally attainable because of inadequacy of reference platforms. However, comparison of BTT positions with reported deployment positions and known locations of relatively swift moving currents such as the Labrador Current indicated positions were within ±10 km. Exact errors could not be determined.

The purpose of deploying BTT's was to make current measurements to compare with the IIP current file. To do this BTT positions were first input to a computer program utilizing a cubic spline routine to smooth out the drifts. The program calculated a smooth trajectory by ensuring a mathematically continuous first derivative of the BTT displacement versus time plot, thus velocity, and a minimum second derivative, thus acceleration or potential energy. It then output a printout of 6-hourly BTT positions and velocities (Table 2) and a plot of the smooth BTT trajectory (Figures 3–7) representing an approximation of the path the BTT followed. On these plots X's represent input positions, not all of which are marked, and numbers are Julian dates.

To make valid comparisons with the IIP currents, the wind current's contribution must be removed from the BTT drifts. Another program, a modified version of IBERG, used CIIP wind files to calculate wind currents using the same Ekman equation described earlier. The actual comparison of observed drifts and IIP currents was accomplished by a third program (Table 3). It computed 6-hourly observed currents with the wind current subtracted out (BTT w/o W.C.) and then vectorially subtracted the IIP (normal) current from this value. The difference was output in individual and cumulative speed and direction and U (east-west) and V (north-south) components on a printout and plots. The results were then analyzed to determine what if any changes in the current file were warranted. Magnitudes of differences, variability of currents in the respective location, time of season and reliability of measurements were among the items taken into account. No changes to the IIP current file were made during the 1979 season.

REVIEW AND OUTLOOK

The validity of the concept of using satellite tracked BTT's to measure currents was proven during the 1979 season. Even though the system was in its fledgling stages, it worked well enough to determine if changes to the IIP current file were necessary.

Programs developed to analyze the BTT drifts proved adequate. Much was learned about the capabilities and limitations of the system. Several refinements are planned for the 1980 season but the general overall operational scheme will remain the same. Perhaps most significantly, since the end of the 1979 season a second satellite in the TIROS series, NOAA-6, has been launched and is operational. It will provide additional positions and thereby even more accurate evaluation of IIP currents. Additionally, several reference beacons have been procured for use to ensure maximum accuracy is obtained. Overall, during 1979 the satellite tracked buoy system provided more accurate and much more timely current measurements at a reduced cost as compared to the old survey method. With the system still developing the prospects for the future appear even brighter.

REFERENCES

Scobie, R. W. and R. H. Schultz (1976). Oceanography of the Grand Banks Region, March 1971-December 1972. U.S. Coast Guard Oceanographic Report No. 70, Coast Guard 373-70:47.

Soule, F. M. (1964). The Normal Topography of the Labrador Current and its Environs in the Vicinity of the Grand Banks of Newfoundland during the Iceberg Season. Woods Hole Oceanographic Institution, Ref. No. 64-36.

Table 1—BTT DATA

Buoy ID	*Date*	*Deployment*		*Positions/Temperatures Supplied*	
		Latitude	*Longitude*	*Total*	*Per Week*
2605	01 March	49-00.6	49-57.6	87	4
2602	05 April	49-38.0	46-42.0	68	4
2600	12 May	48-59.4	49-54.0	52	5
2601	04 June	47-12.0	46-18.0	35	5
2604	04 June	47-12.0	47.06.0	34	5

NOTE: Latitude and Longitude are in degrees-minutes.

DATE (JULIAN)	TIME (HRS-MIN)		LAT (DEG-MIN)		LONG (DEG-MIN)		SPEED (CM/SEC)	DIR (T)
164.	12	0.0	46	12.8	46	53.6	12.29	145.8
164.	18	0.0	46	11.5	46	52.3	13.17	143.1
165.	0	0.0	46	10.3	46	51.1	11.59	148.4
165.	6	0.0	46	9.3	46	50.4	8.29	170.1
165.	12	0.0	46	8.5	46	50.7	7.64	219.3
165.	18	0.0	46	7.9	46	51.9	10.06	242.5
166.	0	0.0	46	7.3	46	53.6	11.49	247.2
166.	6	0.0	46	6.8	46	55.3	11.19	241.4
166.	12	0.0	46	6.1	46	56.8	10.38	228.2
166.	18	0.0	46	5.2	46	58.1	10.90	223.0
167.	0	0.0	46	4.2	46	59.4	12.42	227.2
167.	6	0.0	46	3.2	47	1.2	15.22	236.7
167.	12	0.0	46	2.3	47	3.8	18.99	246.0
167.	18	0.0	46	1.5	47	7.0	21.62	251.7
168.	0	0.0	46	0.7	47	10.6	22.84	256.1
168.	6	0.0	46	0.2	47	14.3	22.61	260.3
168.	12	0.0	45	59.9	47	17.9	21.03	263.9
168.	18	0.0	45	59.6	47	21.3	18.72	260.5
169.	0	0.0	45	59.0	47	24.1	16.50	245.5
169.	6	0.0	45	57.9	47	26.2	17.12	218.0
169.	12	0.0	45	55.8	47	27.5	22.13	192.5
169.	18	0.0	45	53.1	47	27.6	23.94	170.4
170.	0	0.0	45	50.5	47	26.1	24.94	148.8
170.	6	0.0	45	48.1	47	23.5	25.99	137.6
170.	12	0.0	45	46.0	47	20.4	24.72	134.3
170.	18	0.0	45	44.1	47	17.8	20.54	139.1
171.	0	0.0	45	42.4	47	16.2	14.79	161.1
171.	6	0.0	45	40.8	47	16.4	15.14	213.2
171.	12	0.0	45	39.4	47	19.1	26.76	244.5
171.	18	0.0	45	38.1	47	24.2	37.18	253.5
172.	0	0.0	45	36.9	47	30.7	43.03	256.8
172.	6	0.0	45	35.8	47	37.8	43.92	257.8
172.	12	0.0	45	34.8	47	44.7	40.76	257.2
172.	18	0.0	45	33.7	47	51.0	37.64	255.4
173.	0	0.0	45	32.5	47	56.8	35.04	252.2
173.	6	0.0	45	31.2	48	2.1	33.10	247.3
173.	12	0.0	45	29.5	48	6.9	31.88	241.2
173.	18	0.0	45	27.6	48	11.3	30.96	235.2
174.	0	0.0	45	25.4	48	15.3	30.22	229.5
174.	6	0.0	45	23.0	48	18.8	29.60	224.0

Table 2.—Example of BTT (02604) Position, Speed and Direction output.

2604 BTT DRIFT

DAY	TIME	DIST	CUM DIST	SPEED	DIR	CUM SPEED	CUM DIR	U	V	CUM U	CUM V
164	1200			12.29	145.8	12.29	145.8	6.91	-10.16	6.91	-10.16
						BTT W/O W.C.					
NORMAL DRIFT											
SPEED	DIR	U	V	11.48	146.7	11.48	146.7	6.31	-9.59	6.31	-9.59
5.16	157.2	2.00	-4.75			DIFFERENCES					
				6.48	138.3	6.48	138.3	4.31	-4.84	4.31	-4.84

2604 BTT DRIFT

DAY	TIME	DIST	CUM DIST	SPEED	DIR	CUM SPEED	CUM DIR	U	V	CUM U	CUM V
164	1800	1.58	1.58	13.17	143.1	25.45	144.4	7.91	-10.53	14.83	-20.69
						BTT W/O W.C.					
NORMAL DRIFT											
SPEED	DIR	U	V	12.35	143.7	23.83	290.4	7.30	-9.96	13.61	-19.55
4.33	142.4	2.64	-3.44			DIFFERENCES					
				8.02	144.4	14.49	282.8	4.66	-6.52	8.97	-11.36

2604 BTT DRIFT

DAY	TIME	DIST	CUM DIST	SPEED	DIR	CUM SPEED	CUM DIR	U	V	CUM U	CUM V
165	000	1.46	3.04	11.59	148.4	37.02	145.6	6.08	-9.87	20.90	-30.56
						BTT W/O W.C.					
NORMAL DRIFT											
SPEED	DIR	U	V	9.22	167.4	33.04	97.8	2.00	-9.00	15.62	-28.54
4.00	126.5	3.22	-2.38			DIFFERENCES					
				6.73	190.4	21.22	113.2	-1.22	-6.62	7.75	-17.98

Table 3.—Comparison with IIP Current File (BTT 02604).

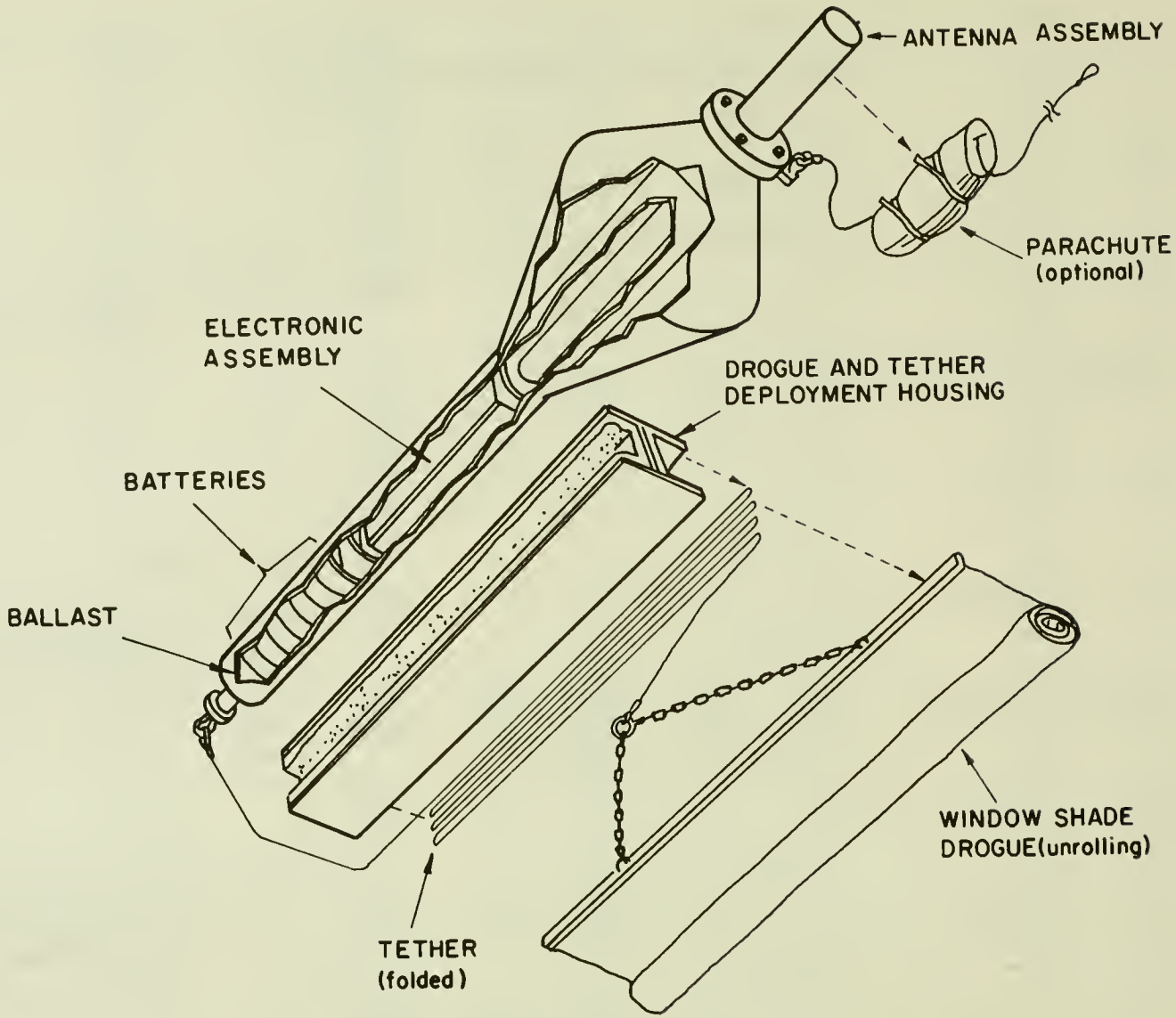


Figure 1.—BTT in TIROS Oceanographic Drifter configuration.

