Ice Floe Trajectories off Labrador and Eastern Newfoundland: 1985 - 1987

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by

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ABSTRACT

Peterson, I.K. and Symonds, G., 1988. Ice floe trajectories off Labrador and eastern Newfoundland : 1985 - 1987. Can. Tech. Rep. Hydrogr. Ocean Sci. No. 104 : v + 101 p.

Sea ice motion off Labrador and eastern Newfoundland was monitored in the early months of 1985 - 1987, using 28 satellite-tracked beacons deployed on ice floes. Six of the beacons were equipped with anemometers positioned at 2 meters above the ice surface. In total, about 1200 buoy-days of data were obtained. Ice trajectory plots and time series plots of ice and wind velocity are presented, along with tabulated values of daily position, ice speed and direction. An intercomparison of daily ice velocity, observed wind and geostrophic wind reveals that about 40-60% of the variance of ice velocity can be explained by the geostrophic wind, while up to 70% can be explained by using anemometer winds instead. Finally, ice beacon velocities were used to validate ice velocities derived from satellite imagery.

RÉSUMÉ

Peterson, I.K. and Symonds, G., 1988. Ice floe trajectories off Labrador and eastern Newfoundland : 1985 - 1987. Can. Tech. Rep. Hydrogr. Ocean Sci. No. 104 : v + 101 p.

Les déplacements des glaces de mer au large du Labrador et de l'est de Terre-Neuve ont été contrôlés au cours des premiers mois de 1985 à 1987 à l'aide de 28 balises repérées par satellite déployées sur des floes. Six de ces balises étaient équipées d'anémomètres placés à deux mètres au-dessus de la surface des glaces. Au total, 1 200 jours-bouées environ de données ont ainsi été obtenus. Les auteurs présentent des tracés des trajectoires des glaces et des séries chronologiques des glaces et des vitesses du vent de même que des tableaux des valeurs quotidiennes de la position des glaces, de leur vitesse et de leur direction. Une comparaison des valeurs quotidiennes de la vitesse des glaces, de la vitesse observée du vent et du vent géostrophique a montré que de 40 à 60 % environ de la variance de la vitesse des glaces pouvait être expliquée par le vent géostrophique, celle valeur atteignait 70 % si on utilisait les valeurs des anémomètres. Les vitesses de déplacement des balises ont aussi été utilisées pour valider les vitesses des glaces obtenues par imagerie satellite.

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1. INTRODUCTION

The understanding of sea ice motion and its effect on ice distribution off the Canadian east coast is important for offshore hydrocarbon exploration and proposed development. Pack ice near a drilling area can not only necessitate the removal of the drilling vessel itself, but can interfere with supply ships, iceberg-towing operations, and the use of safety equipment (Nazarenko and Miller, 1986).

In early 1985, the Physical and Chemical Sciences Branch of the Bedford Institute of Oceanography initiated a program to study sea ice drift over the continental shelf off Labrador and eastern Newfoundland (Fig. 1). The program, funded by the Federal Panel on Energy Research and Development (PERD), intends to obtain reliable estimates of the mean and variance of ice drift from satellite-tracked ice beacon data, and to assess the relative contributions of the various oceanographic and meteorological factors in determining sea ice distribution in this region. Due to significant year to year variability in the sea ice cover along the eastern Newfoundland coast, the program must continue for several years to achieve these objectives.

A total of 28 beacons was deployed on ice floes off Labrador between 1985 and 1987 to monitor ice drift. Six of these were equipped with anemometers to record offshore wind speed and direction. This report will present both the ice trajectory and wind data from the ice beacons, followed by some preliminary results of the data analysis.

2. EQUIPMENT

The satellite-tracked ice beacons used in 1985-87 were all designed and manufactured by Hermes Electronics Ltd, except for two anemometer beacons in 1987 which were designed and manufactured by Metocean Data Services Ltd. The anemometers, made by R. M. Young Co., were positioned at a height of 2 meters above the ice surface.

Data from the beacons are telemetered via the Argos satellite system, which computes ice beacon position from the measured Doppler shift of the beacon transmissions. The data are transmitted every 50 to 60 seconds and received for about 10 minutes on about 10 satellite passes per day, generally spaced 1 to 2 hours apart. A gap of 4 to 6 hours in data collection between 0 and 6 hours GMT is apparent in Figure 2, which shows the fraction of total days with fixes at each hour of the day, ± 0.5 hours, for one buoy in each of the three years, 1985 - 87.

The anemometer beacon deployed in 1985 provided instantaneous wind speed and direction. Because of the daily gap of several hours mentioned above, the anemometer beacons deployed in 1986 and 1987 were designed to compute the average wind over 10 minutes once per hour, and transmit these 10 minute averages for each of the previous 6 hours.

The position accuracy of the ice beacons was estimated when they were field tested at a stationary location (Table 1). The accuracy , which depends on oscillator stability, varies from one beacon to another, but in general, the standard deviation is about 0.2 km for both latitude and longitude. This implies a standard deviation in velocity of 8 cm/s for position fixes 1 hour apart, or 0.3 cm/s for fixes 1 day apart. The high standard deviation shown by buoy 2407 was reflected after deployment in the computed velocities. Some of the standard deviations in Table 1 may be overestimates, since the buoys were tested in groups, and there are reception limitations within ARGOS (Pease et al., 1985). In addition, accuracy may decay over time due to decreasing battery voltage.

Data collected by the anemometer beacons have a wind speed accuracy of ± 1 m/s for winds < 10 m/s and ± 10% for winds > 10 m/s. The wind direction accuracy is ± 5°.

3. DEPLOYMENT

Each winter, two deployments of beacons by helicopter were planned : one in January, when weather and ice conditions permitted, and the other a month later. For each deployment, there would be 2 lines of 2 or 3 beacons each : one in the north off Nain and the other farther south off Makkovik (Fig. 1). In each line, the beacons would be spaced approximately 50 km apart across the shelf, starting with the beacon farthest offshore which would be placed a few kilometers inside the ice edge.

In 1985, the first deployment was performed on January 12, with 3 beacons deployed off Nain (2366, 2362 and 2367) and 2 off Makkovik (2361 and 2364). The second deployment was carried out on February 12, with 3 beacons deployed off Nain (2368, 2363 and 2365) and three off Makkovik (2348, 2341 and 2347). Buoy 2341 was equipped with an anemometer.

In 1986, the first deployment was performed in late January, with 3 buoys deployed off Makkovik on January 25 (2395, 2524 and 2398) and 3 off Nain the following day (2399, 2396, and 2397). For the second deployment on February 12, the ice formed an extremely narrow band along the coast. Therefore only one buoy was deployed off Makkovik (2525) and 2 off Nain, (2523 and 2394). Two more buoys were deployed off Makkovik on March 7 (2361 and 2407). Buoys 2523, 2524 and 2525 were equipped with anemometers.

In 1987, the first deployment was carried out in mid-January with 3 buoys (2375, 3121 and 2373) deployed off Nain on January 18, and 3 deployed off Makkovik (2379, 3123 and 2378) on January 19. Buoys 3121 and 3123 were equipped with anemometers. No second deployment was done because the field contractor went into receivership.

4. DATA PROCESSING AND PRESENTATION

Although some of the ice beacons floated and continued to transmit after the ice floes they were on melted, only position and wind data collected when the beacons were on the ice are presented in this report. The times when the ice floes melted were estimated from examination of AES ice charts and satellite images.

4.1 POSITION DATA

Six-hourly positions were interpolated from the raw position data, after a few obvious isolated spikes had been removed. For each year, the trajectories of all the beacons are superimposed in Figure 3, with dashed lines indicating that ice drift was determined from data with more than one day between fixes. Individual trajectories are plotted in Appendix A, with the positions at 1800 hours GMT marked. This time of day was chosen because it corresponds approximately to when the daily NOAA satellite images available at BIO were taken. The positions at 1800 hours GMT are also listed in Appendix C, along with the mean speed and direction over the previous 24 hours. In addition, U (eastward) and V (northward) components were calculated from raw positions which were separated in time by at least one hour, and are plotted in Appendix B.

4.2 WIND DATA

In 1985, buoy 2341 sent good wind data for sixty-six days between Julian day 43 and 108. The median wind speed and direction were computed for each pass, from which hourly U (eastward) and V (northward) components were then interpolated.

Of the three buoys deployed in 1986 with anemometers, only buoy 2525 provided a long time series record of 40 days (Julian day 43 to 82). The two remaining buoys provided records of less than 7 days. Buoy 2524 was blown out to sea immediately following deployment, providing wind data for only 3 days, while buoy 2523 sent acceptable data for days 43 to 49 only.

In 1987, two buoys deployed were equipped with anemometers. Buoy 3121 collected wind data for 73 days between Julian days 18 and 90. However, buoy 3123 was blown out to sea following deployment and sent good wind data for only nine days between Julian Days 19 and 27.

In this report, wind data are presented for the buoys with long time series only : buoys 2341 in 1985, 2525 in 1986, and 3121 in 1987. The wind data were corrected for movement of the platform, which represents on average about 5% of the wind speed, but can exceed 1 m/s. The hourly data were averaged over 6 hours and are plotted in Figure 4. Six-hourly ice velocities of the floes from which the wind data were collected, are shown below each wind plot. Positive U and V components denote toward the east and toward the north respectively for both wind and ice velocity.

5. RESULTS AND DISCUSSION

5.1 MEAN AND VARIANCE OF ICE VELOCITY

Daily U (eastward) and V (northward) ice velocity components were computed from the interpolated beacon positions in Appendix C, and then averaged in 1° latitude by 2° longitude grid cells, for the area 46 to 58°N and 46 to 62°W (Fig. 5a). Standard deviations were also calculated and resolved along the principal axes of variation, defined as those for which the covariance of the two velocity components is zero. The maximum and minimum diameters of each ellipse in Figure 5(a) correspond to the standard deviations along the principal axes of variation, in the same direction as the principal axes. The number of buoys which entered each grid cell and the total number of daily velocity observations in each cell are shown in Figure 5(b).

Along the Labrador coast, both the mean ice drift and the major principal axis of variation are southeastward, parallel to the coast. Mean ice speeds are generally 40-50 cm/s along the shelf break, where the main core of the Labrador Current is located, but only 10-15 cm/s close to shore. Low mean ice speeds (10-20 cm/s) are also found farther south, over the Northeast Newfoundland Shelf, which is wider than the Labrador Shelf. The standard deviations along the two principal axes of variation are about equal in magnitude in the southern area. Close to the northern edge of the Grand Banks, the mean ice drift is eastward at 35-40 cm/s. However, there are relatively few observations in this region.

5.2 WIND

5.2.1 Ice Velocity vs. Anemometer Wind

The stick plots of the ice drift velocities and observed wind velocities of Figure 4 show a high degree of coherence. This dependence of ice drift on wind was further examined by complex regression analysis, following Thorndike and Colony (1982). Table 2 shows the results of least-squares fitting the equation

$$(U_I - \bar{U}_I) = A (U_2 - \bar{U}_2) + \epsilon$$

where U_I and U_2 are the ice velocity and 2 meter wind velocity vectors respectively, and are thought of as complex numbers. $\bar{U}_I$ and $\bar{U}_2$ are their means over the observation period. A is a complex constant such that $A = |A| e^{i\theta}$, where $|A|$ is the reduction factor, and θ is the turning angle.

For an averaging period of 1 day, ice moved at 5.1 - 5.7% of the surface wind speed, 4 to 41 degrees to the right of the wind. Wind accounted for 70% of the variation in daily ice velocity for buoy 2341, 69% for buoy 2525, and 45% for buoy 3121. The mean current, defined as the mean ice velocity minus the effect of the mean wind, ranged from 7 - 10 cm/s to the south to southeast, parallel to the coast and in the same direction as the Labrador Current.

5.2.2 Anemometer Wind vs. Geostrophic Wind

The anemometer wind data was also compared with gridded geostrophic wind data computed by the Atmospheric Environment Service, from 6-hourly surface pressure data produced by the U.S. Fleet Numerical Oceanographic Center, and distributed by the Naval Environmental Data Network. This pressure dataset is generated on a ~381 km grid spacing, using a blending procedure which incorporates both pressure and wind observations. The geostrophic winds used in this study differ from those described in Swail (1985) for the period up to 1978, in the sense that fewer data have been incorporated into the FNOC pressure analyses. However, the computational procedure is the same. The AES geostrophic wind speeds have a tendency to underestimate the true geostrophic wind speeds, since central pressures in the FNOC dataset for low pressure areas are consistently too high (Swail, 1985). Consequently, the reduction factor between AES geostrophic and observed surface wind at ocean weatherships is only 0.9 (Swail, 1985), compared to a more generally accepted value of about 0.7 found by Thompson et al. (1983). This implies that the AES geostrophic wind speed probably underestimates the true geostrophic wind speed by about 20%. On the other hand, the mean turning angle between the geostrophic and surface wind is about 15° in both studies, with the surface wind to the left of the geostrophic wind.

Geostrophic winds were interpolated from the AES dataset, to the positions of buoy 2341 in 1985, and of buoy 2525 in 1986. Geostrophic winds for 1987 were not available at the time of this report publication.

In Figure 6, 6-hourly anemometer wind speed at 2 meters, $|U_2|$, is plotted against geostrophic wind speed, $|G|$, for the two beacons. The regression equations were

$$|U_2| = 0.00 + 0.37 \; |G| \quad (r^2 = 0.60) \quad \text{for buoy 2341,}$$

and $$|U_2| = 1.96 + 0.33 \; |G| \quad (r^2 = 0.62) \quad \text{for buoy 2525,}$$

where $|U_2|$ and $|G|$ are in m/s.

The mean reduction factor of the 2 meter wind speed relative to the geostrophic wind speed, $\overline{|U_2|/|G|}$, and the mean turning angle, $\overline{(\arctan (v_2/u_2) - \arctan (v_G/u_G))}$, were computed for the two buoys, where $U_2 = (u_2, v_2)$ and $G = (u_G, v_G)$. Only observations with geostrophic wind speeds, $|G|$, greater than 5 m/s were included. The mean reduction factors for buoys 2341 and 2525 were 0.36 and 0.48 respectively, with turning angles of 42 and 38 degrees to the left of the geostrophic wind.

Table 2 shows the results of least-square fitting the equation

$$(U_2 - \overline{U}_2) = A \, (G - \overline{G}) + \epsilon$$

where U_2 and G are the anemometer wind and geostrophic wind, and $A = |A| \; e^{i\theta}$ where $|A|$ and θ are the reduction factor and turning angle (counterclockwise) of the fluctuating wind.

For 6-hourly winds, the squared correlation coefficients were 0.68 and 0.75 for buoys 2341 and 2525. The two buoys had reduction factors of 0.39 and 0.58, with turning angles of 35 and 38°, for the mean wind. For the fluctuating wind,the reduction factors were 0.32 and 0.36, and the turning angle was 42° for both buoys.

For daily winds, the squared correlation coefficients were 0.78 and 0.84.

The reduction factors were 0.40 and 0.58, with a turning angle of 35° for the mean wind. For the fluctuating wind, the reduction factors were 0.33 and 0.36, with turning angles of 43 and 45 degrees.

The turning angles between geostrophic and 2 meter winds reported in this study are somewhat high compared to those in the literature. Overland (1985) quotes turning angles over Arctic sea ice of 22 to 38°. However, Todoroff (1987) recently found an average turning angle of about 45° at Hopedale, along the Labrador coast. Even when the wind dataset was broken down into different quadrants, average turning angles were 36, 43, 49 and 63 degrees. Therefore, the large turning angle at Hopedale cannot be attributed to topography in any major way.

Reduction factors, $|U_{10}|/|G|$, for winds at 10 m over Arctic sea ice ranged from 0.5 to 0.8 (Overland, 1985). The ratio of the wind speed at 2 m relative to that at 10 m should be $\ln(2/z_0)/\ln(10/z_0)$, where z_0 is the surface roughness. The surface roughness along the Labrador coast is probably similar to that found in the Gulf of St. Lawrence, with z_0 values of up to 1.5 cm (Smith et al., 1970). This implies a reduction factor, $|U_2|/|G|$, of 0.4 - 0.6, in agreement with reduction factors of 0.36 and 0.48 found in this study.

5.2.3 Ice Velocity vs. Geostrophic Wind

Also shown in Table 2 are the regression coefficients for ice velocity vs. geostrophic wind, ie. for the equation,

$$(U_I - \bar{U}_I) = A\,(G - \bar{G}) + \epsilon\ ,$$

for each buoy in 1985 and 1986 with more than 5 days of data. Some buoy-days are not included because the geostrophic wind dataset did not cover the whole study area. Except for buoys 2347 and 2365, which were in the Labrador Current, the scaling factors were 1.1 to 2.3%, turning angles were -23 to 8 degrees clockwise, and squared correlation coefficients were 0.42 to 0.60.

The ice zone off the east coast of Greenland is similar to that off Labrador and Newfoundland with respect to ice concentration (Comiso, 1986) and floe size, and in being associated with a strong boundary current. However, the sea ice off Greenland is generally thicker and contains a significant fraction of multi-year ice. For six ice beacons off Greenland, Johannessen et al. (1983) found reduction factors of 0.9 to 2.1%, turning angles of 0 to 23 degrees clockwise, and squared correlation coefficients of 39 to 63%, in good agreement with values found in this study.

In comparison, for the Arctic Ocean, Thorndike and Colony (1982) calculated reduction factors of only 0.3 to 1.3%, with turning angles of -19 to 31 degrees clockwise. Squared correlation coefficients were 50% within 400 km of the coast, increasing to 80% farther offshore.

5.3 CURRENTS

5.3.1 Labrador Current

The influence of the main core of the Labrador Current, which runs along the continental slope, can be seen clearly in the trajectories of buoys 2347 and 2365 in 1985, and buoy 2378 in 1987 (Appendix A), with maximum daily speeds of 87, 108 and 101 cm/s, respectively (Appendix C). These trajectories all exhibited a wavy pattern, which agrees in wavelength (100 - 120 km) and general location with those seen in satellite imagery (Fig. 7). Buoy 2365 made a slight excursion in and out of Hawke Saddle. Flow into and out of Hawke Saddle has also been observed in motion derived from satellite imagery (Peterson, 1987).

5.3.2 Shelf Currents

On the shelf, there is some suggestion of topographic steering of the currents in many of the buoy trajectories. For example, buoys 2363 and 2368 in 1985, and buoy 2523 in 1986, travelled eastward through Hopedale Saddle, a drift pattern also seen in satellite imagery (Peterson, 1987). Further south, buoy 2407 in 1986, closely followed the 300 metre contour eastward along the southern side of Hawke Saddle, and then along the eastern edge of Belle Isle Bank and Funk Island Bank. Buoys 2348, 2364, 2367 and 2341 in 1985 and buoy 2375 in 1987 travelled eastward along the northern edge of the Grand Banks, as did the five ice beacons deployed by Petro-Canada in 1985 (Nazarenko and Miller, 1986).

5.3.3 Tidal Currents

In Appendix B, semi-diurnal or mixed tidal oscillations are evident in some of the records, especially for the two buoys which entered the Strait of Belle Isle : buoy 2361 (day 78-87, 1985) and buoy 2525 (day 56-60, 1986). Other examples of tidal oscillations are further north on the Labrador Shelf for buoys 2375 (day 26-38, 1987), buoy 2379 (day 26-38, 1987) and buoy 3121 (day 20-30, 1987).

It is well known that strong reversing tidal currents exist in the Strait of Belle Isle (Garrett and Petrie, 1981). The near-surface along-strait amplitudes for the O_1, K_1, M_2, and K_2 tides have been estimated as follows : 25, 30, 57 and 20 cm/s (Toulany, 1985). These values represent the weighted means of amplitudes from 5 stations across the strait. On the Labrador Shelf, the dominant tidal constituent, the M_2 tide, has an amplitude of 2 - 10 cm/s (Fissel and Lemon, 1982) at depths of at least 25 m, which corresponds to an amplitude in position of 0.1 - 0.7 km. In comparison, the standard deviation in position is about 0.2 km (Table 1).

5.3.4 Inertial Currents

Oscillations, with about 6 cycles over 4 days, can be seen in the U and V component time series for many of the buoys on the shelf south of Hamilton Bank (Appendix B). Examples are for buoy 2364 (day 46-50, 62-68, 1985), buoy 2341 (day 78-82, 86-90, 98-102, 1985), buoy 2348 (day 114-118, 1985), buoy 2361 (day 76-92, 1986), buoy 2523 (day 76-92, 1986) and buoy 2375 (day 86-98, 1987). In most cases, these probably represent inertial oscillations, since the inertial period in this area is 15-16 hours.

Fluctuations in the amplitude of inertial oscillations are generally associated with fluctuations in the surface wind. Inertial motion has previously been observed on the Labrador Shelf using current meters (Fissel and Lemon, 1982), though no simple correspondence between inertial oscillations and wind events could be detected.

5.4 NEAR-SHORE/LANDFAST ICE

Several buoys exhibited periods of very slow or negligible movement close to shore, probably because they were trapped in landfast ice, or ice which had been compacted against the coast. Buoy 2366 in 1985, and buoy 2379 in 1987 were both within 70 km of the coast, north of Hamilton Inlet, where water depths are less than 100 m. In satellite imagery, this shallow area is usually covered during the ice season, with what appears to be compacted or landfast ice (Fig. 7). The two buoys moved extremely slowly south along the coast, and stopped transmitting after 51 and 21 days respectively, presumably because they were damaged or submerged by rafting ice.

Another example is buoy 2361 in 1985, which was stationary for a month off Newfoundland, at the western end of the Strait of Belle Isle. Finally, buoys 2375 and 3121 in 1987 showed negligible movement between days 77 and 82 along the northeast coast of Newfoundland following and during a period of onshore winds (Fig. 4(c)).

5.5 COMPARISON WITH VELOCITY FIELDS DERIVED FROM SATELLITE IMAGERY

Sea ice movement can also be estimated by tracking ice features in sequential visible NOAA satellite images (eg. Peterson, 1987). This method generally permits better spatial resolution of the velocity field than does the use of ice beacons. In addition, it can be conducted repeatedly in the same location throughout the ice season, whereas the number of ice beacon deployments per year is severely limited because of expense. However, on most days, ice-tracking using NOAA satellite imagery is precluded by extensive cloud coverage.

Three ice velocity fields for March 1985, derived from pairs of satellite images one day apart, are plotted in Figure 8. The narrow arrowheads denote satellite imagery derived ice velocities, while the wide arrowheads denote ice beacon velocities over the same period. The lengths of the arrows are proportional to the ice drift speed as indicated by the scale in the inset in the lower left hand corner. The mean AES geostrophic wind field for the observation period is shown in the inset in the upper right hand corner, and covers the same area as the ice drift chart area.

On March 6-7, 1985, when there were strong longshore winds, there was a fairly uniform flow of ice parallel to the coast. However, considerable spatial variability can be seen in the other two velocity fields, which were associated with relatively weak winds. For instance, on March 19-20, 1985, a strong clockwise flow of ice was visible on Hamilton Bank, with very weak flow in the opposite direction a few kilometres to the west, presumably due to currents. The image for March 20 (Fig. 7), reveals a very pronounced wavy pattern at the shelf edge, which may be related to this flow pattern.

The imagery - derived velocity fields clearly agree well with ice beacon velocities, and indicate the spatial scales represented by the ice beacons. They also verify the ice beacon drift results in that the ice motion is predominantly wind forced, but the oceanic contribution cannot be ignored in this area due to the strong Labrador Current.

6. CONCLUSIONS

Ice drift down the Labrador and east Newfoundland coasts was monitored in 1985-87 using 28 satellite-tracked beacons deployed on ice floes by helicopter. Six of the beacons were equipped with anemometers positioned at 2 meters above the ice surface. In this report, ice trajectory plots are presented, along with tabulated values of daily position, ice speed, and direction.

Time series plots of ice velocity and wind velocity exhibit strong coherence, with wind explaining up to 70% of the variance in daily ice velocity. The anemometer winds agree well with the geostrophic winds ($r^2 \simeq 0.8$). However, the turning angles are high, with the anemometer winds at 40 degrees to the left of the geostrophic wind. Geostrophic wind accounts for 40 - 60% of the variance in ice velocity. The ice floes drifted at 1.1 - 2.3% of the geostrophic wind speed, at -23 to 9 degrees to the right of the wind.

The ice trajectory plots show the influence of the Labrador Current along the continental slope, as well as topographic steering of currents on the shelf. Tidal and inertial oscillations are evident in the time series plots of ice velocity.

Finally, the ice beacon velocities are used to validate ice velocities computed from satellite imagery. Satellite imagery therefore, can complement the present ice beacon program in providing additional ice velocity data of much higher spatial resolution.

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TABLES

Table 1. Standard deviations of ice beacon positions.

Year	Buoy #	Sample time	# of fixes	Longitude (km)	Latitude (km)
1985	2347	Jan 85	29	0.18	0.14
1985	2348	Jan 85	30	0.12	0.10
1985	2361	Dec 84	39	0.13	0.18
1985	2362	Dec 84	40	0.13	0.17
1985	2363	Jan 85	25	0.16	0.09
1985	2364	Dec 84	38	0.16	0.12
1985	2365	Dec 84	41	0.18	0.23
1985	2366	Dec 84	37	0.17	0.16
1985	2367	Dec 84	40	0.18	0.18
1985	2368	Dec 84	32	0.13	0.16
1985	2341	Feb 85	9	0.18	0.17
1986	2361	Dec 85	33	0.23	0.12
1986	2394	Dec 85	10	0.26	0.21
1986	2395	Dec 85	14	0.51	0.19
1986	2396	Dec 85	11	0.15	0.06
1986	2397	Dec 85	14	0.20	0.13
1986	2398	Dec 85	15	0.18	0.09
1986	2399	Dec 85	14	0.16	0.21
1986	2407	Feb 86	16	0.60	0.75
1986	2523	Jan 86	51	0.22	0.16
1986	2524	Jan 86	55	0.41	0.22
1986	2525	Jan 86	47	0.32	0.20
1987	2373	Dec 86	7	0.06	0.22
1987	2375	May 86	42	0.18	0.12
1987	2378	May 86	47	0.26	0.14
1987	2379	May 86	48	0.17	0.12
1987	3121	Jan 87	8	0.26	0.11
1987	3123	Jan 87	8	0.20	0.17

Table 2. Regression coefficients for Anemometer Winds (U_2), Geostrophic Winds (G), and Ice Velocity (U_I), fitted to an equation of the form, $(Y - \bar{Y}) = A\ (X - \bar{X}) + \epsilon$, where $A = |A|\ e^{i\theta}$. The first column for $\bar{X}$ and $\bar{Y}$ refers to the eastward component, while the second column refers to the northward component. N is the number of observations.

Year	Buoy	XY	$\bar{X}$ (m/s)		$\bar{Y}$ (m/s)		|A|	θ (degrees)	r^2	N
6-hourly										
1985	2341	U_2U_I	2.0	0.2	0.13	-0.14	0.050	-40	0.66	259
1986	2525	U_2U_I	3.5	-0.4	0.18	-0.20	0.056	-25	0.67	144
1987	3121	U_2U_I	0.2	-1.9	0.06	-0.14	0.048	-3	0.43	284
1985	2341	GU_2	4.3	-2.3	1.9	0.2	0.32	42	0.68	256
1986	2525	GU_2	5.7	-4.7	4.3	-0.1	0.36	42	0.75	104
Daily										
1985	2341	U_2U_I	2.0	0.1	0.12	-0.14	0.051	-41	0.70	64
1986	2525	U_2U_I	3.4	-0.5	0.17	-0.20	0.057	-26	0.69	36
1987	3121	U_2U_I	0.2	-1.8	0.05	-0.13	0.051	-4	0.45	72
1985	2341	GU_2	4.1	-2.6	2.0	0.1	0.33	43	0.78	64
1985	2525	GU_2	5.6	-4.6	4.3	-0.3	0.36	45	0.84	24
1985	2347	GU_I	4.7	-1.5	0.46	-0.40	0.015	-62	0.14	10
1985	2348	GU_I	3.9	-0.9	0.11	-0.09	0.013	-8	0.44	75
1985	2361	GU_I	-2.1	-4.4	0.04	-0.07	0.011	23	0.48	24
1985	2362	GU_I	3.4	-4.5	0.13	-0.15	0.015	14	0.49	62
1985	2363	GU_I	3.1	-1.5	0.08	-0.09	0.016	4	0.48	52
1985	2364	GU_I	1.3	-3.4	0.15	-0.16	0.018	-4	0.57	47
1985	2365	GU_I	3.1	-5.3	0.43	-0.38	0.026	20	0.52	11
1985	2367	GU_I	3.1	-2.4	0.10	-0.07	0.013	-7	0.42	76
1985	2368	GU_I	3.2	-1.6	0.10	-0.11	0.016	5	0.47	63
1985	2341	GU_I	4.1	-2.6	0.12	-0.14	0.017	-3	0.54	64
1986	2361	GU_I	3.0	-3.0	0.14	-0.10	0.015	9	0.46	33
1986	2407	GU_I	2.6	-1.7	0.11	-0.12	0.023	13	0.60	44
1986	2523	GU_I	3.8	-3.7	0.12	-0.15	0.017	12	0.48	41
1986	2525	GU_I	6.3	-4.6	0.27	-0.25	0.021	19	0.59	24

FIGURES

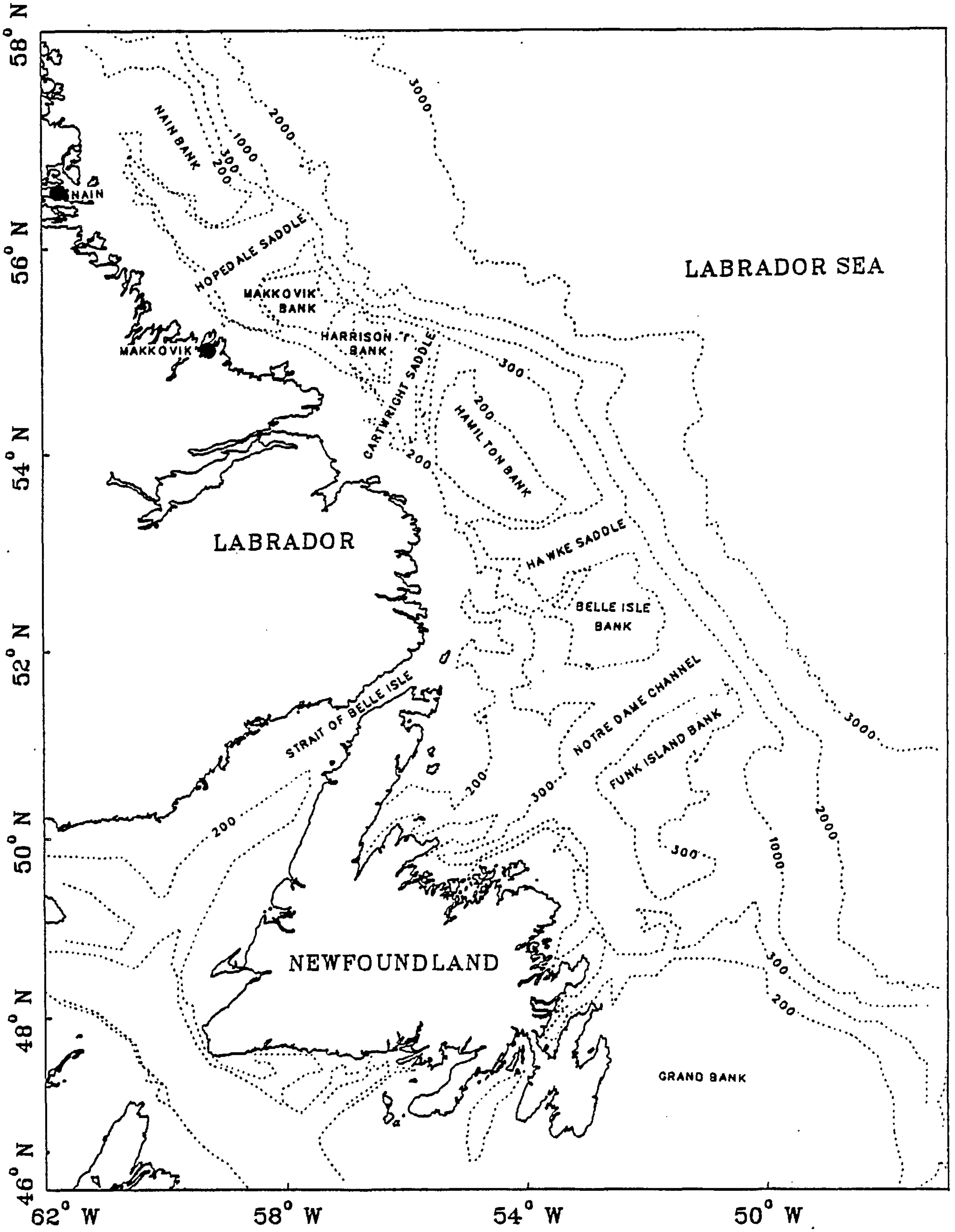


Fig. 1. The bathymetry off Labrador and eastern Newfoundland (depth contours are in meters).

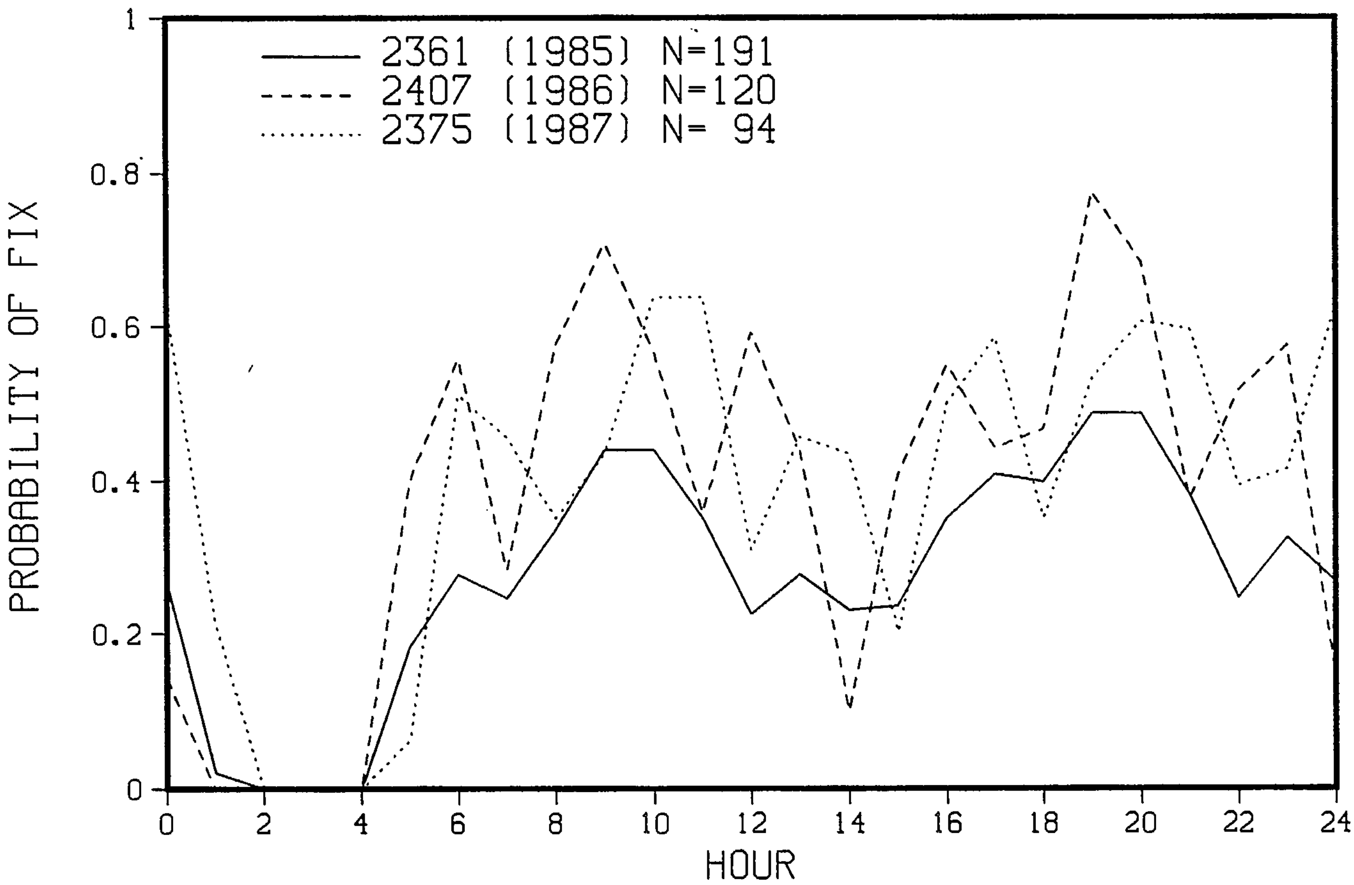


Fig. 2. Probability of fix in given hour of the day for buoys 2361 (1985), 2407 (1986), and 2375 (1987); N refers to the total number of days.