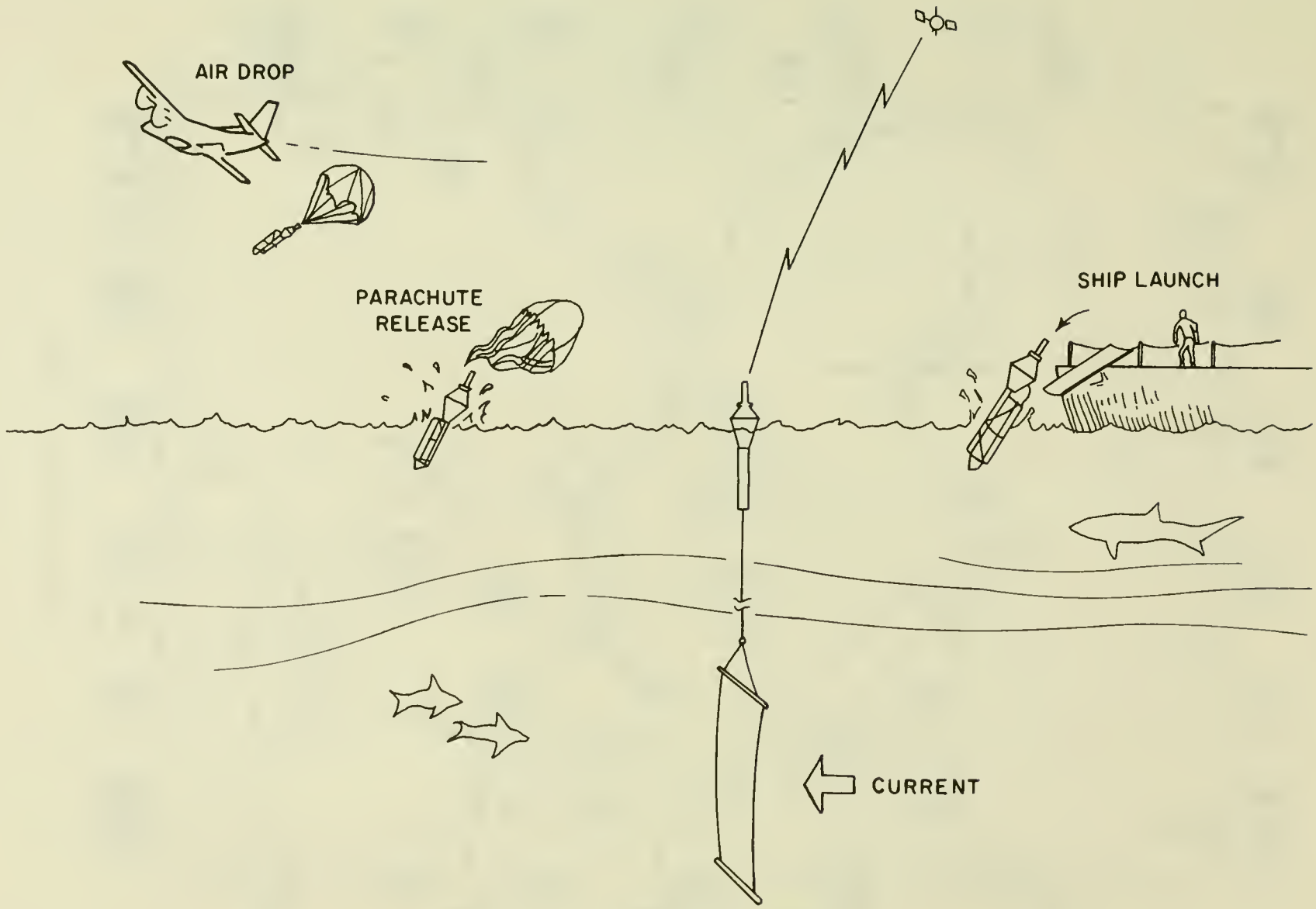


Figure 2.—BTT Deployment

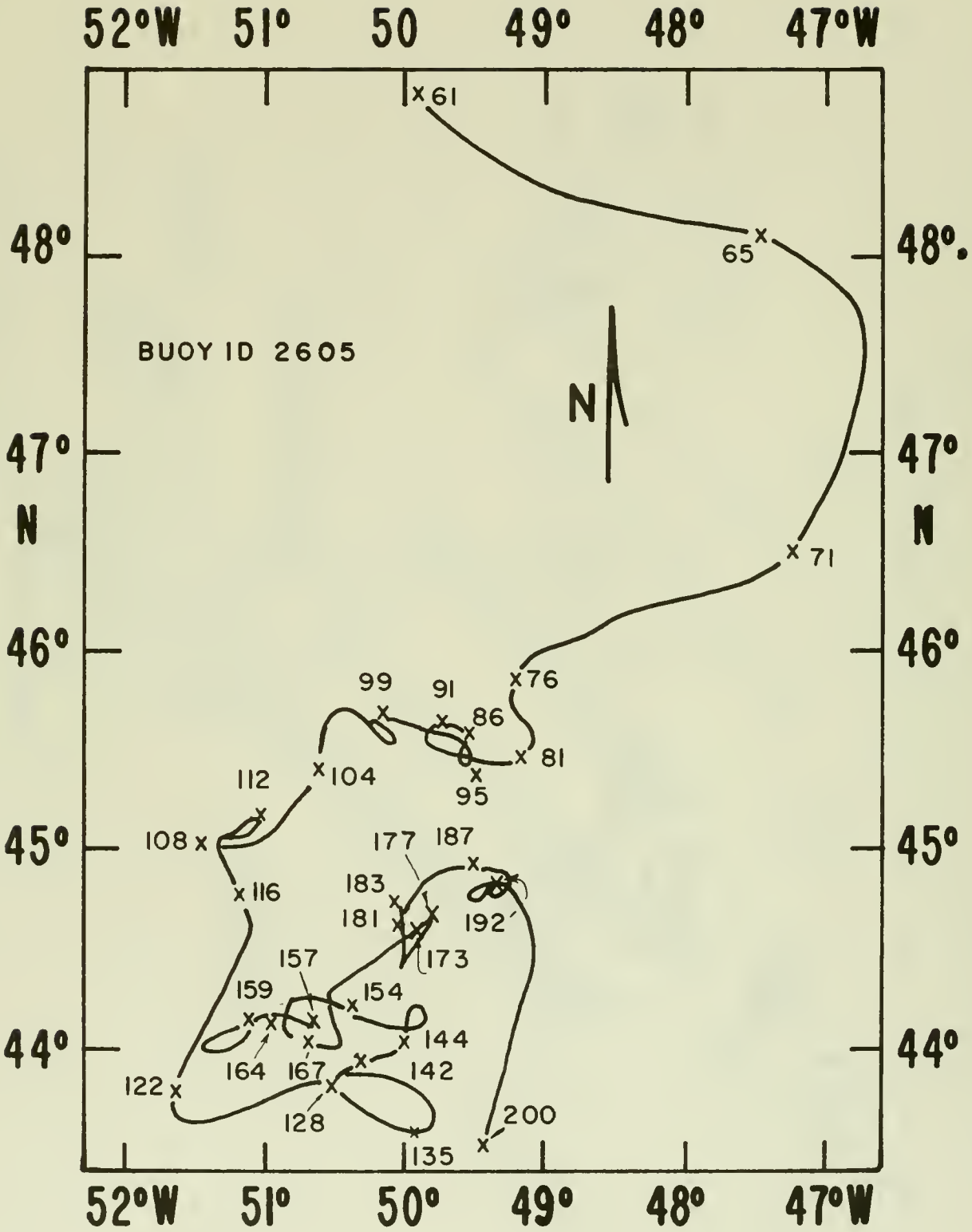


Figure 3.—Drift of BTT 02605.

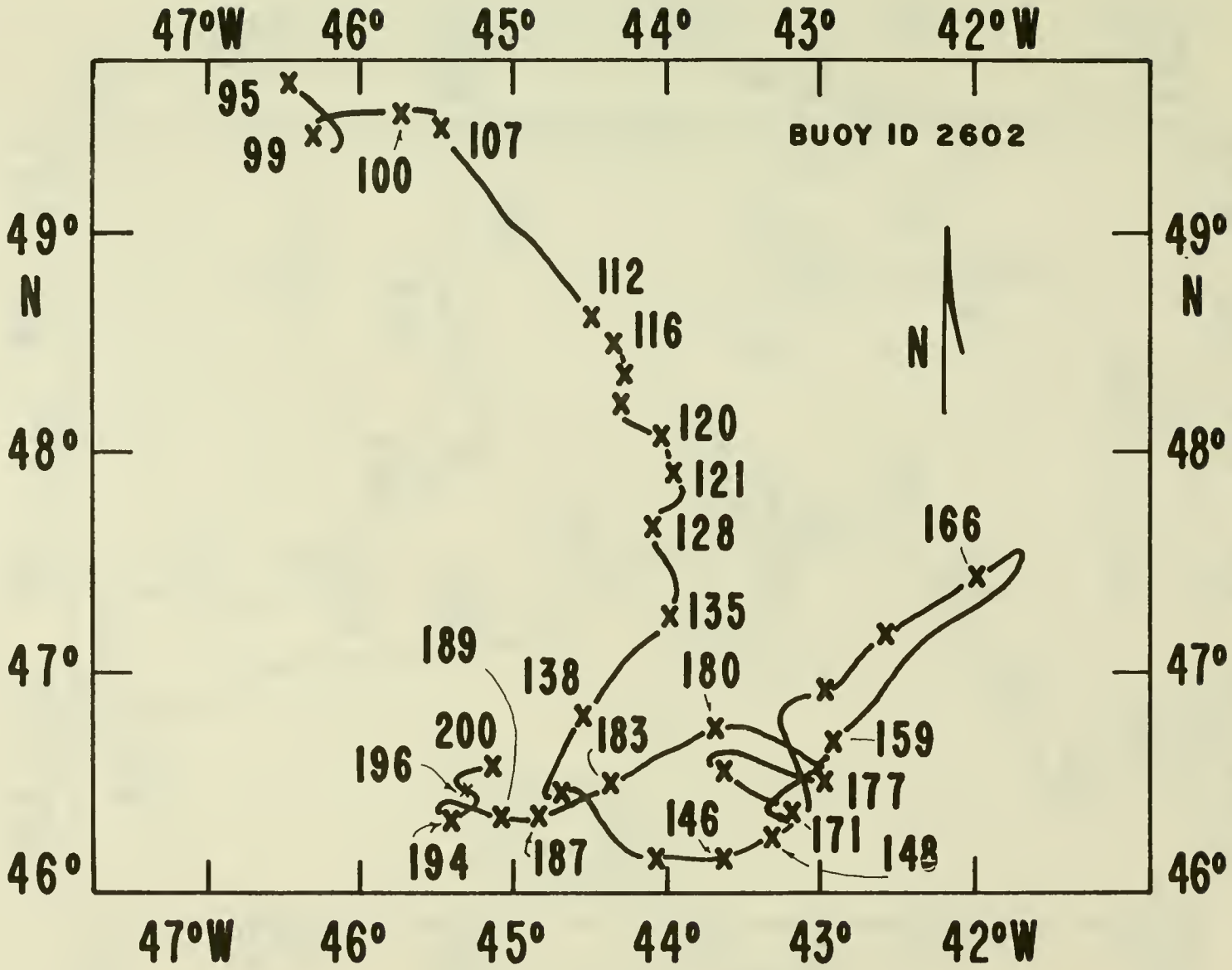


Figure 4.—Drift of BTT 02602.

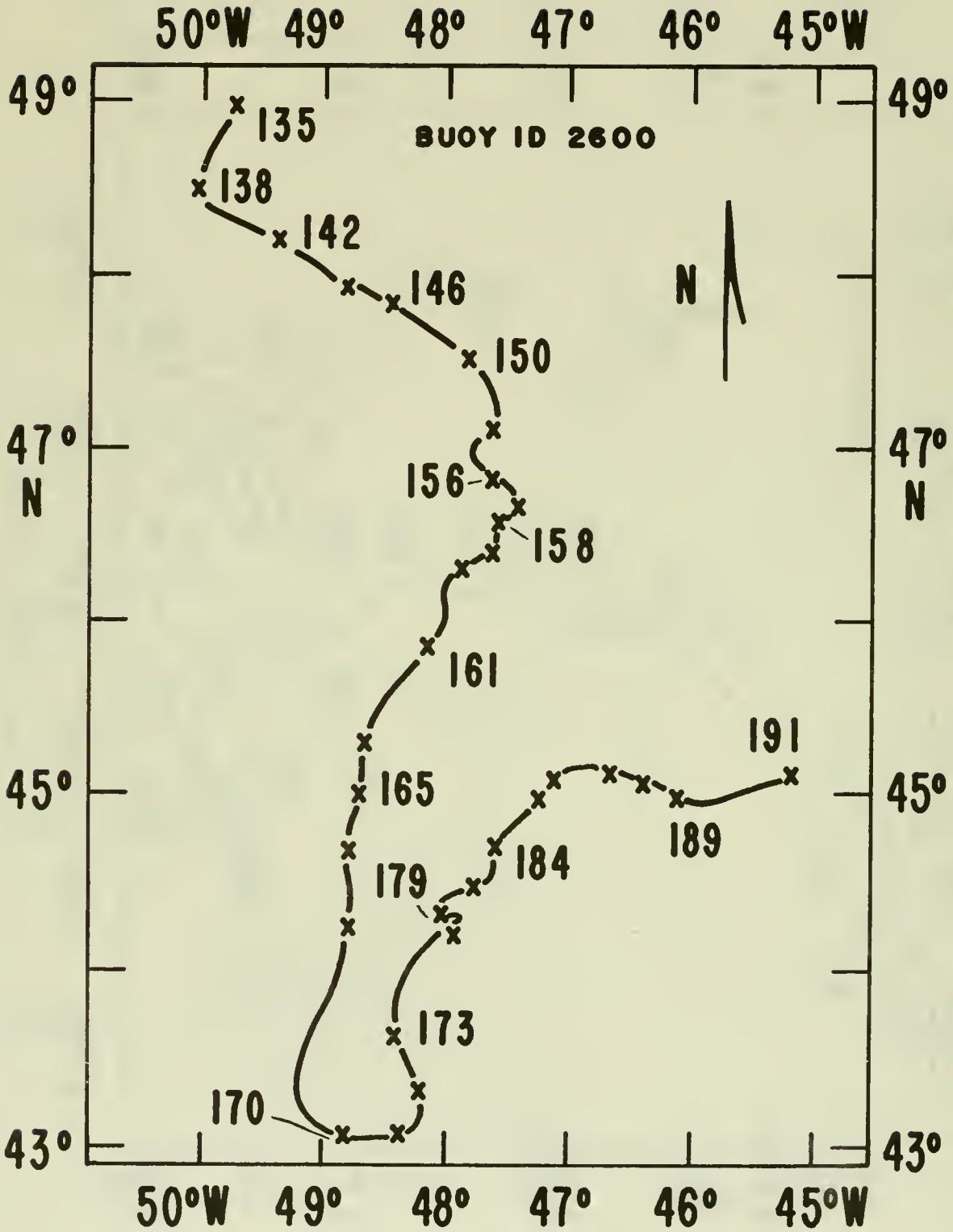


Figure 5.—Drift of BTT 02600.