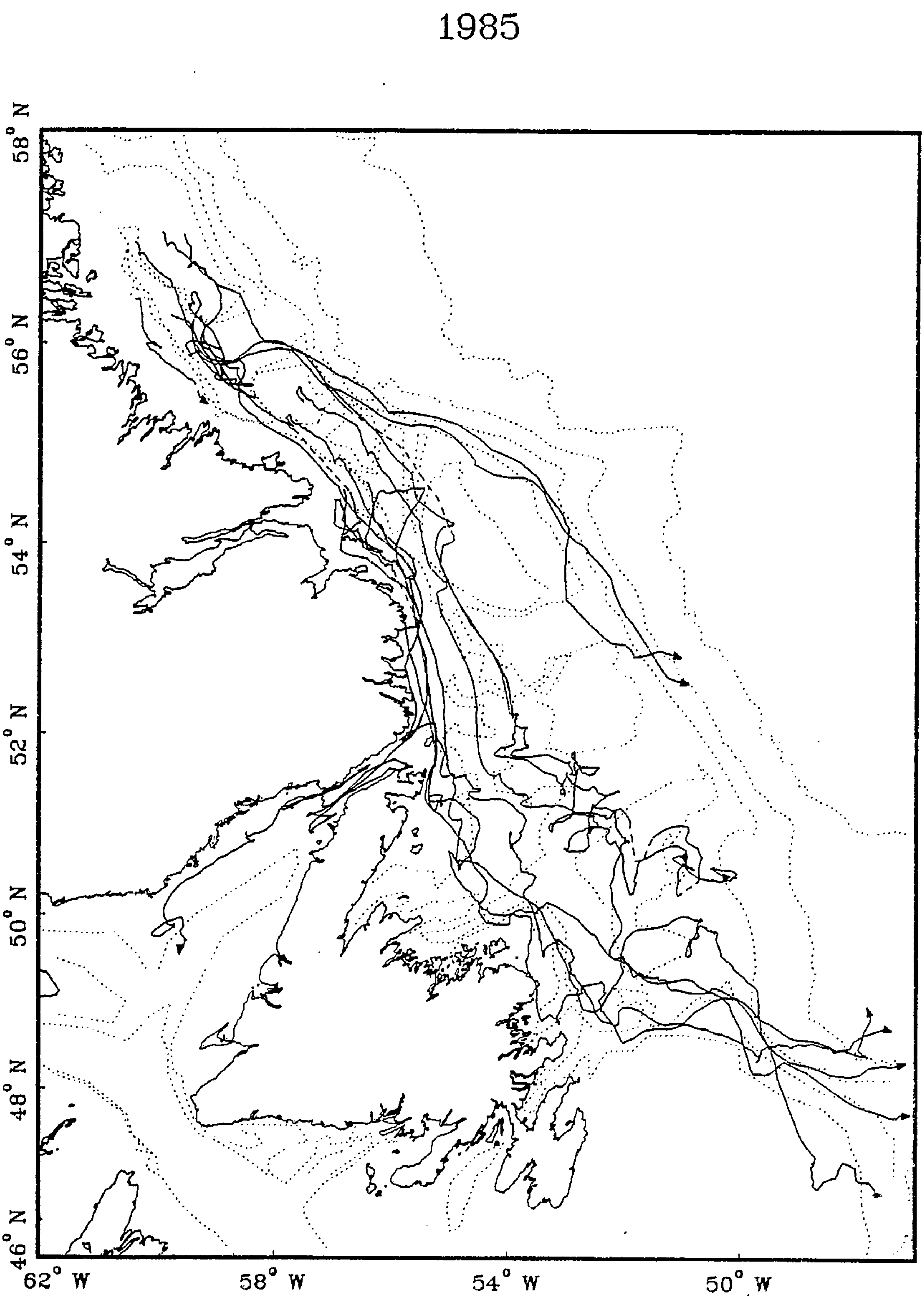


Fig. 3(a). Trajectories for ice beacons in 1985.

1986

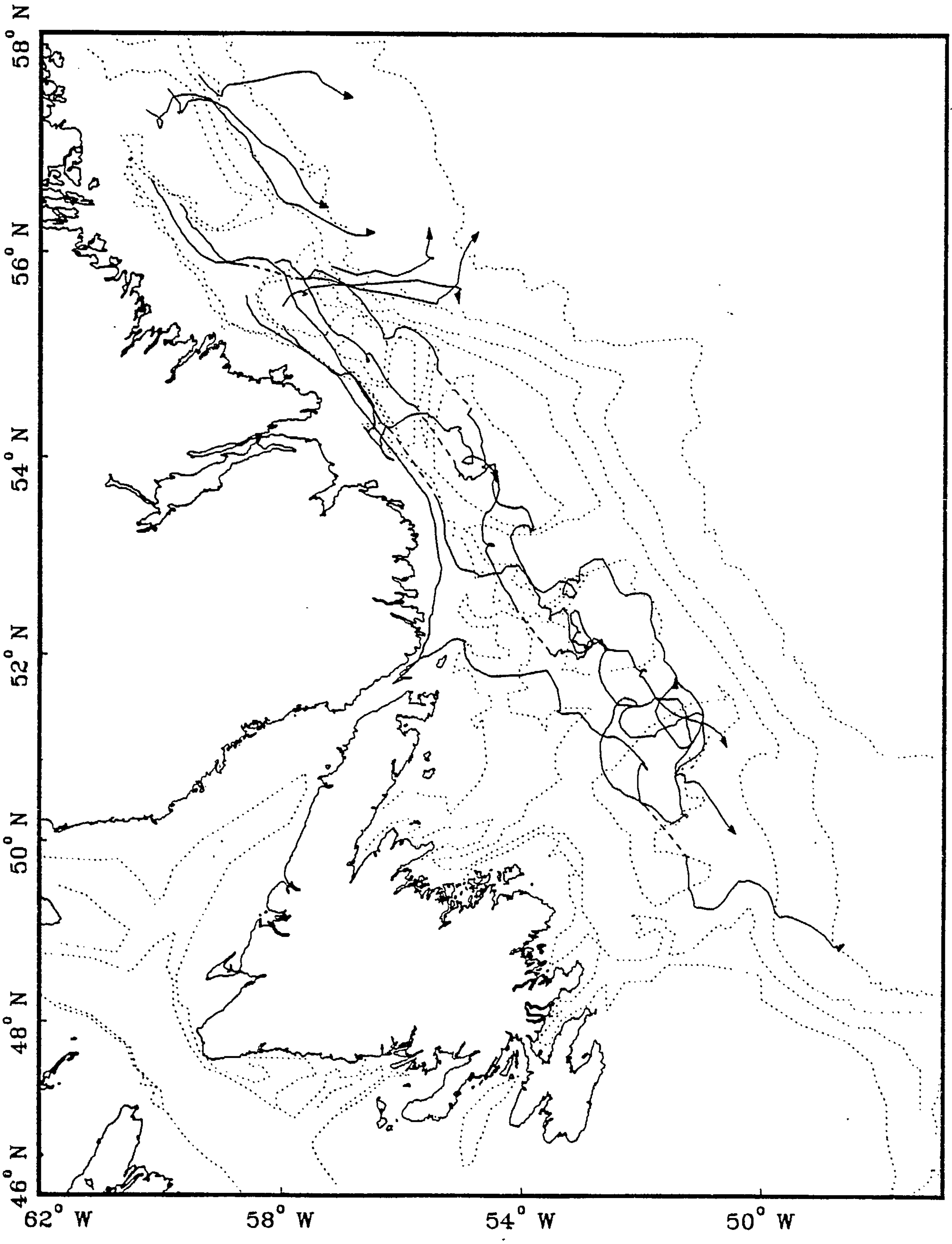


Fig. 3(b). Trajectories for ice beacons in 1986.

1987

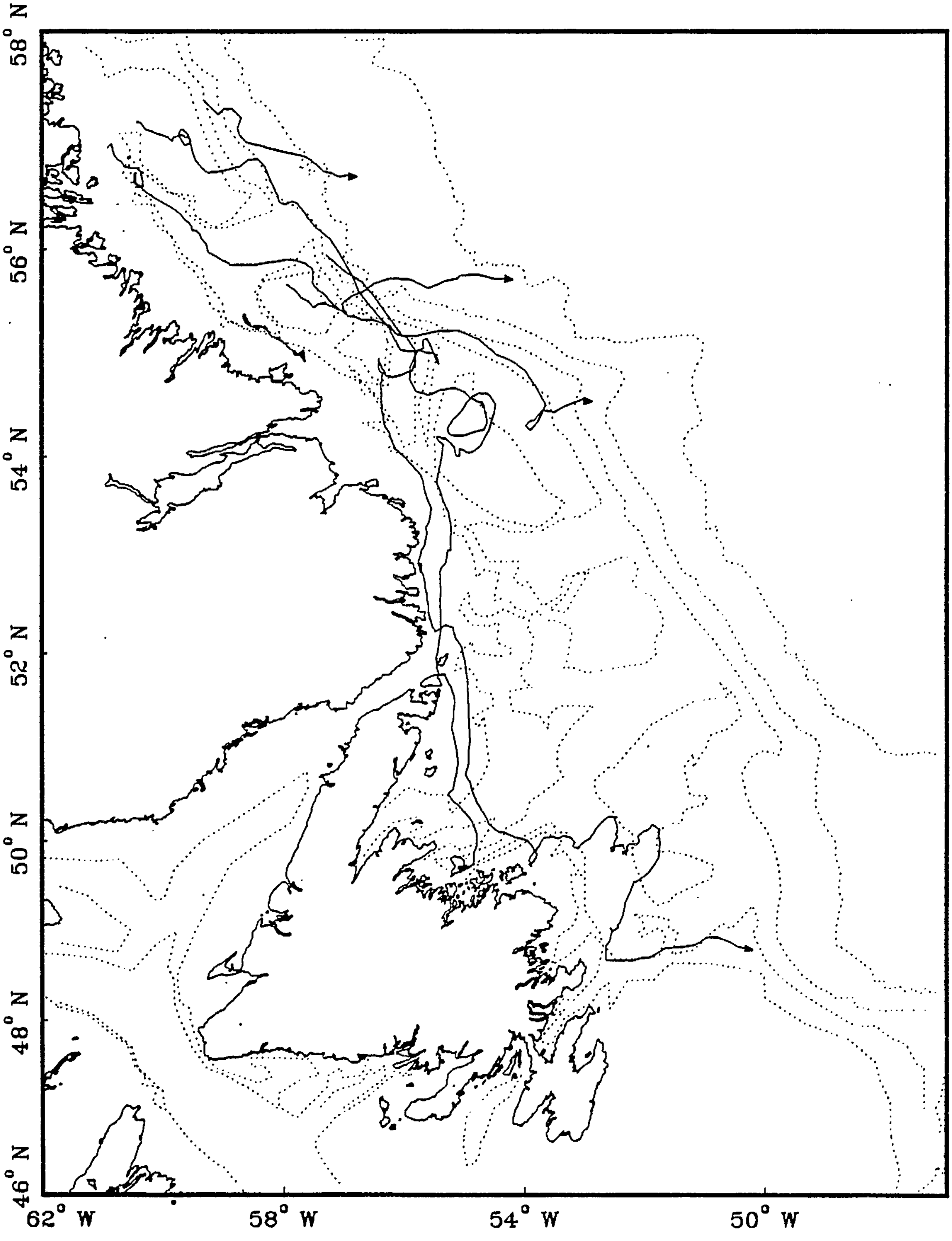
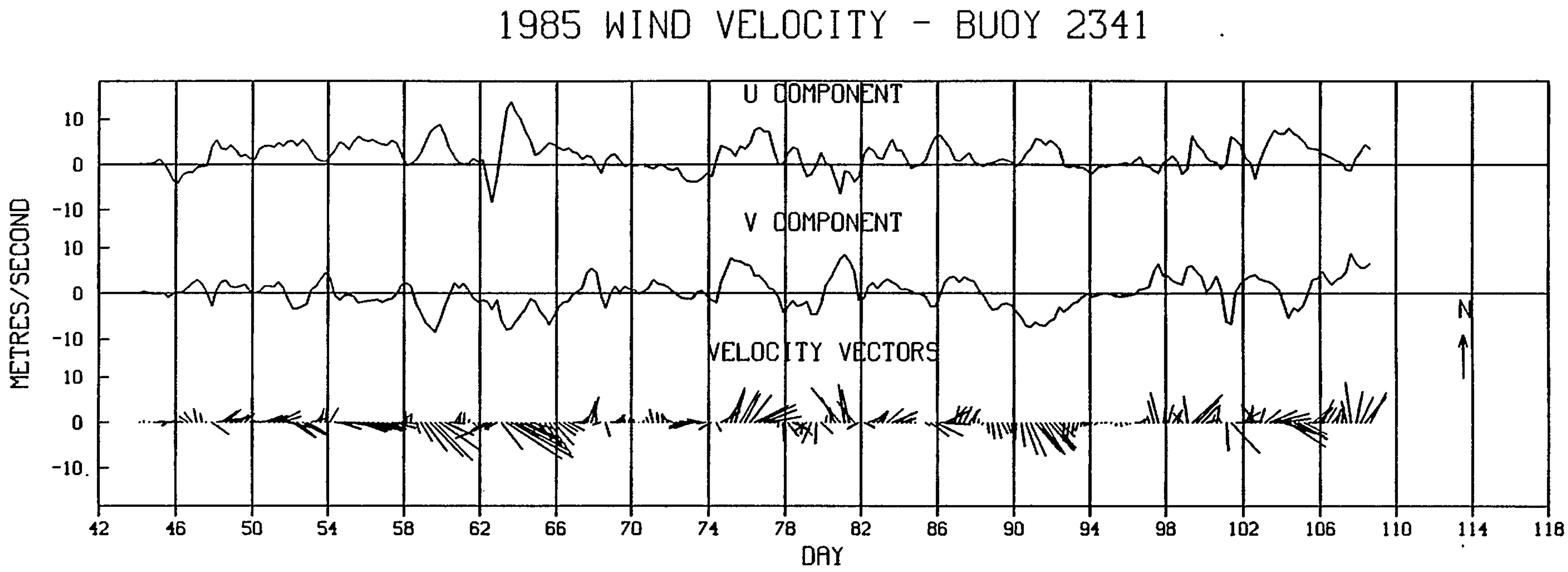


Fig. 3(c). Trajectories for ice beacons in 1987.



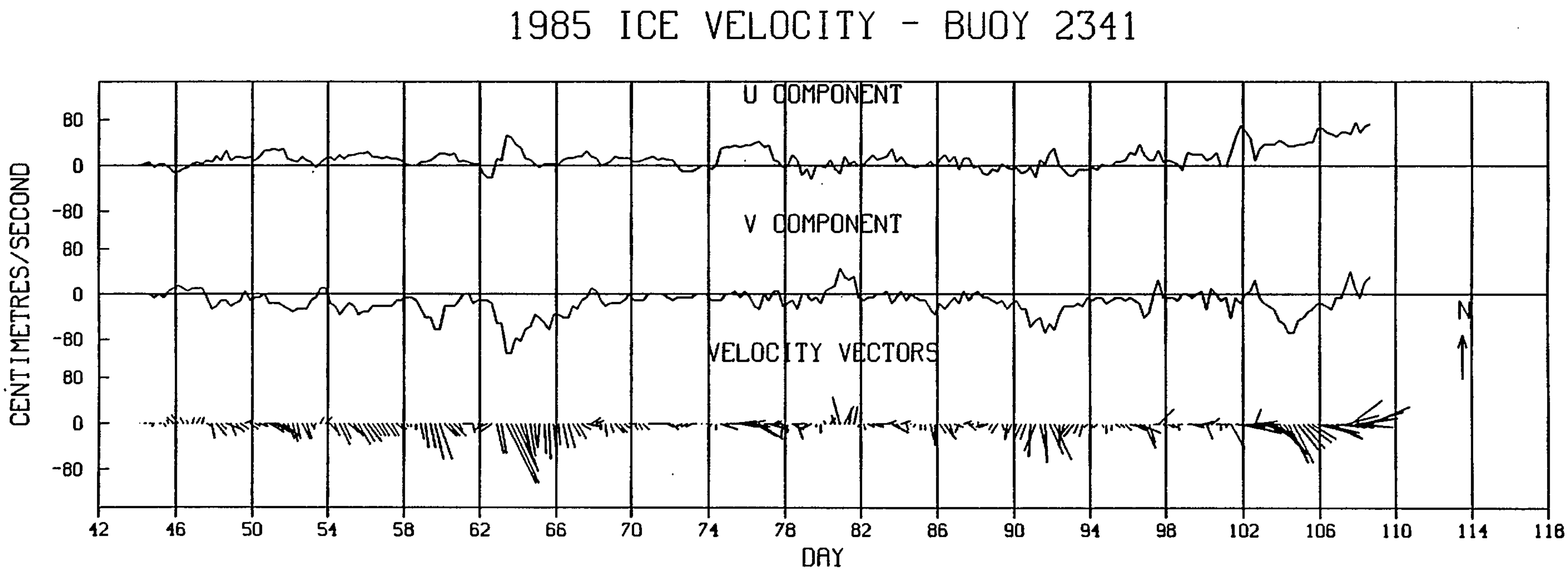
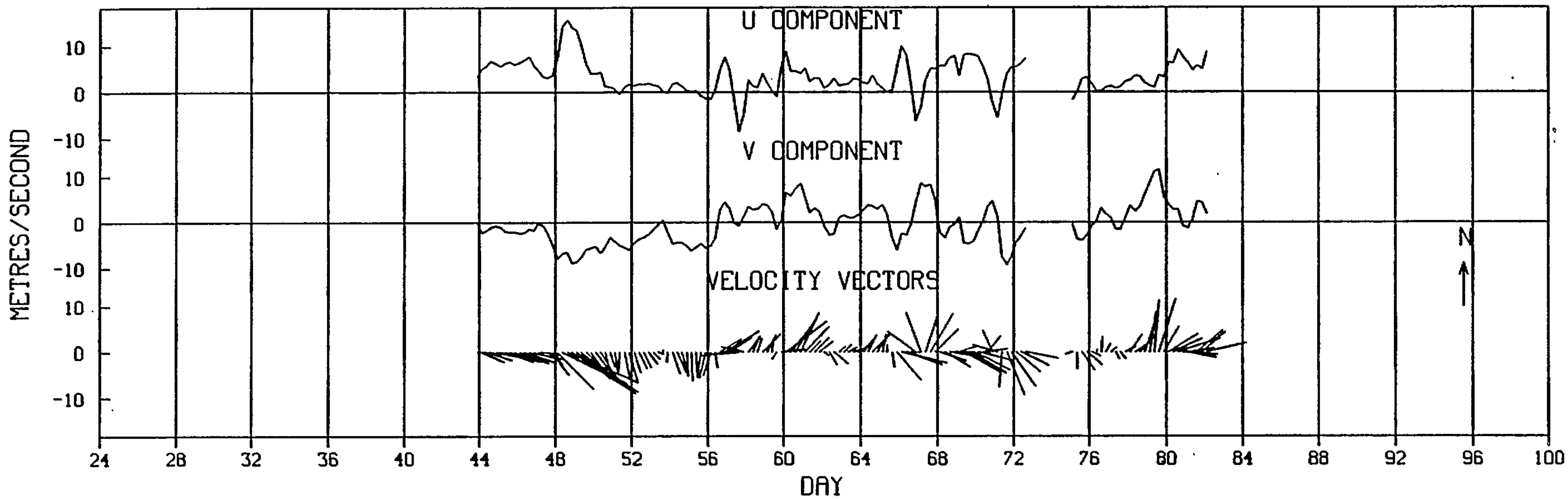


Fig. 4(a). Anemometer wind velocity (direction towards) at 2 meters, and ice velocity, for buoy 2341.

1986 WIND VELOCITY - BUOY 2525



1986 ICE VELOCITY - BUOY 2525

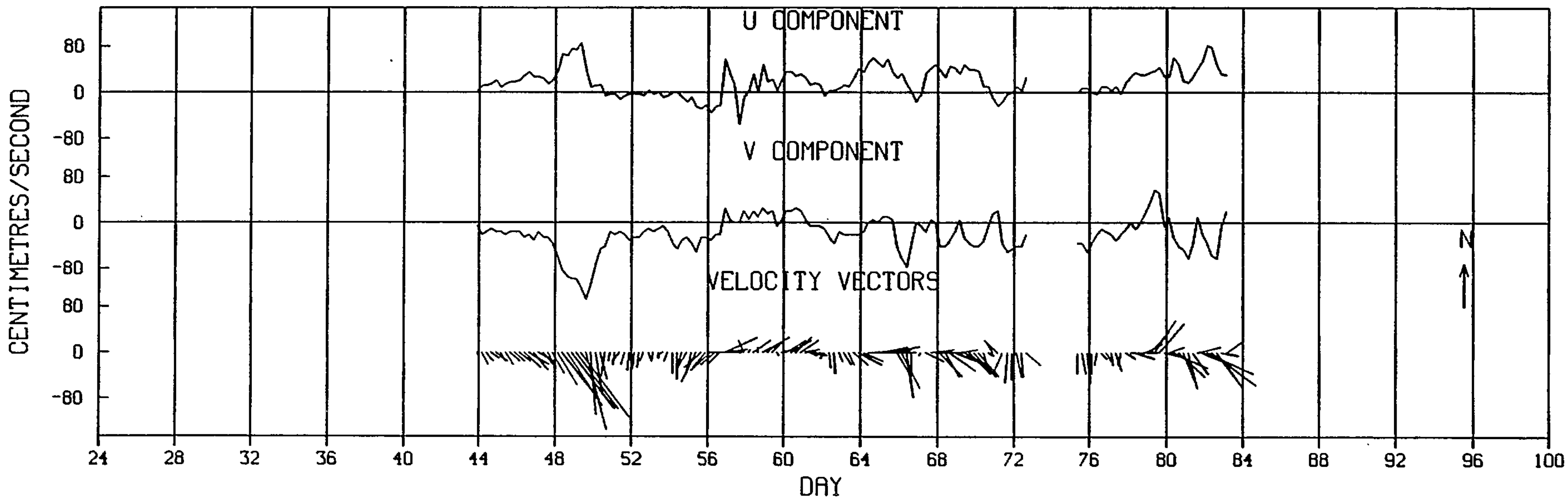
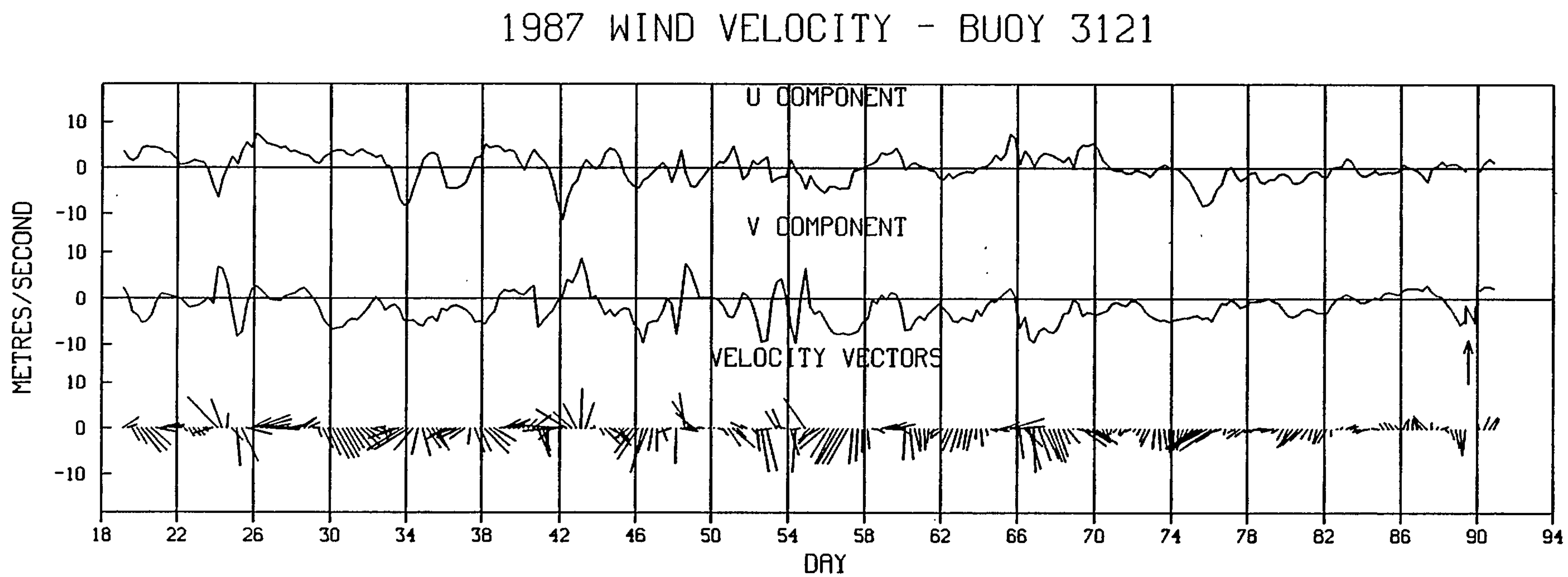


Fig. 4(b). Anemometer wind velocity (direction towards) at 2 meters, and ice velocity, for buoy 2525.



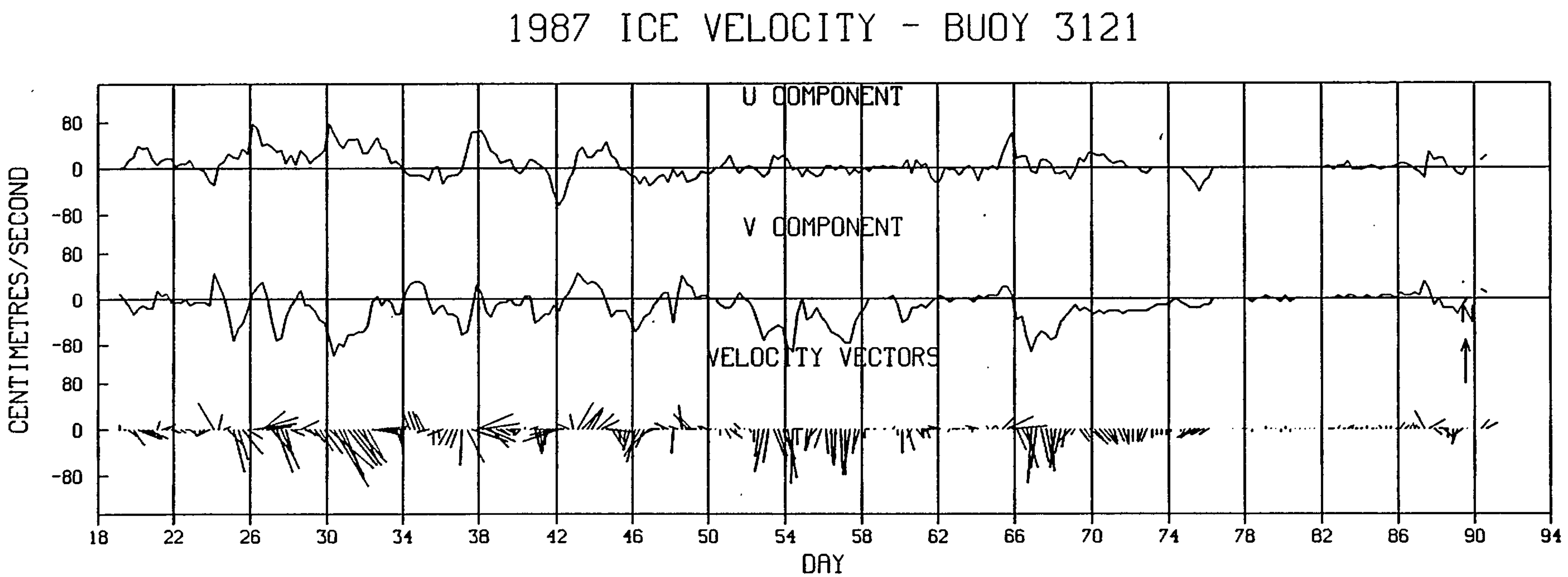


Fig. 4(c). Anemometer wind velocity (direction towards) at 2 meters, and ice velocity, for buoy 3121.

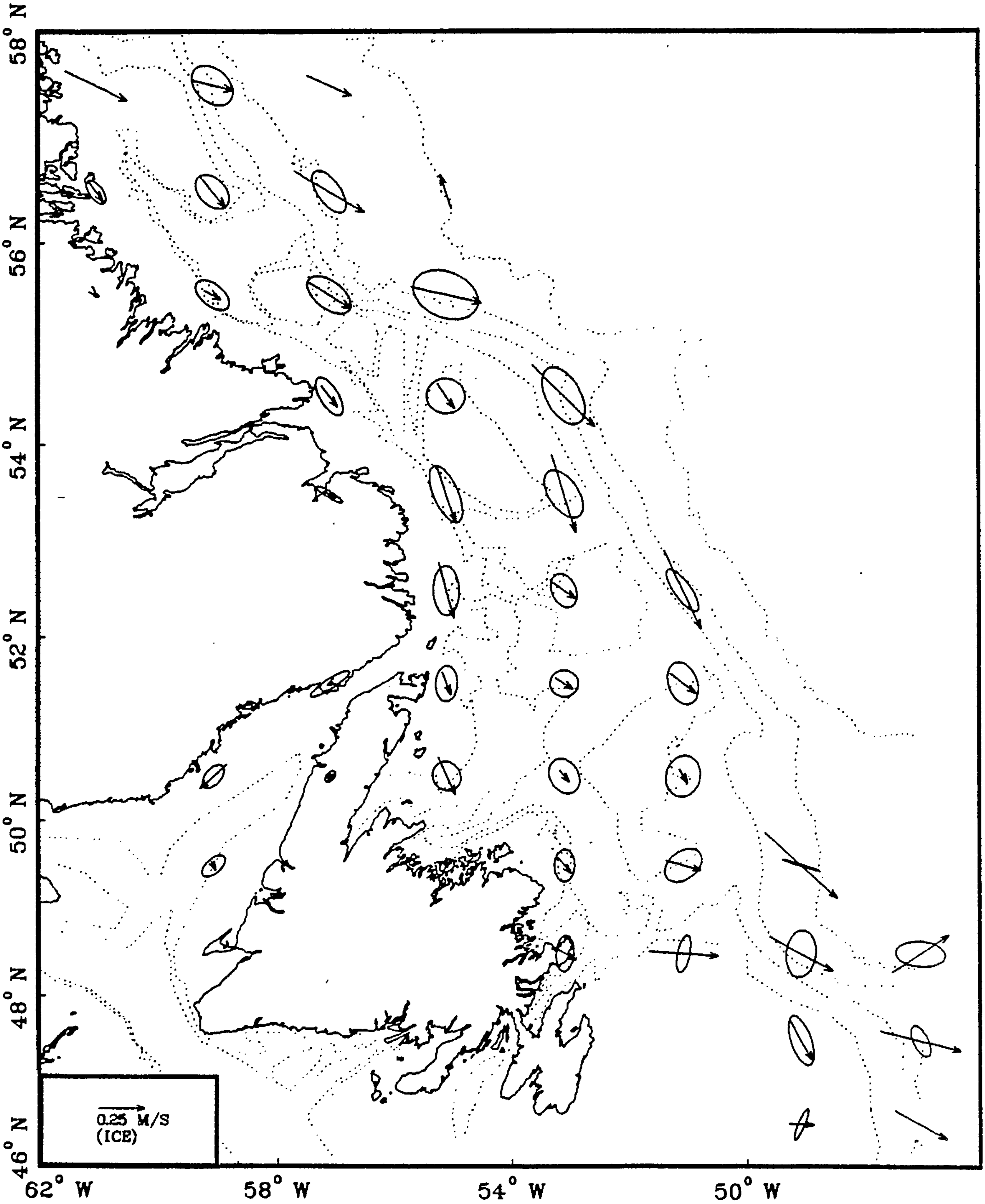


Fig. 5(a). Mean ice drift vectors and standard deviations of ice drift in 1° latitude by 2° longitude grid cells. The maximum and minimum diameters of each ellipse correspond to the standard deviations along the principal axes of variation.

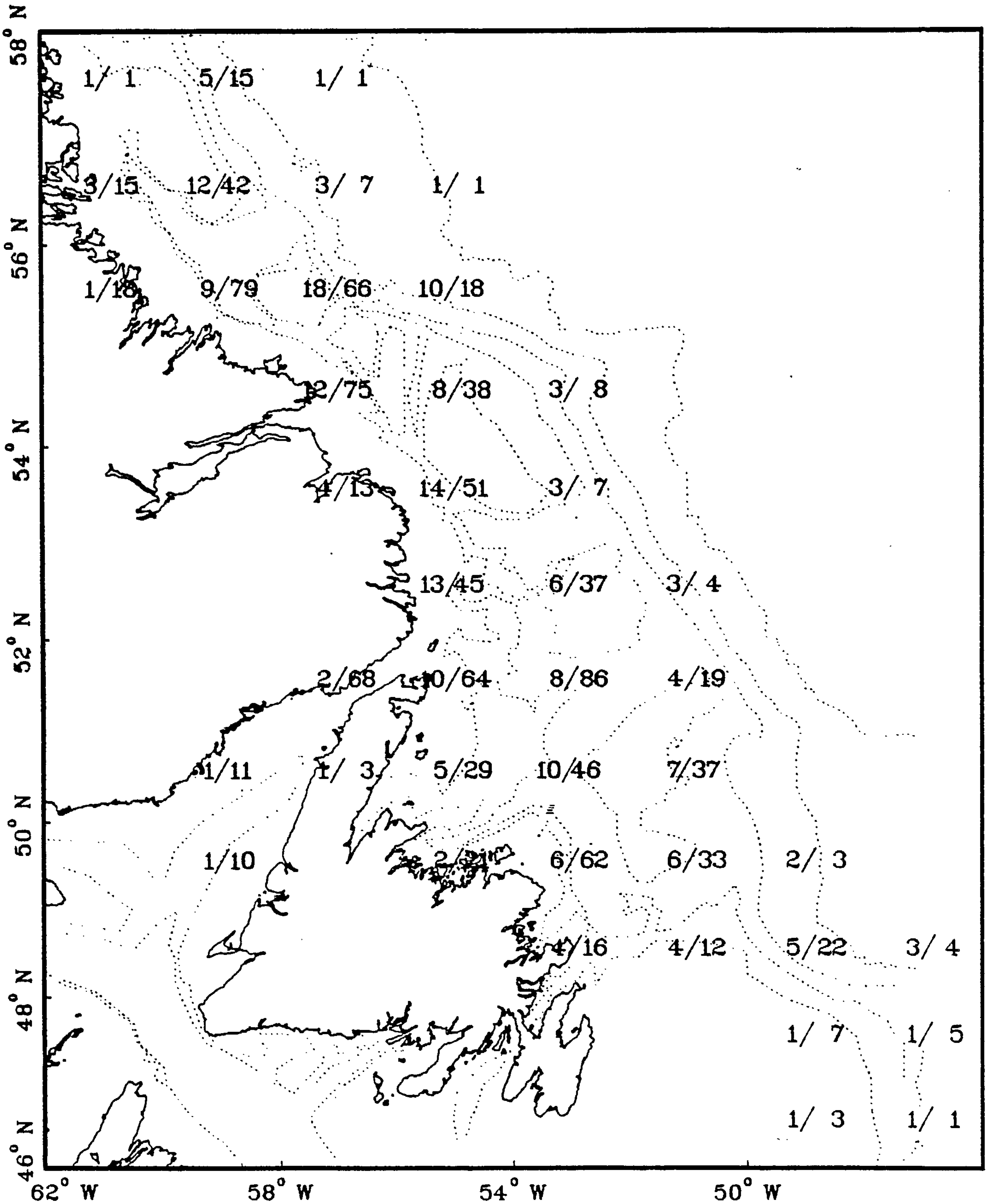
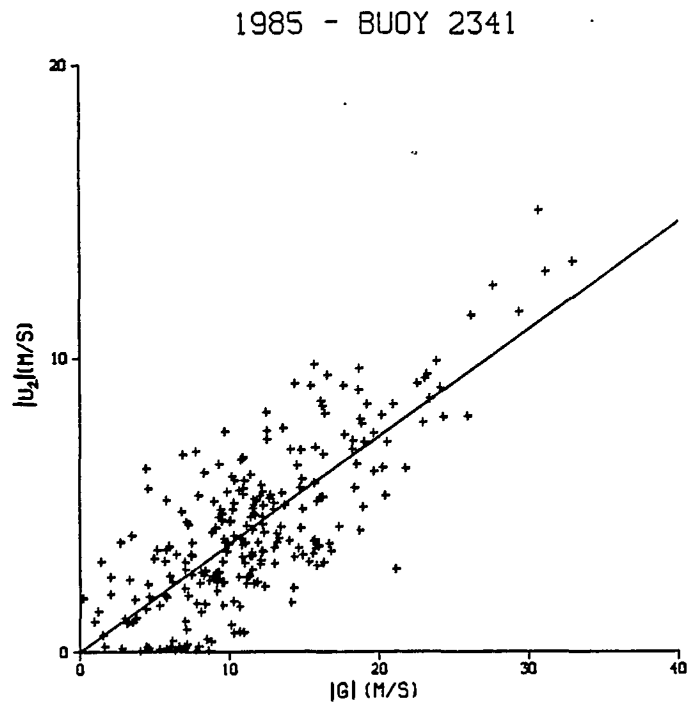


Fig.5(b). The number of ice beacons which entered each grid cell, followed by the total number of observations for each grid cell.



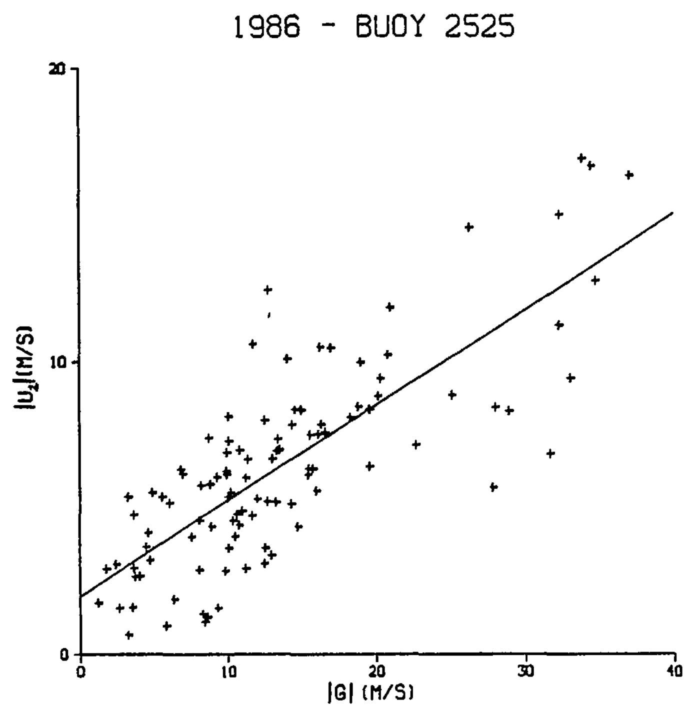


Fig. 6. Anemometer wind speed at 2 meters, $|U_2|$, vs. geostrophic wind speed, $|G|$, for buoys 2341 and 2525.

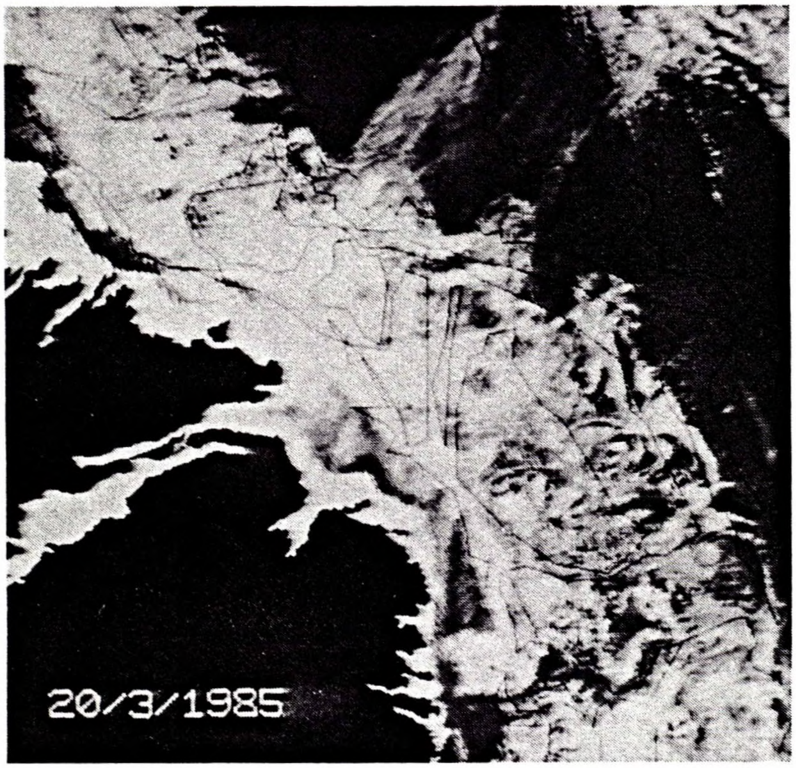


Fig. 7. Visible NOAA satellite image of southern Labrador coast on March 20, 1985, showing a wavy ice edge along the edge of the shelf north of Hamilton Bank, and compacted or landfast ice along the coast.

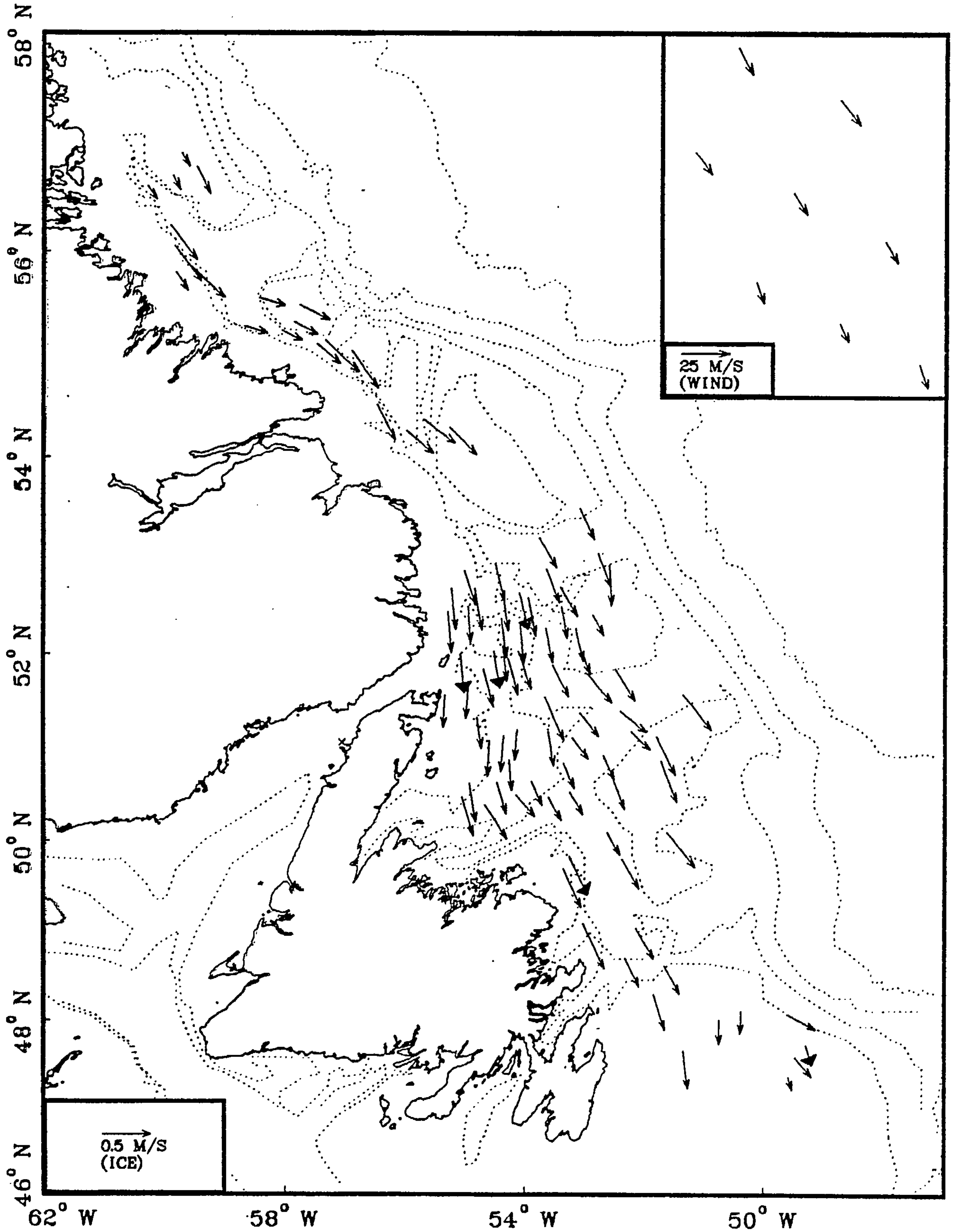


Fig. 8(a). Daily ice velocities derived from satellite imagery (narrow arrowheads), and ice beacon velocities (wide arrowheads) on March 6 (1716 Z) - March 7 (1705 Z), 1985.

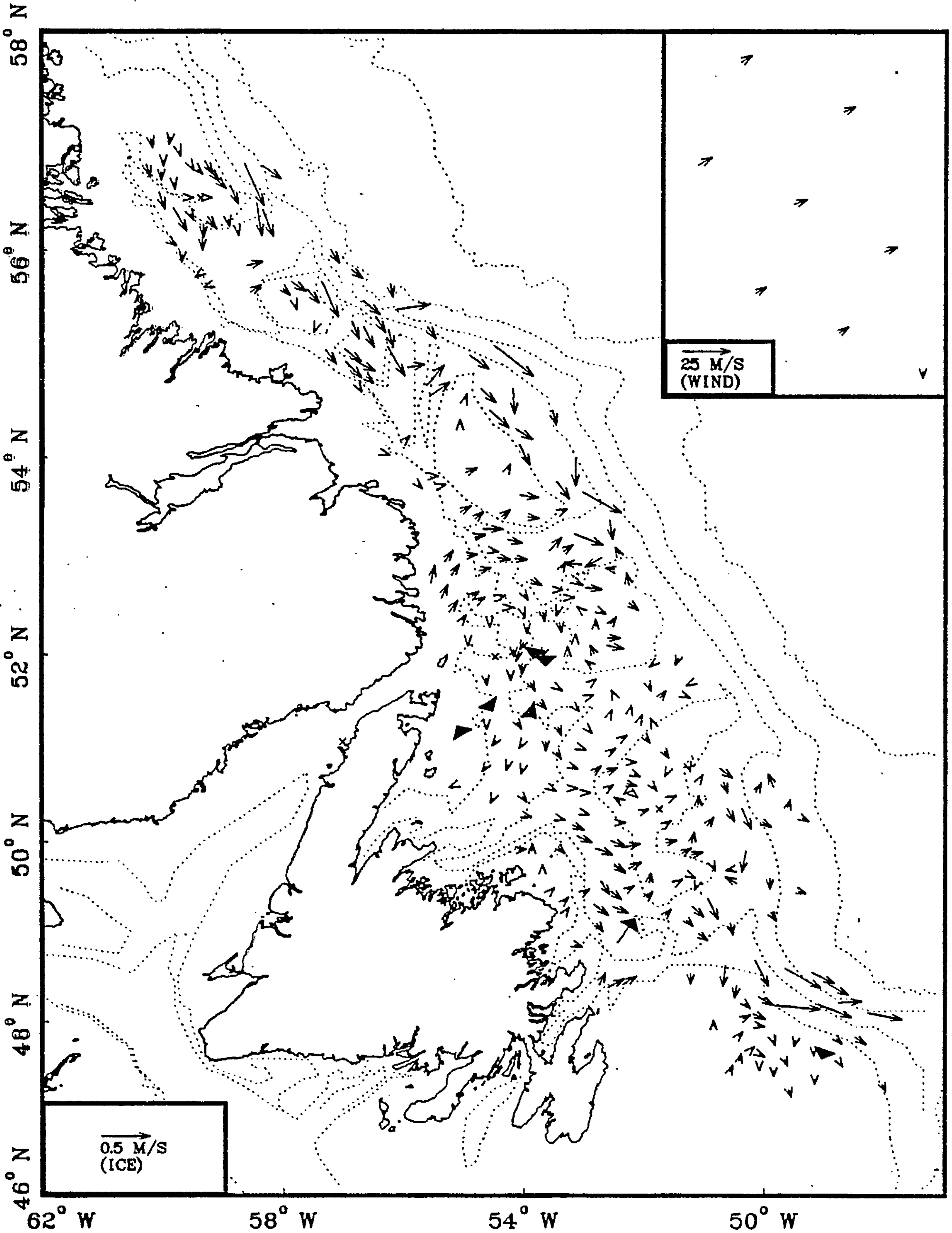


Fig. 8(b). Daily ice velocities derived from satellite imagery (narrow arrowheads), and ice beacon velocities (wide arrowheads) on March 10 (1635 Z) - March 11 (1625 Z), 1985.

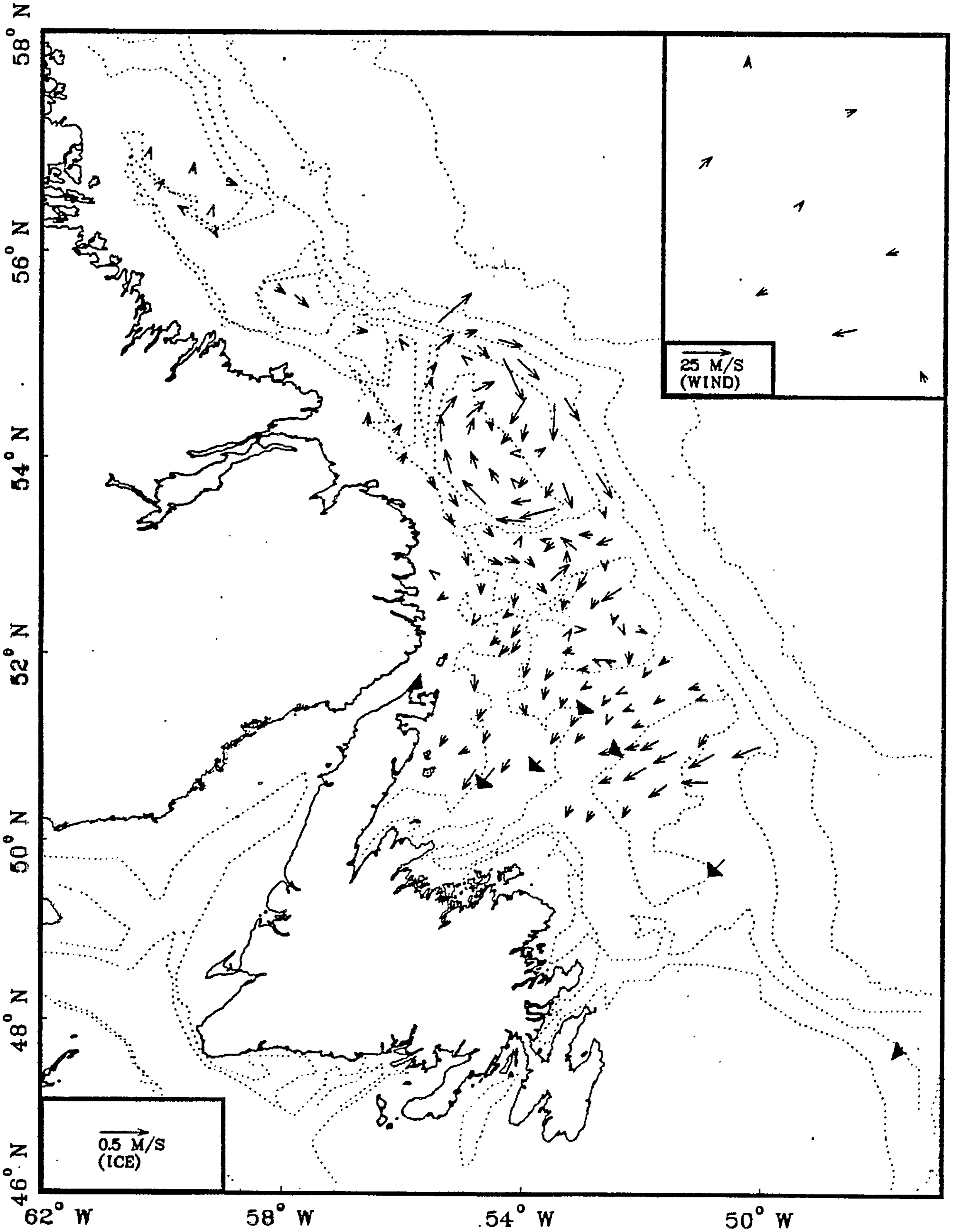
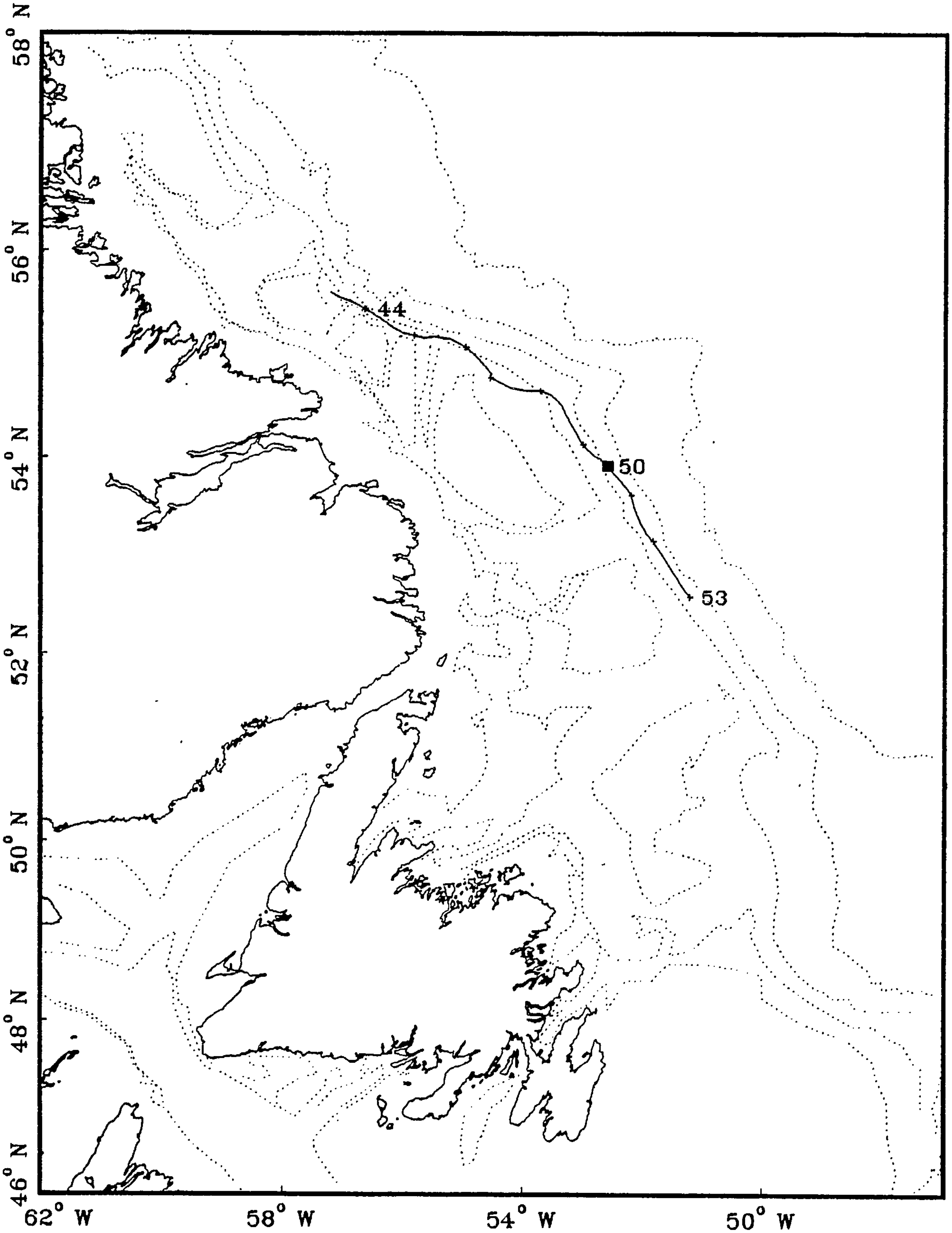


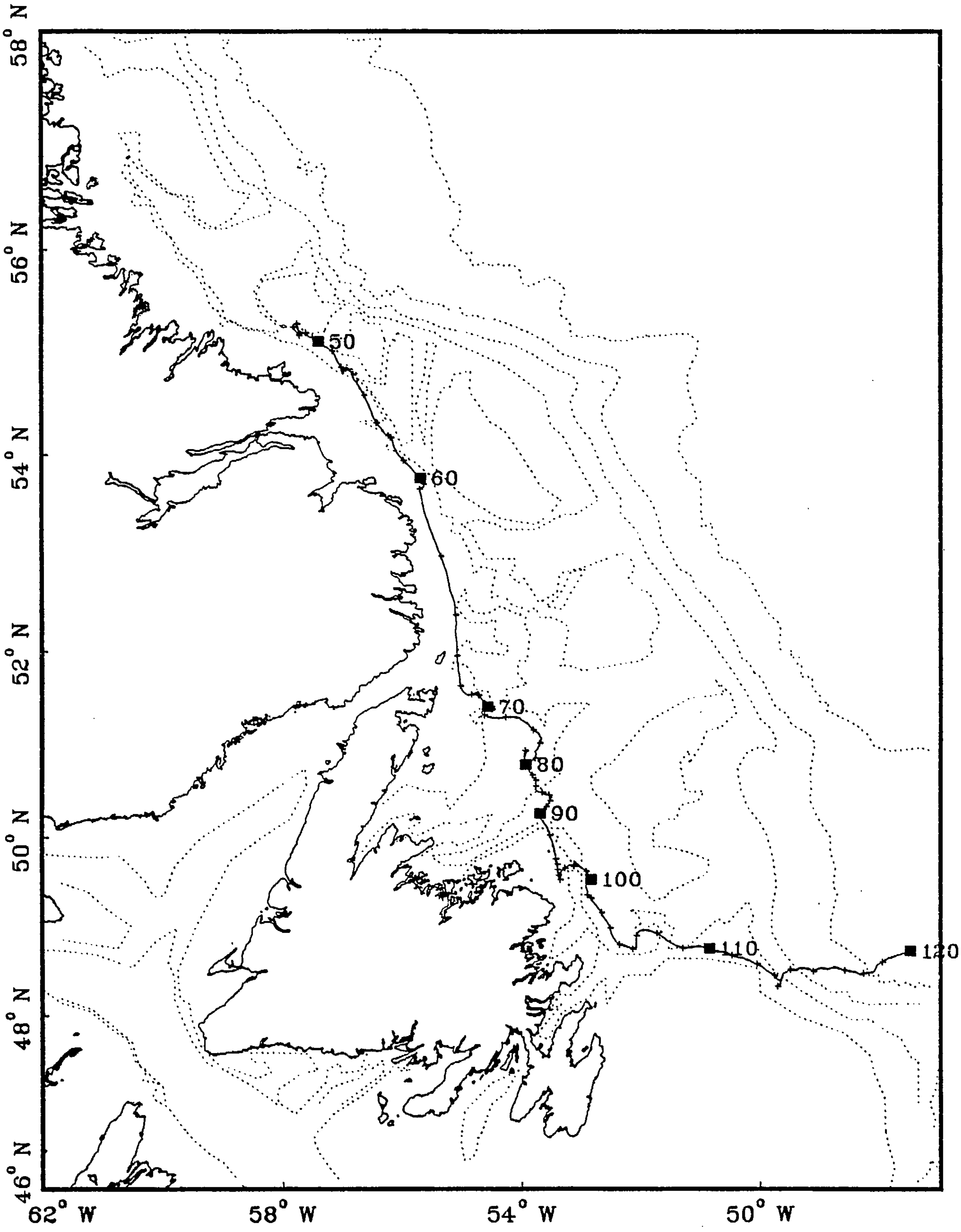
Fig. 8(c). Daily ice velocities derived from satellite imagery (narrow arrowheads), and ice beacon velocities (wide arrowheads) on March 19 (1640 Z) - March 20 (1629 Z), 1985.

Appendix A. Individual floe trajectories, using 6-hourly interpolated positions, with positions at 1800 hours GMT marked in Julian days. Dashed lines indicate that there was more than 1 day between fixes. Listings of the positions at 1800 hours GMT are given in Appendix C. A total of 28 plots is shown : 11 for 1985, 11 for 1986 and 6 for 1987.