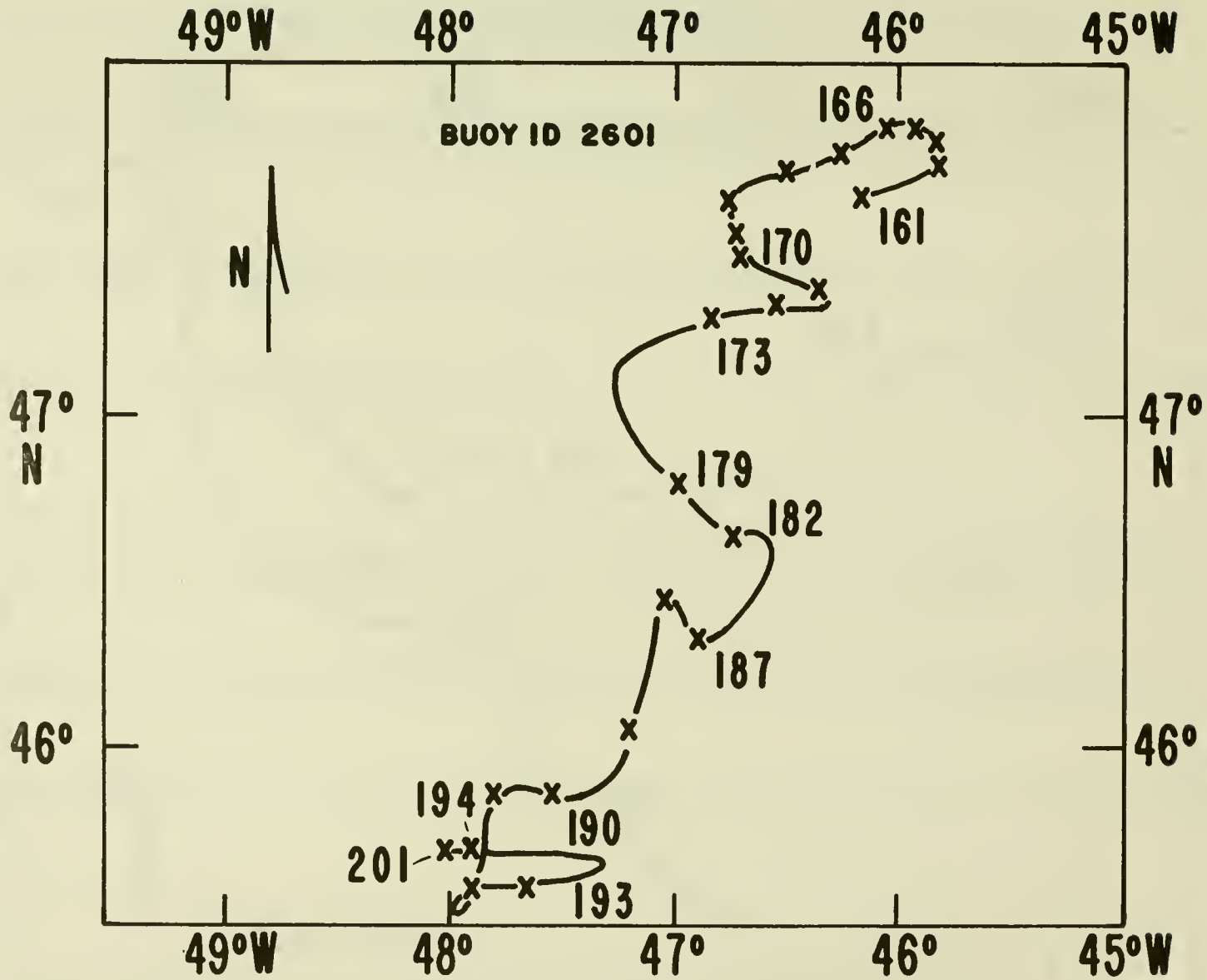


Figure 6.—Drift of BTT 02601.

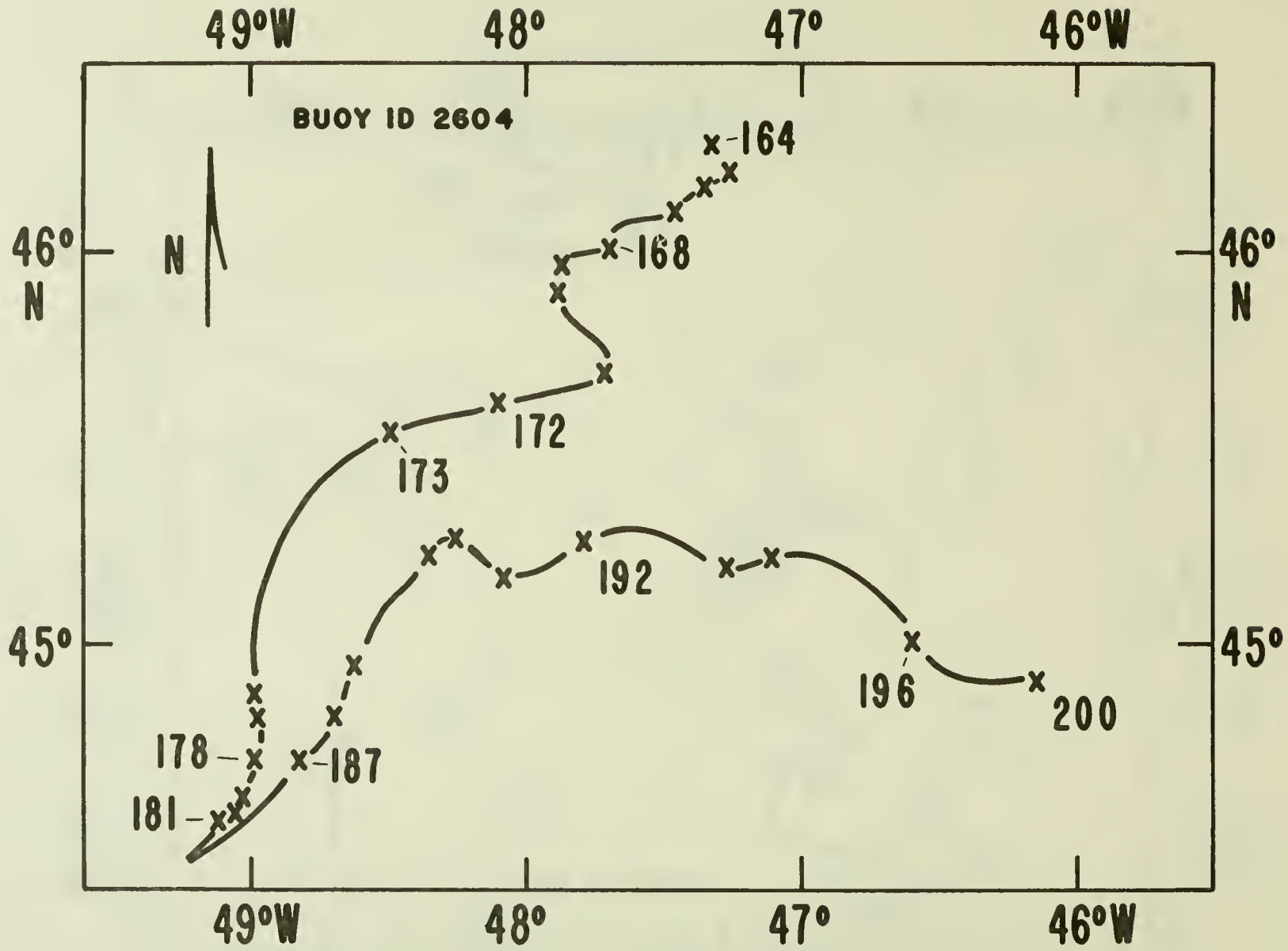


Figure 7.—Drift of BTT 02604.

APPENDIX A
IIP CURRENTS

LAT	LONG	DIR	SPD
LAT	LONG	DIR	SPD
52.00	57.00	0	0
52.00	56.40	0	0
52.00	56.20	0	0
52.00	56.00	0	0
52.00	55.40	0	0
52.00	55.20	0	0
52.00	55.00	160	23
52.00	54.40	160	23
52.00	54.20	160	23
52.00	54.00	160	23
52.00	53.40	160	23
52.00	53.20	160	23
52.00	53.00	160	23
52.00	52.40	160	23
52.00	52.20	160	23
52.00	52.00	160	23
52.00	51.40	160	23
52.00	51.20	160	23
52.00	51.00	160	69
52.00	50.40	158	64
52.00	50.20	169	37
52.00	50.00	169	37
52.00	49.50	169	37
52.00	49.40	169	37
52.00	49.30	169	37
52.00	49.20	169	37
52.00	49.10	169	37
52.00	49.00	169	37
52.00	48.50	169	37
52.00	48.40	168	35
52.00	48.30	172	35
52.00	48.20	180	34
52.00	48.10	180	34
52.00	48.00	180	34
52.00	47.50	180	34
52.00	47.40	180	34
52.00	47.30	180	34
52.00	47.20	180	34
52.00	47.10	180	34
52.00	47.00	180	34
52.00	46.50	172	35
52.00	46.40	168	35
52.00	46.30	168	35
52.00	46.20	168	35
52.00	46.10	165	36
52.00	46.00	161	36
52.00	45.40	161	36
52.00	45.20	148	35
52.00	45.00	140	36
52.00	44.40	140	36
52.00	44.20	140	36
52.00	44.00	129	36
52.00	43.40	129	36
52.00	43.20	129	36
52.00	43.00	129	36
52.00	42.40	128	29
52.00	42.20	118	29
52.00	42.00	118	29
52.00	41.40	119	18
52.00	41.20	119	18
52.00	41.00	116	15
52.00	40.40	116	15
52.00	40.20	116	15
52.00	40.00	116	15
52.00	39.40	116	15
52.00	39.20	116	15
52.00	39.00	116	15
51.40	57.00	0	0
51.40	56.40	0	0
51.40	56.20	0	0
51.40	56.00	0	0
51.40	55.40	0	0
51.40	55.20	0	0
51.40	55.00	160	23
51.40	54.40	160	23
51.40	54.20	160	23
51.40	54.00	160	23
51.40	53.40	160	23
51.40	53.20	160	23
51.40	53.00	160	23
51.40	52.40	160	23
51.40	52.20	160	23
51.40	52.00	160	23
51.40	51.40	160	23
51.40	51.20	160	23
51.40	51.00	159	74
51.40	50.40	160	69
51.40	50.20	170	42
51.40	50.00	170	42
51.40	49.50	170	42
51.40	49.40	170	42
51.40	49.30	170	42
51.40	49.20	170	42
51.40	49.10	170	42
51.40	49.00	170	42
51.40	48.50	170	42
51.40	48.40	169	40
51.40	48.30	173	39
51.40	48.20	180	39
51.40	48.10	180	41
51.40	48.00	180	41
51.40	47.50	180	41
51.40	47.40	180	39
51.40	47.30	180	39
51.40	47.20	180	37
51.40	47.10	180	37
51.40	47.00	180	37
51.40	46.50	172	37
51.40	46.40	169	37
51.40	46.30	169	37
51.40	46.20	169	37
51.40	46.10	165	38
51.40	46.00	161	36
51.40	45.40	150	37
51.40	45.20	140	36
51.40	45.00	129	36
51.40	44.40	129	36
51.40	44.20	129	35
51.40	44.00	129	36
51.40	43.40	119	37
51.40	43.20	119	37
51.40	43.00	121	35
51.40	42.40	118	29
51.40	42.20	118	29
51.40	42.00	119	18

NOTE: LAT LONG ARE IN DEGREES.MINUTES.

LAT	LONG	DIR	SPD
51.40	41.40	119	18
51.40	41.20	116	15
51.40	41.00	108	14
51.40	40.40	108	14
51.40	40.20	108	14
51.40	40.00	108	14
51.40	39.40	108	14
51.40	39.20	108	14
51.40	39.00	108	14
51.20	57.00	0	0
51.20	56.40	0	0
51.20	56.20	0	0
51.20	56.00	0	0
51.20	55.40	0	0
51.20	55.20	160	23
51.20	55.00	160	23
51.20	54.40	160	23
51.20	54.20	160	23
51.20	54.00	160	23
51.20	53.40	160	23
51.20	53.20	160	23
51.20	53.00	160	23
51.20	52.40	160	23
51.20	52.20	160	23
51.20	52.00	160	23
51.20	51.40	160	23
51.20	51.20	160	23
51.20	51.00	160	76
51.20	50.40	159	74
51.20	50.20	170	42
51.20	50.00	170	42
51.20	49.50	170	42
51.20	49.40	170	42
51.20	49.30	170	42
51.20	49.20	170	42
51.20	49.10	170	42
51.20	49.00	170	42
51.20	48.50	170	42
51.20	48.40	169	40
51.20	48.30	173	39
51.20	48.20	180	39
51.20	48.10	180	41
51.20	48.00	180	41
51.20	47.50	180	41
51.20	47.40	180	39
51.20	47.30	180	39
51.20	47.20	180	37
51.20	47.10	180	37
51.20	47.00	180	37
51.20	46.50	172	37
51.20	46.40	169	37
51.20	46.30	165	38
51.20	46.20	161	36
51.20	46.10	154	38
51.20	46.00	150	37
51.20	45.40	140	36
51.20	45.20	129	36
51.20	45.00	119	37
51.20	44.40	119	37
51.20	44.20	119	37
51.20	44.00	119	37
51.20	43.40	100	37
51.20	43.20	100	37
51.20	43.00	100	37
51.20	42.40	98	30
51.20	42.20	98	30
51.20	42.00	97	18
51.20	41.40	97	18
51.20	41.20	99	14
51.20	41.00	99	14
51.20	40.40	99	14
51.20	40.20	99	14
51.20	40.00	99	14
51.20	39.40	99	14
51.20	39.20	99	14
51.20	39.00	99	14
51.00	57.00	0	0
51.00	56.40	0	0
51.00	56.20	0	0
51.00	56.00	0	0
51.00	55.40	0	0
51.00	55.20	160	23
51.00	55.00	160	23
51.00	54.40	160	23
51.00	54.20	160	23
51.00	54.00	160	23
51.00	53.40	160	23
51.00	53.20	160	23
51.00	53.00	160	23
51.00	52.40	160	23
51.00	52.20	160	23
51.00	52.00	160	23
51.00	51.40	160	23
51.00	51.20	160	23
51.00	51.00	149	78
51.00	50.40	160	76
51.00	50.20	171	44
51.00	50.00	171	44
51.00	49.50	171	44
51.00	49.40	171	44
51.00	49.30	171	44
51.00	49.20	171	44
51.00	49.10	171	44
51.00	49.00	171	44
51.00	48.50	171	44
51.00	48.40	171	44
51.00	48.30	171	44
51.00	48.20	171	44
51.00	48.10	173	44
51.00	48.00	180	41
51.00	47.50	180	39
51.00	47.40	180	37
51.00	47.30	180	37
51.00	47.20	180	34
51.00	47.10	180	34
51.00	47.00	180	34
51.00	46.50	172	35
51.00	46.40	168	35
51.00	46.30	165	36
51.00	46.20	160	34
51.00	46.10	153	36
51.00	46.00	148	35
51.00	45.40	148	35
51.00	45.20	137	34
51.00	45.00	137	34
51.00	44.40	129	36
51.00	44.20	121	35
51.00	44.00	109	34
51.00	43.40	109	34
51.00	43.20	101	35
51.00	43.00	98	30
51.00	42.40	97	18