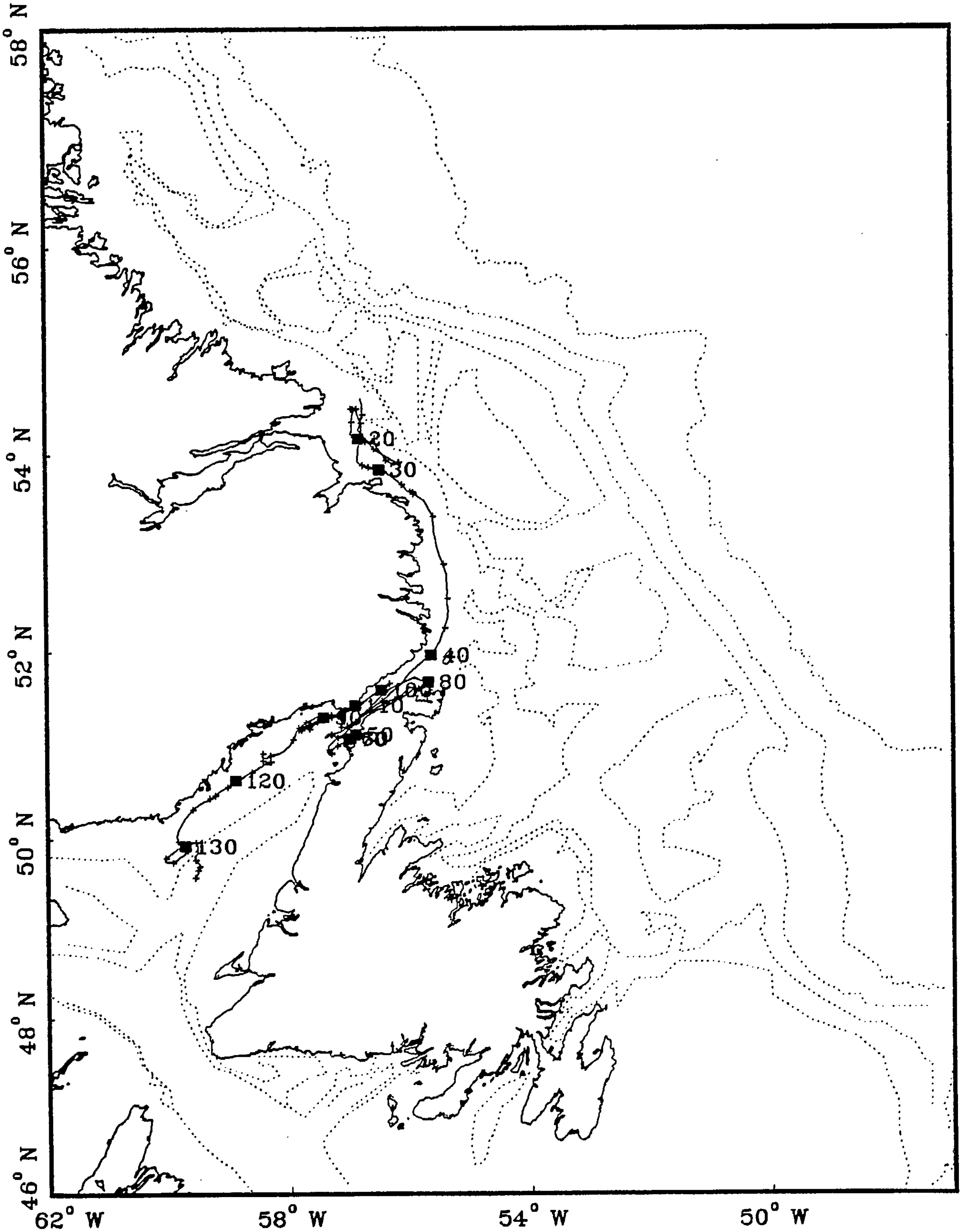
BUOY 2347 – 1985



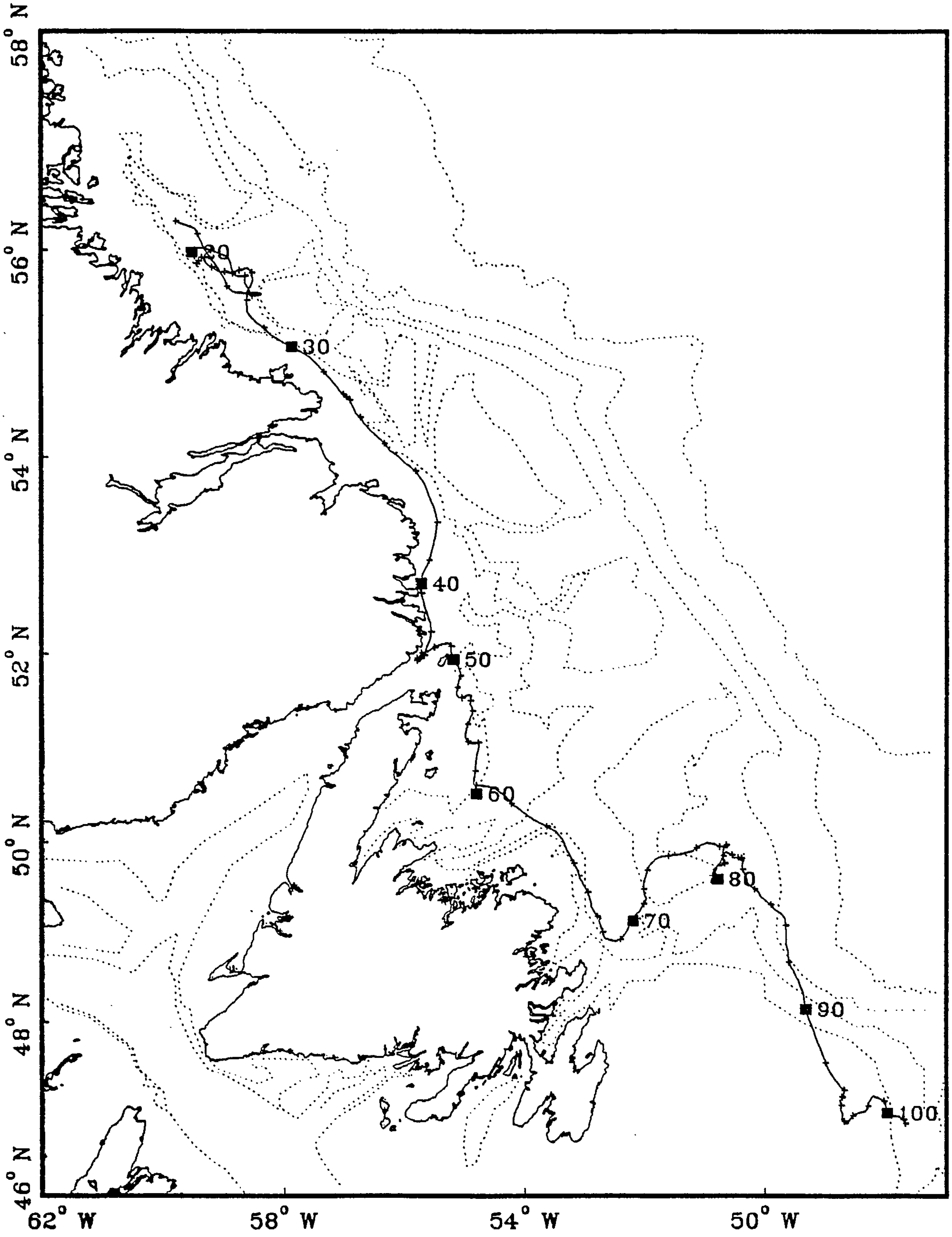
BUOY 2348 – 1985



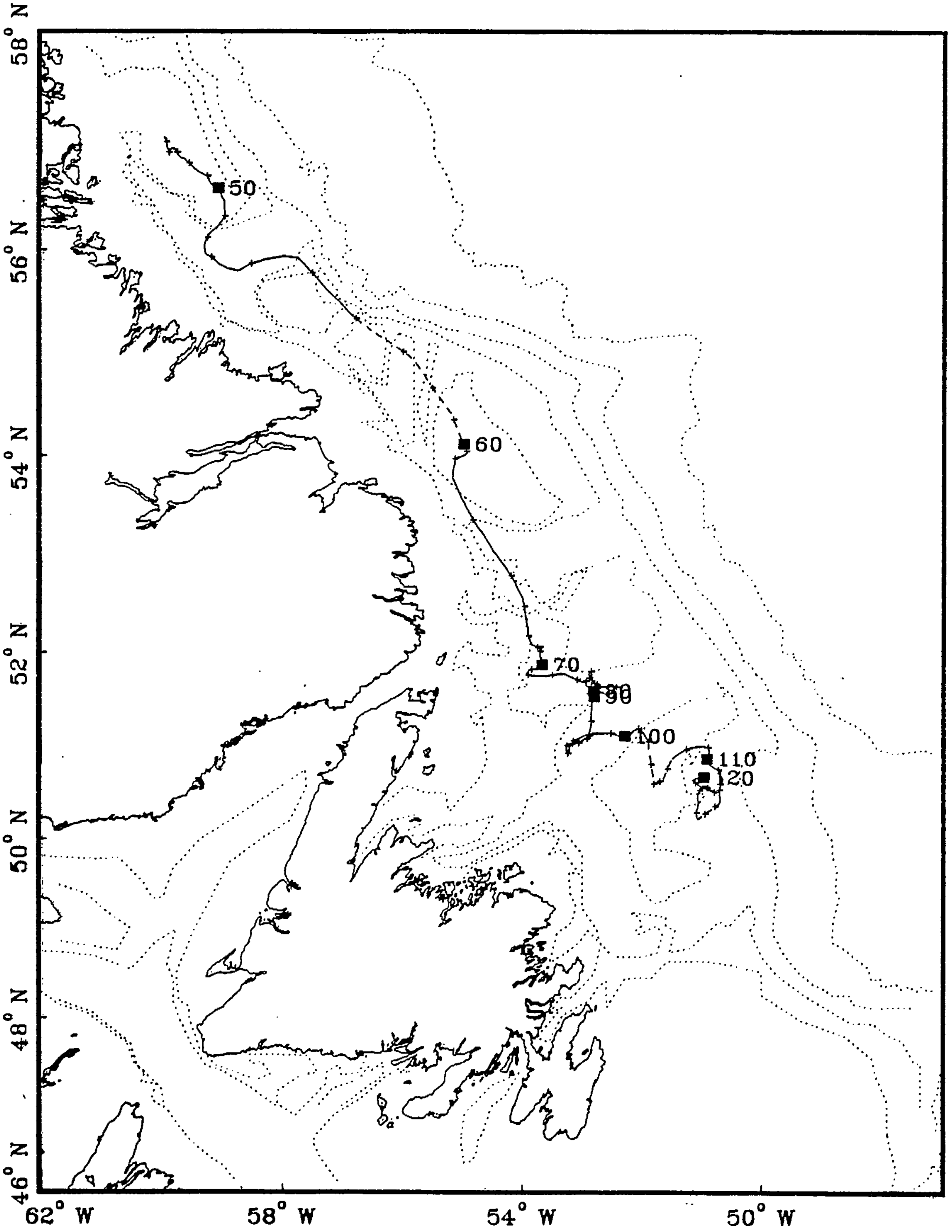
BUOY 2361 – 1985



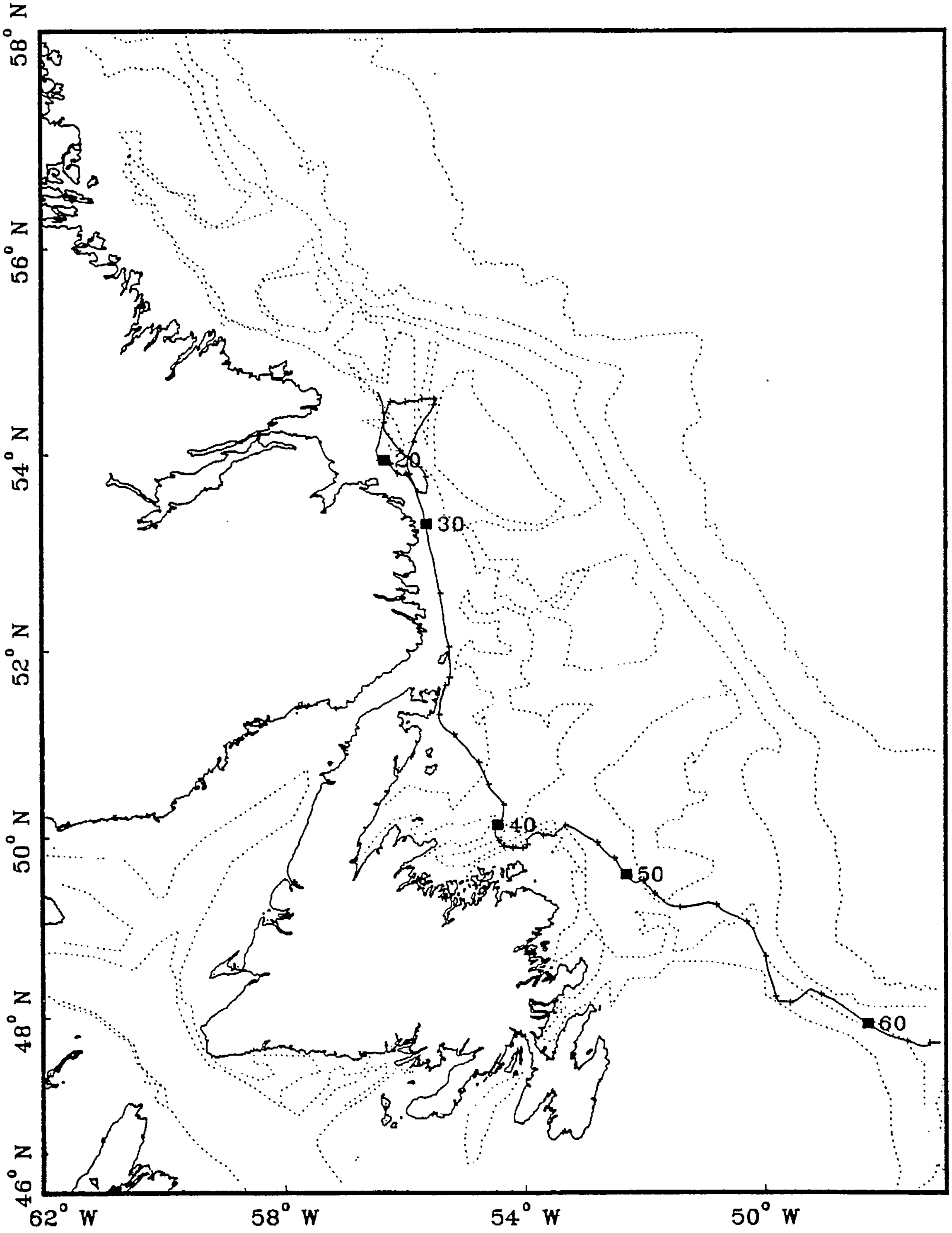
BUOY 2362 – 1985



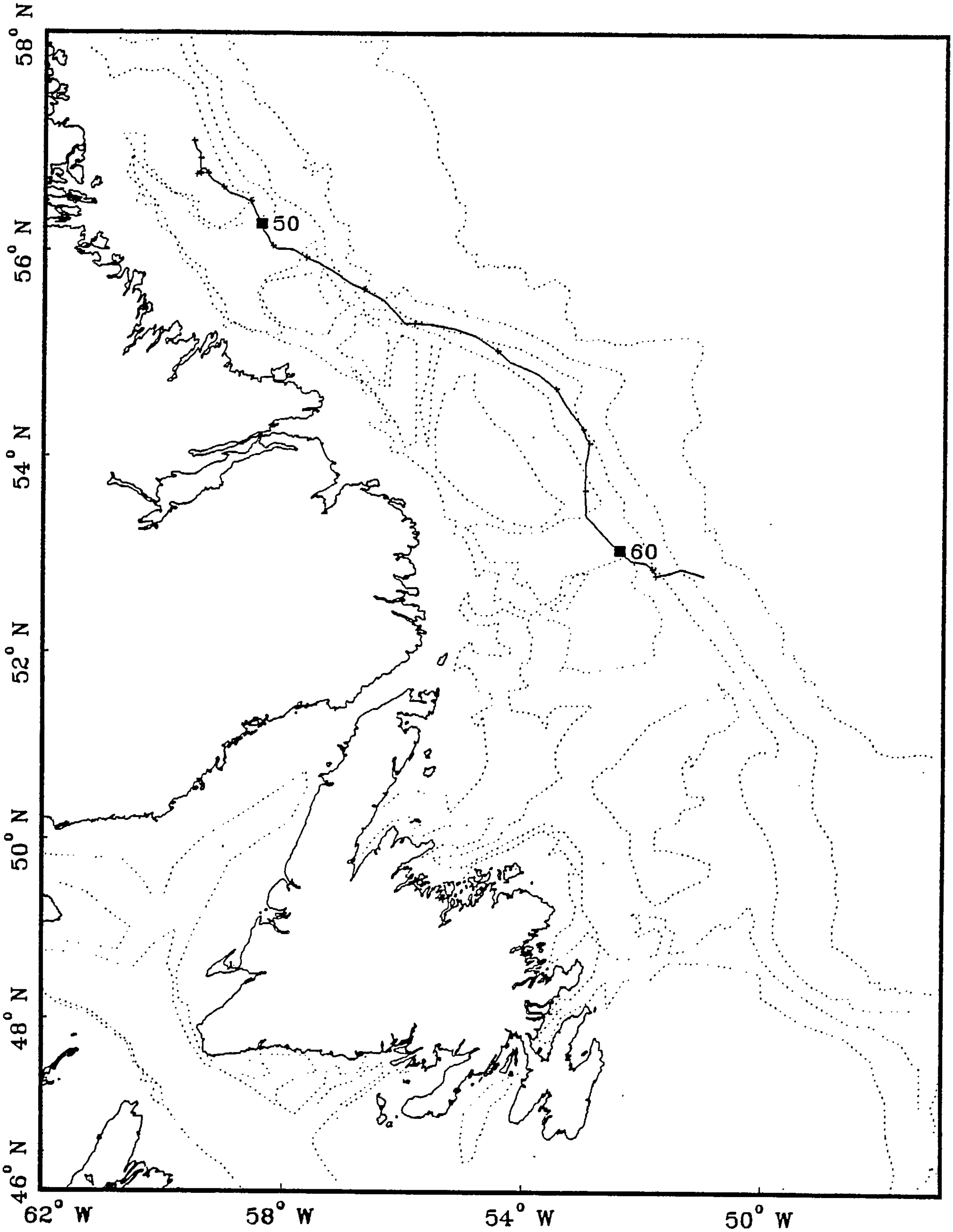
BUOY 2363 – 1985



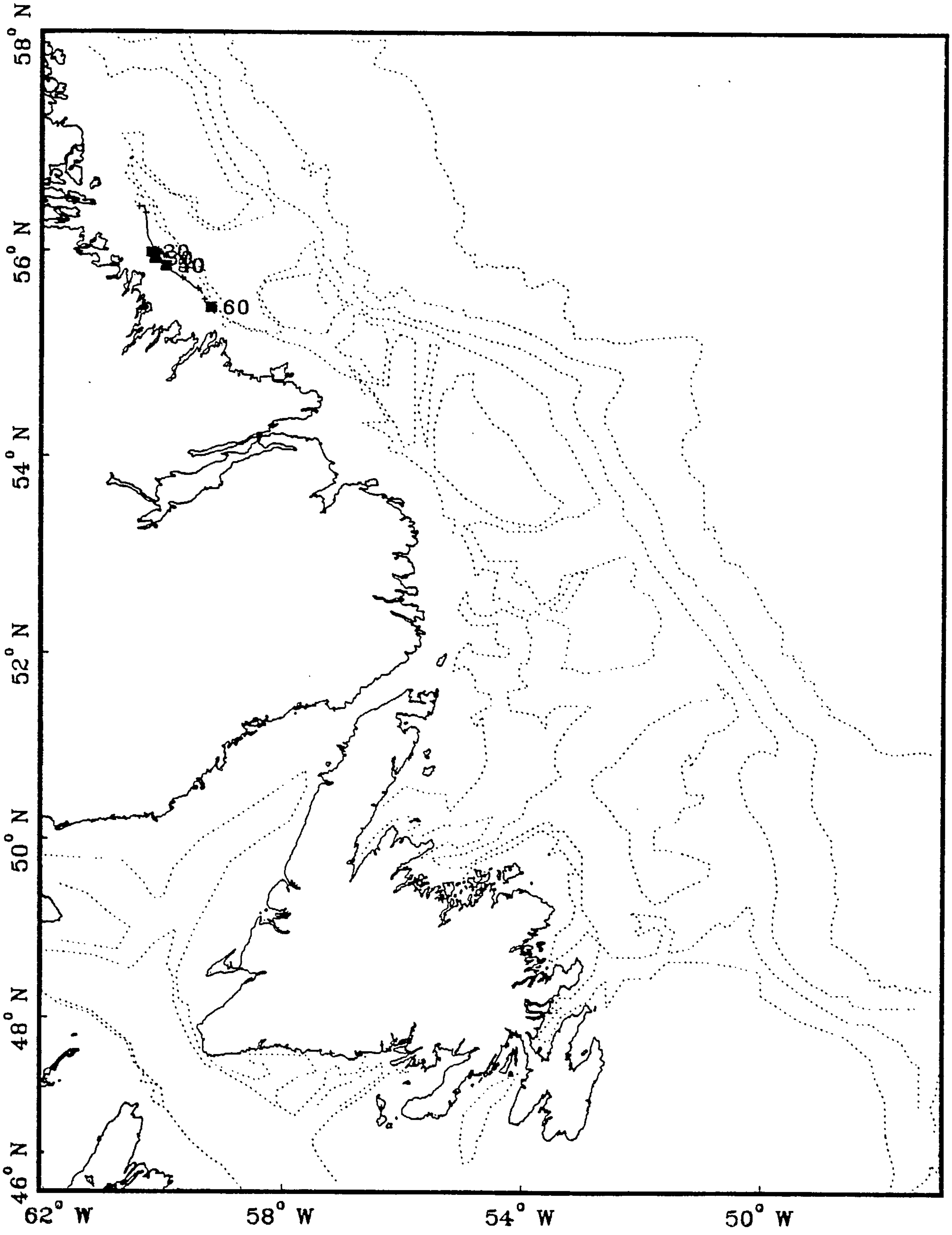
BUOY 2364 – 1985



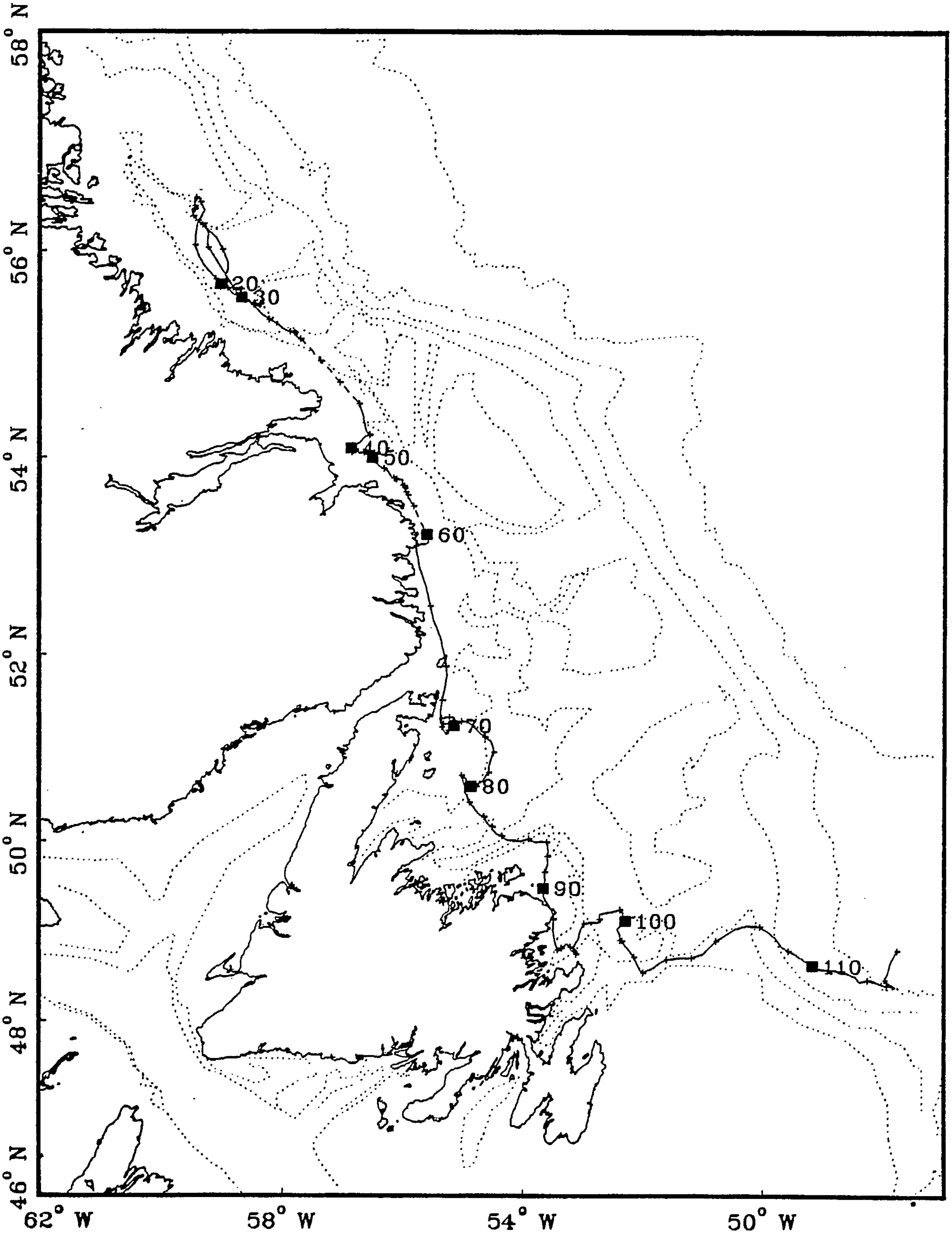
BUOY 2365 – 1985



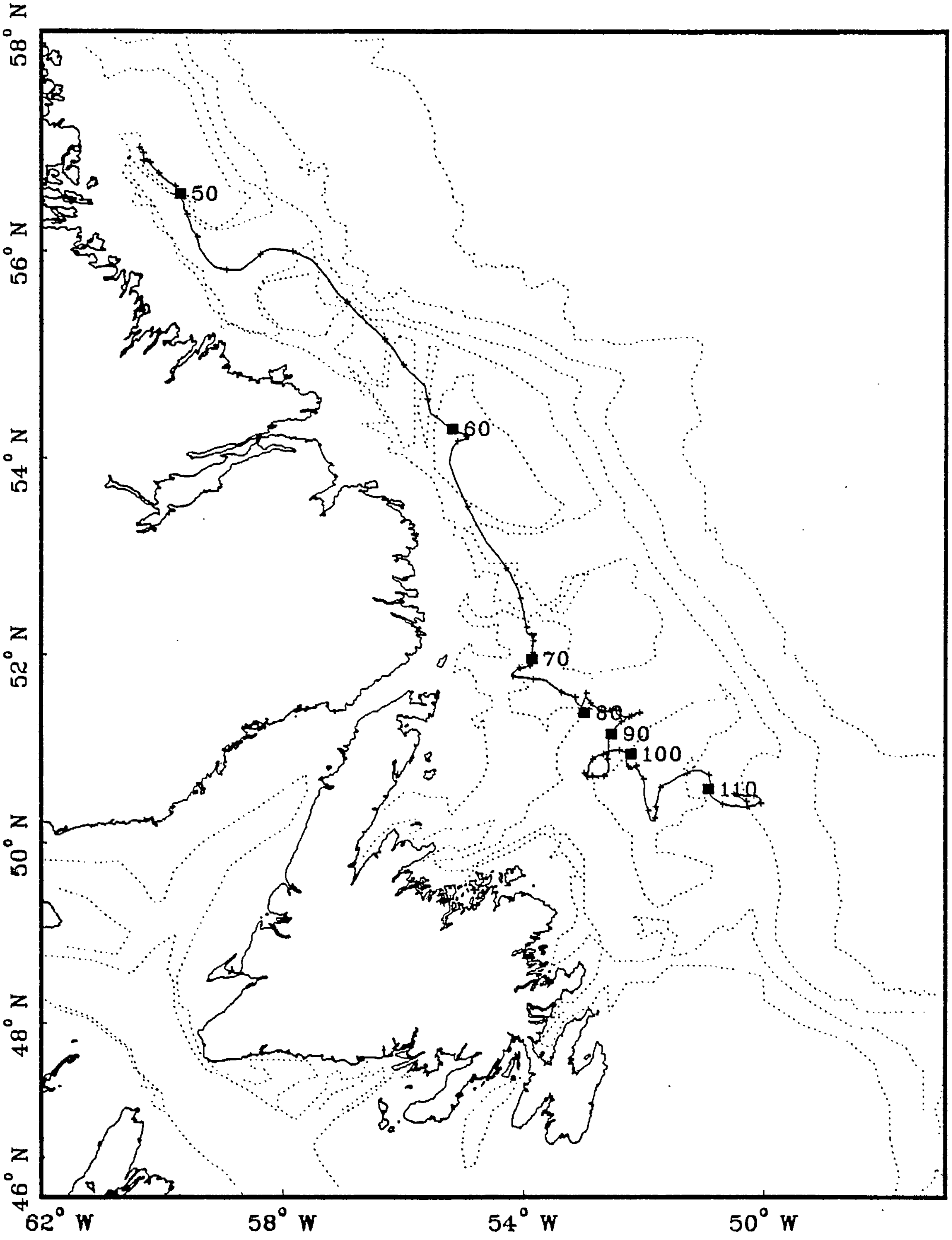
BUOY 2366 – 1985



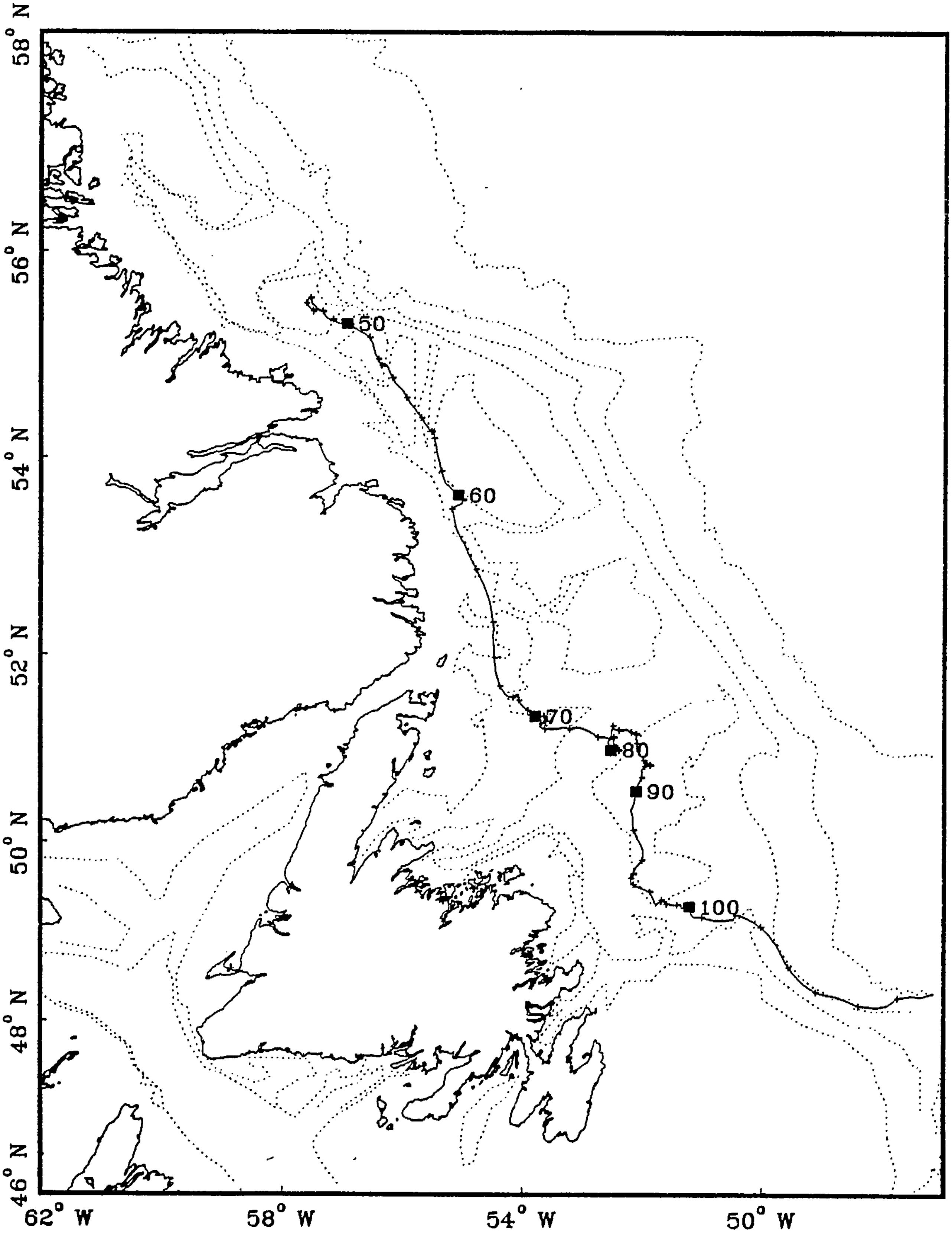
BUOY 2367 – 1985



BUOY 2368 - 1985



BUOY 2341 – 1985



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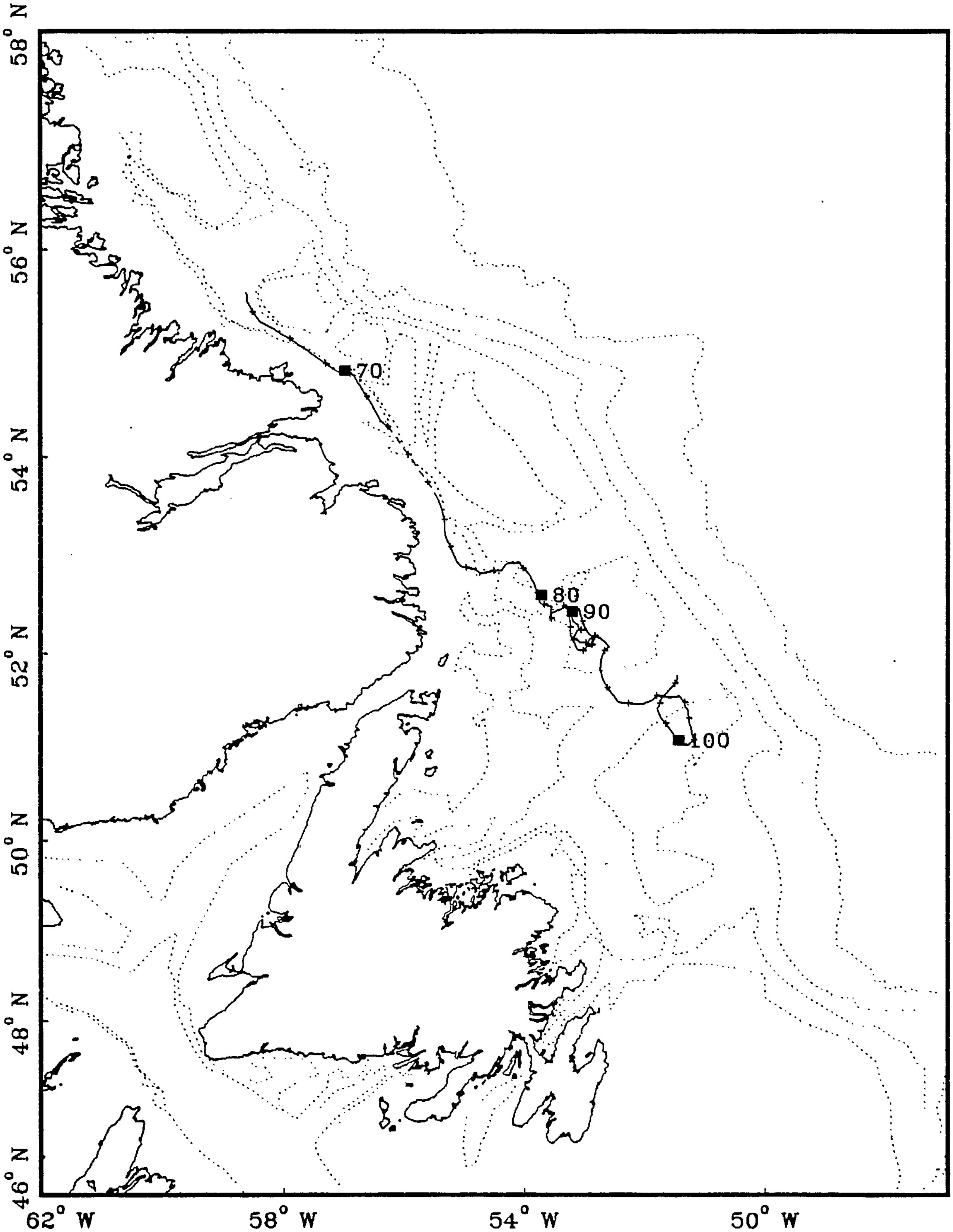

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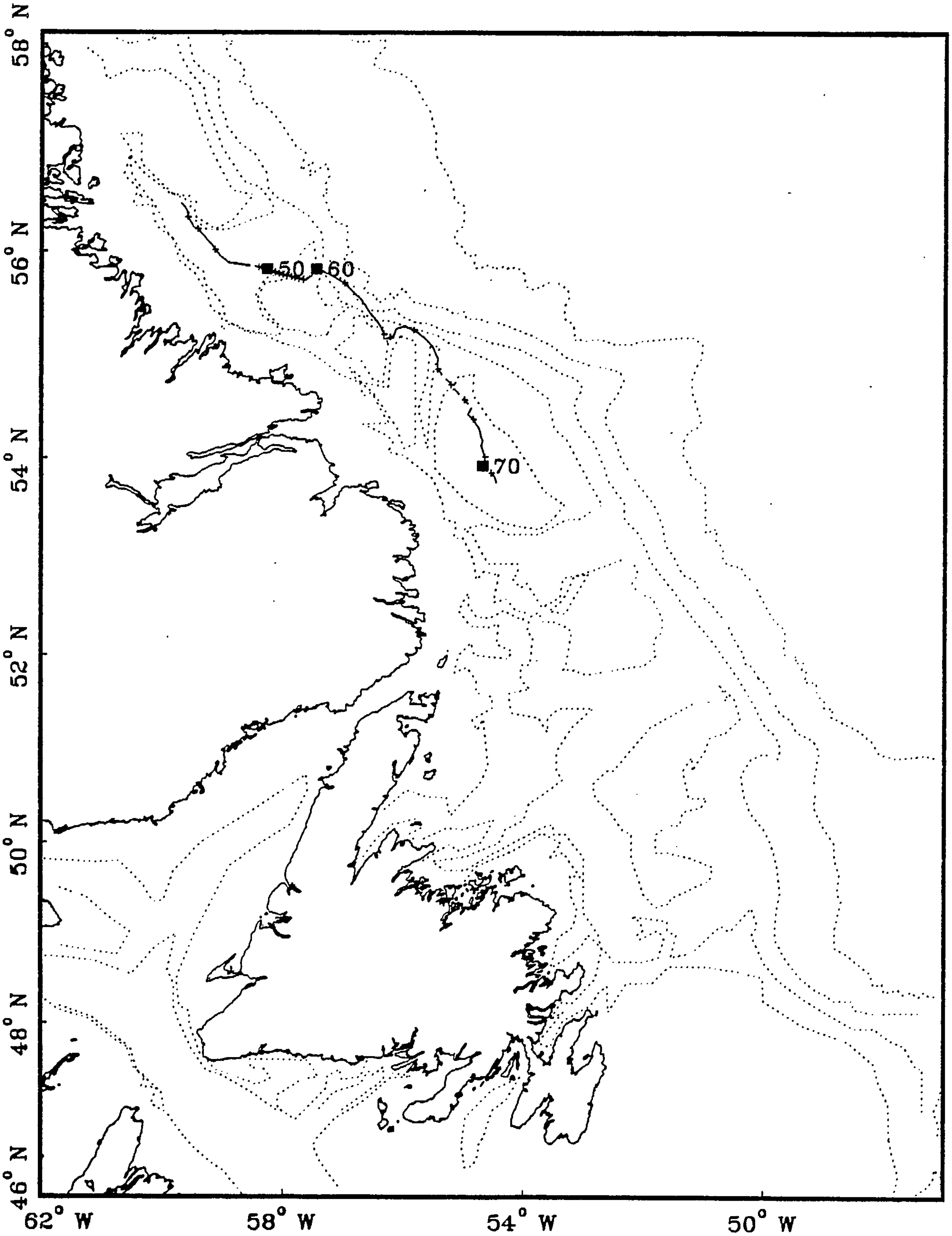

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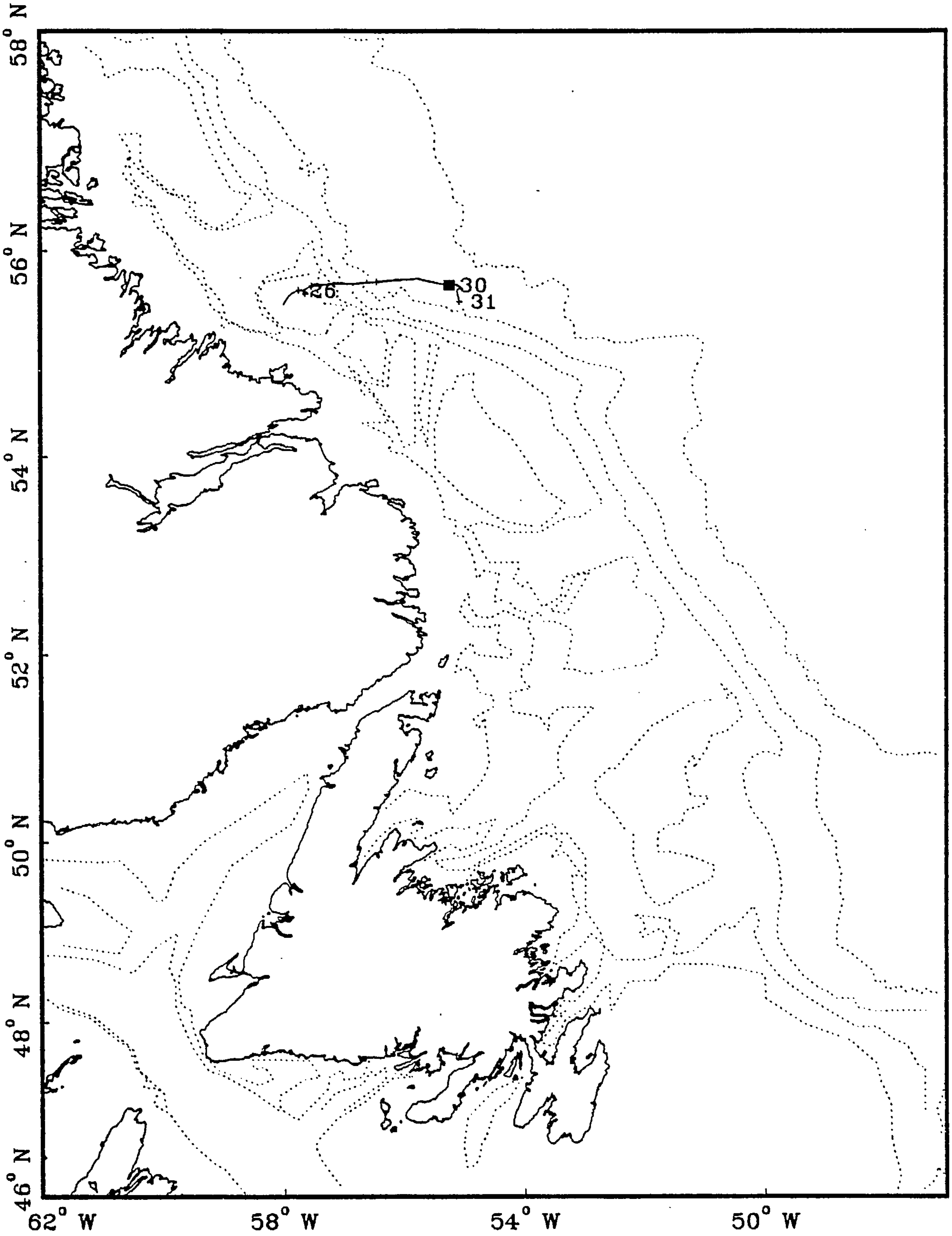