LAT	LONG	DIR	SPD				
51.00	42.20	97	18	50.40	42.40	97	18
51.00	42.00	97	18	50.40	42.20	97	18
51.00	41.40	99	14	50.40	42.00	90	20
51.00	41.20	99	14	50.40	41.40	90	13
51.00	41.00	99	14	50.40	41.20	90	13
51.00	40.40	99	14	50.40	41.00	90	13
51.00	40.20	99	14	50.40	40.40	90	13
51.00	40.00	99	14	50.40	40.20	90	13
51.00	39.40	99	14	50.40	40.00	90	13
51.00	39.20	99	14	50.40	39.40	90	13
51.00	39.00	99	14	50.40	39.20	90	13
50.40	57.00	0	0	50.40	39.00	90	13
50.40	56.40	0	0	50.20	57.00	0	0
50.40	56.20	0	0	50.20	56.40	0	0
50.40	56.00	0	0	50.20	56.20	0	0
50.40	55.40	160	23	50.20	56.00	0	0
50.40	55.20	160	23	50.20	55.40	160	23
50.40	55.00	160	23	50.20	55.20	160	23
50.40	54.40	160	23	50.20	55.00	160	23
50.40	54.20	160	23	50.20	54.40	160	23
50.40	54.00	160	23	50.20	54.20	160	23
50.40	53.40	160	23	50.20	54.00	160	23
50.40	53.20	160	23	50.20	53.40	160	23
50.40	53.00	160	23	50.20	53.20	160	23
50.40	52.40	160	23	50.20	53.00	160	23
50.40	52.20	160	23	50.20	52.40	160	23
50.40	52.00	160	23	50.20	52.20	160	23
50.40	51.40	160	23	50.20	52.00	160	23
50.40	51.20	160	23	50.20	51.40	160	23
50.40	51.00	160	23	50.20	51.20	160	23
50.40	50.40	149	78	50.20	51.00	160	23
50.40	50.20	160	76	50.20	50.40	150	80
50.40	50.00	135	32	50.20	50.20	150	80
50.40	49.50	135	32	50.20	50.00	135	32
50.40	49.40	135	32	50.20	49.50	135	32
50.40	49.30	135	32	50.20	49.40	135	32
50.40	49.20	135	32	50.20	49.30	135	32
50.40	49.10	135	32	50.20	49.20	135	32
50.40	49.00	135	32	50.20	49.10	135	32
50.40	48.50	135	32	50.20	49.00	116	26
50.40	48.40	135	32	50.20	48.50	90	18
50.40	48.30	135	32	50.20	48.40	90	11
50.40	48.20	135	32	50.20	48.30	90	11
50.40	48.10	135	32	50.20	48.20	90	11
50.40	48.00	135	32	50.20	48.10	90	11
50.40	47.50	135	32	50.20	48.00	90	11
50.40	47.40	135	32	50.20	47.50	90	11
50.40	47.30	135	32	50.20	47.40	90	11
50.40	47.20	135	32	50.20	47.30	90	11
50.40	47.10	135	32	50.20	47.20	90	11
50.40	47.00	135	32	50.20	47.10	90	11
50.40	46.50	135	32	50.20	47.00	90	11
50.40	46.40	135	32	50.20	46.50	90	11
50.40	46.30	135	32	50.20	46.40	90	11
50.40	46.20	135	32	50.20	46.30	90	18
50.40	46.10	135	32	50.20	46.20	90	23
50.40	46.00	140	33	50.20	46.10	90	27
50.40	45.40	129	33	50.20	46.00	90	30
50.40	45.20	129	33	50.20	45.40	131	31
50.40	45.00	120	32	50.20	45.20	120	32
50.40	44.40	120	32	50.20	45.00	112	30
50.40	44.20	111	32	50.20	44.40	112	30
50.40	44.00	111	32	50.20	44.20	112	30
50.40	43.40	108	29	50.20	44.00	112	30
50.40	43.20	98	30	50.20	43.40	98	30
50.40	43.00	98	30	50.20	43.20	98	30

LAT	LONG	DIR	SPD				
50.20	43.00	98	30	50.00	43.20	90	32
50.20	42.40	90	20	50.00	43.00	90	27
50.20	42.20	90	20	50.00	42.40	90	20
50.20	42.00	90	20	50.00	42.20	90	20
50.20	41.40	90	13	50.00	42.00	90	20
50.20	41.20	90	13	50.00	41.40	90	20
50.20	41.00	90	13	50.00	41.20	90	20
50.20	40.40	90	13	50.00	41.00	90	20
50.20	40.20	90	13	50.00	40.40	90	20
50.20	40.00	90	13	50.00	40.20	90	20
50.20	39.40	90	13	50.00	40.00	82	18
50.20	39.20	90	20	50.00	39.40	78	23
50.20	39.00	90	20	50.00	39.20	78	23
50.00	57.00	0	0	50.00	39.00	78	23
50.00	56.40	0	0	49.40	57.00	0	0
50.00	56.20	0	0	49.40	56.40	0	0
50.00	56.00	0	0	49.40	56.20	0	0
50.00	55.40	0	0	49.40	56.00	0	0
50.00	55.20	0	0	49.40	55.20	0	0
50.00	55.00	160	23	49.40	55.40	0	0
50.00	54.40	160	23	49.40	55.00	0	0
50.00	54.20	160	23	49.40	54.40	0	0
50.00	54.00	160	23	49.40	54.20	0	0
50.00	53.40	160	23	49.40	54.00	139	39
50.00	53.20	160	23	49.40	53.40	149	45
50.00	53.00	160	23	49.40	53.20	159	59
50.00	52.40	160	23	49.40	53.00	159	59
50.00	52.20	160	23	49.40	52.40	160	23
50.00	52.00	160	23	49.40	52.20	160	23
50.00	51.40	160	23	49.40	52.00	160	23
50.00	51.20	160	23	49.40	51.40	160	23
50.00	51.00	160	23	49.40	51.20	160	23
50.00	50.40	160	23	49.40	51.00	160	23
50.00	50.20	150	80 *	49.40	50.40	160	23 *
50.00	50.00	150	80 *	49.40	50.20	150	80 *
50.00	49.50	113	33 *	49.40	50.00	150	80 *
50.00	49.40	102	27 *	49.40	49.50	150	80 *
50.00	49.30	109	34 *	49.40	49.40	103	18 *
50.00	49.20	126	45 *	49.40	49.30	42	17 *
50.00	49.10	137	42 *	49.40	49.20	166	31 *
50.00	49.00	108	16 *	49.40	49.10	171	44 *
50.00	48.50	12	22 *	49.40	49.00	170	45 *
50.00	48.40	1	20 *	49.40	48.50	94	4 *
50.00	48.30	0	10 *	49.40	48.40	2	14 *
50.00	48.20	2	11 *	49.40	48.30	357	12 *
50.00	48.10	351	15 *	49.40	48.20	358	8 *
50.00	48.00	342	11 *	49.40	48.10	342	5 *
50.00	47.50	349	3 *	49.40	48.00	340	13 *
50.00	47.40	118	3 *	49.40	47.50	340	16 *
50.00	47.30	127	6 *	49.40	47.40	322	9 *
50.00	47.20	113	8 *	49.40	47.30	285	2 *
50.00	47.10	91	14 *	49.40	47.20	1	10 *
50.00	47.00	78	24 *	49.40	47.10	8	25 *
50.00	46.50	59	37 *	49.40	47.00	10	36 *
50.00	46.40	33	56 *	49.40	46.50	11	38 *
50.00	46.30	13	64 *	49.40	46.40	5	19 *
50.00	46.20	352	38 *	49.40	46.30	259	9 *
50.00	46.10	276	18 *	49.40	46.20	227	26 *
50.00	46.00	238	29 *	49.40	46.10	221	35 *
50.00	45.40	231	33 *	49.40	46.00	220	35 *
50.00	45.20	235	28 *	49.40	45.40	225	27 *
50.00	45.00	0	0 *	49.40	45.20	198	22 *
50.00	44.40	171	32	49.40	45.00	0	0 *
50.00	44.20	98	32	49.40	44.40	171	32
50.00	44.00	98	32	49.40	44.20	90	34
50.00	43.40	98	32	49.40	44.00	90	34

LAT	LONG	DIR	SPD					
49.40	43.40	90	30		49.20	44.00	79	37
49.40	43.20	90	30		49.20	43.40	81	30
49.40	43.00	90	30		49.20	43.20	81	30
49.40	42.40	90	20		49.20	43.00	81	30
49.40	42.20	90	20		49.20	42.40	82	18
49.40	42.00	90	20		49.20	42.20	82	18
49.40	41.40	90	20		49.20	42.00	82	18
49.40	41.20	90	20		49.20	41.40	82	18
49.40	41.00	82	18		49.20	41.20	82	18
49.40	40.40	82	18		49.20	41.00	82	18
49.40	40.20	82	18		49.20	40.40	82	18
49.40	40.00	83	21		49.20	40.20	82	18
49.40	39.40	78	23		49.20	40.00	82	18
49.40	39.20	78	23		49.20	39.40	78	23
49.40	39.00	78	23		49.20	39.20	78	23
49.20	57.00	0	0		49.20	39.00	78	23
49.20	56.40	0	0		49.00	57.00	0	0
49.20	56.20	0	0		49.00	56.40	0	0
49.20	56.00	0	0		49.00	56.20	0	0
49.20	55.40	0	0		49.00	56.00	0	0
49.20	55.20	0	0		49.00	55.40	0	0
49.20	55.00	0	0		49.00	55.20	0	0
49.20	54.40	0	0		49.00	55.00	0	0
49.20	54.20	0	0		49.00	54.40	0	0
49.20	54.00	0	0		49.00	54.20	0	0
49.20	53.40	0	0		49.00	54.00	0	0
49.20	53.20	149	45		49.00	53.40	0	0
49.20	53.00	160	49		49.00	53.20	149	45
49.20	52.40	160	23		49.00	53.00	160	49
49.20	52.20	160	23		49.00	52.40	160	49
49.20	52.00	160	23		49.00	52.20	160	23
49.20	51.40	155	34 *		49.00	52.00	160	23
49.20	51.20	124	30 *		49.00	51.40	128	23 *
49.20	51.00	90	15 *		49.00	51.20	122	29 *
49.20	50.40	104	24 *		49.00	51.00	127	22 *
49.20	50.20	111	30 *		49.00	50.40	125	16 *
49.20	50.00	153	80 *		49.00	50.20	150	14 *
49.20	49.50	157	80 *		49.00	50.00	150	80 *
49.20	49.40	150	80 *		49.00	49.50	153	80 *
49.20	49.30	173	37 *		49.00	49.40	153	80 *
49.20	49.20	181	36 *		49.00	49.30	144	26 *
49.20	49.10	170	30 *		49.00	49.20	140	33 *
49.20	49.00	137	22 *		49.00	49.10	136	36 *
49.20	48.50	99	18 *		49.00	49.00	126	31 *
49.20	48.40	80	14 *		49.00	48.50	120	24 *
49.20	48.30	62	7 *		49.00	48.40	142	25 *
49.20	48.20	6	4 *		49.00	48.30	158	27 *
49.20	48.10	2	3 *		49.00	48.20	153	11 *
49.20	48.00	24	1 *		49.00	48.10	12	6 *
49.20	47.50	287	2 *		49.00	48.00	2	5 *
49.20	47.40	320	7 *		49.00	47.50	38	2 *
49.20	47.30	330	14 *		49.00	47.40	25	7 *
49.20	47.20	352	16 *		49.00	47.30	11	12 *
49.20	47.10	342	18 *		49.00	47.20	355	7 *
49.20	47.00	317	19 *		49.00	47.10	286	5 *
49.20	46.50	291	21 *		49.00	47.00	286	9 *
49.20	46.40	271	25 *		49.00	46.50	294	10 *
49.20	46.30	256	26 *		49.00	46.40	275	9 *
49.20	46.20	249	23 *		49.00	46.30	240	10 *
49.20	46.10	246	20 *		49.00	46.20	219	14 *
49.20	46.00	246	15 *		49.00	46.10	218	16 *
49.20	45.40	200	22 *		49.00	46.00	236	11 *
49.20	45.20	210	13 *		49.00	45.40	185	9 *
49.20	45.00	0	0 *		49.00	45.20	108	22 *
49.20	44.40	225	26		49.00	45.00	87	20 *
49.20	44.20	90	37		49.00	44.40	90	37

LAT	LONG	DIR	SPD
49.00	44.20	90	37
49.00	44.00	79	37
49.00	43.40	79	37
49.00	43.20	79	37
49.00	43.00	69	39
49.00	42.40	68	25
49.00	42.20	68	25
49.00	42.00	68	25
49.00	41.40	79	26
49.00	41.20	79	26
49.00	41.00	79	26
49.00	40.40	82	18
49.00	40.20	82	18
49.00	40.00	82	18
49.00	39.40	79	26
49.00	39.20	79	26
49.00	39.00	79	26
48.40	57.00	0	0
48.40	56.40	0	0
48.40	56.20	0	0
48.40	56.00	0	0
48.40	55.40	0	0
48.40	55.20	0	0
48.40	55.00	0	0
48.40	54.40	0	0
48.40	54.20	0	0
48.40	54.00	0	0
48.40	53.40	0	0
48.40	53.20	0	0
48.40	53.00	139	39
48.40	52.40	160	49
48.40	52.20	169	49
48.40	52.00	180	48
48.40	51.40	115	14 *
48.40	51.20	134	21 *
48.40	51.00	113	28 *
48.40	50.40	115	30 *
48.40	50.20	122	33 *
48.40	50.00	127	35 *
48.40	49.50	130	80 *
48.40	49.40	132	80 *
48.40	49.30	135	80 *
48.40	49.20	134	29 *
48.40	49.10	129	23 *
48.40	49.00	141	25 *
48.40	48.50	154	30 *
48.40	48.40	158	29 *
48.40	48.30	151	26 *
48.40	48.20	135	21 *
48.40	48.10	115	16 *
48.40	48.00	101	12 *
48.40	47.50	84	8 *
48.40	47.40	41	5 *
48.40	47.30	46	6 *
48.40	47.20	198	1 *
48.40	47.10	185	6 *
48.40	47.00	186	3 *
48.40	46.50	326	1 *
48.40	46.40	251	1 *
48.40	46.30	189	3 *
48.40	46.20	155	3 *
48.40	46.10	99	5 *
48.40	46.00	79	7 *
48.40	45.40	12	21 *
48.40	45.20	43	22 *
48.40	45.00	76	22 *
48.40	44.40	100	37
48.40	44.20	90	37
48.40	44.00	79	37
48.40	43.40	69	39
48.40	43.20	59	40
48.40	43.00	59	40
48.40	42.40	61	29
48.40	42.20	60	23
48.40	42.00	68	25
48.40	41.40	71	29
48.40	41.20	71	29
48.40	41.00	81	30
48.40	40.40	82	18
48.40	40.20	82	18
48.40	40.00	82	18
48.40	39.40	81	30
48.40	39.20	81	30
48.40	39.00	81	30
48.20	57.00	0	0
48.20	56.40	0	0
48.20	56.20	0	0
48.20	56.00	0	0
48.20	55.40	0	0
48.20	55.20	0	0
48.20	55.00	0	0
48.20	54.40	0	0
48.20	54.20	0	0
48.20	54.00	0	0
48.20	53.40	0	0
48.20	53.20	0	0
48.20	53.00	139	39
48.20	52.40	160	49
48.20	52.20	169	49
48.20	52.00	180	48
48.20	51.40	180	13
48.20	51.20	180	2 *
48.20	51.00	116	5 *
48.20	50.40	117	17 *
48.20	50.20	117	24 *
48.20	50.00	104	28 *
48.20	49.50	101	34 *
48.20	49.40	118	44 *
48.20	49.30	130	57 *
48.20	49.20	131	61 *
48.20	49.10	130	57 *
48.20	49.00	128	52 *
48.20	48.50	124	49 *
48.20	48.40	121	48 *
48.20	48.30	117	45 *
48.20	48.20	103	41 *
48.20	48.10	93	40 *
48.20	48.00	100	40 *
48.20	47.50	108	43 *
48.20	47.40	105	41 *
48.20	47.30	98	34 *
48.20	47.20	98	28 *
48.20	47.10	100	24 *
48.20	47.00	96	22 *
48.20	46.50	93	18 *
48.20	46.40	102	15 *
48.20	46.30	111	12 *
48.20	46.20	89	8 *
48.20	46.10	74	9 *
48.20	46.00	115	11 *
48.20	45.40	60	7
48.20	45.20	1	20 *

LAT	LONG	DIR	SPD				
48.20	45.00	24	20 *	48.00	45.20	17	16 *
48.20	44.40	100	37	48.00	45.00	137	34
48.20	44.20	90	37	48.00	44.40	109	34
48.20	44.00	79	37	48.00	44.20	90	34
48.20	43.40	70	42	48.00	44.00	71	29
48.20	43.20	70	42	48.00	43.40	50	36
48.20	43.00	70	42	48.00	43.20	50	36
48.20	42.40	61	29	48.00	43.00	50	36
48.20	42.20	60	23	48.00	42.40	51	29
48.20	42.00	60	23	48.00	42.20	61	29
48.20	41.40	61	29	48.00	42.00	51	29
48.20	41.20	61	29	48.00	41.40	71	29
48.20	41.00	61	30	48.00	41.20	71	29
48.20	40.40	82	18	48.00	41.00	71	29
48.20	40.20	82	18	48.00	40.40	66	17
48.20	40.00	82	18	48.00	40.20	66	17
48.20	39.40	78	35	48.00	40.00	66	17
48.20	39.20	78	35	48.00	39.40	77	21
48.20	39.00	78	35	48.00	39.20	77	21
48.00	57.00	0	0	48.00	39.00	77	21
48.00	56.40	0	0	47.40	57.00	0	0
48.00	56.20	0	0	47.40	56.40	0	0
48.00	56.00	0	0	47.40	56.20	0	0
48.00	55.40	0	0	47.40	56.00	0	0
48.00	55.20	0	0	47.40	55.40	0	0
48.00	55.00	0	0	47.40	55.20	0	0
48.00	54.40	0	0	47.40	55.00	0	0
48.00	54.20	0	0	47.40	54.40	0	0
48.00	54.00	0	0	47.40	54.20	0	0
48.00	53.40	0	0	47.40	54.00	0	0
48.00	53.20	0	0	47.40	53.40	0	0
48.00	53.00	0	0	47.40	53.20	0	0
48.00	52.40	171	44	47.40	53.00	0	0
48.00	52.20	169	49	47.40	52.40	169	40
48.00	52.00	190	49	47.40	52.20	150	53
48.00	51.40	220	23 *	47.40	52.00	199	49
48.00	51.20	206	10 *	47.40	51.40	199	23
48.00	51.00	206	10 *	47.40	51.20	188	23
48.00	50.40	153	10 *	47.40	51.00	180	23 *
48.00	50.20	169	7 *	47.40	50.40	171	7 *
48.00	50.00	90	9 *	47.40	50.20	326	2 *
48.00	49.50	104	7 *	47.40	50.00	302	1 *
48.00	49.40	138	10 *	47.40	49.50	185	12 *
48.00	49.30	139	17 *	47.40	49.40	194	12 *
48.00	49.20	129	26 *	47.40	49.30	224	9 *
48.00	49.10	122	35 *	47.40	49.20	243	7 *
48.00	49.00	120	44 *	47.40	49.10	248	5 *
48.00	48.50	119	49 *	47.40	49.00	223	4 *
48.00	48.40	114	52 *	47.40	48.50	156	4 *
48.00	48.30	108	57 *	47.40	48.40	95	7 *
48.00	48.20	104	59 *	47.40	48.30	81	7 *
48.00	48.10	101	57 *	47.40	48.20	110	10 *
48.00	48.00	96	53 *	47.40	48.10	135	15 *
48.00	47.50	95	50 *	47.40	48.00	143	22 *
48.00	47.40	109	49 *	47.40	47.50	146	28 *
48.00	47.30	123	52 *	47.40	47.40	151	32 *
48.00	47.20	128	48 *	47.40	47.30	161	36 *
48.00	47.10	132	39 *	47.40	47.20	171	44 *
48.00	47.00	141	30 *	47.40	47.10	178	49 *
48.00	46.50	156	24 *	47.40	47.00	181	44 *
48.00	46.40	171	22 *	47.40	46.50	181	35 *
48.00	46.30	182	18 *	47.40	46.40	176	26 *
48.00	46.20	210	4 *	47.40	46.30	164	15 *
48.00	46.10	343	8 *	47.40	46.20	97	7 *
48.00	46.00	359	6 *	47.40	46.10	45	15 *
48.00	45.40	44	13 *	47.40	46.00	43	20 *

LAT	LONG	DIR	SPD
47.40	45.40	68	14 *
47.40	45.20	83	7 *
47.40	45.00	149	32
47.40	44.40	120	32
47.40	44.20	98	32
47.40	44.00	81	32
47.40	43.40	59	32
47.40	43.20	48	31
47.40	43.00	50	33
47.40	42.40	50	33
47.40	42.20	50	33
47.40	42.00	50	33
47.40	41.40	48	24
47.40	41.20	48	24
47.40	41.00	48	24
47.40	40.40	49	21
47.40	40.20	60	18
47.40	40.00	60	18
47.40	39.40	60	23
47.40	39.20	60	23
47.40	39.00	60	23
47.20	57.00	0	0
47.20	56.40	0	0
47.20	56.20	0	0
47.20	56.00	0	0
47.20	55.40	0	0
47.20	55.20	0	0
47.20	55.00	0	0
47.20	54.40	0	0
47.20	54.20	0	0
47.20	54.00	0	0
47.20	53.40	0	0
47.20	53.20	0	0
47.20	53.00	0	0
47.20	52.40	201	44
47.20	52.20	199	49
47.20	52.00	199	49
47.20	51.40	199	23
47.20	51.20	188	23
47.20	51.00	180	23
47.20	50.40	169	23
47.20	50.20	169	23
47.20	50.00	231	8 *
47.20	49.50	241	8 *
47.20	49.40	187	8 *
47.20	49.30	151	14 *
47.20	49.20	170	9 *
47.20	49.10	152	3 *
47.20	49.00	100	3 *
47.20	48.50	158	2 *
47.20	48.40	231	10 *
47.20	48.30	193	10 *
47.20	48.20	224	12 *
47.20	48.10	240	6 *
47.20	48.00	355	5 *
47.20	47.50	59	4 *
47.20	47.40	163	25 *
47.20	47.30	170	52 *
47.20	47.20	170	58 *
47.20	47.10	165	51 *
47.20	47.00	162	40 *
47.20	46.50	160	29 *
47.20	46.40	159	19 *
47.20	46.30	125	10 *
47.20	46.20	44	16 *
47.20	46.10	27	26 *
47.20	46.00	33	19 *
47.20	45.40	89	2 *
47.20	45.20	28	5 *
47.20	45.00	323	8 *
47.20	44.40	140	18
47.20	44.20	131	24
47.20	44.00	90	27
47.20	43.40	52	26
47.20	43.20	41	24
47.20	43.00	37	26
47.20	42.40	39	36
47.20	42.20	39	36
47.20	42.00	39	36
47.20	41.40	41	24
47.20	41.20	41	24
47.20	41.00	41	24
47.20	40.40	40	21
47.20	40.20	40	21
47.20	40.00	49	21
47.20	39.40	48	24
47.20	39.20	48	24
47.20	39.00	48	24
47.00	57.00	0	0
47.00	56.40	0	0
47.00	56.20	0	0
47.00	56.00	0	0
47.00	55.40	0	0
47.00	55.20	0	0
47.00	55.00	0	0
47.00	54.40	0	0
47.00	54.20	0	0
47.00	54.00	0	0
47.00	53.40	0	0
47.00	53.20	0	0
47.00	53.00	0	0
47.00	52.40	209	47
47.00	52.20	210	51
47.00	52.00	199	49
47.00	51.40	191	23
47.00	51.20	180	23
47.00	51.00	180	23
47.00	50.40	180	23
47.00	50.20	169	23
47.00	50.00	169	23
47.00	49.50	174	23
47.00	49.40	180	23
47.00	49.30	180	23
47.00	49.20	180	30
47.00	49.10	184	30
47.00	49.00	188	30
47.00	48.50	192	31
47.00	48.40	198	29
47.00	48.30	198	29
47.00	48.20	50	18 *
47.00	48.10	69	17
47.00	48.00	91	14 *
47.00	47.50	128	14 *
47.00	47.40	154	23 *
47.00	47.30	160	46 *
47.00	47.20	161	58 *
47.00	47.10	166	67 *
47.00	47.00	172	75 *
47.00	46.50	177	53 *
47.00	46.40	181	27 *
47.00	46.30	337	0 *
47.00	46.20	357	9 *

LAT	LONG	DIR	SPD				
47.00	46.10	337	8 *	46.40	46.20	354	7 *
47.00	46.00	276	7 *	46.40	46.10	351	6 *
47.00	45.40	232	13 *	46.40	46.00	236	1 *
47.00	45.20	294	13 *	46.40	45.40	217	5 *
47.00	45.00	254	13	46.40	45.20	274	2 *
47.00	44.40	158	15	46.40	45.00	306	6 *
47.00	44.20	100	26	46.40	44.40	31	7 *
47.00	44.00	90	30	46.40	44.20	100	26
47.00	43.40	81	30	46.40	44.00	90	30
47.00	43.20	59	32	46.40	43.40	68	32
47.00	43.00	50	33	46.40	43.20	71	36
47.00	42.40	50	36	46.40	43.00	60	37
47.00	42.20	50	36	46.40	42.40	49	39
47.00	42.00	50	36	46.40	42.20	49	39
47.00	41.40	38	29	46.40	42.00	49	39
47.00	41.20	38	29	46.40	41.40	50	36
47.00	41.00	38	29	46.40	41.20	50	36
47.00	40.40	40	21	46.40	41.00	61	29
47.00	40.20	40	21	46.40	40.40	60	18
47.00	40.00	49	21	46.40	40.20	49	21
47.00	39.40	49	21	46.40	40.00	49	21
47.00	39.20	49	21	46.40	39.40	51	14
47.00	39.00	49	21	46.40	39.20	51	14
46.40	57.00	0	0	46.40	39.00	51	14
46.40	56.40	0	0	46.20	57.00	269	23
46.40	56.20	0	0	46.20	56.40	269	23
46.40	56.00	0	0	46.20	56.20	269	23
46.40	55.40	0	0	46.20	56.00	269	23
46.40	55.20	0	0	46.20	55.40	269	23
46.40	55.00	0	0	46.20	55.20	269	23
46.40	54.40	0	0	46.20	55.00	259	23
46.40	54.20	0	0	46.20	54.40	250	23
46.40	54.00	0	0	46.20	54.20	239	23
46.40	53.40	0	0	46.20	54.00	228	23
46.40	53.20	0	0	46.20	53.40	229	23
46.40	53.00	229	39	46.20	53.20	231	23
46.40	52.40	220	39	46.20	53.00	220	23
46.40	52.20	221	49	46.20	52.40	221	23
46.40	52.00	210	51	46.20	52.20	210	23
46.40	51.40	199	23	46.20	52.00	210	23
46.40	51.20	188	20	46.20	51.40	208	23
46.40	51.00	190	23	46.20	51.20	208	23
46.40	50.40	190	23	46.20	51.00	201	24
46.40	50.20	180	23	46.20	50.40	201	24
46.40	50.00	180	23	46.20	50.20	190	23
46.40	49.50	184	23	46.20	50.00	190	23
46.40	49.40	188	23	46.20	49.50	189	23
46.40	49.30	188	23	46.20	49.40	188	23
46.40	49.20	188	23	46.20	49.30	193	23
46.40	49.10	188	23	46.20	49.20	198	23
46.40	49.00	217	12 *	46.20	49.10	198	23
46.40	48.50	155	12 *	46.20	49.00	184	4 *
46.40	48.40	110	5 *	46.20	48.50	214	6 *
46.40	48.30	57	12 *	46.20	48.40	270	4 *
46.40	48.20	50	1 *	46.20	48.30	296	7 *
46.40	48.10	213	6 *	46.20	48.20	233	5 *
46.40	48.00	275	5 *	46.20	48.10	196	9 *
46.40	47.50	303	2 *	46.20	48.00	243	3 *
46.40	47.40	179	21 *	46.20	47.50	254	10 *
46.40	47.30	185	65 *	46.20	47.40	208	52 *
46.40	47.20	192	88 *	46.20	47.30	202	97 *
46.40	47.10	197	94 *	46.20	47.20	201	103 *
46.40	47.00	200	79 *	46.20	47.10	195	80 *
46.40	46.50	201	38 *	46.20	47.00	186	34 *
46.40	46.40	195	15 *	46.20	46.50	153	11 *
46.40	46.30	321	0 *	46.20	46.40	75	9 *