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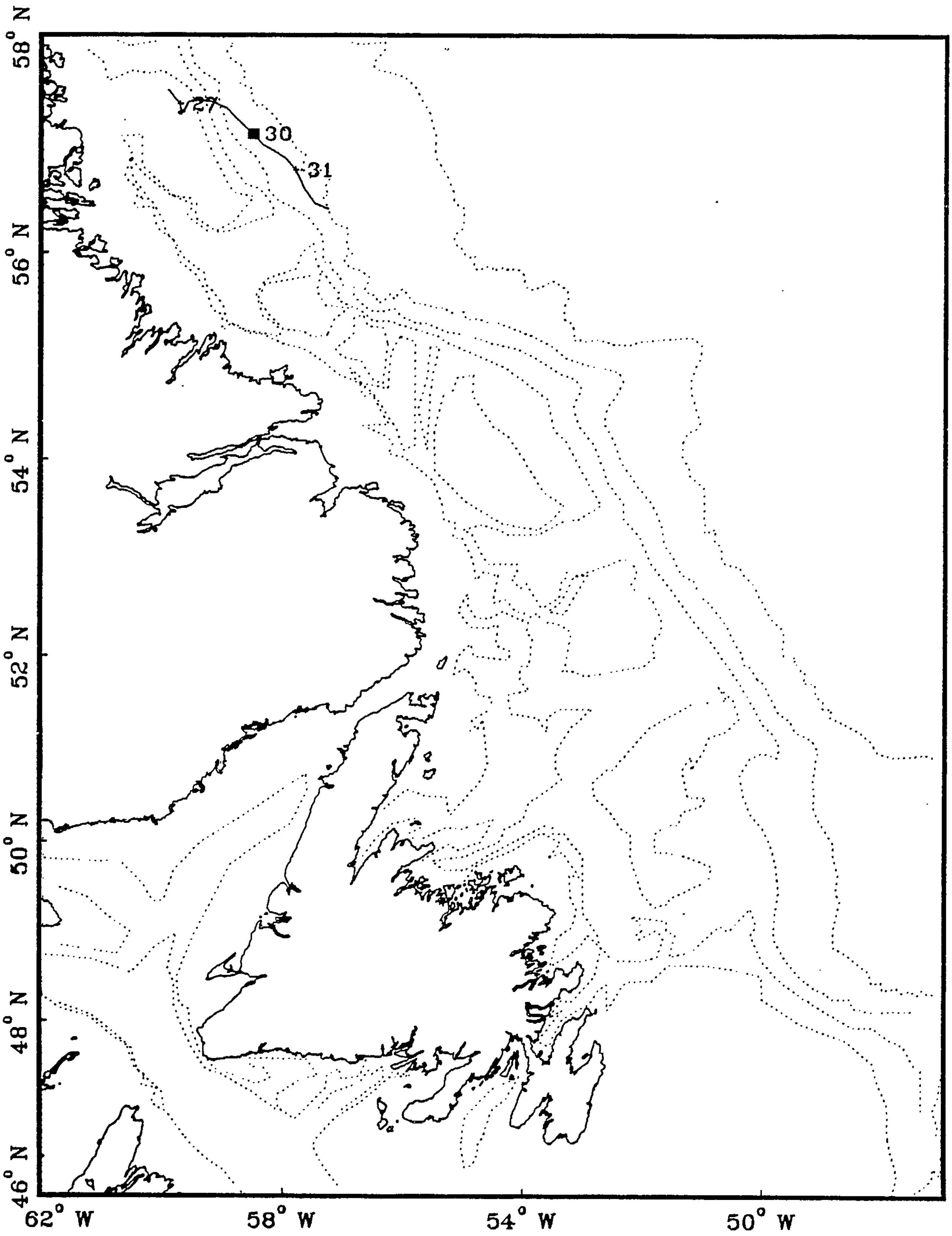
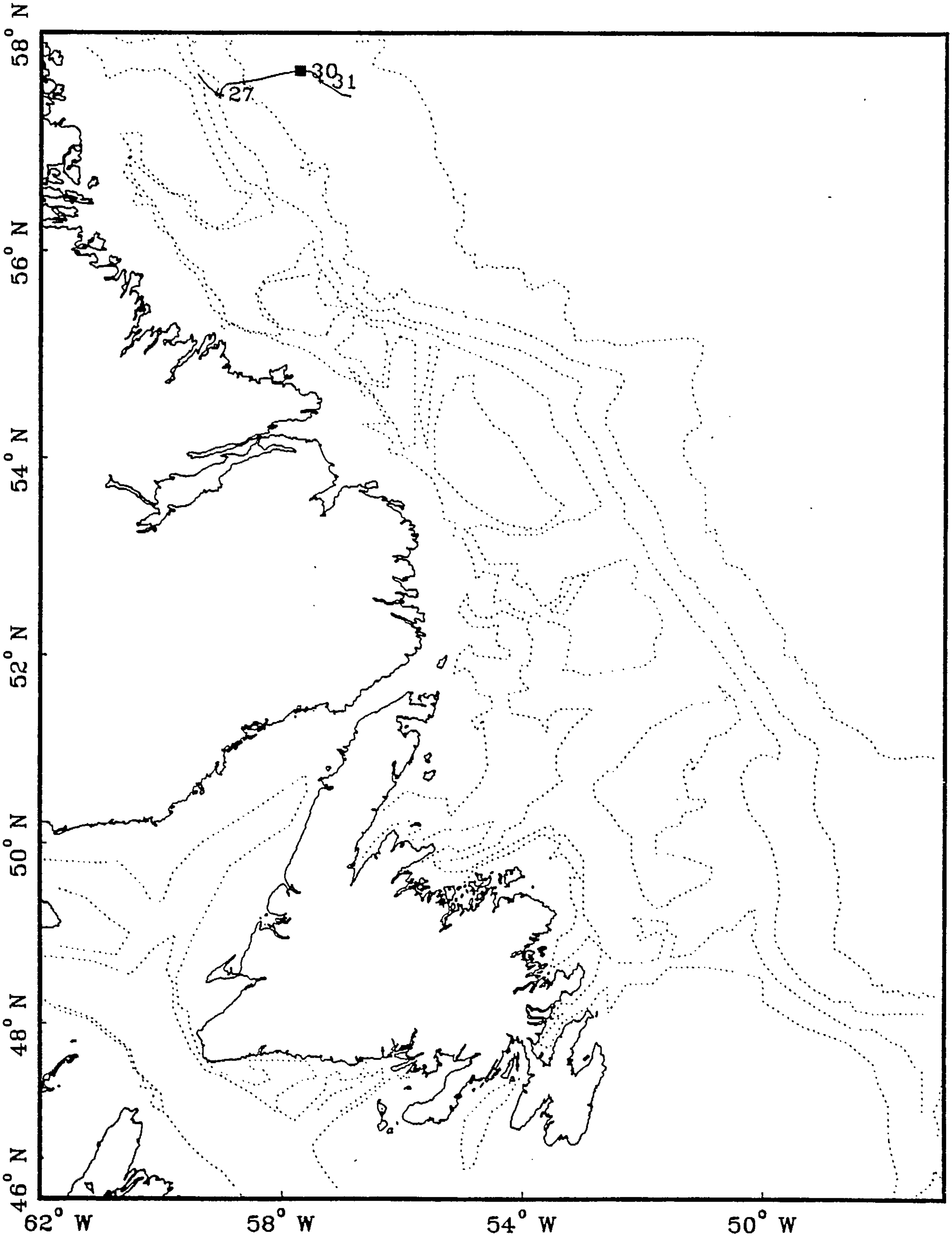
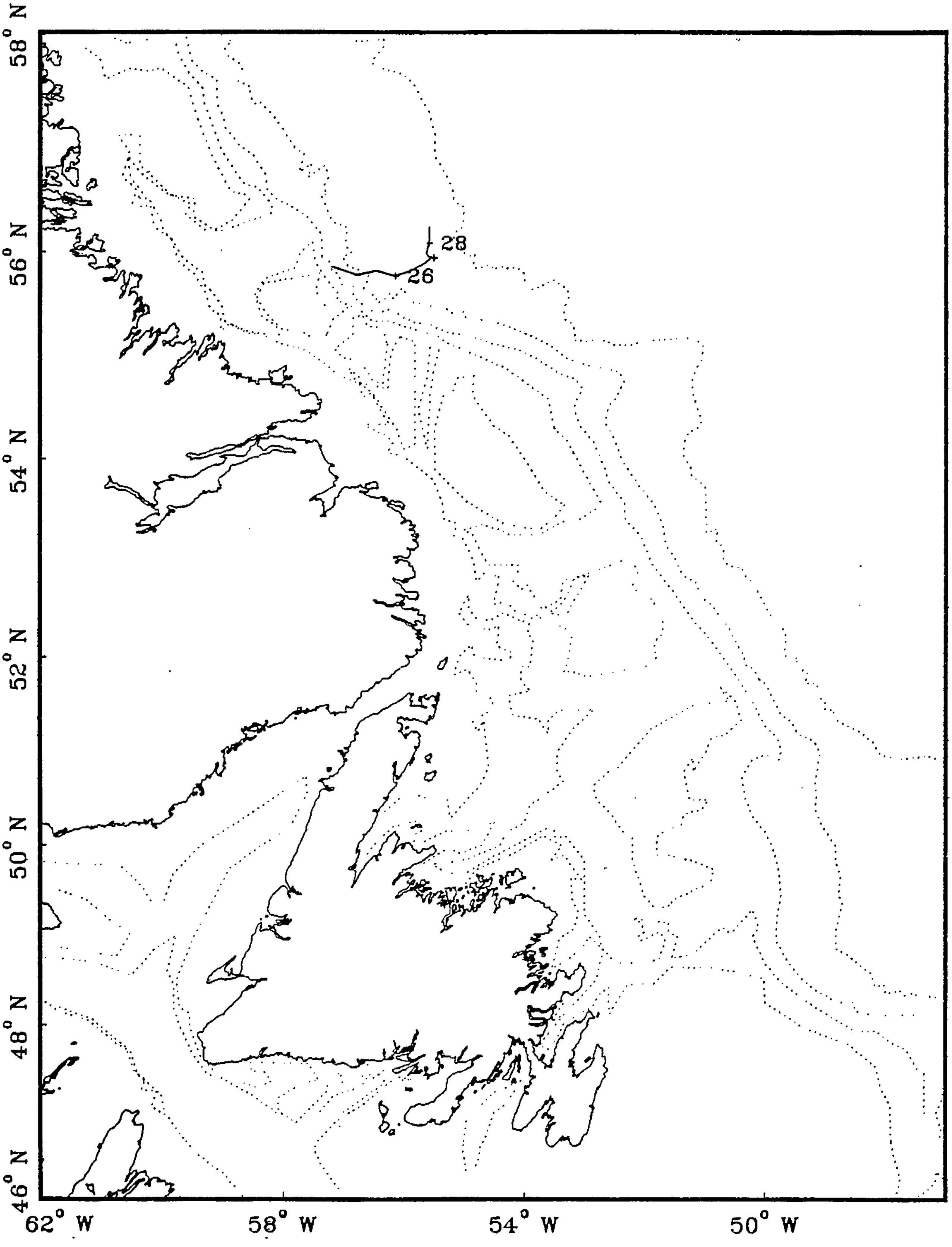


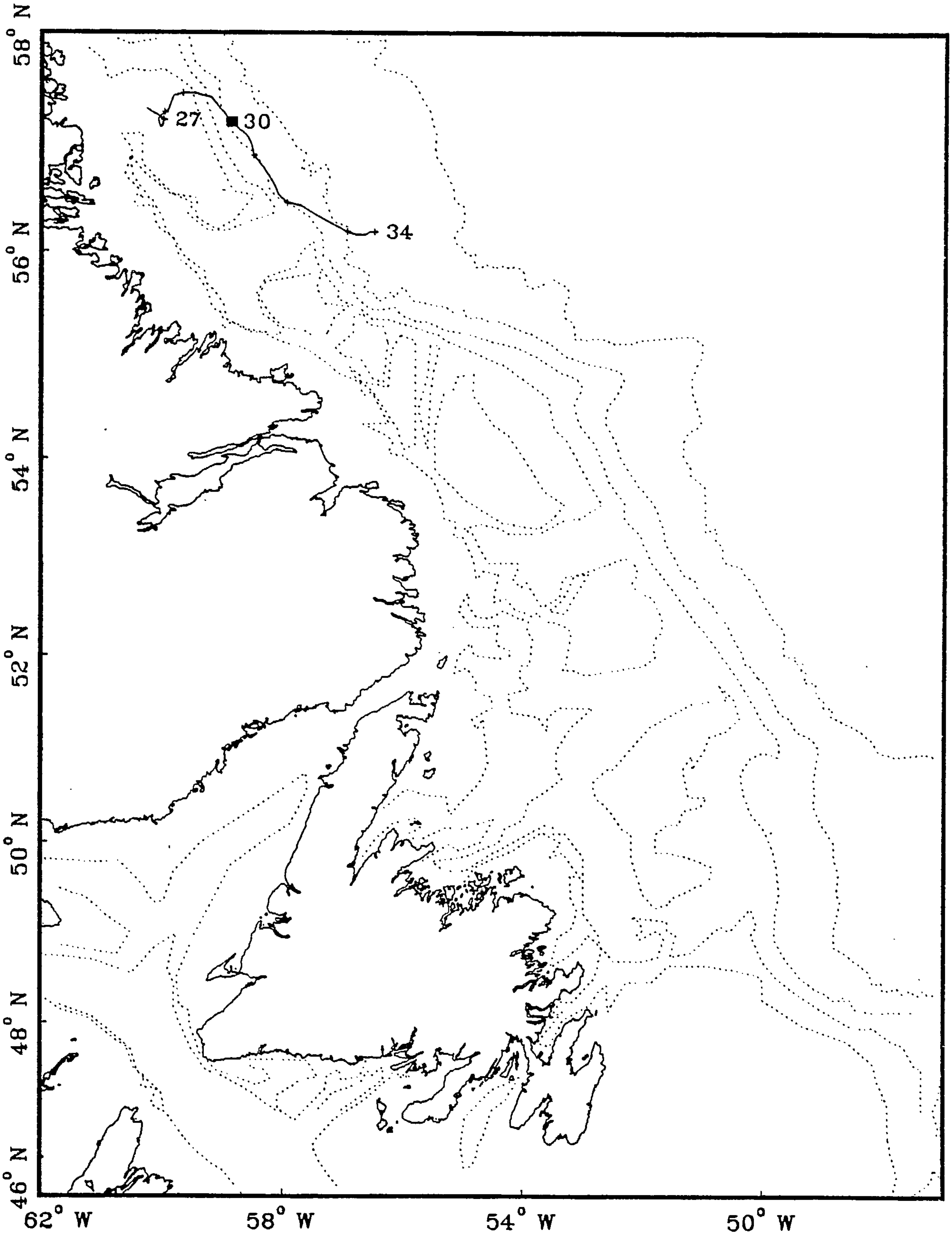
BUOY 2397 – 1986



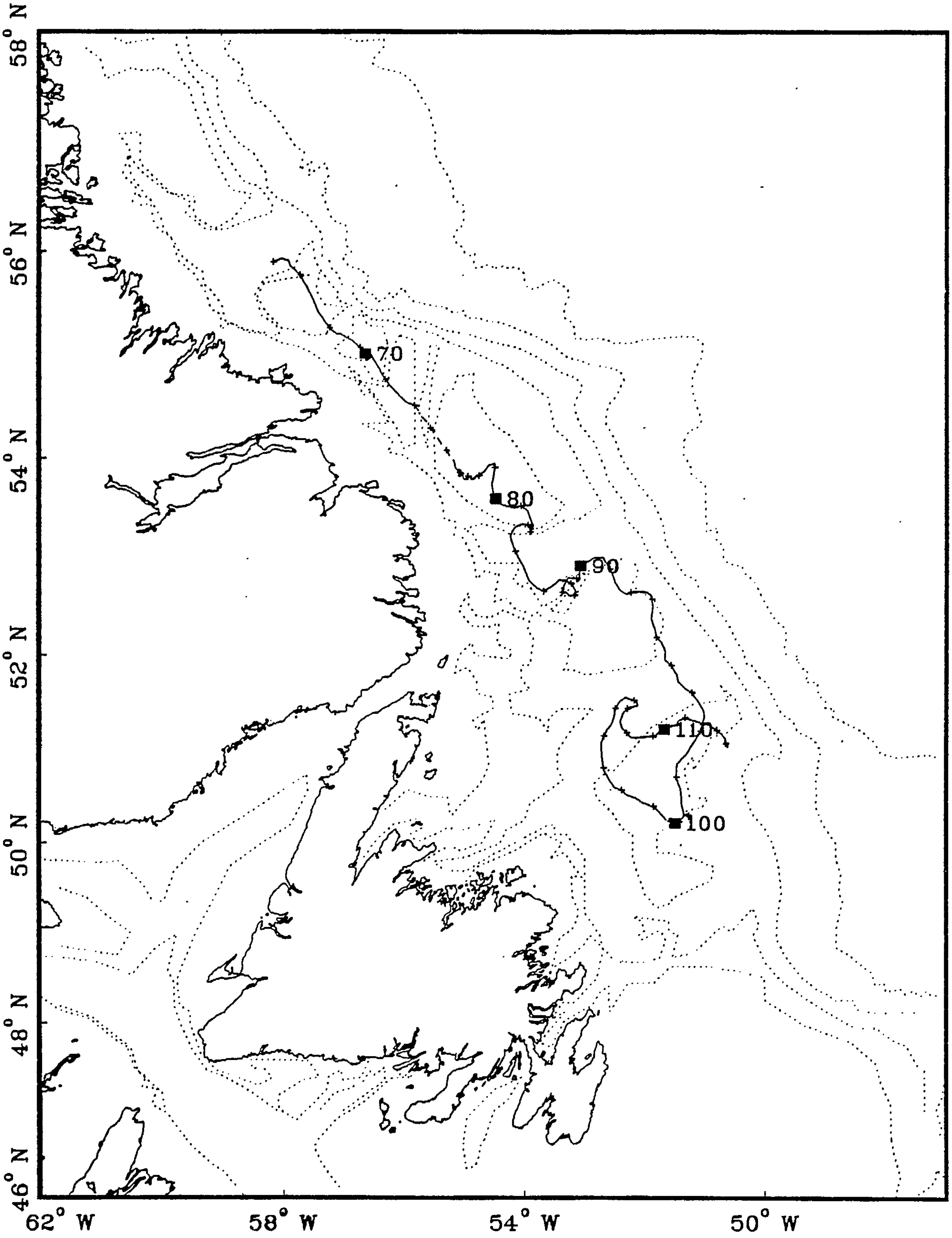
BUOY 2398 – 1986



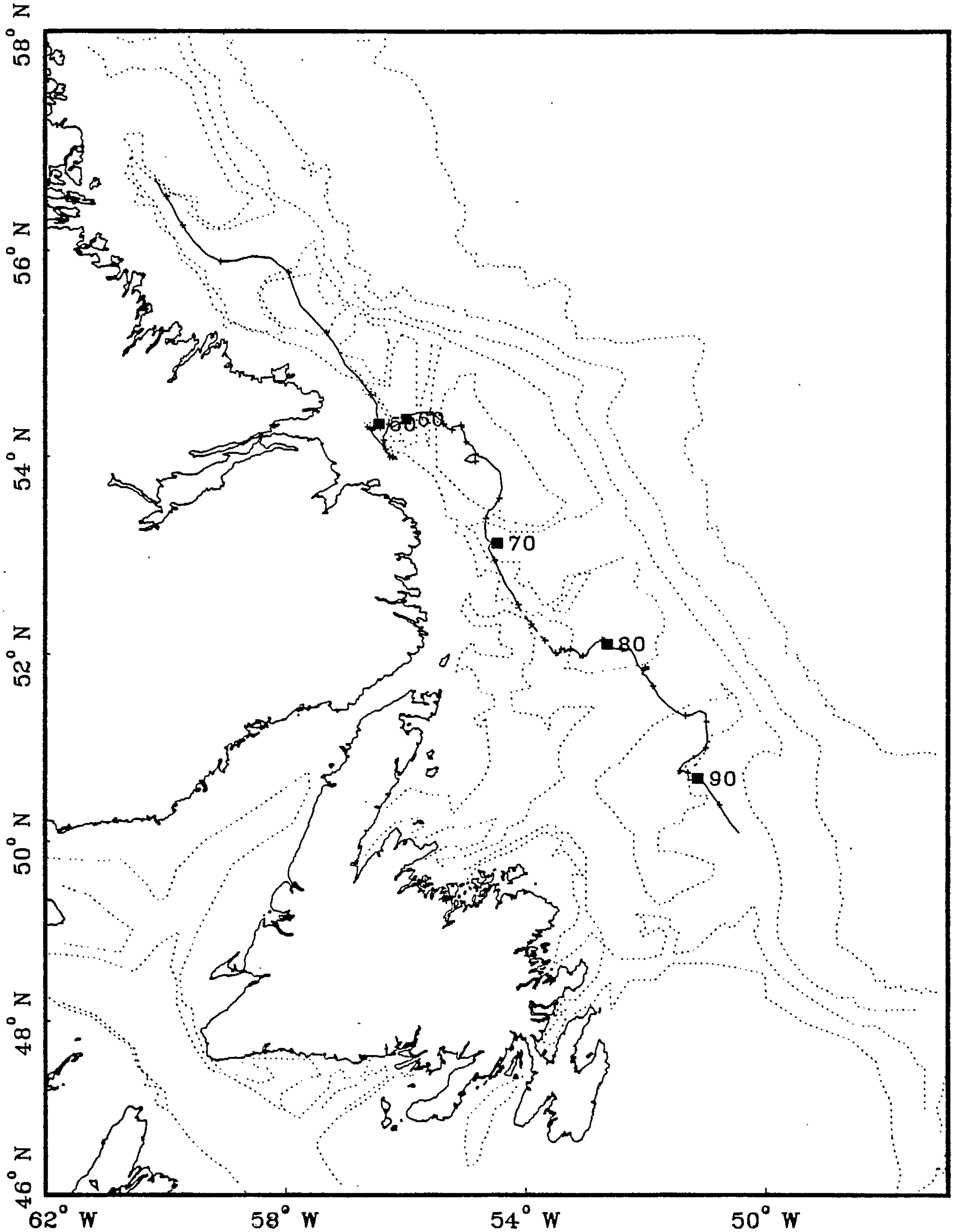
BUOY 2399 – 1986



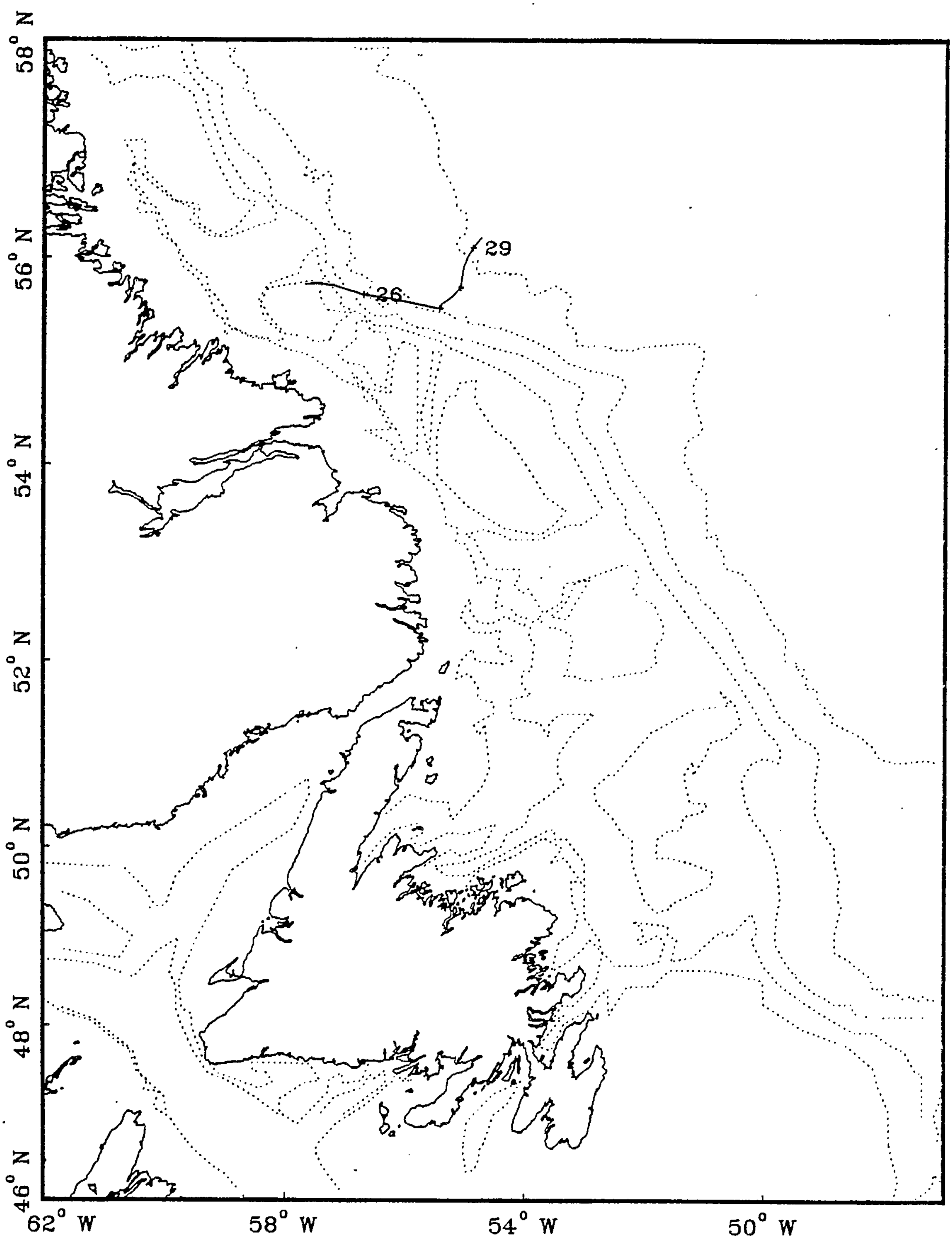
BUOY 2407 – 1986



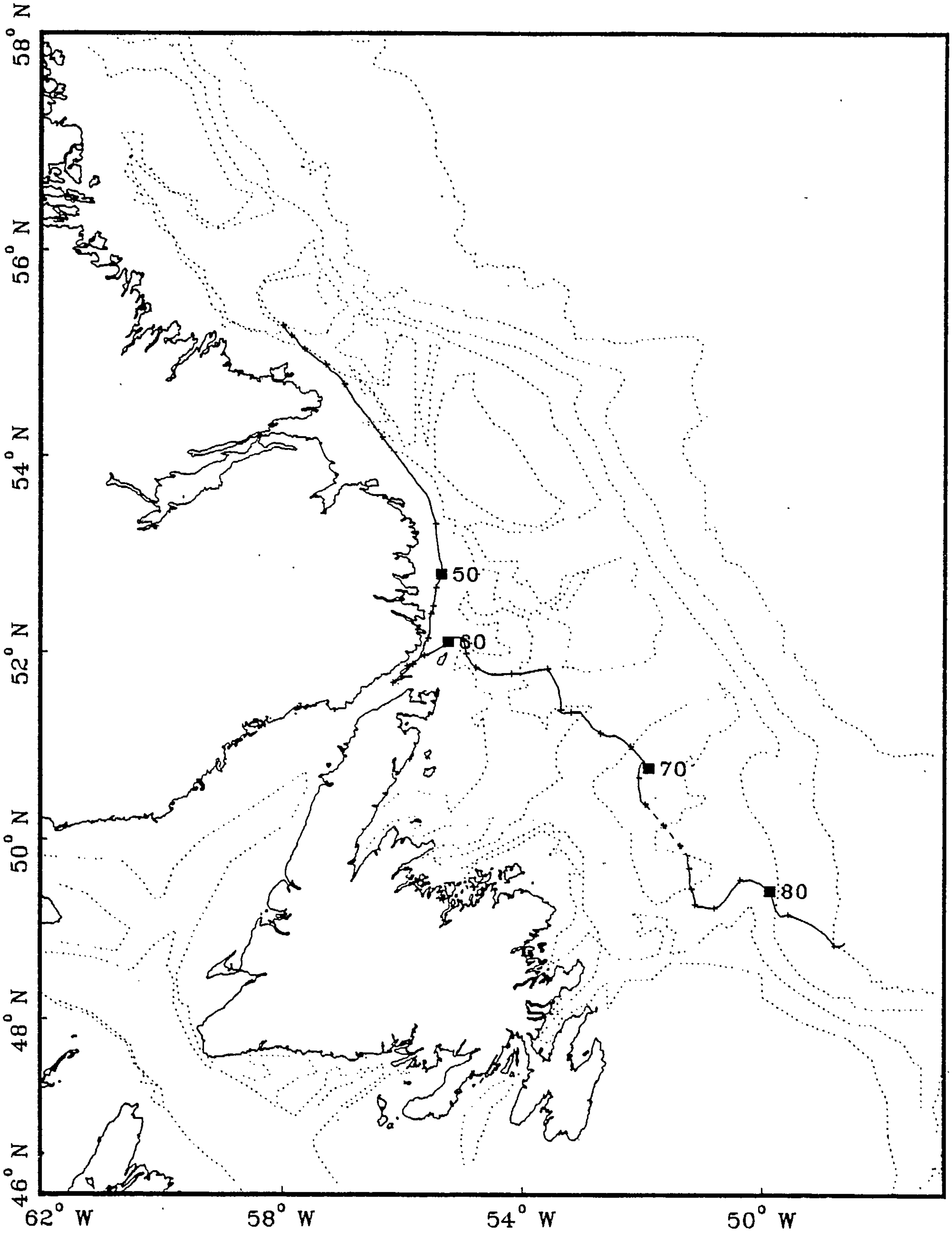
BUOY 2523 – 1986



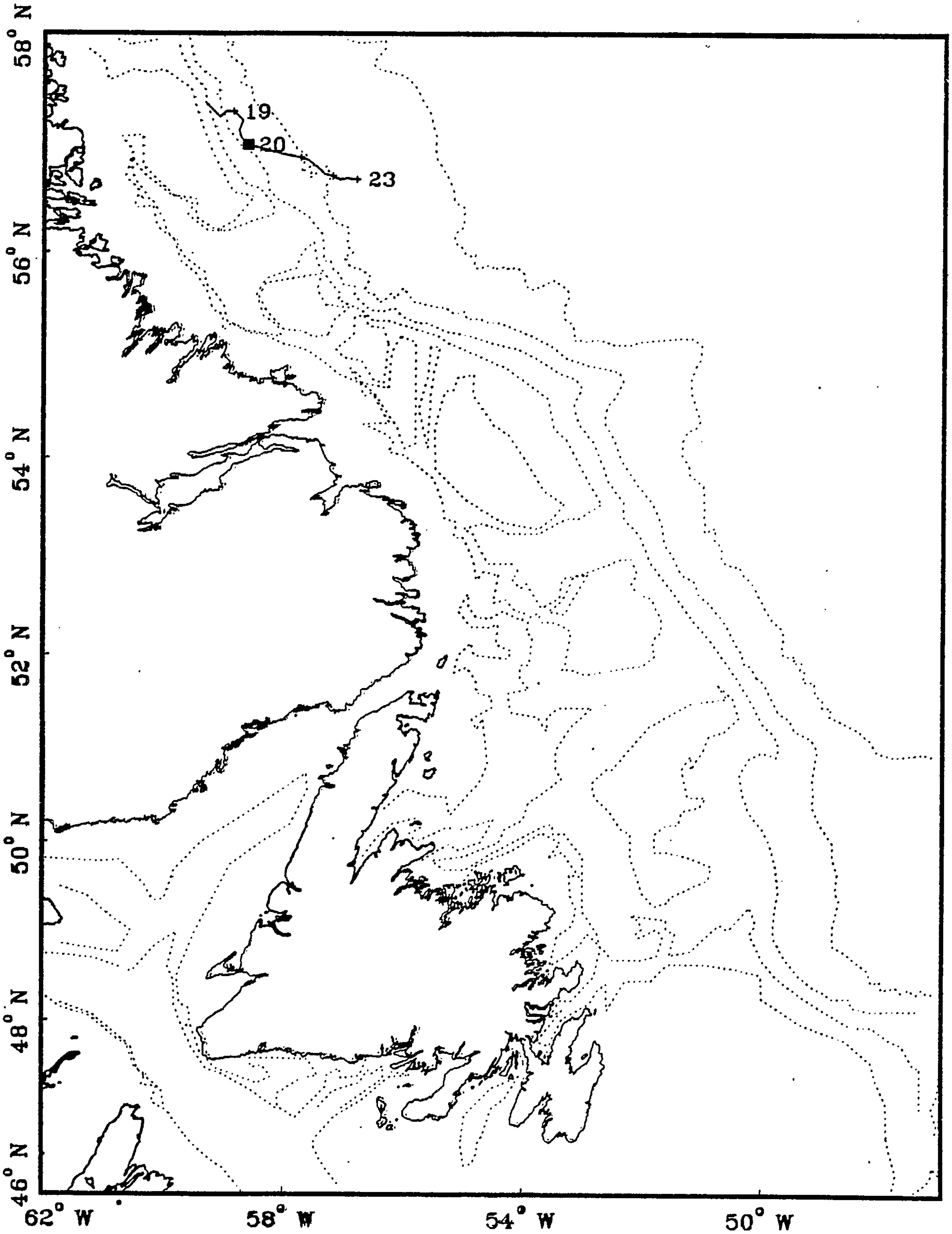
BUOY 2524 – 1986



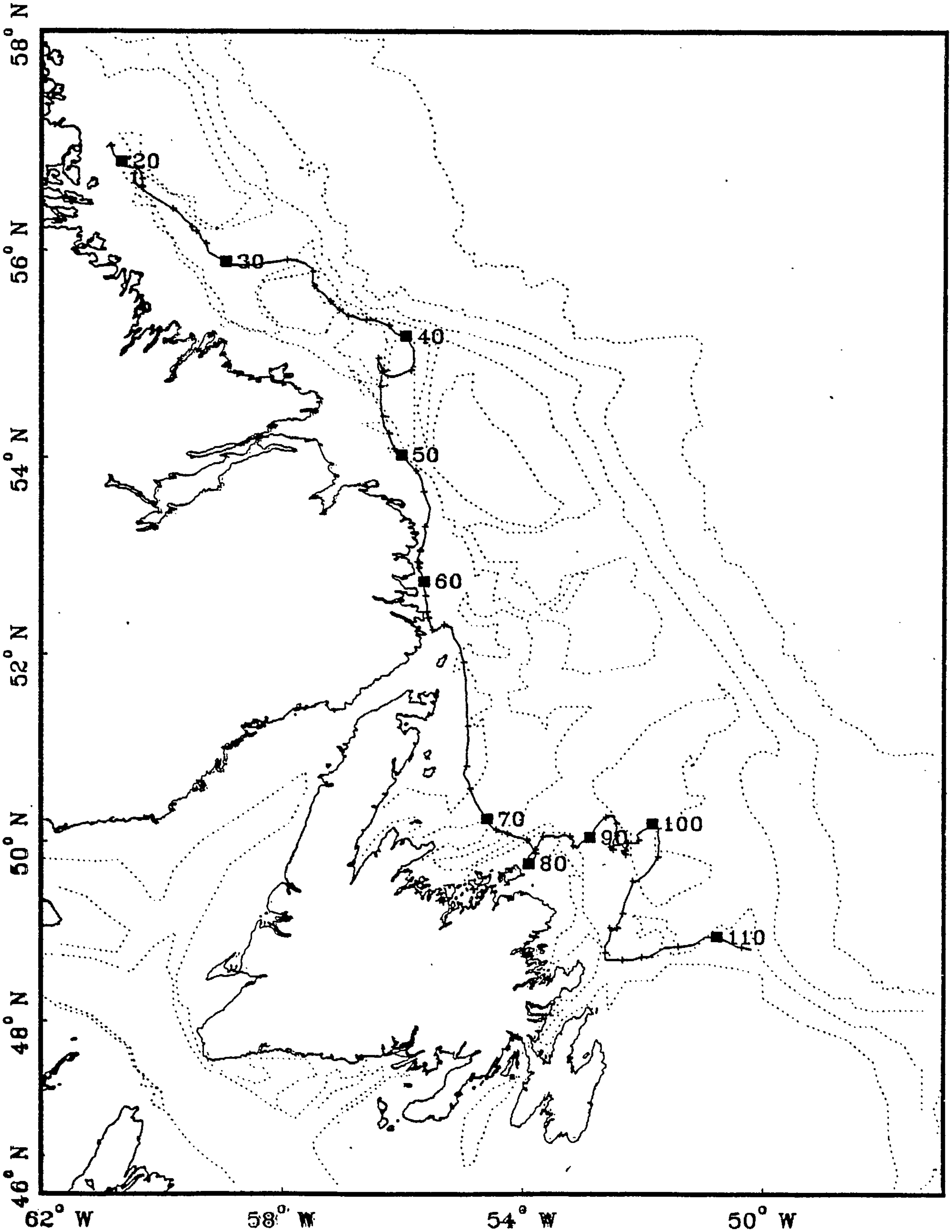
BUOY 2525 – 1986



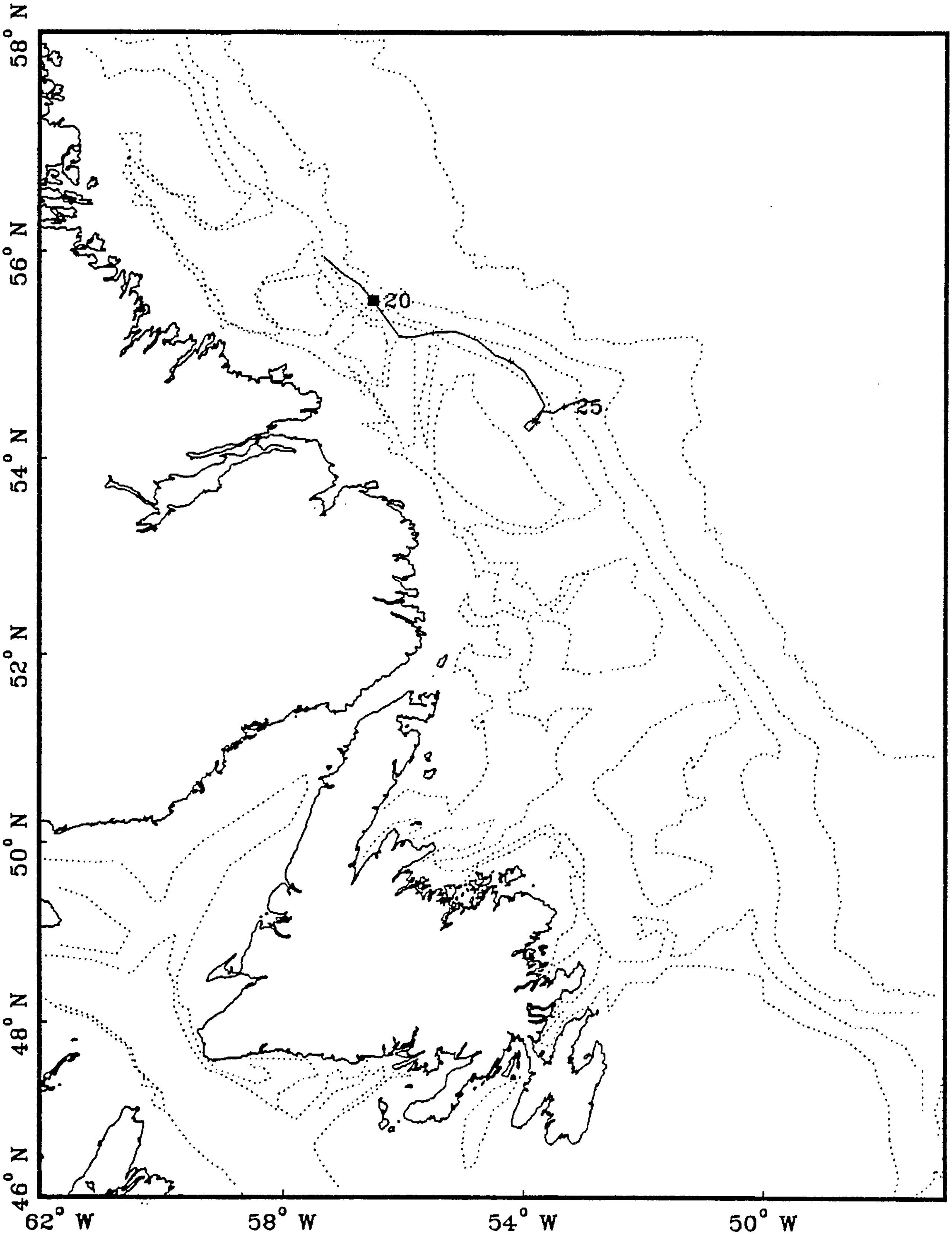
BUOY 2373 – 1987



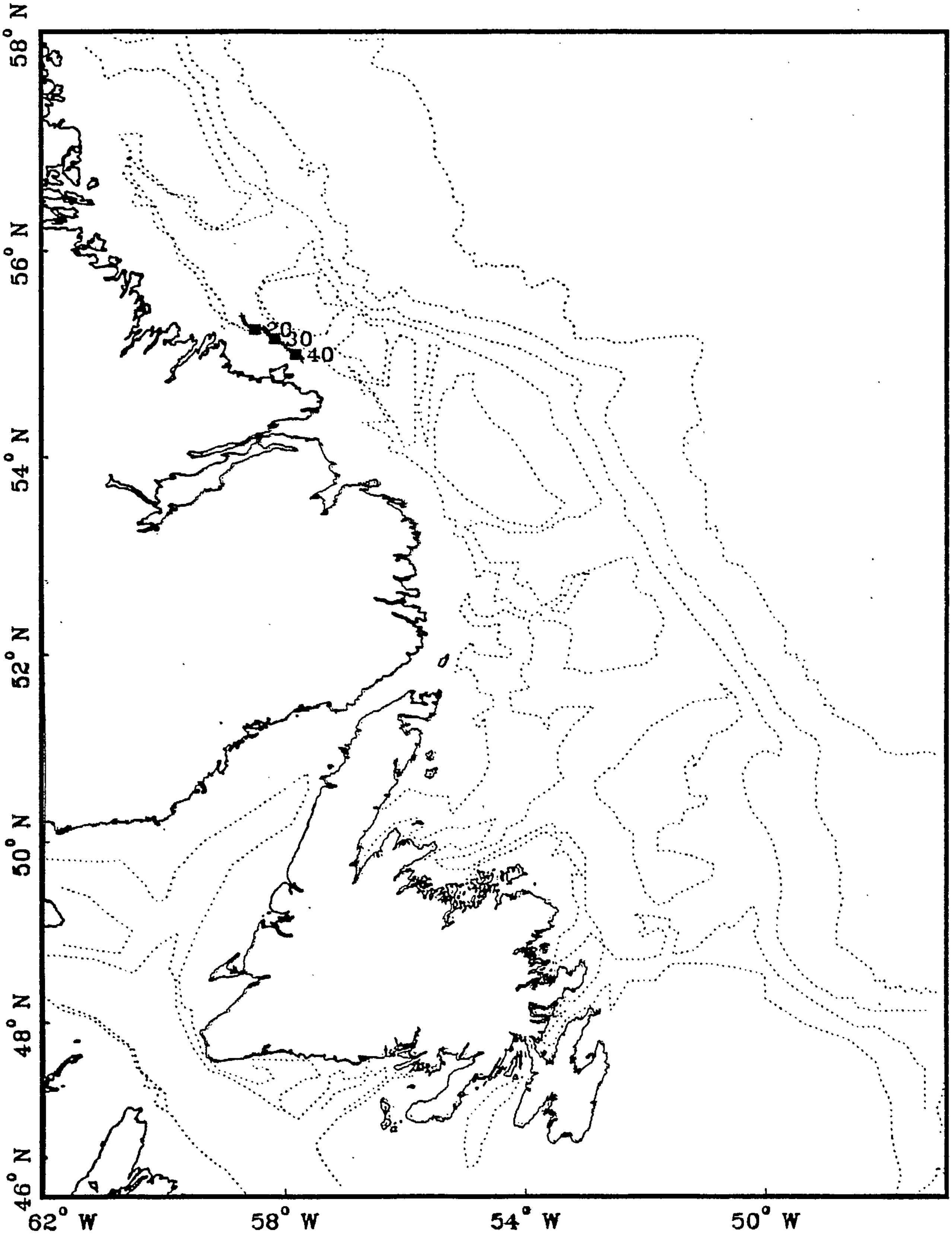
BUOY 2375 – 1987



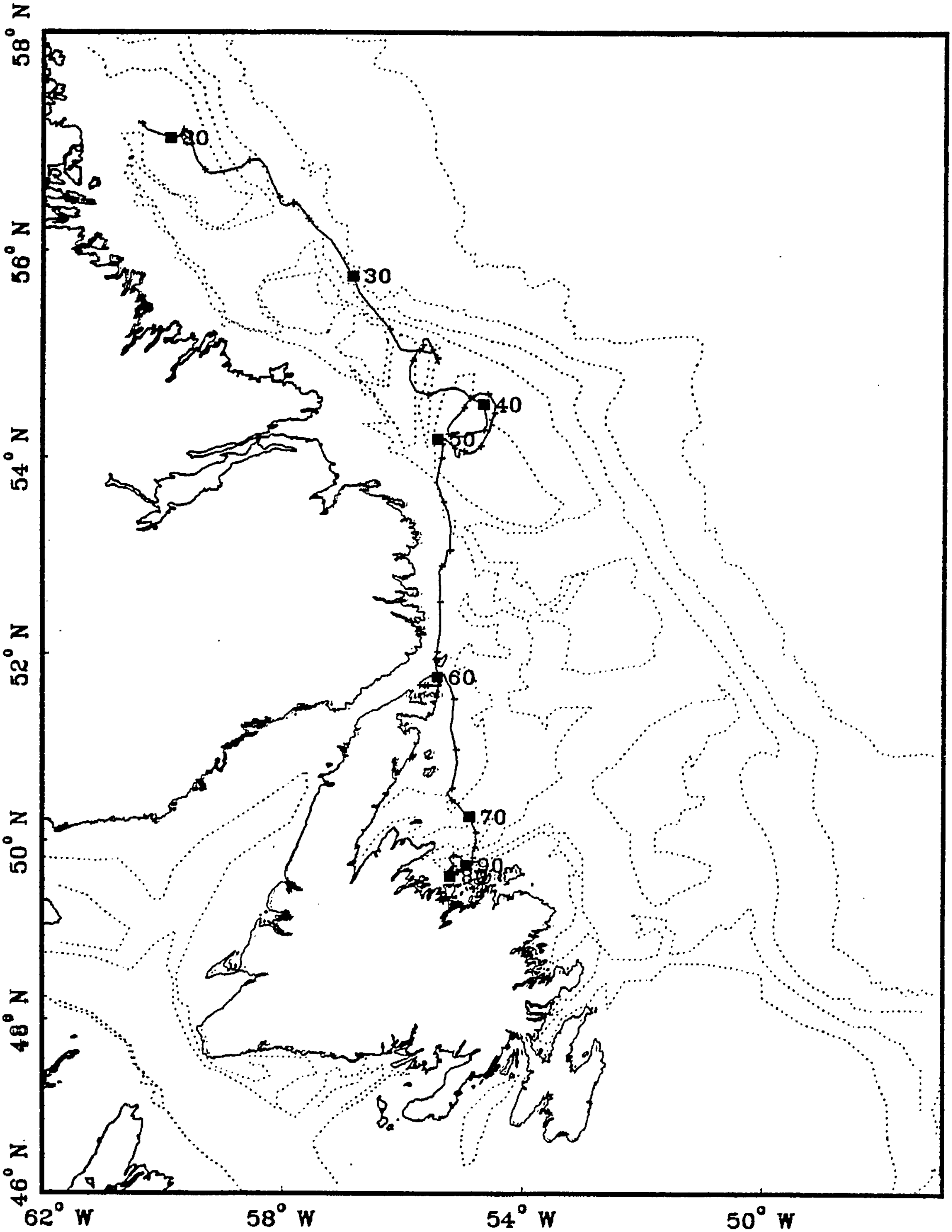
BUOY 2378 - 1987



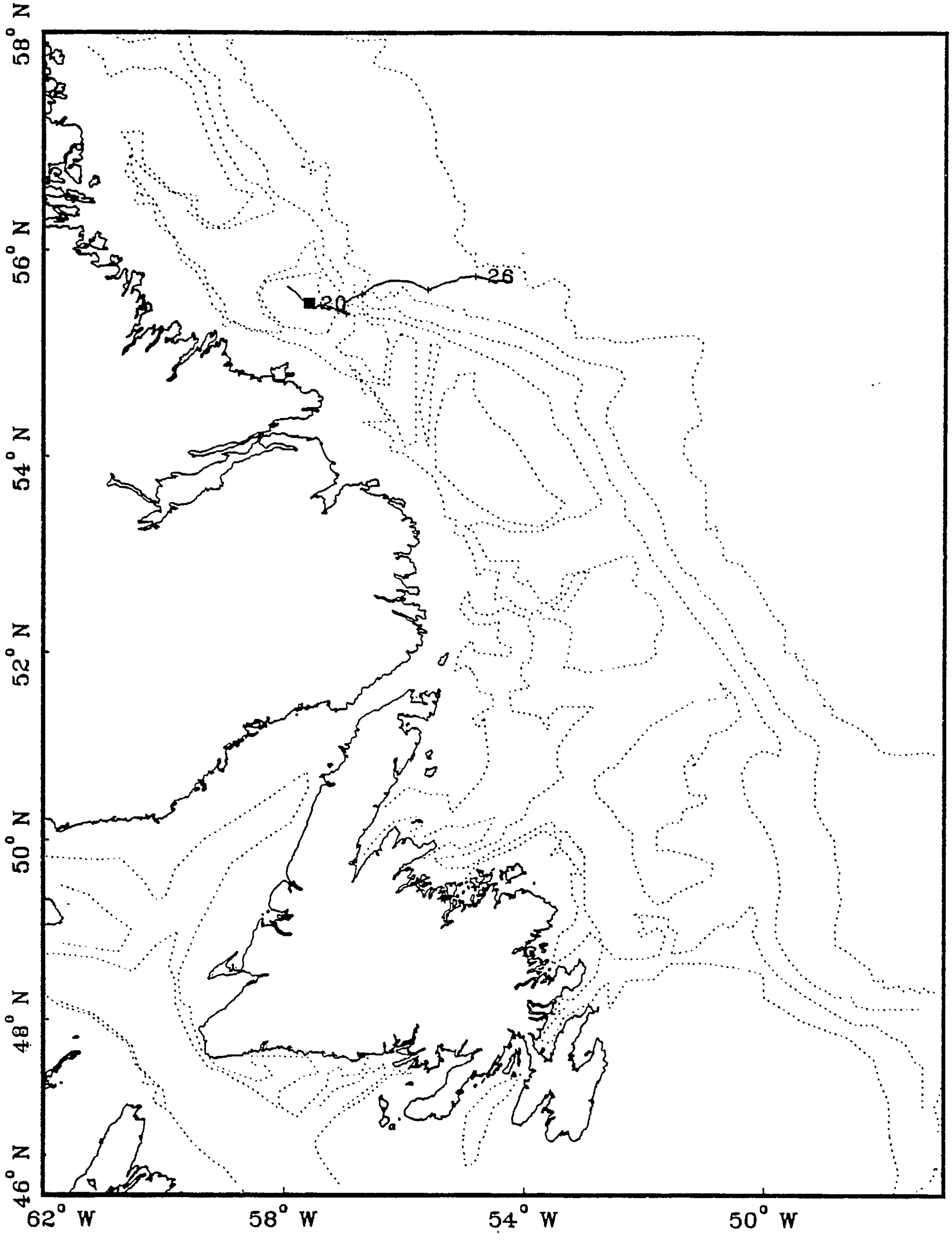
BUOY 2379 – 1987



BUOY 3121 - 1987

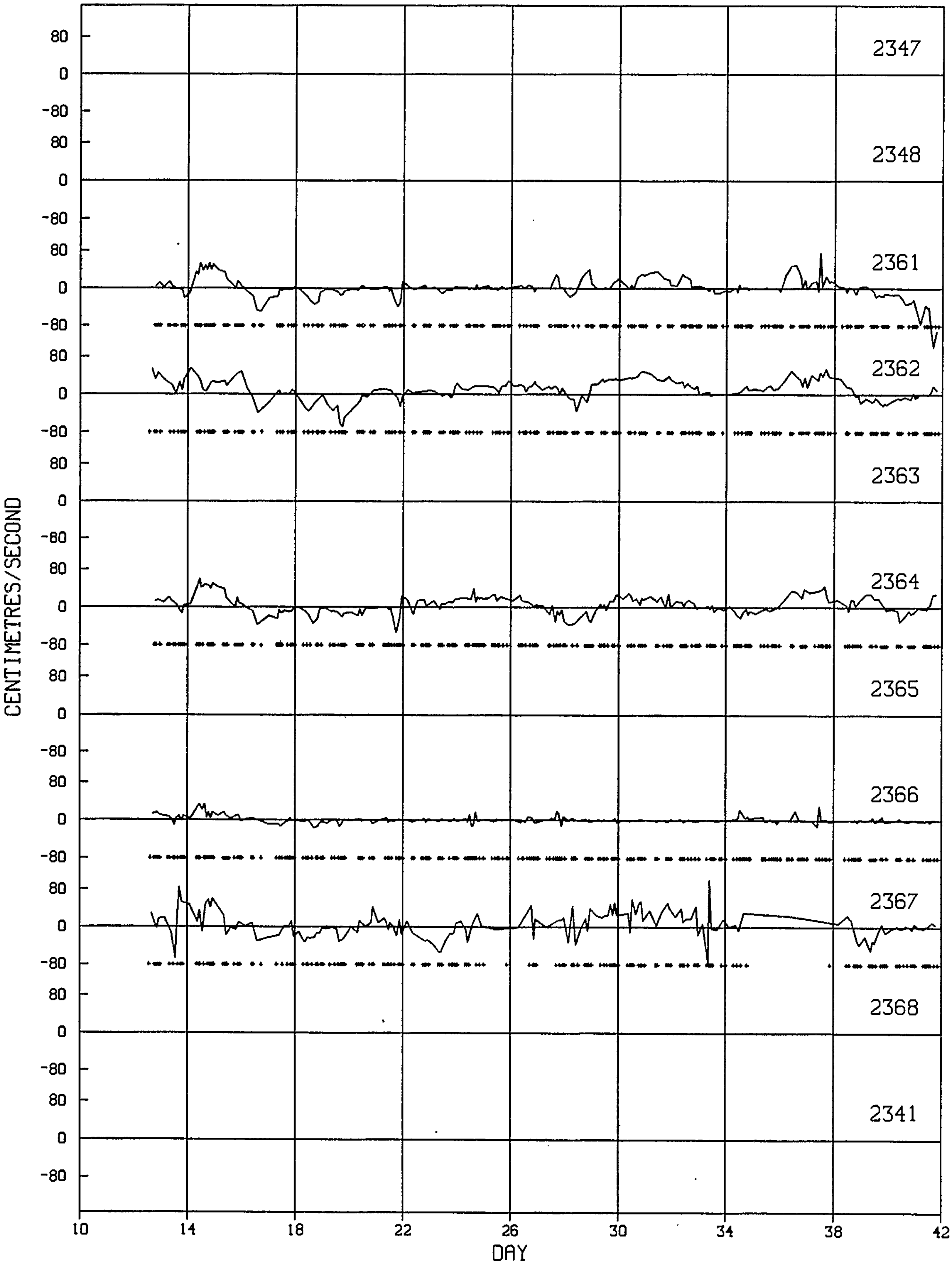


BUOY 3123 – 1987

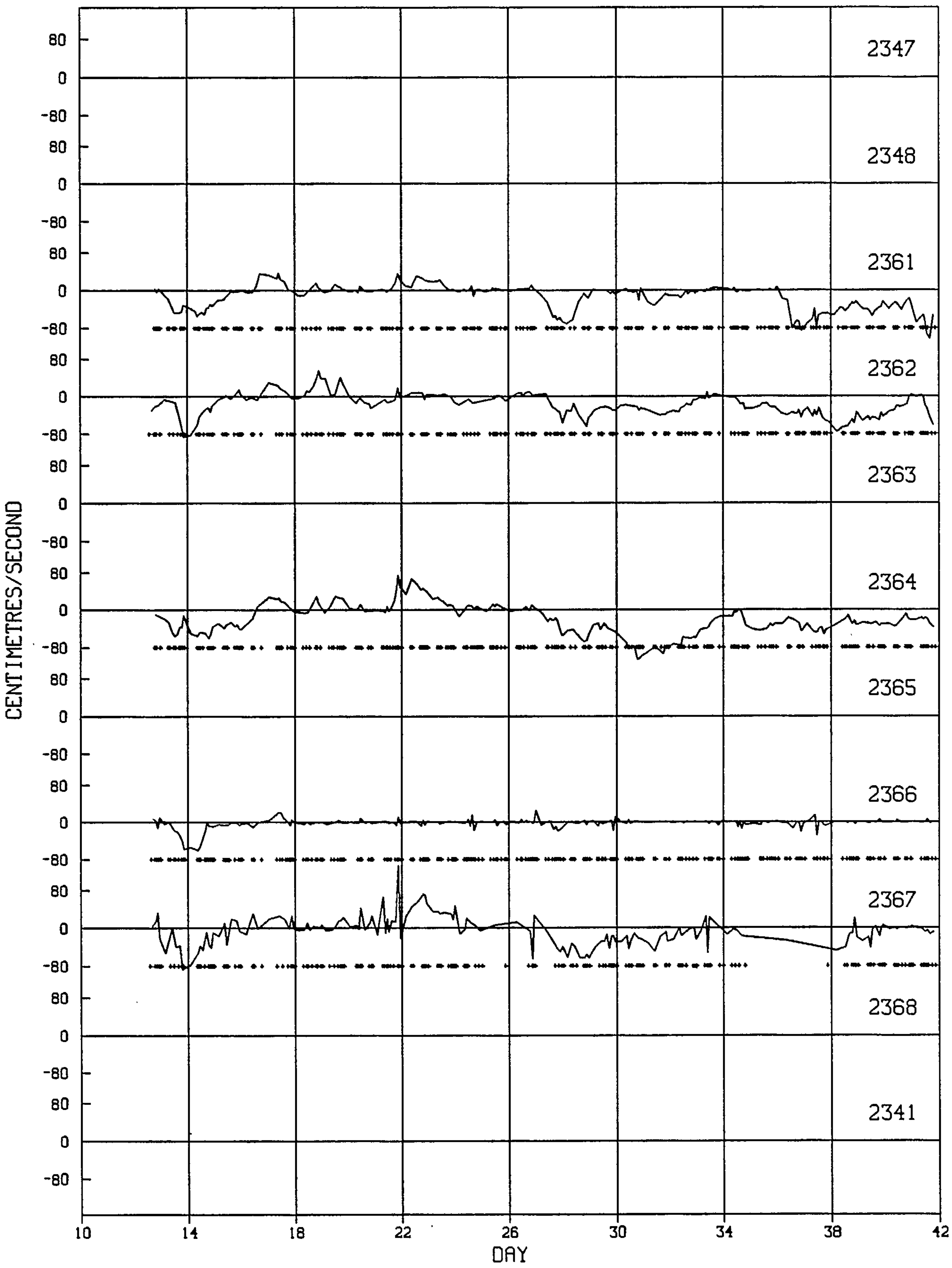


Appendix B. U (eastward) and V (northward) ice velocity components, computed from fixes at least 1 hour apart. The times of the fixes are marked with small crosses below the individual time series.