LAT	LONG	DIR	SPD				
46.20	46.30	58	14 *	46.00	46.40	68 *	15
46.20	46.20	61	17 *	46.00	46.30	50 *	16
46.20	46.10	76	15 *	46.00	46.20	43 *	14
46.20	46.00	115	16 *	46.00	46.10	56 *	12
46.20	45.40	122	15 *	46.00	46.00	99 *	12
46.20	45.20	82	17 *	46.00	45.40	88 *	20
46.20	45.00	64	23 *	46.00	45.20	70 *	24
46.20	44.40	63	32 *	46.00	45.00	67 *	21
46.20	44.20	79	26	46.00	44.40	18 *	46
46.20	44.00	67	30	46.00	44.20	68	25
46.20	43.40	67	30	46.00	44.00	71	29
46.20	43.20	71	36	46.00	43.40	68	32
46.20	43.00	69	47	46.00	43.20	69	39
46.20	42.40	69	39	46.00	43.00	70	42
46.20	42.20	59	40	46.00	42.40	69	39
46.20	42.00	59	40	46.00	42.20	69	39
46.20	41.40	58	35	46.00	42.00	71	29
46.20	41.20	58	35	46.00	41.40	68	25
46.20	41.00	61	29	46.00	41.20	68	25
46.20	40.40	60	18	46.00	41.00	60	23
46.20	40.20	49	21	46.00	40.40	60	18
46.20	40.00	49	21	46.00	40.20	60	18
46.20	39.40	51	14	46.00	40.00	49	21
46.20	39.20	51	14	46.00	39.40	51	14
46.20	39.00	51	14	46.00	39.20	51	14
46.00	57.00	259	23	46.00	39.00	51	14
46.00	56.40	259	23	45.40	57.00	259	49
46.00	56.20	259	23	45.40	56.40	259	23
46.00	56.00	259	23	45.40	56.20	259	23
46.00	55.40	259	23	45.40	56.00	259	23
46.00	55.20	259	23	45.40	55.40	259	23
46.00	55.00	259	23	45.40	55.20	259	23
46.00	54.40	250	23	45.40	55.00	259	23
46.00	54.20	240	23	45.40	54.40	250	23
46.00	54.00	228	23	45.40	54.20	240	23
46.00	53.40	231	23	45.40	54.00	228	23
46.00	53.20	218	23	45.40	53.40	220	23
46.00	53.00	218	23	45.40	53.20	218	23
46.00	52.40	210	23	45.40	53.00	218	23
46.00	52.20	210	23	45.40	52.40	219	23
46.00	52.00	210	23	45.40	52.20	220	23
46.00	51.40	208	23	45.40	52.00	219	23
46.00	51.20	198	23	45.40	51.40	219	23
46.00	51.00	201	23	45.40	51.20	221	25
46.00	50.40	201	23	45.40	51.00	221	25
46.00	50.20	201	23	45.40	50.40	228	23
46.00	50.00	201	23	45.40	50.20	228	23
46.00	49.50	199	23	45.40	50.00	231	23
46.00	49.40	198	23	45.40	49.50	225	23
46.00	49.30	204	23	45.40	49.40	218	23
46.00	49.20	208	23	45.40	49.30	219	23
46.00	49.10	209	23	45.40	49.20	177	12 *
46.00	49.00	183	10	45.40	49.10	137	17 *
46.00	48.50	178	11 *	45.40	49.00	164	10 *
46.00	48.40	166	4 *	45.40	48.50	171	6 *
46.00	48.30	43	3 *	45.40	48.40	222	7 *
46.00	48.20	177	1 *	45.40	48.30	237	23 *
46.00	48.10	208	14 *	45.40	48.20	226	63 *
46.00	48.00	215	31 *	45.40	48.10	222	87 *
46.00	47.50	217	70 *	45.40	48.00	219	92 *
46.00	47.40	213	96 *	45.40	47.50	217	59 *
46.00	47.30	208	98 *	45.40	47.40	215	38 *
46.00	47.20	209	43 *	45.40	47.30	195	13 *
46.00	47.10	229	8 *	45.40	47.20	86	9 *
46.00	47.00	64	6 *	45.40	47.10	55	16 *
46.00	46.50	82	12 *	45.40	47.00	41	17 *

LAT	LONG	DIR	SPD					
45.40	46.50	45	16	*	45.20	47.00	73	22 *
45.40	46.40	75	12	*	45.20	46.50	75	20 *
45.40	46.30	109	10	*	45.20	46.40	94	16 *
45.40	46.20	87	5	*	45.20	46.30	113	17 *
45.40	46.10	17	6		45.20	46.20	111	17 *
45.40	46.00	14	6	*	45.20	46.10	97	14 *
45.40	45.40	44	10	*	45.20	46.00	74	12 *
45.40	45.20	79	12	*	45.20	45.40	33	23 *
45.40	45.00	59	18	*	45.20	45.20	51	23 *
45.40	44.40	63	38	*	45.20	45.00	40	38 *
45.40	44.20	68	25		45.20	44.40	5	45 *
45.40	44.00	71	29		45.20	44.20	68	25
45.40	43.40	67	30		45.20	44.00	70	27
45.40	43.20	70	34		45.20	43.40	71	29
45.40	43.00	68	37		45.20	43.20	67	30
45.40	42.40	71	22		45.20	43.00	68	32
45.40	42.20	71	22		45.20	42.40	71	22
45.40	42.00	82	18		45.20	42.20	77	21
45.40	41.40	82	18		45.20	42.00	82	18
45.40	41.20	82	18		45.20	41.40	82	18
45.40	41.00	69	19		45.20	41.20	82	18
45.40	40.40	60	18		45.20	41.00	69	19
45.40	40.20	60	18		45.20	40.40	69	19
45.40	40.00	50	18		45.20	40.20	60	18
45.40	39.40	51	14		45.20	40.00	60	18
45.40	39.20	51	14		45.20	39.40	51	14
45.40	39.00	51	14		45.20	39.20	51	14
45.20	57.00	259	49		45.20	39.00	51	14
45.20	56.40	259	49		45.00	57.00	259	49
45.20	56.20	259	23		45.00	56.40	259	49
45.20	56.00	259	23		45.00	56.20	259	49
45.20	55.40	259	23		45.00	56.00	259	23
45.20	55.20	259	23		45.00	55.40	259	23
45.20	55.00	259	23		45.00	55.20	259	23
45.20	54.40	250	23		45.00	55.00	259	23
45.20	54.20	240	23		45.00	54.40	250	23
45.20	54.00	221	23		45.00	54.20	240	23
45.20	53.40	221	23		45.00	54.00	218	23
45.20	53.20	218	23		45.00	53.40	220	23
45.20	53.00	220	23		45.00	53.20	220	23
45.20	52.40	219	23		45.00	53.00	220	23
45.20	52.20	219	23		45.00	52.40	219	23
45.20	52.00	219	23		45.00	52.20	208	23
45.20	51.40	208	23		45.00	52.00	208	23
45.20	51.20	209	23		45.00	51.40	209	23
45.20	51.00	209	23		45.00	51.20	209	23
45.20	50.40	209	23		45.00	51.00	209	23
45.20	50.20	209	23		45.00	50.40	208	23
45.20	50.00	209	23		45.00	50.20	210	23
45.20	49.50	213	23		45.00	50.00	208	23
45.20	49.40	219	23		45.00	49.50	209	23 *
45.20	49.30	220	23	*	45.00	49.40	230	14 *
45.20	49.20	178	4	*	45.00	49.30	141	13 *
45.20	49.10	134	1	*	45.00	49.20	144	4 *
45.20	49.00	173	17	*	45.00	49.10	187	9 *
45.20	48.50	195	42	*	45.00	49.00	193	50 *
45.20	48.40	206	90	*	45.00	48.50	194	115 *
45.20	48.30	211	106	*	45.00	48.40	198	108 *
45.20	48.20	221	68	*	45.00	48.30	198	48 *
45.20	48.10	232	43		45.00	48.20	182	14 *
45.20	48.00	249	19		45.00	48.10	46	13 *
45.20	47.50	345	7	*	45.00	48.00	39	24 *
45.20	47.40	38	17	*	45.00	47.50	40	27 *
45.20	47.30	50	22	*	45.00	47.40	38	27 *
45.20	47.20	62	23	*	45.00	47.30	40	27 *
45.20	47.10	71	23	*	45.00	47.20	46	26 *

LAT	LONG	DIR	SPD				
45.00	47.10	56	25 *	44.40	47.20	43	30*
45.00	47.00	72	25 *	44.40	47.10	50	27*
45.00	46.50	87	24 *	44.40	47.00	64	23*
45.00	46.40	93	25 *	44.40	46.50	79	22*
45.00	46.30	97	28 *	44.40	46.40	79	23*
45.00	46.20	106	30 *	44.40	46.30	83	21*
45.00	46.10	110	28 *	44.40	46.20	113	22*
45.00	46.00	94	22 *	44.40	46.10	129	29*
45.00	45.40	50	20 *	44.40	46.00	120	28*
45.00	45.20	26	36 *	44.40	45.40	61	26*
45.00	45.00	71	29	44.40	45.20	33	43*
45.00	44.40	71	29	44.40	45.00	19	41*
45.00	44.20	71	29	44.40	44.40	71	29
45.00	44.00	71	29	44.40	44.20	68	32
45.00	43.40	71	29	44.40	44.00	71	36
45.00	43.20	71	36	44.40	43.40	71	36
45.00	43.00	68	37	44.40	43.20	69	39
45.00	42.40	78	35	44.40	43.00	70	42
45.00	42.20	81	32	44.40	42.40	78	35
45.00	42.00	81	30	44.40	42.20	78	35
45.00	41.40	82	18	44.40	42.00	81	30
45.00	41.20	82	18	44.40	41.40	79	26
45.00	41.00	69	19	44.40	41.20	79	26
45.00	40.40	71	22	44.40	41.00	79	26
45.00	40.20	71	22	44.40	40.40	68	25
45.00	40.00	69	19	44.40	40.20	68	25
45.00	39.40	66	17	44.40	40.00	69	19
45.00	39.20	66	17	44.40	39.40	69	19
45.00	39.00	66	17	44.40	39.20	69	19
44.40	57.00	261	44	44.40	39.00	69	19
44.40	56.40	261	44	44.20	57.00	239	40
44.40	56.20	261	44	44.20	56.40	239	40
44.40	56.00	261	44	44.20	56.20	239	40
44.40	55.40	261	44	44.20	56.00	239	40
44.40	55.20	248	44	44.20	55.40	239	40
44.40	55.00	248	44	44.20	55.20	239	40
44.40	54.40	248	44	44.20	55.00	239	40
44.40	54.20	239	45	44.20	54.40	239	40
44.40	54.00	231	23	44.20	54.20	229	39
44.40	53.40	230	23	44.20	54.00	220	39
44.40	53.20	230	23	44.20	53.40	219	33
44.40	53.00	227	23	44.20	53.20	221	23
44.40	52.40	227	23	44.20	53.00	218	23
44.40	52.20	218	23	44.20	52.40	220	23
44.40	52.00	222	23	44.20	52.20	209	23
44.40	51.40	221	23	44.20	52.00	209	23
44.40	51.20	209	23	44.20	51.40	209	23
44.40	51.00	209	23	44.20	51.20	209	23
44.40	50.40	198	23	44.20	51.00	200	23
44.40	50.20	198	23	44.20	50.40	198	23
44.40	50.00	188	23	44.20	50.20	198	23 *
44.40	49.50	184	23	44.20	50.00	93	13 *
44.40	49.40	180	13 *	44.20	49.50	109	6 *
44.40	49.30	180	4 *	44.20	49.40	35	5 *
44.40	49.20	228	3	44.20	49.30	354	7 *
44.40	49.10	189	31 *	44.20	49.20	231	6 *
44.40	49.00	187	94 *	44.20	49.10	194	30 *
44.40	48.50	186	115 *	44.20	49.00	185	90 *
44.40	48.40	186	58	44.20	48.50	181	111 *
44.40	48.30	177	14	44.20	48.40	175	46 *
44.40	48.20	46	11	44.20	48.30	72	8 *
44.40	48.10	32	21	44.20	48.20	29	23 *
44.40	48.00	27	26	44.20	48.10	29	25 *
44.40	47.50	28	28	44.20	48.00	27	27 *
44.40	47.40	31	30	44.20	47.50	23	29 *
44.40	47.30	37	30	44.20	47.40	19	33 *