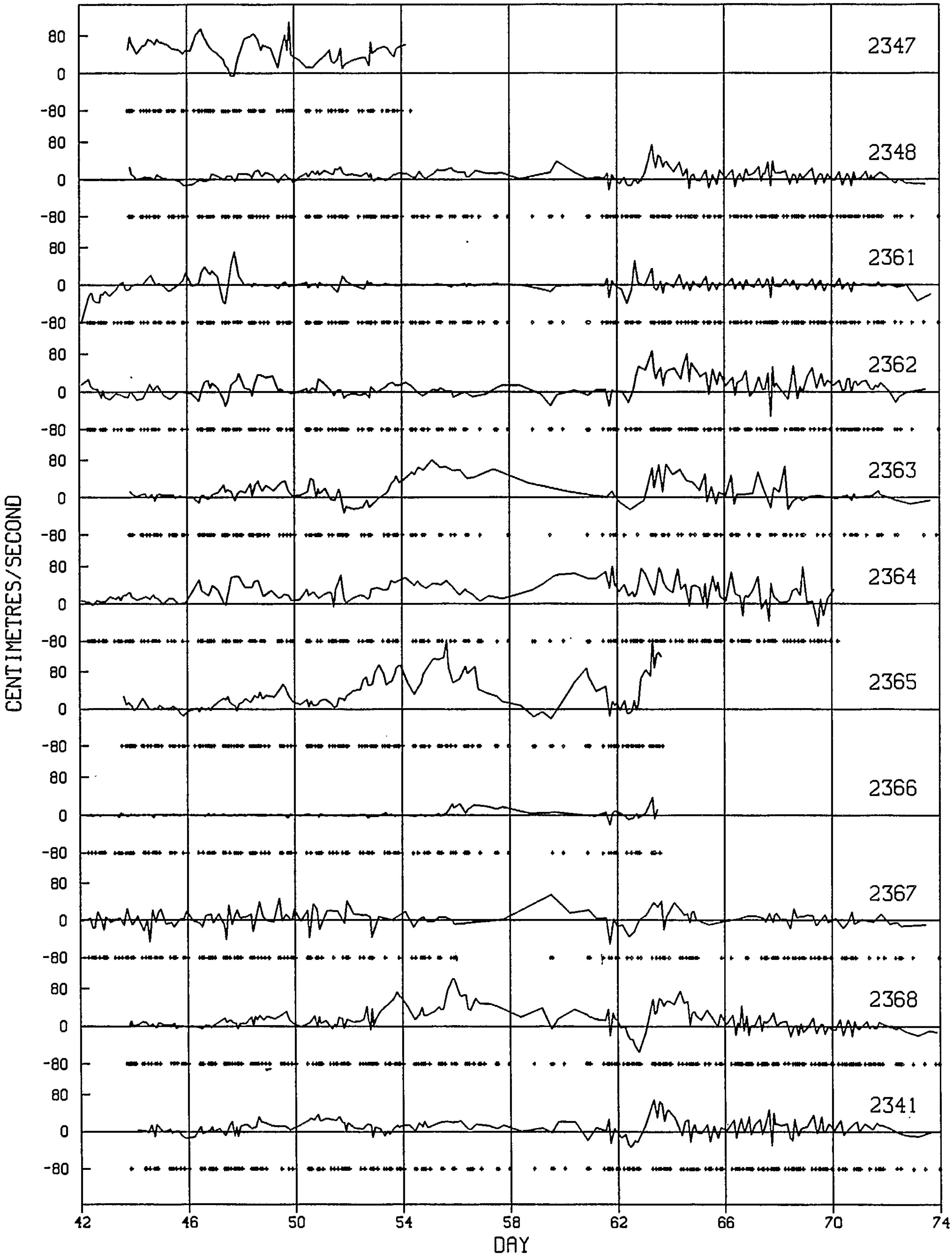
U COMPONENT - 1985



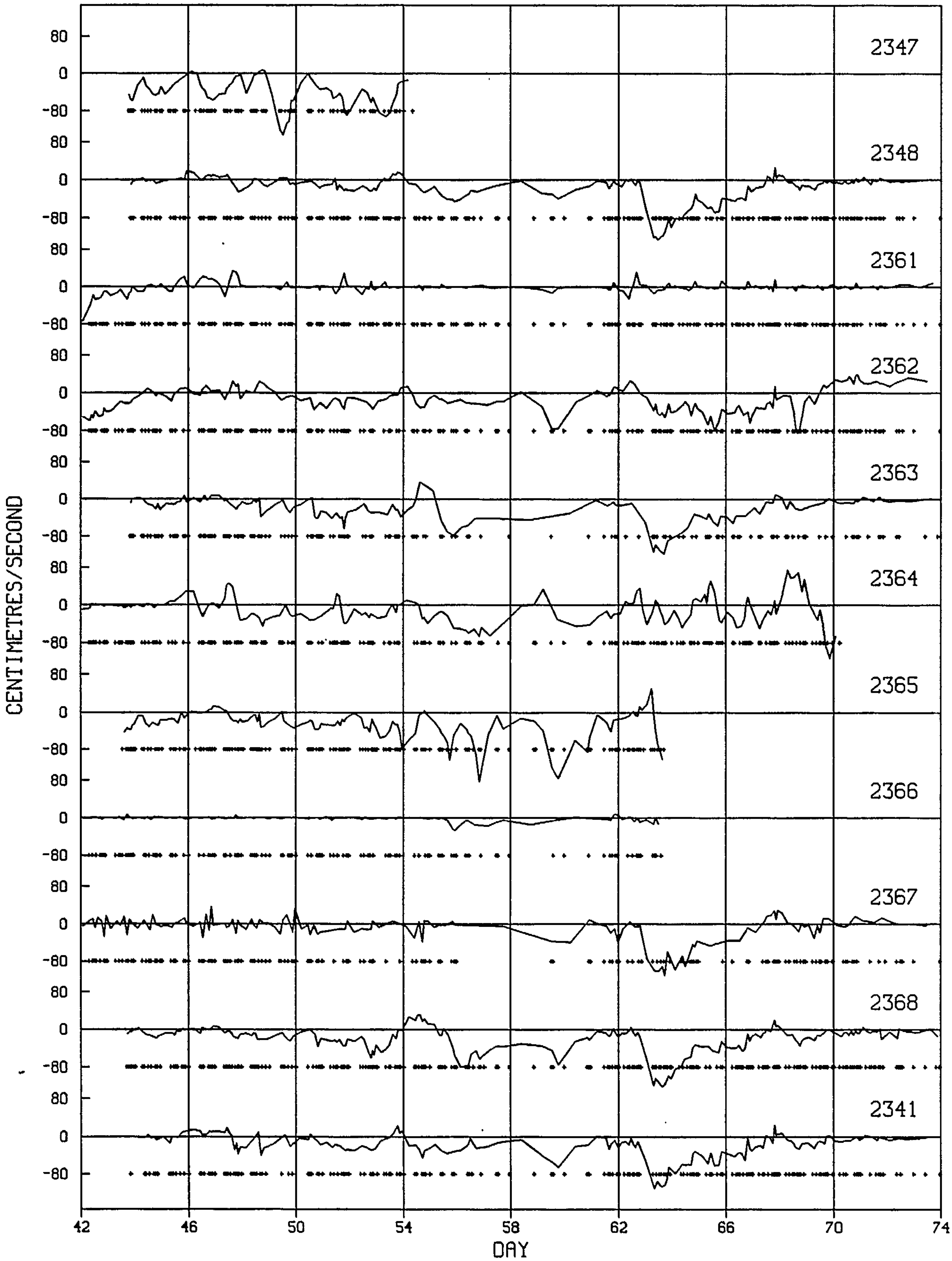
V COMPONENT - 1985



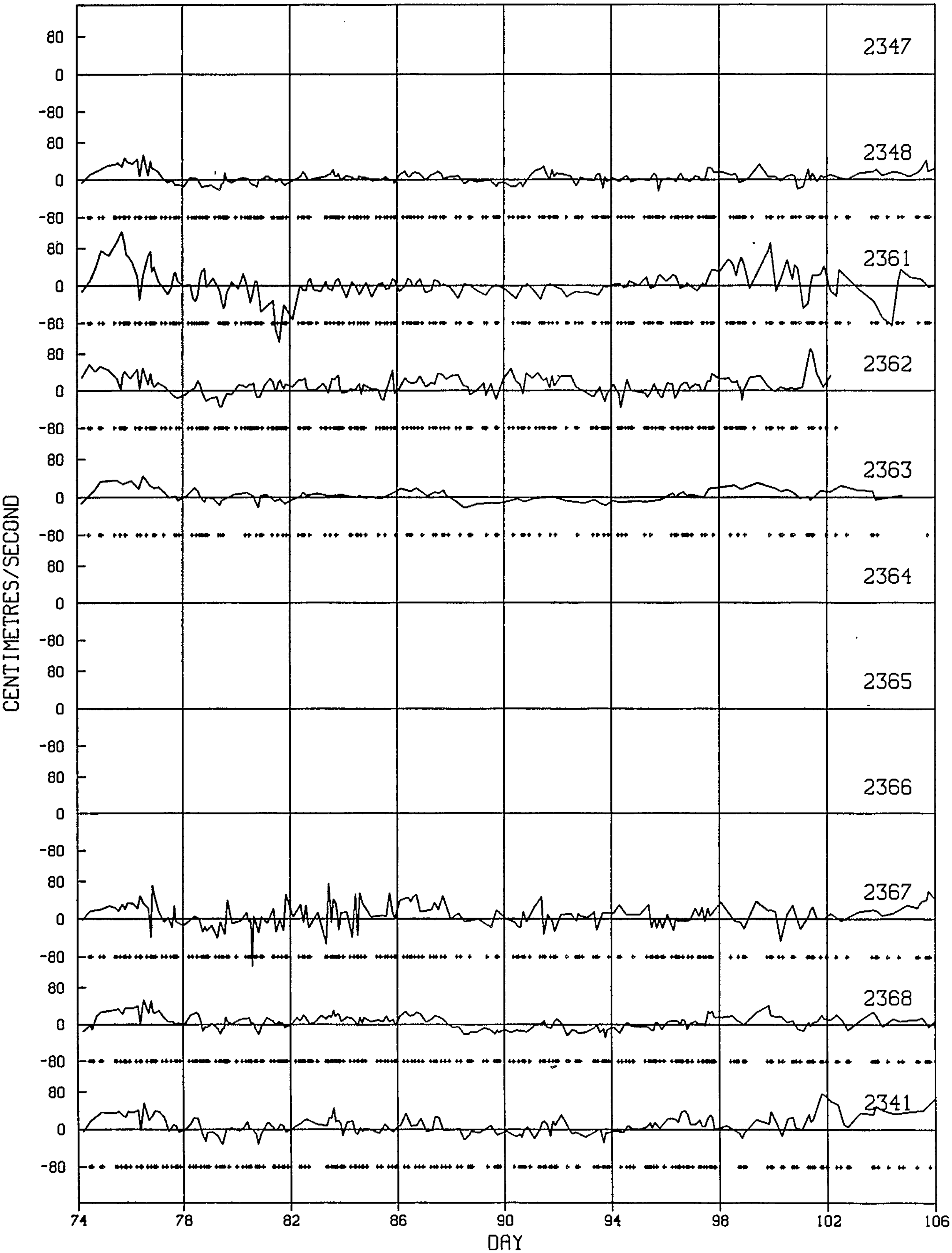
U COMPONENT - 1985



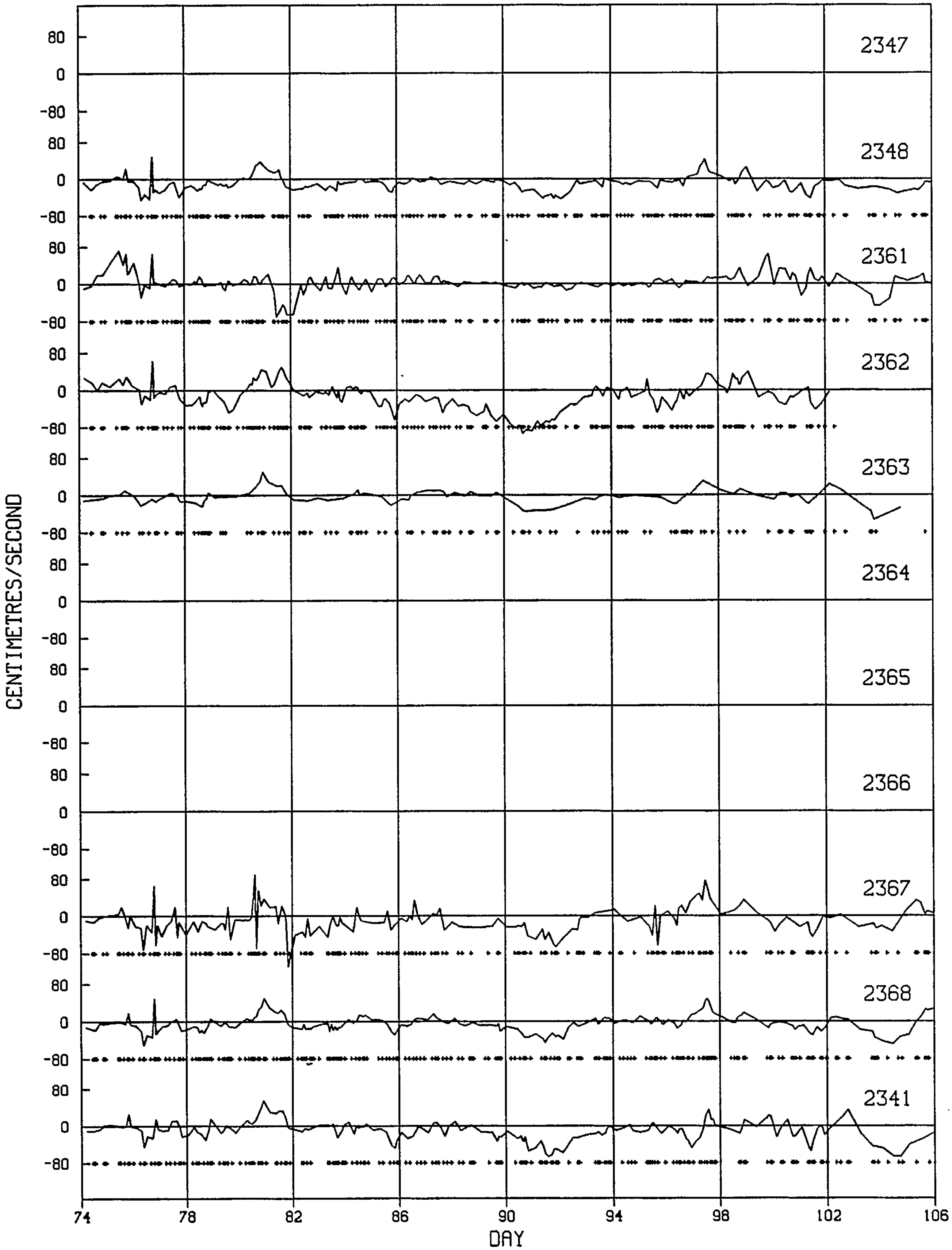
V COMPONENT - 1985



U COMPONENT - 1985



V COMPONENT - 1985



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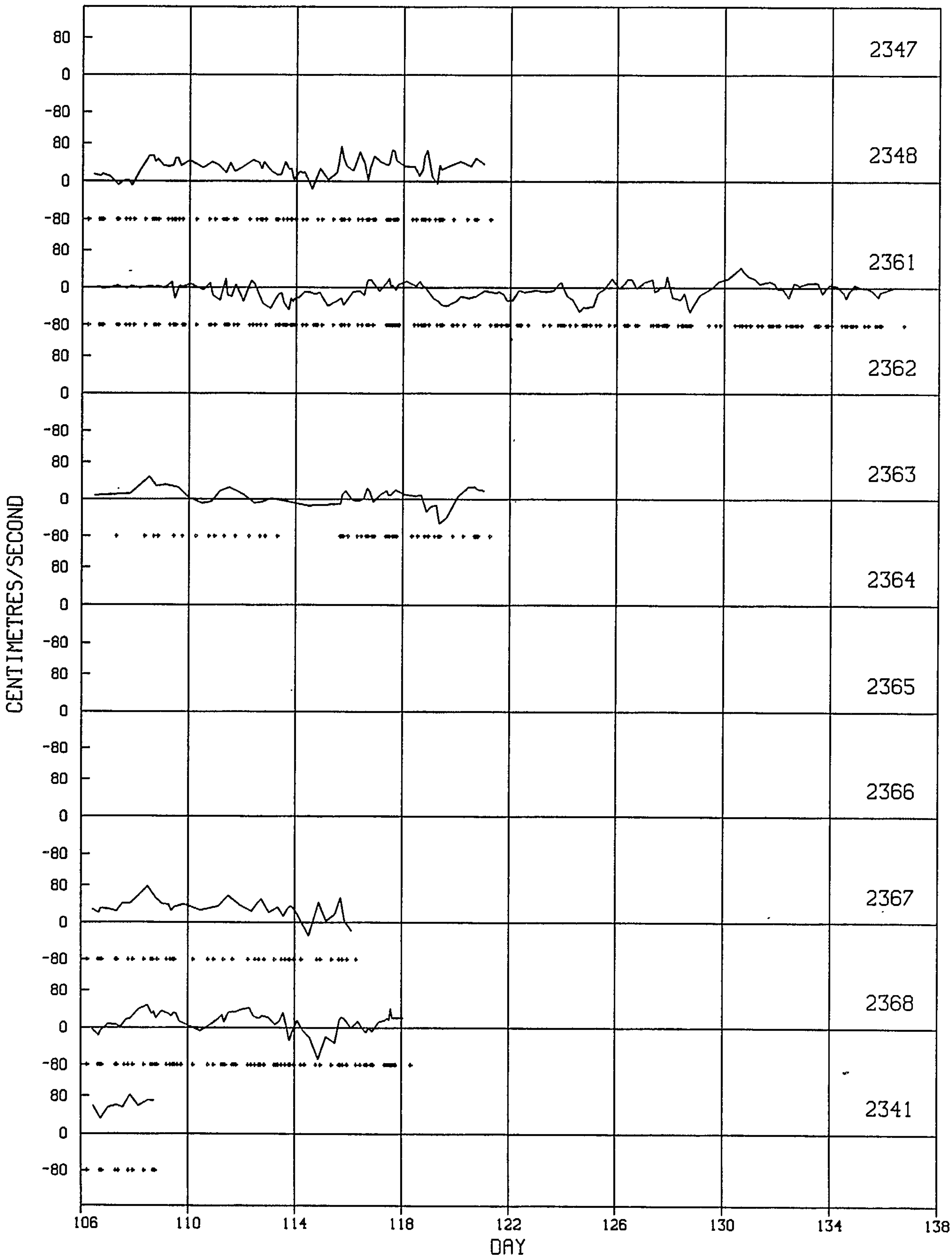
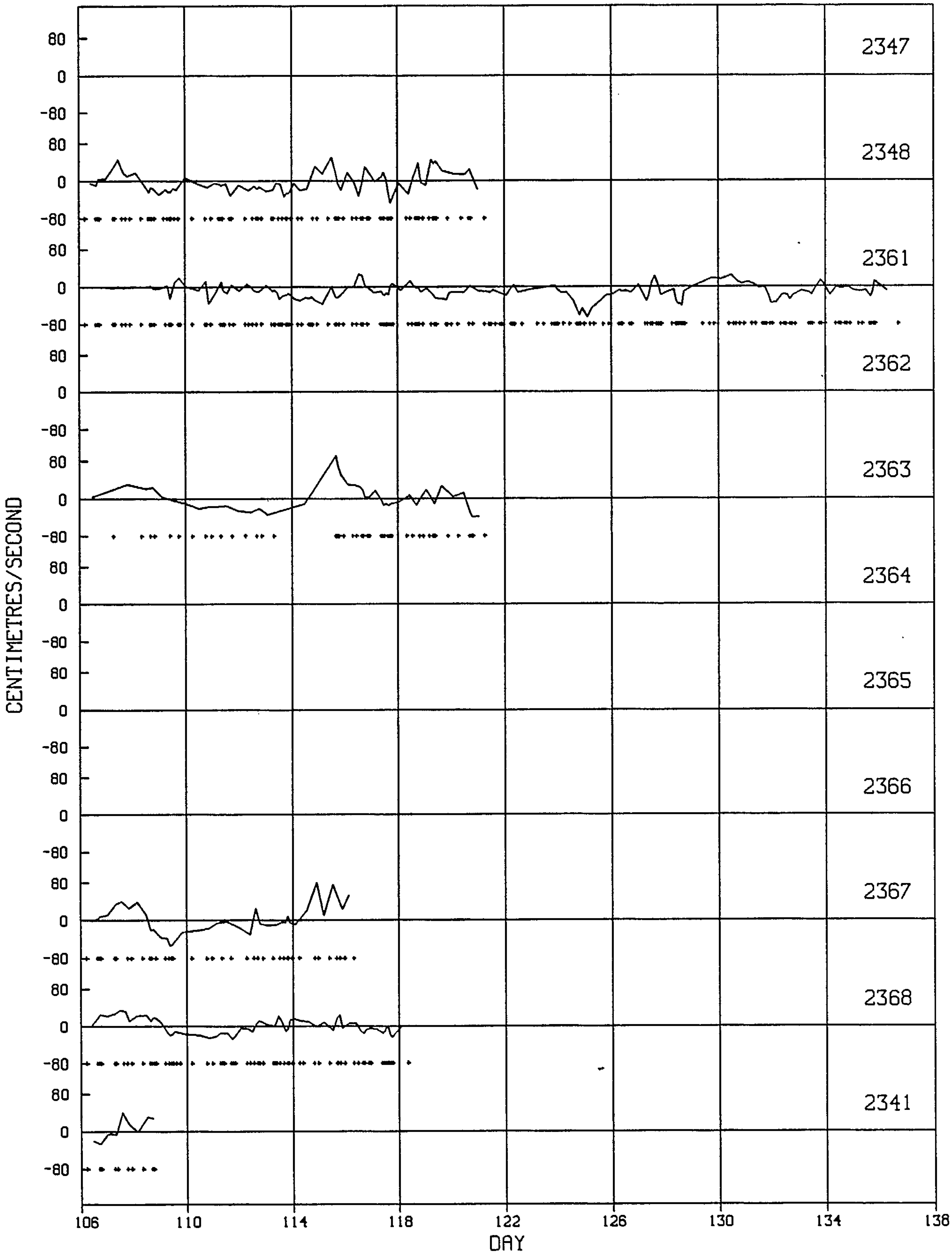
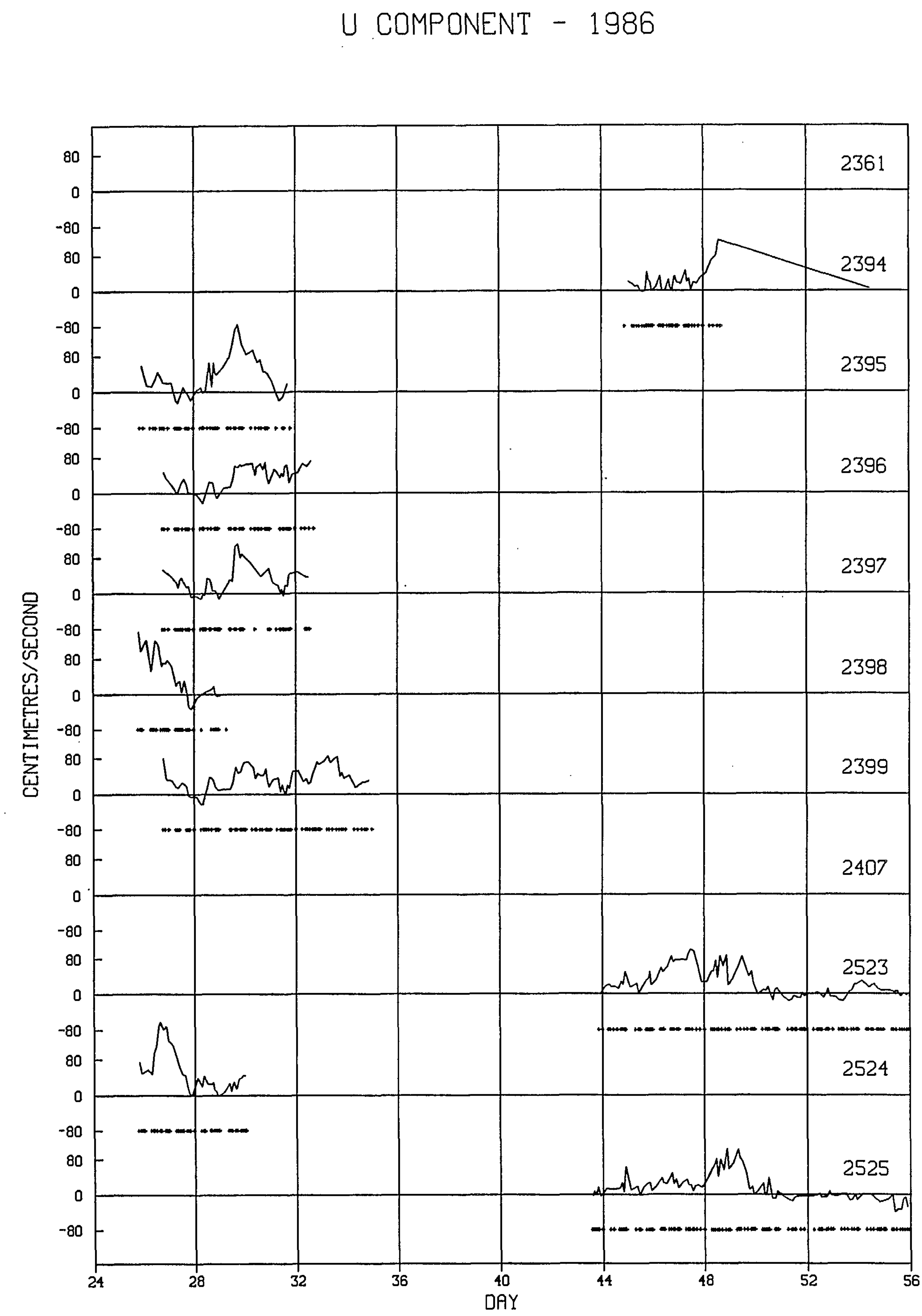
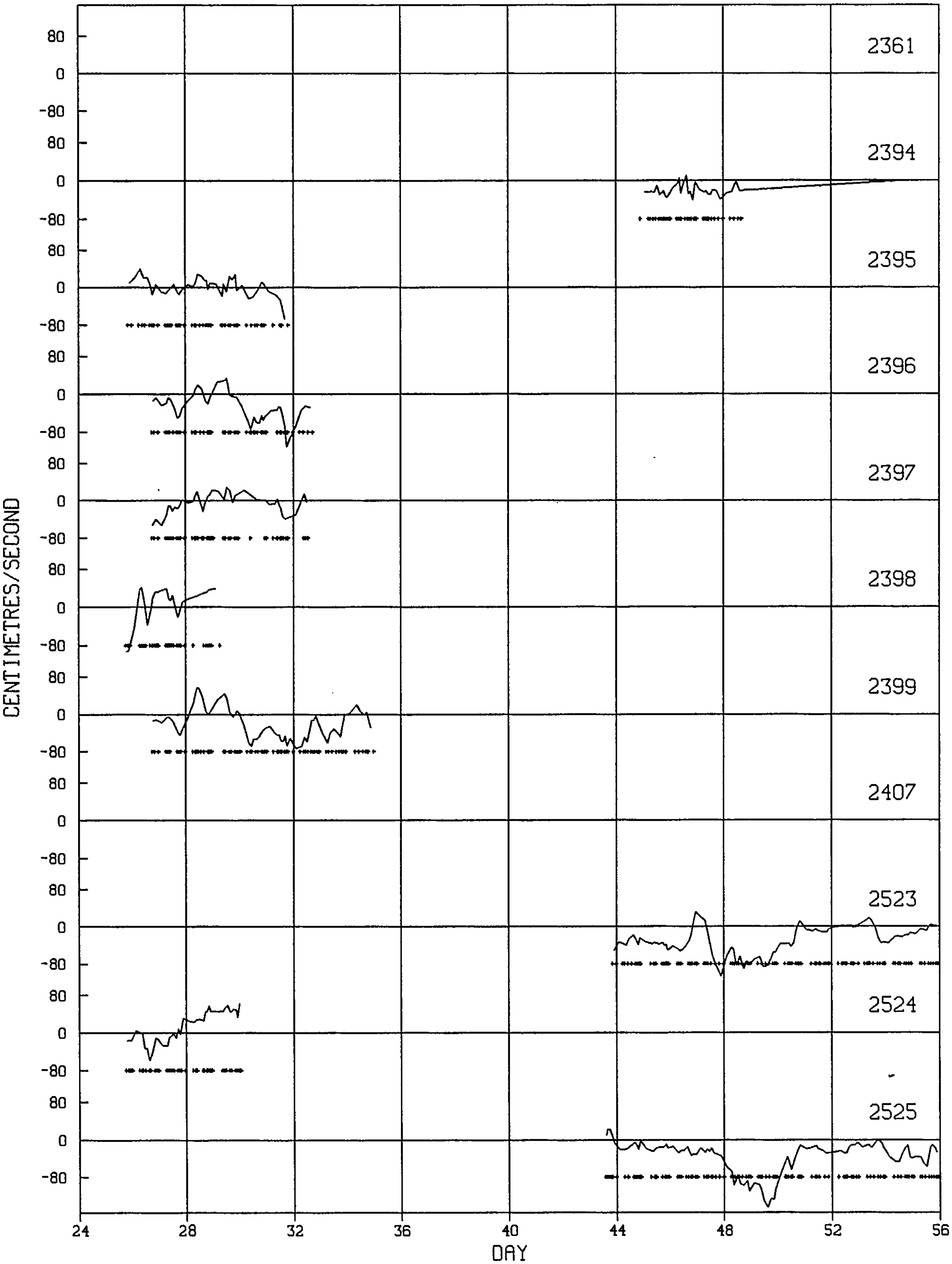


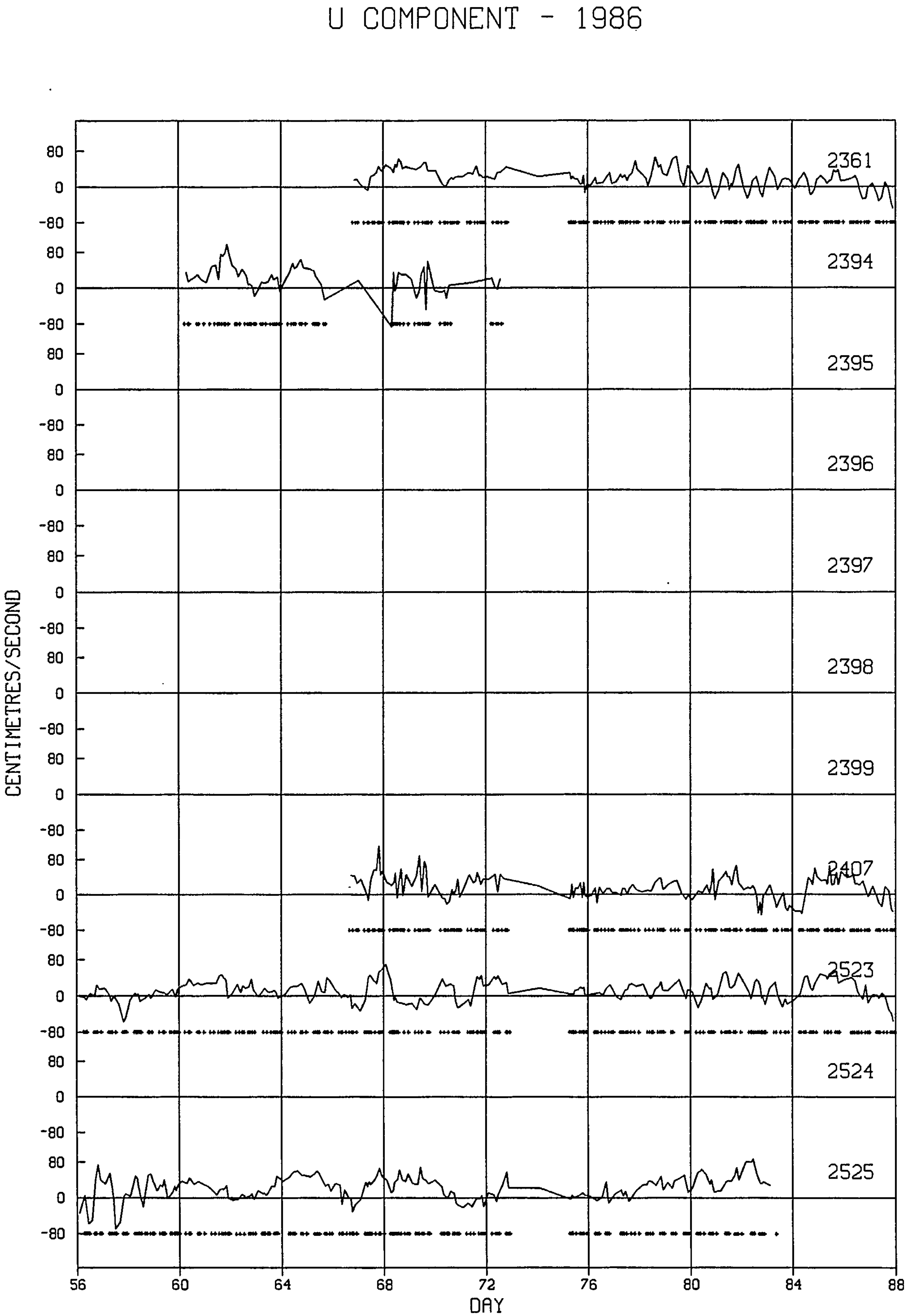
V COMPONENT - 1985




U COMPONENT - 1986
2361
2394
2395
2396
2397
2398
2399
2407
2523
2524
2525
80
0
-80
CENTIMETRES/SECOND
24
28
32
36
40
44
48
52
56
DAY

V COMPONENT - 1986

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CENTIMETRES/SECOND
DAY
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60
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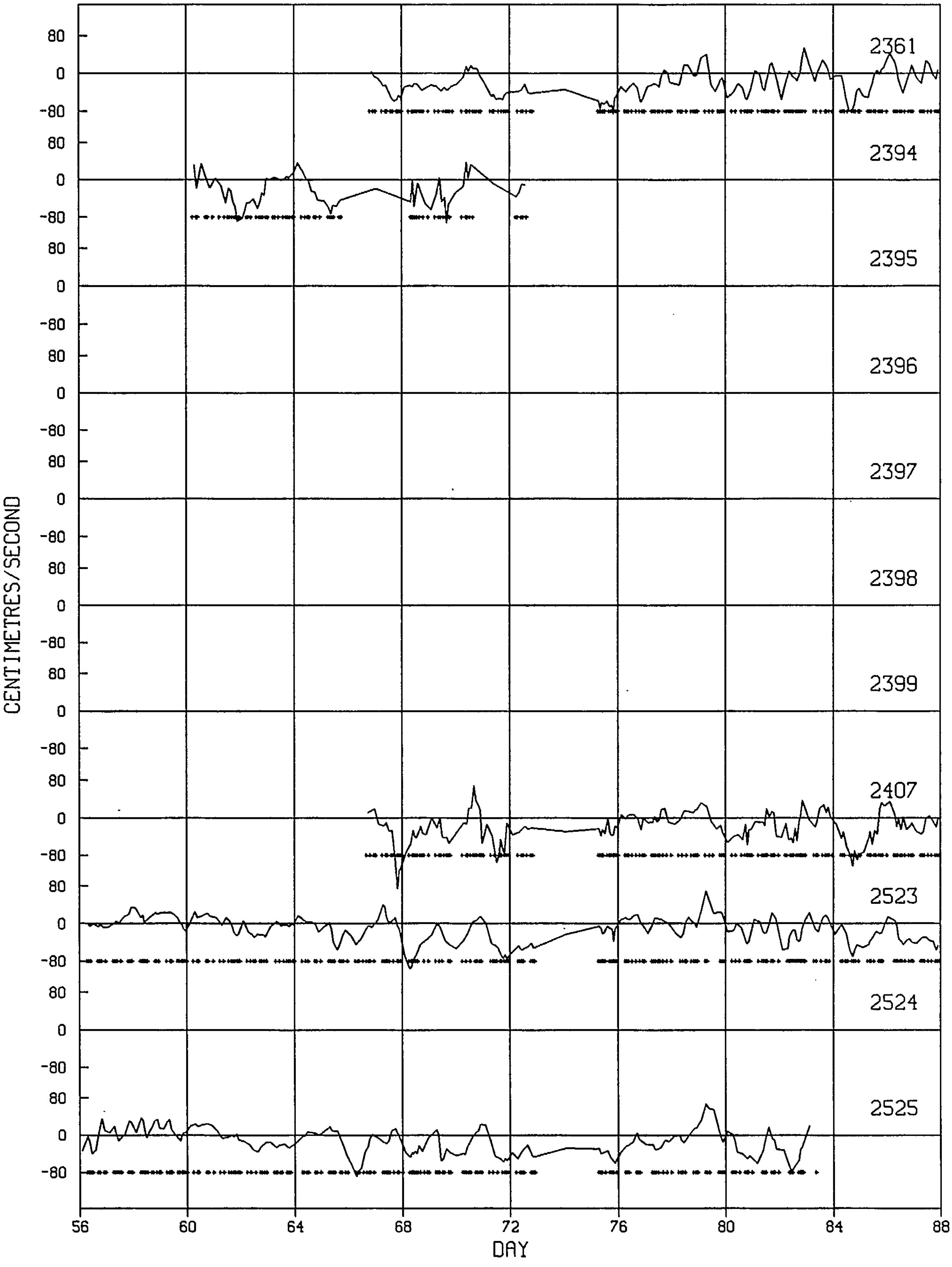
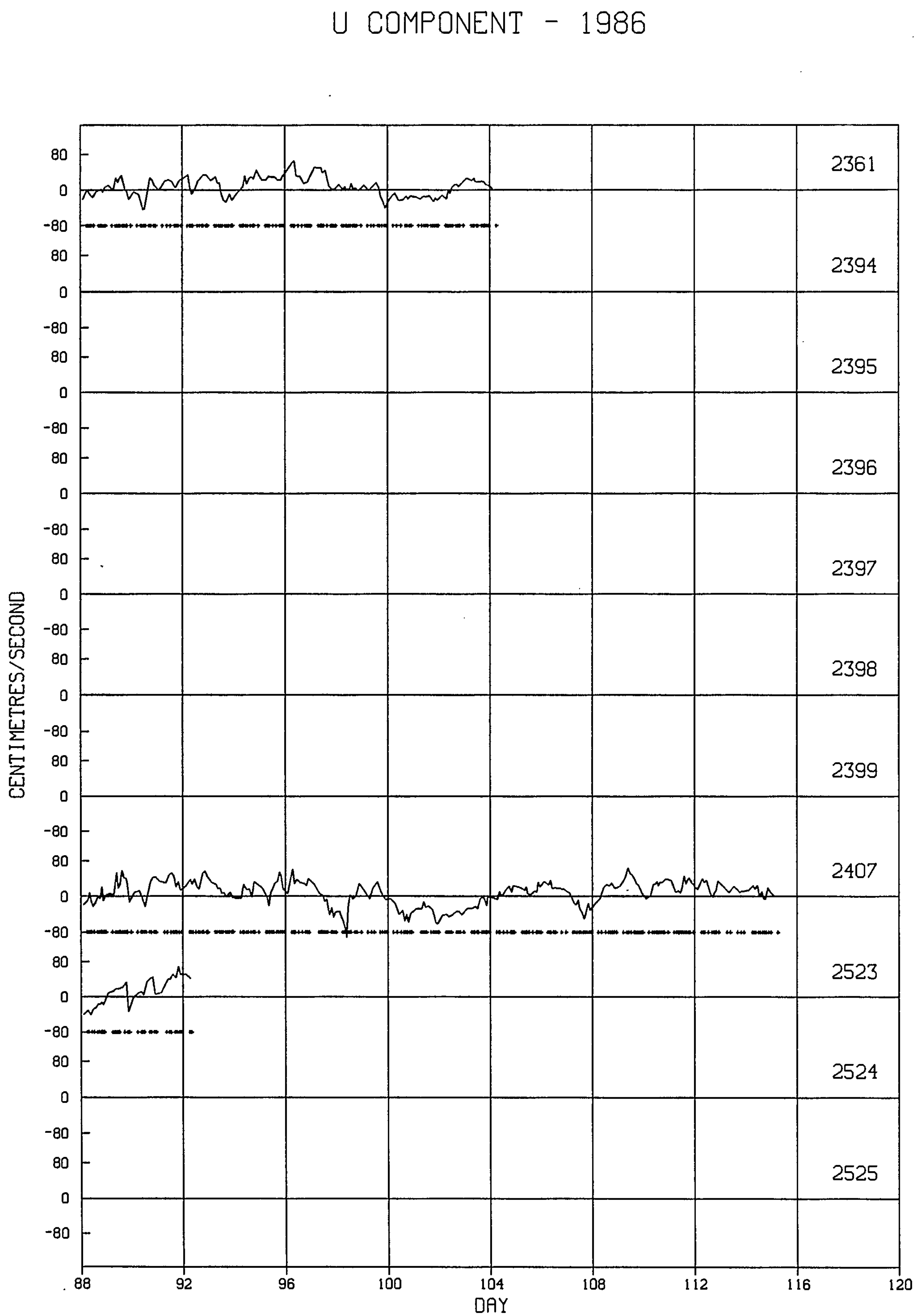
68
72
76
80
84
88

V COMPONENT - 1986

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CENTIMETRES/SECOND
DAY
2361
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2396
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2407
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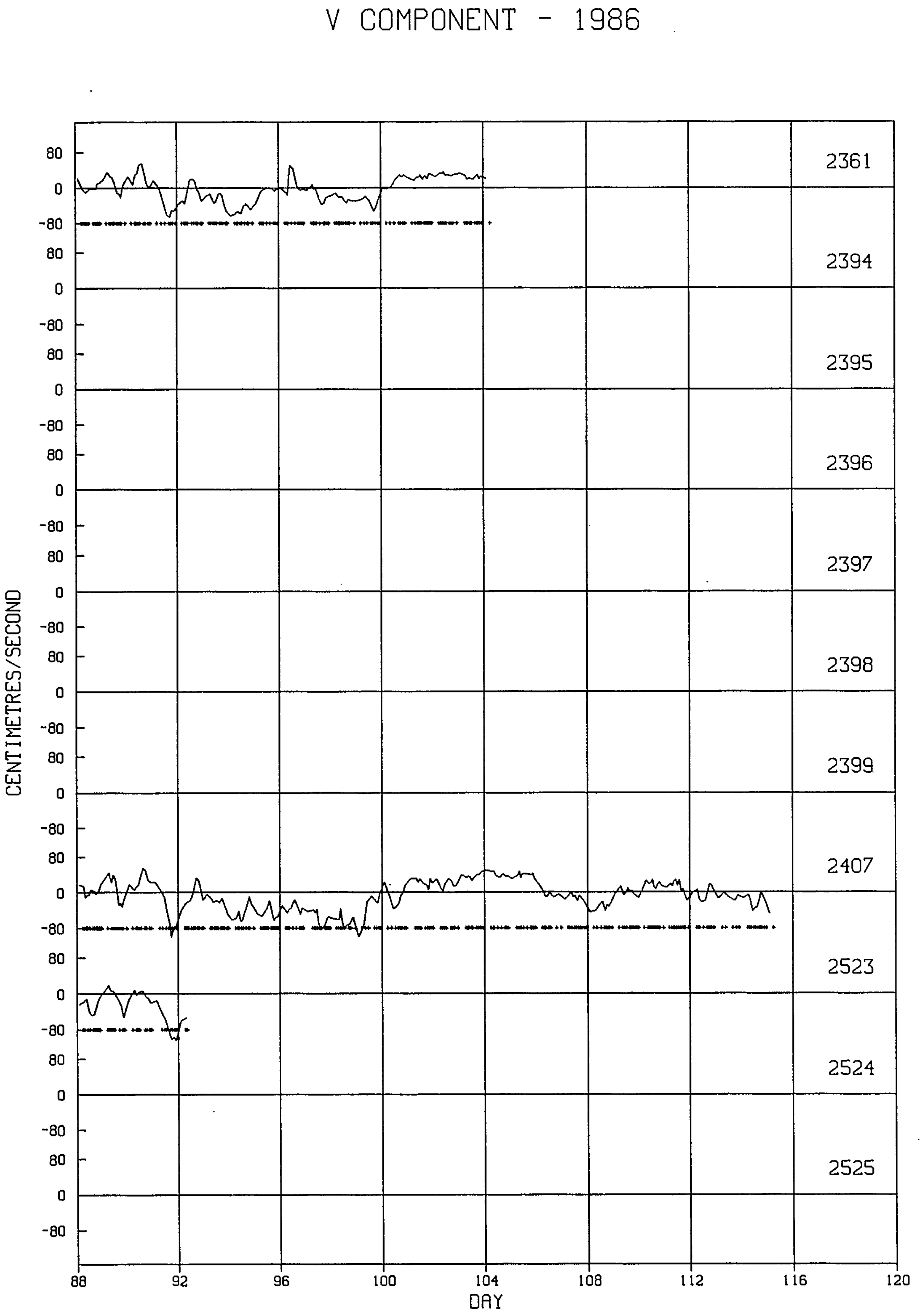
2525
80
0
-80
88
92
96
100
104
108
112
116
120