LAT	LONG	DIR	SPD
44.20	47.30	19	34 *
44.20	47.20	23	27 *
44.20	47.10	36	20 *
44.20	47.00	48	16 *
44.20	46.50	65	15 *
44.20	46.40	92	14 *
44.20	46.30	109	16 *
44.20	46.20	100	17 *
44.20	46.10	88	23 *
44.20	46.00	88	29 *
44.20	45.40	66	37 *
44.20	45.20	69	32 *
44.20	45.00	69	32 *
44.20	44.40	70	42
44.20	44.20	70	42
44.20	44.00	68	44
44.20	43.40	68	44
44.20	43.20	68	44
44.20	43.00	81	44
44.20	42.40	78	35
44.20	42.20	78	35
44.20	42.00	81	30
44.20	41.40	79	26
44.20	41.20	79	26
44.20	41.00	79	26
44.20	40.40	78	23
44.20	40.20	78	23
44.20	40.00	82	18
44.20	39.40	82	18
44.20	39.20	82	18
44.20	39.00	82	18
44.00	57.00	220	39
44.00	56.40	220	39
44.00	56.20	220	39
44.00	56.00	220	39
44.00	55.40	220	39
44.00	55.20	210	40
44.00	55.00	210	40
44.00	54.40	210	40
44.00	54.20	210	40
44.00	54.00	210	40
44.00	53.40	210	32
44.00	53.20	208	29
44.00	53.00	210	23
44.00	52.40	209	23
44.00	52.20	201	23
44.00	52.00	201	23
44.00	51.40	191	23
44.00	51.20	192	23
44.00	51.00	191	23
44.00	50.40	349	23
44.00	50.20	347	23
44.00	50.00	176	10 *
44.00	49.50	167	11 *
44.00	49.40	131	7 *
44.00	49.30	139	6 *
44.00	49.20	187	23 *
44.00	49.10	195	48 *
44.00	49.00	195	83 *
44.00	48.50	190	56 *
44.00	48.40	181	24 *
44.00	48.30	20	9 *
44.00	48.20	9	21 *
44.00	48.10	10	22 *
44.00	48.00	13	23 *
44.00	47.50	13	24 *
44.00	47.40	13	26 *
44.00	47.30	12	26 *
44.00	47.20	11	24 *
44.00	47.10	12	21 *
44.00	47.00	20	18 *
44.00	46.50	34	15 *
44.00	46.40	53	15 *
44.00	46.30	63	17 *
44.00	46.20	60	22 *
44.00	46.10	60	28 *
44.00	46.00	69	32 *
44.00	45.40	69	42 *
44.00	45.20	68	43 *
44.00	45.00	77	56 *
44.00	44.40	69	47
44.00	44.20	68	44
44.00	44.00	69	47
44.00	43.40	69	47
44.00	43.20	78	47
44.00	43.00	78	47
44.00	42.40	81	44
44.00	42.20	81	44
44.00	42.00	78	35
44.00	41.40	81	30
44.00	41.20	81	30
44.00	41.00	81	30
44.00	40.40	79	26
44.00	40.20	79	26
44.00	40.00	79	26
44.00	39.40	77	21
44.00	39.20	77	21
44.00	39.00	77	21
43.40	57.00	220	39
43.40	56.40	220	39
43.40	56.20	220	39
43.40	56.00	220	39
43.40	55.40	220	39
43.40	55.20	210	40
43.40	55.00	210	40
43.40	54.40	210	40
43.40	54.20	210	40
43.40	54.00	200	39
43.40	53.40	201	32
43.40	53.20	201	32
43.40	53.00	198	29
43.40	52.40	198	29
43.40	52.20	199	27
43.40	52.00	259	22
43.40	51.40	161	27
43.40	51.20	34	19
43.40	51.00	99	20
43.40	50.40	47	22
43.40	50.20	64	6
43.40	50.00	241	10
43.40	49.50	325	12
43.40	49.40	288	4
43.40	49.30	203	22
43.40	49.20	199	51
43.40	49.10	199	92 *
43.40	49.00	202	60 *
43.40	48.50	204	36 *
43.40	48.40	215	11 *
43.40	48.30	344	11 *
43.40	48.20	351	22 *
43.40	48.10	351	27 *
43.40	48.00	350	28 *

LAT	LONG	DIR	SPD
43.40	47.50	353	29 *
43.40	47.40	356	32 *
43.40	47.30	1	33 *
43.40	47.20	8	27 *
43.40	47.10	16	22 *
43.40	47.00	20	23 *
43.40	46.50	26	25 *
43.40	46.40	42	22 *
43.40	46.30	57	25 *
43.40	46.20	50	37 *
43.40	46.10	45	48 *
43.40	46.00	50	50 *
43.40	45.40	65	43 *
43.40	45.20	59	44 *
43.40	45.00	62	61 *
43.40	44.40	68	64
43.40	44.20	68	54
43.40	44.00	69	59
43.40	43.40	79	52
43.40	43.20	78	47
43.40	43.00	81	44
43.40	42.40	90	46
43.40	42.20	90	46
43.40	42.00	90	46
43.40	41.40	90	34
43.40	41.20	90	34
43.40	41.00	90	34
43.40	40.40	90	27
43.40	40.20	90	27
43.40	40.00	90	27
43.40	39.40	90	25
43.40	39.20	90	25
43.40	39.00	90	25
43.20	57.00	190	40
43.20	56.40	190	40
43.20	56.20	190	40
43.20	56.00	190	40
43.20	55.40	190	40
43.20	55.20	190	40
43.20	55.00	190	40
43.20	54.40	190	40
43.20	54.20	190	40
43.20	54.00	190	40
43.20	53.40	190	37
43.20	53.20	190	37
43.20	53.00	180	34
43.20	52.40	180	32
43.20	52.20	188	30
43.20	52.00	254	6 *
43.20	51.40	6	7 *
43.20	51.20	343	18 *
43.20	51.00	34	6 *
43.20	50.40	86	8 *
43.20	50.20	190	7 *
43.20	50.00	159	14 *
43.20	49.50	195	7 *
43.20	49.40	218	27 *
43.20	49.30	213	51 *
43.20	49.20	208	84 *
43.20	49.10	202	60 *
43.20	49.00	199	33 *
43.20	48.50	203	3 *
43.20	48.40	27	11 *
43.20	48.30	30	16 *
43.20	48.20	24	17 *
43.20	48.10	13	18 *
43.20	48.00	3	22 *
43.20	47.50	0	29 *
43.20	47.40	1	35 *
43.20	47.30	3	38 *
43.20	47.20	8	38 *
43.20	47.10	17	36 *
43.20	47.00	27	34 *
43.20	46.50	32	36 *
43.20	46.40	32	49 *
43.20	46.30	37	65 *
43.20	46.20	47	70 *
43.20	46.10	55	65 *
43.20	46.00	60	63 *
43.20	45.40	86	64 *
43.20	45.20	70	54
43.20	45.00	80	58
43.20	44.40	79	53
43.20	44.20	79	66
43.20	44.00	79	51
43.20	43.40	80	56
43.20	43.20	79	52
43.20	43.00	79	49
43.20	42.40	81	44
43.20	42.20	81	44
43.20	42.00	81	44
43.20	41.40	90	34
43.20	41.20	90	34
43.20	41.00	90	34
43.20	40.40	90	27
43.20	40.20	90	27
43.20	40.00	90	27
43.20	39.40	90	25
43.20	39.20	90	25
43.20	39.00	90	25
43.00	57.00	180	39
43.00	56.40	180	39
43.00	56.20	180	39
43.00	56.00	180	39
43.00	55.40	180	39
43.00	55.20	180	39
43.00	55.00	180	39
43.00	54.40	180	39
43.00	54.20	180	39
43.00	54.00	180	39
43.00	53.40	180	39
43.00	53.20	169	37
43.00	53.00	161	36
43.00	52.40	169	37
43.00	52.20	169	37
43.00	52.00	195	9 *
43.00	51.40	219	22 *
43.00	51.20	296	25 *
43.00	51.00	304	34 *
43.00	50.40	266	29 *
43.00	50.20	262	32 *
43.00	50.00	241	40 *
43.00	49.50	227	53 *
43.00	49.40	221	59 *
43.00	49.30	215	54 *
43.00	49.20	210	37 *
43.00	49.10	201	18 *
43.00	49.00	143	4 *
43.00	48.50	43	7 *
43.00	48.40	20	12 *
43.00	48.30	13	15 *
43.00	48.20	16	15 *

LAT	LONG	DIR	SPD
43.00	48.10	20	17 *
43.00	48.00	19	24 *
43.00	47.50	17	33 *
43.00	47.40	17	40 *
43.00	47.30	16	45 *
43.00	47.20	15	48 *
43.00	47.10	17	49 *
43.00	47.00	25	55 *
43.00	46.50	31	61 *
43.00	46.40	32	79 *
43.00	46.30	32	87 *
43.00	46.20	40	74 *
43.00	46.10	53	63 *
43.00	46.00	46	64 *
43.00	45.40	160	33 *
43.00	45.20	79	52
43.00	45.00	80	54
43.00	44.40	80	54
43.00	44.20	90	58
43.00	44.00	90	55
43.00	43.40	90	48
43.00	43.20	90	46
43.00	43.00	98	44
43.00	42.40	100	40
43.00	42.20	100	40
43.00	42.00	100	40
43.00	41.40	101	35
43.00	41.20	101	35
43.00	41.00	100	37
43.00	40.40	100	40
43.00	40.20	100	40
43.00	40.00	90	30
43.00	39.40	90	23
43.00	39.20	90	23
43.00	39.00	90	23
42.40	57.00	149	40
42.40	56.40	149	40
42.40	56.20	159	39
42.40	56.00	159	39
42.40	55.40	159	39
42.40	55.20	169	40
42.40	55.00	170	42
42.40	54.40	170	42
42.40	54.20	170	42
42.40	54.00	170	42
42.40	53.40	160	42
42.40	53.20	150	42
42.40	53.00	139	42
42.40	52.40	130	42 *
42.40	52.20	119	42 *
42.40	52.00	196	17 *
42.40	51.40	194	11 *
42.40	51.20	256	4 *
42.40	51.00	253	21 *
42.40	50.40	257	31 *
42.40	50.20	248	36 *
42.40	50.00	235	47 *
42.40	49.50	236	40 *
42.40	49.40	247	25 *
42.40	49.30	278	12 *
42.40	49.20	320	3 *
42.40	49.10	86	4 *
42.40	49.00	79	7 *
42.40	48.50	59	9 *
42.40	48.40	40	13 *
42.40	48.30	31	18 *
42.40	48.20	29	22 *
42.40	48.10	28	27
42.40	48.00	27	36
42.40	47.50	25	42
42.40	47.40	25	42 *
42.40	47.30	22	40 *
42.40	47.20	15	45 *
42.40	47.10	13	58 *
42.40	47.00	14	80 *
42.40	46.50	19	96 *
42.40	46.40	27	90 *
42.40	46.30	30	76 *
42.40	46.20	28	77 *
42.40	46.10	40	72 *
42.40	46.00	95	56 *
42.40	45.40	69	52
42.40	45.20	79	52
42.40	45.00	79	52
42.40	44.40	90	48
42.40	44.20	90	48
42.40	44.00	90	48
42.40	43.40	90	44
42.40	43.20	99	42
42.40	43.00	99	42
42.40	42.40	98	30
42.40	42.20	98	30
42.40	42.00	98	30
42.40	41.40	108	36
42.40	41.20	108	36
42.40	41.00	108	36
42.40	40.40	109	42
42.40	40.20	109	42
42.40	40.00	109	42
42.40	39.40	111	25
42.40	39.20	111	25
42.40	39.00	111	25
42.20	57.00	120	40
42.20	56.40	120	40
42.20	56.20	130	42
42.20	56.00	130	42
42.20	55.40	141	44
42.20	55.20	141	44
42.20	55.00	141	44
42.20	54.40	149	45
42.20	54.20	149	45
42.20	54.00	149	45
42.20	53.40	139	42
42.20	53.20	139	42
42.20	53.00	130	42
42.20	52.40	120	45
42.20	52.20	110	47
42.20	52.00	83	29 *
42.20	51.40	124	40 *
42.20	51.20	130	26 *
42.20	51.00	152	18 *
42.20	50.40	192	12 *
42.20	50.20	185	13 *
42.20	50.00	128	13 *
42.20	49.50	93	18 *
42.20	49.40	82	24 *
42.20	49.30	77	25 *
42.20	49.20	74	24 *
42.20	49.10	70	22 *
42.20	49.00	66	22 *
42.20	48.50	63	24 *
42.20	48.40	59	27 *

LAT	LONG	DIR	SPD				
42.20	48.30	52	30 *	42.00	48.40	66	21 *
42.20	48.20	45	31 *	42.00	48.30	58	15 *
42.20	48.10	40	33 *	42.00	48.20	36	13 *
42.20	48.00	28	31 *	42.00	48.10	358	12
42.20	47.50	12	30 *	42.00	48.00	20	7
42.20	47.40	359	30 *	42.00	47.50	25	8 *
42.20	47.30	0	34 *	42.00	47.40	8	25 *
42.20	47.20	5	45 *	42.00	47.30	1	46 *
42.20	47.10	6	65 *	42.00	47.20	3	60 *
42.20	47.00	4	94 *	42.00	47.10	7	70 *
42.20	46.50	3	110 *	42.00	47.00	9	92 *
42.20	46.40	6	88 *	42.00	46.50	2	92 *
42.20	46.30	13	64 *	42.00	46.40	356	101 *
42.20	46.20	14	71 *	42.00	46.30	2	93 *
42.20	46.10	7	79 *	42.00	46.20	9	51 *
42.20	46.00	9	62 *	42.00	46.10	324	17 *
42.20	45.40	69	52	42.00	46.00	304	38 *
42.20	45.20	78	47	42.00	45.40	60	42
42.20	45.00	78	47	42.00	45.20	70	42
42.20	44.40	90	44	42.00	45.00	70	42
42.20	44.20	90	41	42.00	44.40	79	40
42.20	44.00	90	41	42.00	44.20	90	39
42.20	43.40	90	37	42.00	44.00	90	37
42.20	43.20	100	37	42.00	43.40	90	37
42.20	43.00	101	35	42.00	43.20	90	37
42.20	42.40	98	30	42.00	43.00	90	34
42.20	42.20	98	30	42.00	42.40	90	30
42.20	42.00	98	30	42.00	42.20	90	30
42.20	41.40	108	35	42.00	42.00	98	30
42.20	41.20	108	36	42.00	41.40	98	30
42.20	41.00	109	35	42.00	41.20	93	30
42.20	40.40	109	42	42.00	41.00	108	29
42.20	40.20	109	42	42.00	40.40	102	29
42.20	40.00	109	42	42.00	40.20	108	29
42.20	39.40	111	25	42.00	40.00	108	29
42.20	39.20	111	25	42.00	39.40	102	21
42.20	39.00	111	25	42.00	39.20	102	21
42.00	57.00	100	40	42.00	39.00	102	21
42.00	56.40	100	40	41.40	57.00	90	39
42.00	56.20	110	39	41.40	56.40	90	39
42.00	56.00	109	42	41.40	56.20	90	41
42.00	55.40	119	42	41.40	56.00	98	44
42.00	55.20	120	45	41.40	55.40	98	44
42.00	55.00	130	39	41.40	55.20	98	44
42.00	54.40	129	48	41.40	55.00	98	44
42.00	54.20	129	48	41.40	54.40	110	47
42.00	54.00	129	48	41.40	54.20	110	47
42.00	53.40	128	44	41.40	54.00	109	49
42.00	53.20	128	44	41.40	53.40	110	47
42.00	53.00	120	45	41.40	53.20	110	47
42.00	52.40	119	47	41.40	53.00	100	49
42.00	52.20	110	47	41.40	52.40	100	52
42.00	52.00	70	34 *	41.40	52.20	100	49
42.00	51.40	137	29 *	41.40	52.00	100	52
42.00	51.20	124	46 *	41.40	51.40	358	23 *
42.00	51.00	133	47 *	41.40	51.20	89	35 *
42.00	50.40	114	45 *	41.40	51.00	108	55 *
42.00	50.20	94	37 *	41.40	50.40	96	58 *
42.00	50.00	80	45 *	41.40	50.20	94	71 *
42.00	49.50	72	51 *	41.40	50.00	77	81 *
42.00	49.40	74	52 *	41.40	49.50	79	78 *
42.00	49.30	82	49 *	41.40	49.40	89	72 *
42.00	49.20	94	43 *	41.40	49.30	100	69 *
42.00	49.10	101	39 *	41.40	49.20	102	68 *
42.00	49.00	92	32 *	41.40	49.10	100	68 *
42.00	48.50	74	27 *	41.40	49.00	101	68 *

LAT	LONG	DIR	SPD
41.40	48.50	103	67 *
41.40	48.40	102	61 *
41.40	48.30	100	54 *
41.40	48.20	94	45 *
41.40	48.10	85	55 *
41.40	48.00	61	33 *
41.40	47.50	44	36 *
41.40	47.40	44	42 *
41.40	47.30	46	57 *
41.40	47.20	32	74 *
41.40	47.10	23	90 *
41.40	47.00	18	83 *
41.40	46.50	19	54 *
41.40	46.40	60	47
41.40	46.30	58	49
41.40	46.20	58	49
41.40	46.10	59	45
41.40	46.00	60	42
41.40	45.40	60	37
41.40	45.20	60	37
41.40	45.00	58	35
41.40	44.40	71	36
41.40	44.20	78	35
41.40	44.00	90	34
41.40	43.40	90	34
41.40	43.20	101	35
41.40	43.00	101	35
41.40	42.40	90	30
41.40	42.20	90	30
41.40	42.00	98	30
41.40	41.40	111	25
41.40	41.20	119	23
41.40	41.00	119	23
41.40	40.40	131	24
41.40	40.20	131	24
41.40	40.00	119	18
41.40	39.40	119	18
41.40	39.20	119	18
41.40	39.00	0	0
41.20	57.00	90	39
41.20	56.40	90	39
41.20	56.20	90	39
41.20	56.00	90	41
41.20	55.40	90	44
41.20	55.20	90	48
41.20	55.00	90	48
41.20	54.40	90	48
41.20	54.20	90	48
41.20	54.00	90	48
41.20	53.40	90	46
41.20	53.20	90	48
41.20	53.00	90	51
41.20	52.40	90	53
41.20	52.20	90	55
41.20	52.00	90	55
41.20	51.40	90	55
41.20	51.20	90	58
41.20	51.00	110	65 *
41.20	50.40	102	48 *
41.20	50.20	51	47 *
41.20	50.00	76	68 *
41.20	49.50	94	62 *
41.20	49.40	102	51 *
41.20	49.30	103	45 *
41.20	49.20	104	42 *
41.20	49.10	106	40 *
41.20	49.00	113	38 *
41.20	48.50	124	32 *
41.20	48.40	132	29 *
41.20	48.30	124	29 *
41.20	48.20	100	38 *
41.20	48.10	106	52 *
41.20	48.00	109	66 *
41.20	47.50	115	49 *
41.20	47.40	26	41 *
41.20	47.30	6	92 *
41.20	47.20	34	97 *
41.20	47.10	83	44 *
41.20	47.00	59	47
41.20	46.50	69	47
41.20	46.40	71	44
41.20	46.30	64	43
41.20	46.20	60	42
41.20	46.10	59	40
41.20	46.00	60	37
41.20	45.40	59	32
41.20	45.20	61	29
41.20	45.00	51	29
41.20	44.40	48	31
41.20	44.20	50	33
41.20	44.00	68	32
41.20	43.40	90	32
41.20	43.20	101	35
41.20	43.00	109	54
41.20	42.40	109	49
41.20	42.20	109	49
41.20	42.00	100	49
41.20	41.40	111	25
41.20	41.20	111	25
41.20	41.00	119	23
41.20	40.40	119	23
41.20	40.20	131	24
41.20	40.00	131	24
41.20	39.40	119	18
41.20	39.20	119	18
41.20	39.00	119	18
41.00	57.00	79	40
41.00	56.40	79	40
41.00	56.20	80	42
41.00	56.00	81	44
41.00	55.40	90	48
41.00	55.20	90	48
41.00	55.00	90	53
41.00	54.40	90	55
41.00	54.20	90	58
41.00	54.00	90	60
41.00	53.40	90	55
41.00	53.20	90	55
41.00	53.00	90	55
41.00	52.40	90	55
41.00	52.20	90	58
41.00	52.00	90	58
41.00	51.40	90	58
41.00	51.20	90	58
41.00	51.00	90	55
41.00	50.40	90	53
41.00	50.20	9	82 *
41.00	50.00	57	61 *
41.00	49.50	127	59 *
41.00	49.40	147	61 *
41.00	49.30	153	44 *
41.00	49.20	159	30 *

LAT	LONG	DIR	SPD
41.00	49.10	171	28*
41.00	49.00	185	51*
41.00	48.50	90	51
41.00	48.40	90	51
41.00	48.30	90	51
41.00	48.20	90	51
41.00	48.10	84	49
41.00	48.00	78	47
41.00	47.50	78	47
41.00	47.40	81	44
41.00	47.30	81	44
41.00	47.20	80	42
41.00	47.10	80	42
41.00	47.00	80	42
41.00	46.50	79	40
41.00	46.40	79	37
41.00	46.30	75	38
41.00	46.20	71	36
41.00	46.10	63	36
41.00	46.00	58	35
41.00	45.40	59	32
41.00	45.20	61	29
41.00	45.00	51	29
41.00	44.40	61	29
41.00	44.20	38	29
41.00	44.00	81	30
41.00	43.40	98	30
41.00	43.20	112	30
41.00	43.00	98	30
41.00	42.40	102	21
41.00	42.20	90	20
41.00	42.00	90	20
41.00	41.40	97	18
41.00	41.20	97	18
41.00	41.00	110	19
41.00	40.40	119	18
41.00	40.20	119	18
41.00	40.00	119	18
41.00	39.40	116	15
41.00	39.20	116	15
41.00	39.00	116	15
40.40	57.00	81	44
40.40	56.40	78	47
40.40	56.20	79	49
40.40	56.00	79	52
40.40	55.40	80	54
40.40	55.20	80	58
40.40	55.00	80	58
40.40	54.40	90	62
40.40	54.20	90	65
40.40	54.00	90	65
40.40	53.40	90	65
40.40	53.20	90	65
40.40	53.00	90	65
40.40	52.40	90	65
40.40	52.20	90	65
40.40	52.00	90	65
40.40	51.40	90	62
40.40	51.20	90	62
40.40	51.00	90	62
40.40	50.40	90	62
40.40	50.20	90	62
40.40	50.00	90	55
40.40	49.50	90	55
40.40	49.40	90	53
40.40	49.30	90	53
40.40	49.20	90	51
40.40	49.10	90	51
40.40	49.00	90	48
40.40	48.50	90	48
40.40	48.40	90	48
40.40	48.30	90	46
40.40	48.20	90	44
40.40	48.10	90	44
40.40	48.00	90	41
40.40	47.50	90	41
40.40	47.40	90	41
40.40	47.30	90	39
40.40	47.20	90	37
40.40	47.10	82	37
40.40	47.00	78	35
40.40	46.50	78	35
40.40	46.40	78	35
40.40	46.30	74	33
40.40	46.20	67	30
40.40	46.10	63	31
40.40	46.00	59	32
40.40	45.40	61	29
40.40	45.20	48	24
40.40	45.00	29	18
40.40	44.40	8	16
40.40	44.20	8	16
40.40	44.00	18	14
40.40	43.40	36	23
40.40	43.20	60	23
40.40	43.00	71	22
40.40	42.40	77	21
40.40	42.20	90	20
40.40	42.00	90	20
40.40	41.40	90	11
40.40	41.20	90	11
40.40	41.00	101	11
40.40	40.40	111	12
40.40	40.20	126	11
40.40	40.00	126	11
40.40	39.40	126	11
40.40	39.20	111	12
40.40	39.00	111	12
40.20	57.00	79	49
40.20	56.40	79	49
40.20	56.20	79	49
40.20	56.00	80	54
40.20	55.40	80	54
40.20	55.20	80	58
40.20	55.00	80	58
40.20	54.40	90	60
40.20	54.20	90	65
40.20	54.00	90	65
40.20	53.40	90	65
40.20	53.20	90	65
40.20	53.00	90	65
40.20	52.40	90	65
40.20	52.20	90	65
40.20	52.00	90	65
40.20	51.40	90	62
40.20	51.20	90	62
40.20	51.00	90	62
40.20	50.40	90	62
40.20	50.20	90	62
40.20	50.00	90	60
40.20	49.50	90	58
40.20	49.40	90	55

LAT	LONG	DIR	SPD
40.20	49.30	90	53
40.20	49.20	90	51
40.20	49.10	90	51
40.20	49.00	90	48
40.20	48.50	90	46
40.20	48.40	90	44
40.20	48.30	90	44
40.20	48.20	90	41
40.20	48.10	90	46
40.20	48.00	90	48
40.20	47.50	90	41
40.20	47.40	90	34
40.20	47.30	90	37
40.20	47.20	100	37
40.20	47.10	105	33
40.20	47.00	112	30
40.20	46.50	112	30
40.20	46.40	108	29
40.20	46.30	114	28
40.20	46.20	120	27
40.20	46.10	120	27
40.20	46.00	120	27
40.20	45.40	131	24
40.20	45.20	150	23
40.20	45.00	158	23
40.20	44.40	347	21
40.20	44.20	0	20
40.20	44.00	4[illegible]	21
40.20	43.40	49	21
40.20	43.20	[illegible]0	23
40.20	43.00	68	25
40.20	42.40	78	23
40.20	42.20	90	20
40.20	42.00	[illegible]0	20
40.20	41.40	90	11
40.20	41.20	90	11
40.20	41.00	101	11
40.20	40.40	101	11
40.20	40.20	111	12
40.20	40.00	111	12
40.20	39.40	101	11
40.20	39.20	101	11
40.20	39.00	101	11
40.00	57.00	70	54
40.00	56.40	70	54
40.00	56.20	80	58
40.00	56.00	80	58
40.00	55.40	80	58
40.00	55.20	80	58
40.00	55.00	80	58
40.00	54.40	79	63
40.00	54.20	79	63
40.00	54.00	90	65
40.00	53.40	90	65
40.00	53.20	90	65
40.00	53.00	90	65
40.00	52.40	90	65
40.00	52.20	90	65
40.00	52.00	90	65
40.00	51.40	90	62
40.00	51.20	90	62
40.00	51.00	90	62
40.00	50.40	90	62
40.00	50.20	90	62
40.00	50.00	90	55
40.00	49.50	90	53
40.00	49.40	90	48
40.00	49.30	90	48
40.00	49.20	90	48
40.00	49.10	90	48
40.00	49.00	90	46
40.00	48.50	90	44
40.00	48.40	90	41
40.00	48.30	90	41
40.00	48.20	90	41
40.00	48.10	90	39
40.00	48.00	90	34
40.00	47.50	90	32
40.00	47.40	90	30
40.00	47.30	94	30
40.00	47.20	98	30
40.00	47.10	107	31
40.00	47.00	112	30
40.00	46.50	112	30
40.00	46.40	109	27
40.00	46.30	116	26
40.00	46.20	119	23
40.00	46.10	119	23
40.00	46.00	119	23
40.00	45.40	131	24
40.00	45.20	150	23
40.00	45.00	167	21
40.00	44.40	351	16
40.00	44.20	0	16
40.00	44.00	0	16
40.00	43.40	11	23
40.00	43.20	18	22
40.00	43.00	29	23
40.00	42.40	40	21
40.00	42.20	49	21
40.00	42.00	60	23
40.00	41.40	68	12
40.00	41.20	78	11
40.00	41.00	90	11
40.00	40.40	90	11
40.00	40.20	101	11
40.00	40.00	101	11
40.00	39.40	101	11
40.00	39.20	101	11
40.00	39.00	101	11
0.00	0.00	999	0

*U. S. G. P. O. 720-625/1302-42