V COMPONENT - 1986
CENTIMETRES/SECOND
DAY
80
0
-80
2361
2394
2395
2396
2397
2398
2399
2407
2523
2524
2525
88
92
96
100
104
108
112
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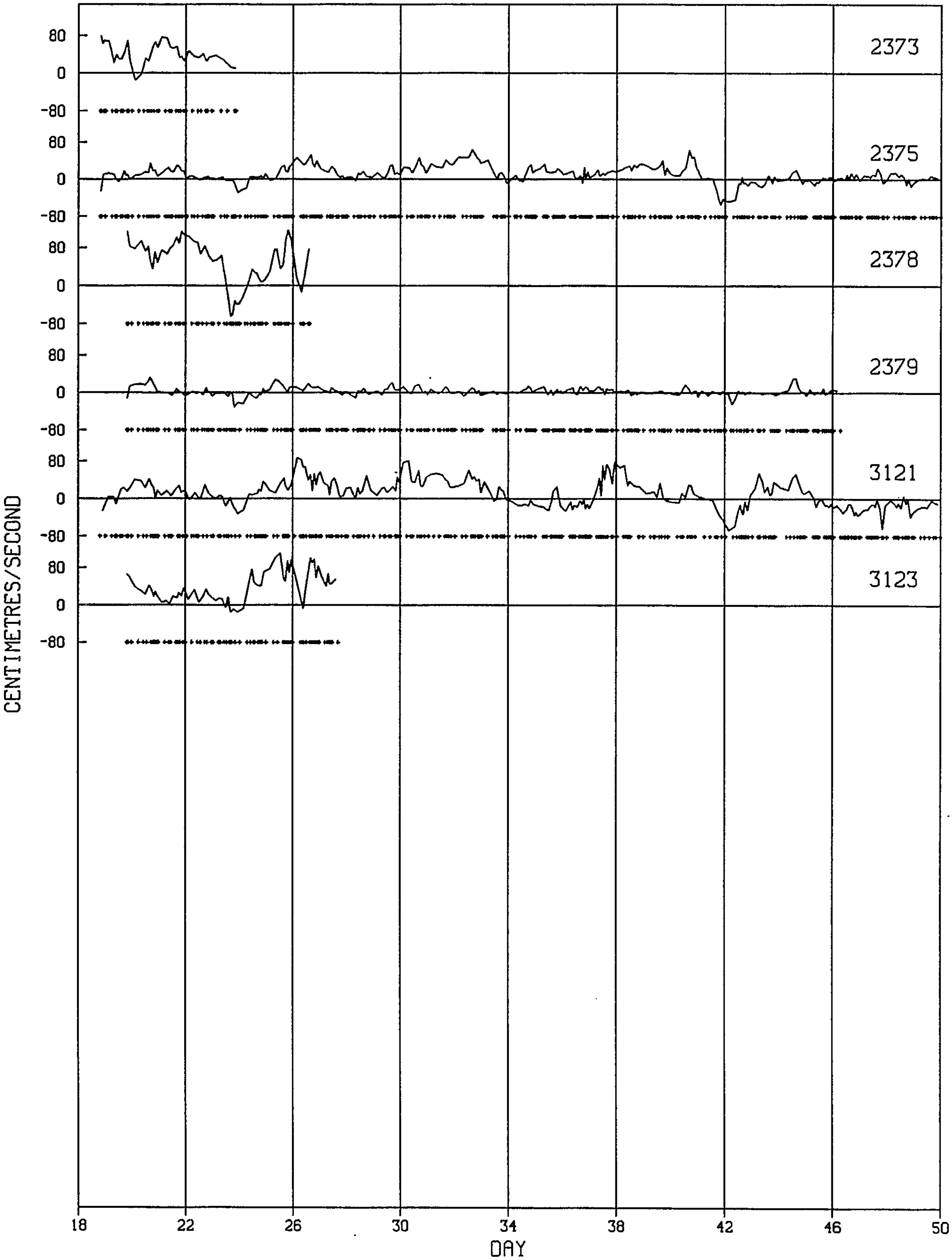
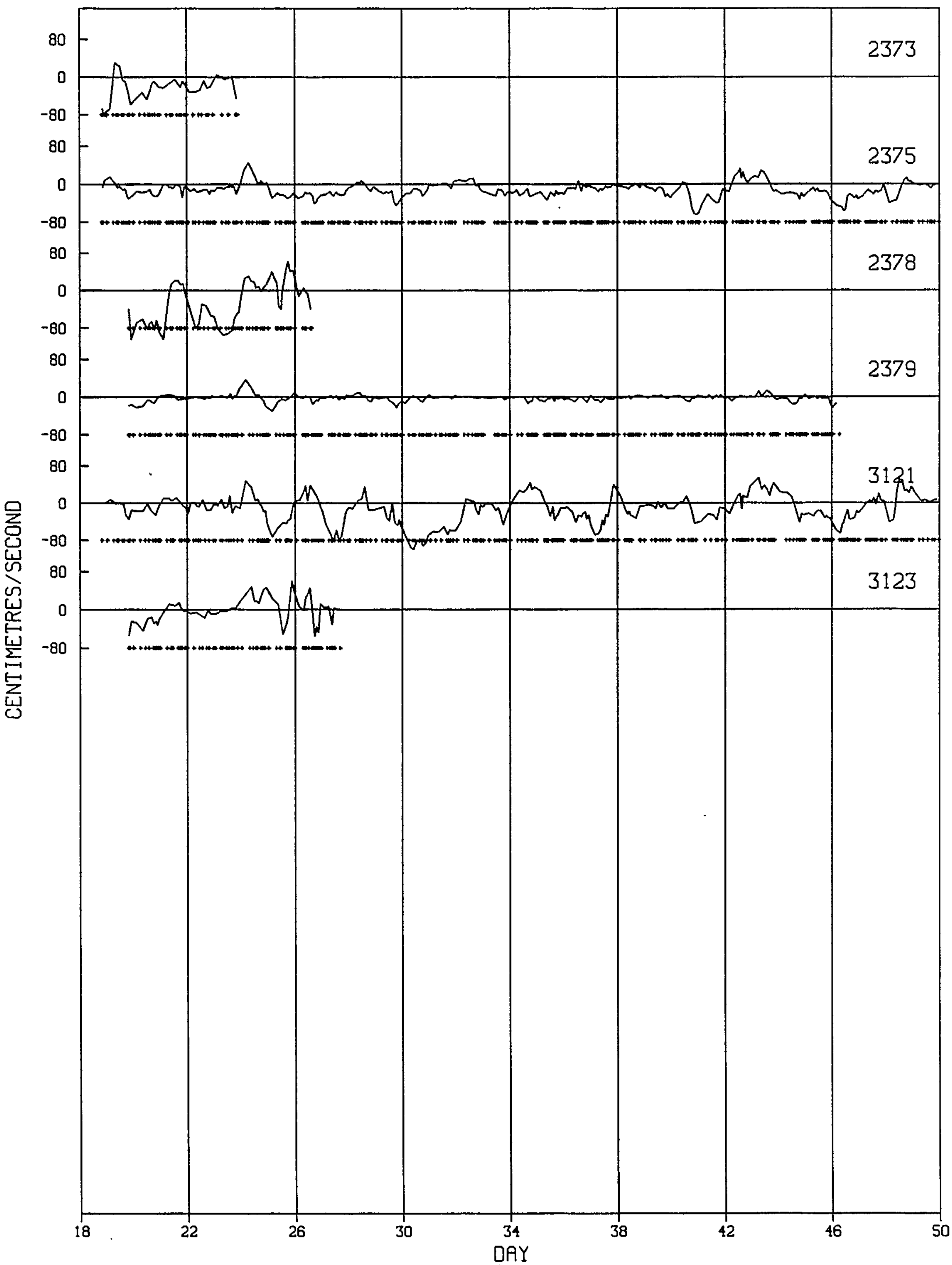
120

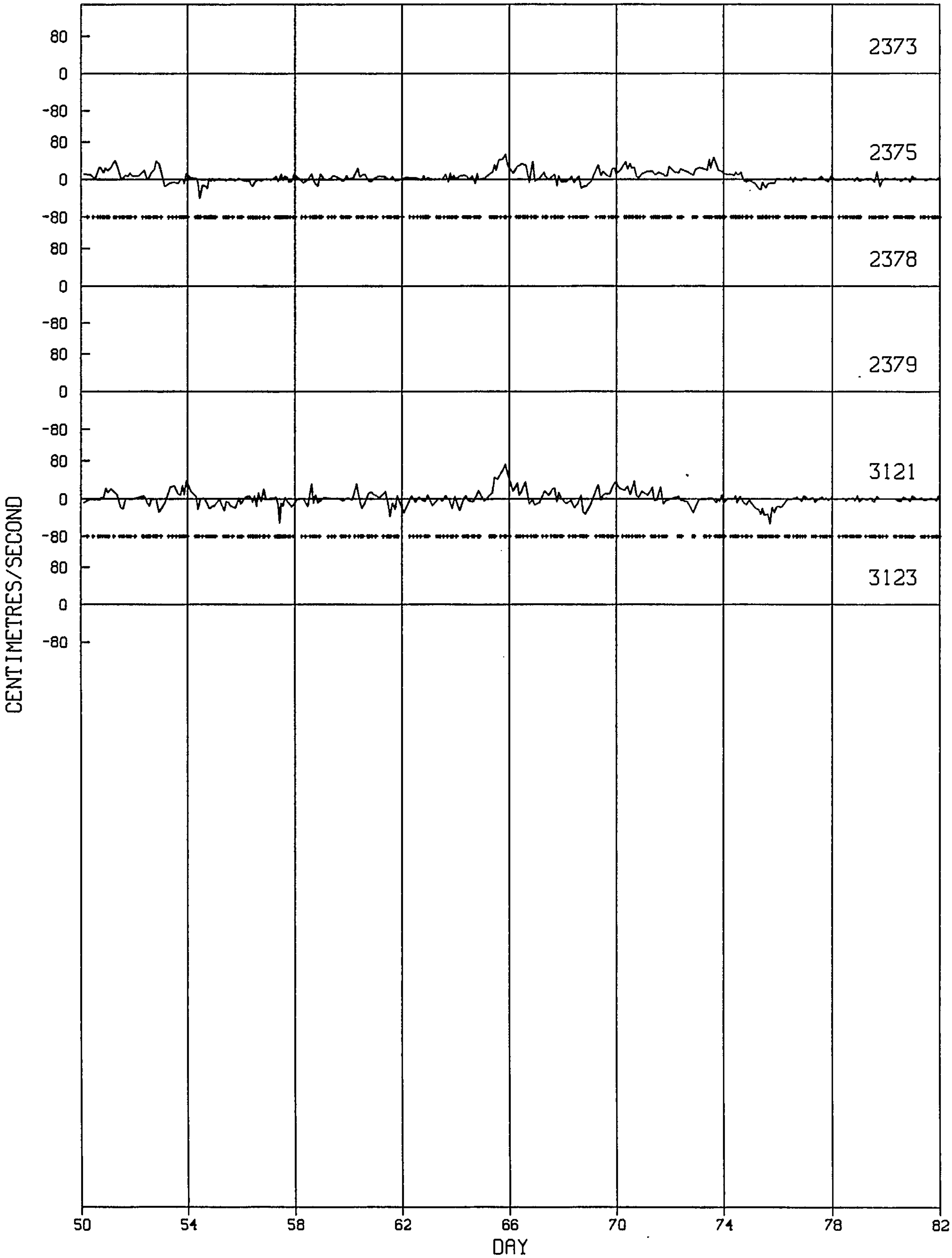
U COMPONENT - 1987

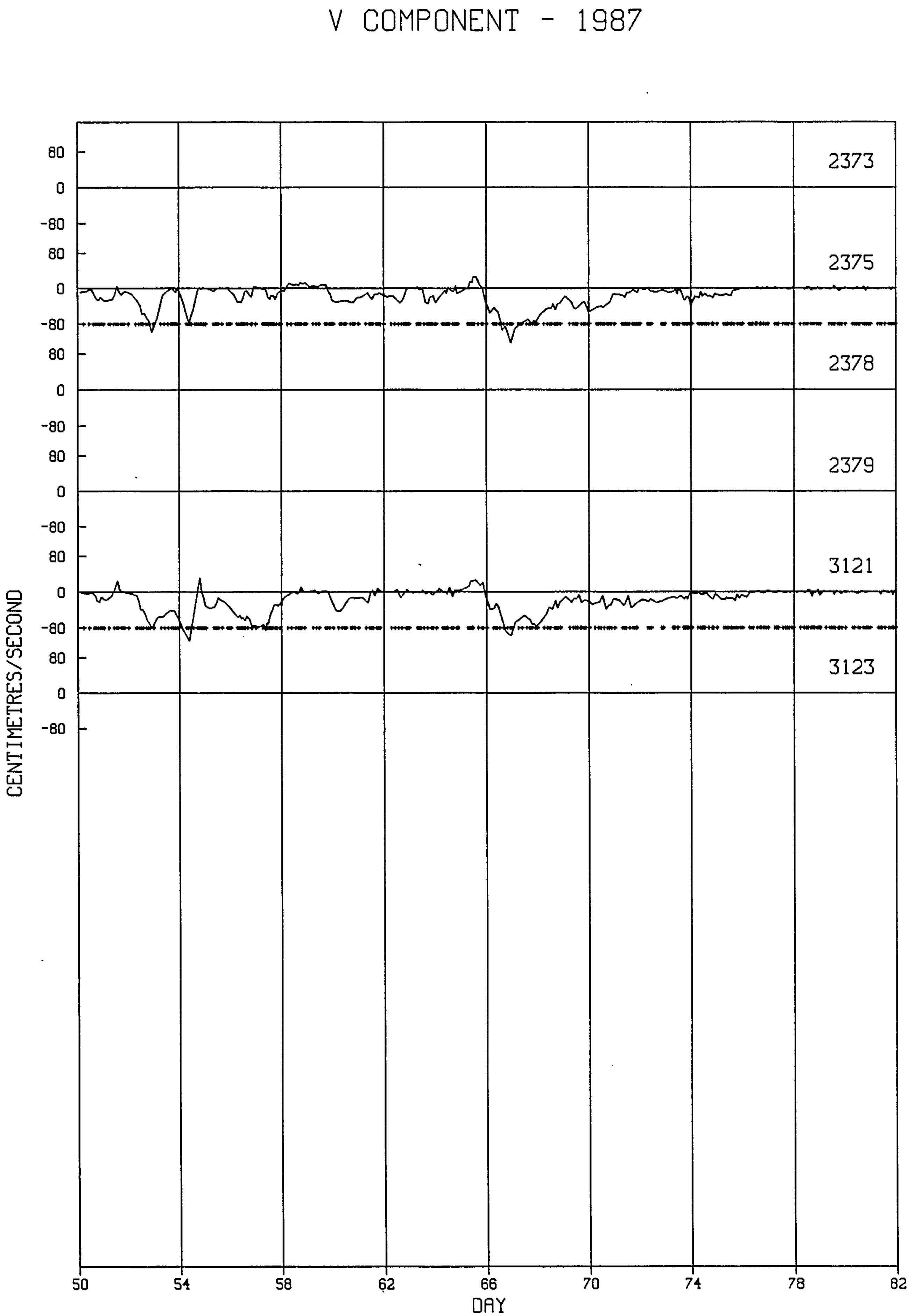


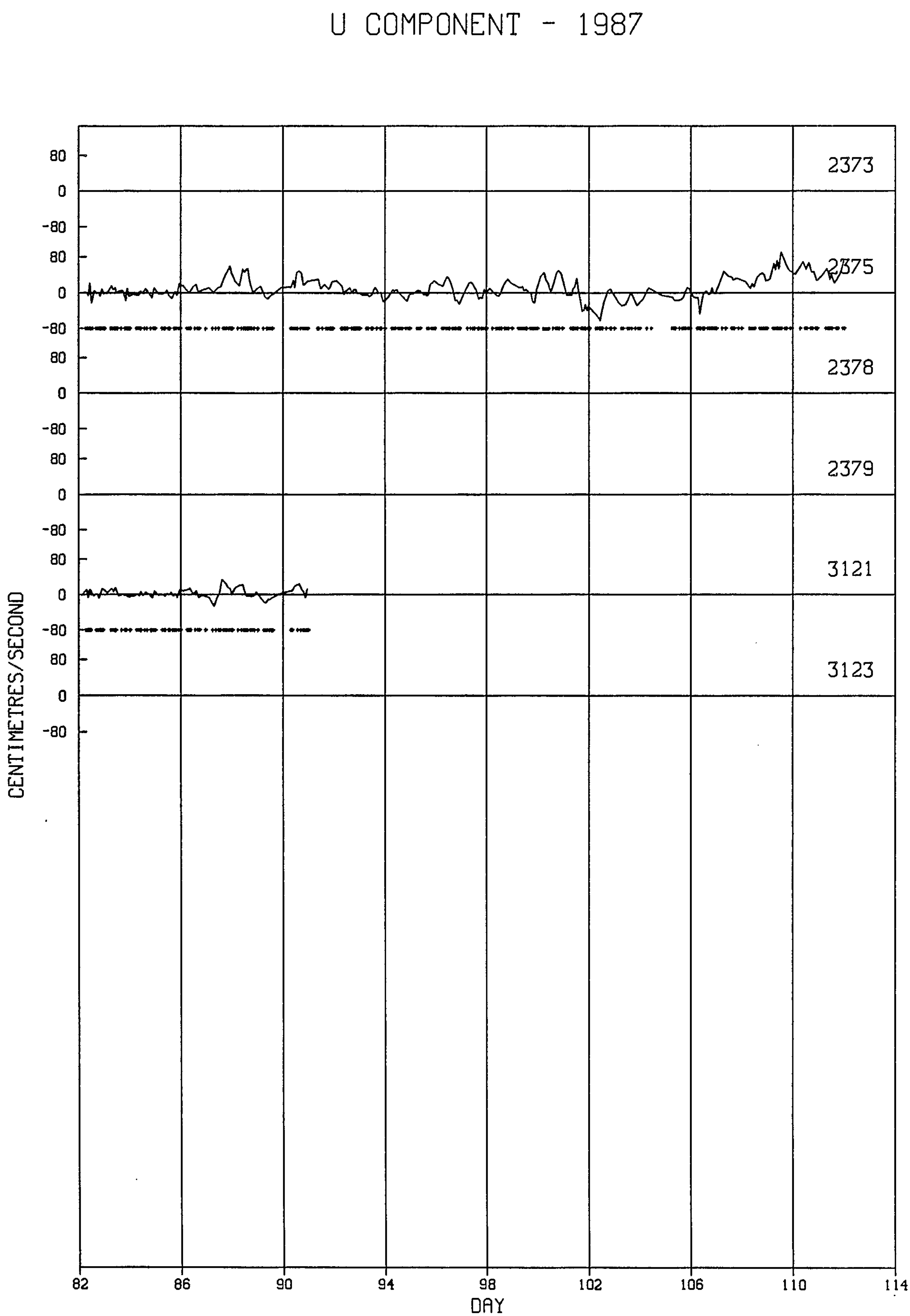
V COMPONENT - 1987



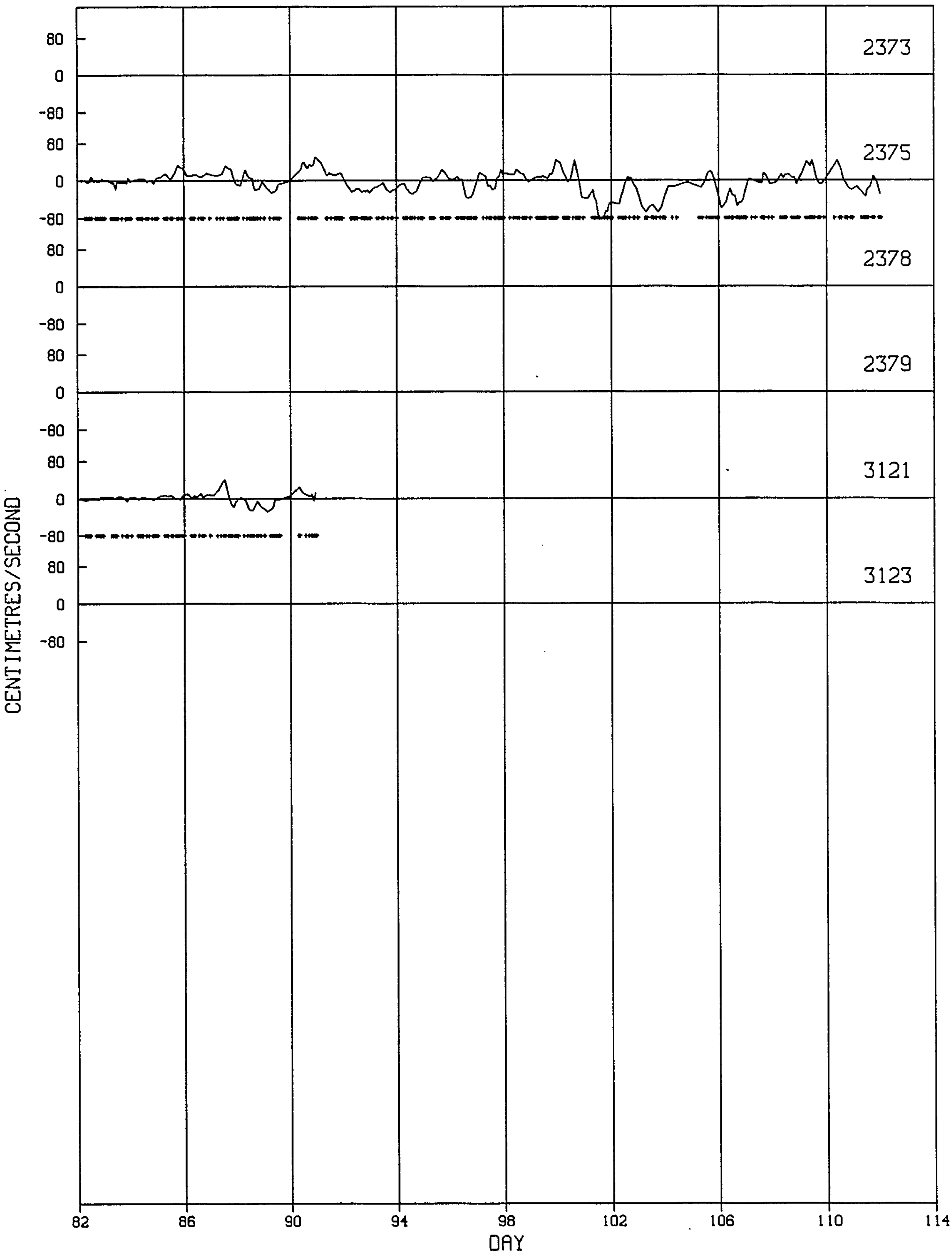
U COMPONENT - 1987




V COMPONENT - 1987
2373
2375
2378
2379
3121
3123
80
0
-80
CENTIMETRES/SECOND
50
54
58
62
66
70
74
78
82
DAY


U COMPONENT - 1987
2373
2375
2378
2379
3121
3123
80
0
-80
CENTIMETRES/SECOND
82
86
90
94
98
102
106
110
114
DAY

V COMPONENT - 1987



Appendix C. Listings of interpolated positions at 1800 hours GMT, with mean speed (cm/s) and direction (clockwise, from true north) over previous 24 hours. The last two columns denote the time interval in hours between 1800 hours and the previous fix (T1), and the following fix (T2).

DAY	LAT	LONG	U	DIR	T1	T2
BUOY 2347 (1985)						
44	55.45	-56.61	**********		.2	.0
45	55.20	-55.80	68.	118.	.2	.1
46	55.09	-54.94	65.	103.	.0	.1
47	54.79	-54.53	49.	142.	.0	.1
48	54.66	-53.70	64.	105.	.0	.1
49	54.13	-53.00	86.	142.	.0	.0
50	53.92	-52.60	41.	132.	.2	.1
51	53.63	-52.20	48.	141.	.1	.0
52	53.17	-51.84	65.	155.	.2	.0
53	52.60	-51.23	87.	147.	.1	.0
BUOY 2348 (1985)						
44	55.18	-57.66	**********		.2	.0
45	55.17	-57.65	1.	150.	.1	.1
46	55.25	-57.76	13.	322.	.0	.1
47	55.28	-57.69	6.	53.	.0	.1
48	55.19	-57.54	16.	136.	.0	.1
49	55.15	-57.43	10.	122.	.0	.1
50	55.11	-57.34	8.	128.	.2	.0
51	55.02	-57.10	21.	123.	.1	.0
52	54.86	-56.95	23.	152.	.1	.0
53	54.83	-56.91	5.	142.	.1	.0
54	54.79	-56.75	13.	113.	.0	.1
55	54.59	-56.57	29.	152.	.3	.1
56	54.32	-56.37	38.	157.	.1	.1
57	54.19	-56.17	23.	138.	.2	.2
58	54.17	-56.13	4.	130.	.8	.1
59	53.94	-55.92	34.	152.	.2	.2
60	53.76	-55.65	31.	138.	.8	.1
61	53.70	-55.59	9.	149.	.1	.0
62	53.65	-55.65	8.	215.	.0	.1
63	52.97	-55.30	92.	163.	.0	.1
64	52.37	-55.05	80.	166.	.0	.1
65	51.95	-55.03	54.	178.	.1	.0
66	51.63	-54.97	41.	173.	.1	.0
67	51.54	-54.78	19.	127.	.0	.0
68	51.53	-54.67	9.	98.	.1	.0
69	51.45	-54.57	13.	142.	.1	.0
70	51.41	-54.53	6.	148.	.1	.0
71	51.41	-54.45	6.	90.	.0	.0
72	51.38	-54.44	4.	168.	.2	.2
73	51.38	-54.56	10.	270.	.8	.2
74	51.32	-54.57	8.	186.	.2	.1
75	51.30	-54.21	29.	95.	.1	.0
76	51.16	-53.76	41.	116.	.1	.0
77	51.02	-53.65	20.	154.	.1	.0
78	50.86	-53.73	22.	198.	.1	.0
79	50.77	-53.87	16.	225.	.1	.2
80	50.79	-53.90	4.	316.	.1	.0
81	50.94	-53.89	19.	2.	.0	.1
82	50.79	-53.87	19.	175.	.0	.6
83	50.68	-53.78	16.	153.	.0	.1
84	50.62	-53.72	9.	148.	.1	.0
85	50.56	-53.72	8.	180.	.1	.0
86	50.49	-53.61	13.	135.	.1	.0
87	50.46	-53.50	10.	113.	.1	.0
88	50.40	-53.49	8.	174.	.1	.0
89	50.34	-53.55	9.	213.	.1	.0
90	50.26	-53.66	14.	221.	.0	.0
91	50.03	-53.49	33.	155.	.0	.1
92	49.77	-53.39	34.	166.	.0	.1
93	49.71	-53.37	8.	168.	.0	.1
94	49.65	-53.36	8.	174.	.1	.0
95	49.59	-53.34	8.	168.	.0	.0
96	49.54	-53.32	7.	165.	.1	.0
97	49.67	-53.24	18.	22.	.1	.0
98	49.69	-53.09	13.	78.	.1	.0
99	49.63	-52.88	19.	114.	.6	.0
100	49.54	-52.81	13.	153.	.0	.1
101	49.37	-52.87	22.	193.	.0	.1
102	49.33	-52.80	8.	131.	.0	.1
103	49.17	-52.63	25.	145.	.1	.0
104	49.00	-52.48	25.	150.	.1	.0
105	48.81	-52.32	28.	151.	.0	.0
106	48.76	-52.10	20.	109.	.1	.0
107	48.91	-52.04	20.	15.	.1	.0
108	48.94	-51.70	29.	82.	.1	.0
109	48.77	-51.27	43.	121.	.0	.5
110	48.77	-50.84	37.	90.	.0	.2
111	48.69	-50.45	35.	107.	.0	.5
112	48.59	-50.03	38.	110.	.0	.1
113	48.46	-49.74	30.	124.	.1	.0
114	48.34	-49.69	16.	164.	.4	.0
115	48.53	-49.48	30.	36.	.1	.0
116	48.51	-49.10	33.	95.	.1	.1
117	48.52	-48.58	44.	88.	.1	.0
118	48.49	-48.27	27.	98.	.1	.0
119	48.62	-47.96	31.	58.	.3	.1
120	48.74	-47.51	41.	68.	.0	.5
BUOY 2361 (1985)						
13	54.38	-56.74	**********		.2	.0
14	54.05	-56.55	45.	161.	.0	.1
15	53.92	-56.14	35.	118.	.0	.1
16	53.94	-56.35	16.	279.	.0	.6
17	54.15	-56.53	30.	333.	.0	.1
18	54.12	-56.69	13.	252.	.1	.0
19	54.15	-56.80	9.	295.	.1	.0
20	54.15	-56.82	2.	270.	.3	.0
21	54.16	-56.89	5.	284.	.1	.1
22	54.31	-56.92	19.	353.	.0	.1
23	54.44	-56.93	17.	357.	.0	.1
24	54.43	-56.91	2.	131.	.0	.1

DAY	LAT	LONG	U	DIR	T1	T2	DAY	LAT	LONG	U	DIR	T1	T2
25	54.43	-56.89	2.	90.	.0	.1	78	51.66	-55.70	3.	328.	.1	.0
26	54.44	-56.84	4.	71.	.0	.1	79	51.64	-55.68	3.	148.	.1	.2
27	54.30	-56.76	19.	162.	.1	.0	80	51.68	-55.68	5.	360.	.1	.0
28	53.89	-56.74	53.	178.	.3	.0	81	51.58	-56.39	58.	257.	.0	.1
29	53.87	-56.64	8.	109.	.2	.0	82	51.27	-56.88	56.	225.	.0	.1
30	53.85	-56.48	12.	102.	.0	.1	83	51.24	-56.94	6.	231.	.1	.1
31	53.70	-56.09	35.	123.	.3	.1	84	51.22	-57.02	7.	248.	.1	.0
32	53.61	-55.90	19.	129.	.0	.1	85	51.21	-57.12	8.	261.	.1	.0
33	53.62	-55.91	1.	329.	.2	.1	86	51.25	-57.11	5.	9.	.0	.0
34	53.63	-55.95	3.	293.	.0	.0	87	51.32	-57.11	9.	360.	.1	.0
35	53.63	-55.95	0.	*****	.1	.0	88	51.33	-57.17	5.	285.	.1	.0
36	53.38	-55.58	43.	139.	.1	.0	89	51.34	-57.28	9.	278.	.1	.0
37	52.89	-55.41	64.	168.	.2	.0	90	51.31	-57.42	12.	251.	.0	.1
38	52.54	-55.35	45.	174.	.0	.1	91	51.27	-57.51	9.	235.	.1	.1
39	52.24	-55.39	39.	185.	.0	.1	92	51.22	-57.64	12.	239.	.1	.1
40	51.96	-55.63	41.	208.	.0	.1	93	51.20	-57.82	15.	260.	.1	.0
41	51.49	-56.43	88.	227.	.0	.1	94	51.18	-57.81	3.	163.	.0	.0
42	51.10	-57.17	78.	230.	.0	.0	95	51.18	-57.77	3.	90.	.0	.0
43	50.97	-57.33	21.	218.	.1	.0	96	51.19	-57.64	11.	83.	.1	.0
44	50.93	-57.28	7.	142.	.2	.0	97	51.24	-57.63	6.	7.	.1	.0
45	50.94	-57.31	3.	298.	.2	.1	98	51.34	-57.19	38.	70.	.1	.0
46	51.01	-57.18	14.	50.	.0	.1	99	51.42	-56.84	30.	70.	.5	.0
47	51.10	-57.00	19.	52.	.0	.1	100	51.60	-56.46	38.	53.	.0	.1
48	51.13	-56.89	10.	67.	.0	.1	101	51.62	-56.45	3.	17.	.0	.1
49	51.13	-56.88	1.	90.	.0	.0	102	51.67	-56.31	13.	60.	.3	.1
50	51.13	-56.89	1.	270.	.2	.0	103	51.61	-56.44	13.	233.	.1	.0
51	51.11	-56.93	4.	232.	.1	.0	104	51.38	-57.13	63.	242.	.1	.0
52	51.12	-56.91	2.	52.	.1	.0	105	51.45	-56.94	18.	59.	.0	.0
53	51.12	-56.90	1.	90.	.2	.0	106	51.45	-56.94	0.	*****	.1	.0
54	51.12	-56.90	0.	*****	.1	.0	107	51.45	-56.94	0.	*****	.1	.0
55	51.12	-56.90	0.	*****	.3	.1	108	51.45	-56.93	1.	90.	.1	.0
56	51.13	-56.91	2.	328.	.2	.1	109	51.45	-56.92	1.	90.	.0	.1
57	51.13	-56.90	1.	90.	.2	.2	110	51.44	-56.90	2.	129.	.0	.1
58	51.13	-56.90	0.	*****	.8	.1	111	51.35	-57.09	19.	233.	.1	.1
59	51.09	-56.98	8.	232.	.2	.2	112	51.32	-57.27	15.	255.	.1	.1
60	51.09	-56.98	0.	*****	.8	.1	113	51.26	-57.70	36.	257.	.1	.0
61	51.08	-56.99	2.	212.	.1	.0	114	51.08	-57.92	29.	218.	.0	.0
62	51.09	-57.00	2.	328.	.0	.1	115	50.91	-58.29	37.	234.	.1	.0
63	51.08	-57.00	1.	180.	.0	.1	116	50.93	-58.42	11.	284.	.1	.1
64	51.07	-57.00	1.	180.	.1	.1	117	50.85	-58.42	10.	180.	.1	.0
65	51.08	-57.00	1.	360.	.1	.0	118	50.84	-58.29	11.	97.	.1	.0
66	51.08	-57.00	0.	*****	.1	.0	119	50.73	-58.60	29.	241.	.3	.1
67	51.08	-56.99	1.	90.	.0	.0	120	50.64	-58.89	26.	244.	.1	.1
68	51.08	-57.00	1.	270.	.1	.0	121	50.57	-59.01	13.	227.	.1	.1
69	51.08	-57.00	0.	*****	.1	.0	122	50.48	-59.21	20.	235.	.1	.5
70	51.08	-57.00	0.	*****	.1	.0	123	50.45	-59.30	8.	242.	.3	.0
71	51.08	-56.99	1.	90.	.0	.0	124	50.33	-59.58	28.	236.	.0	.0
72	51.10	-57.00	3.	343.	.2	.2	125	49.98	-59.83	50.	205.	.1	.2
73	51.13	-57.27	22.	280.	.4	.2	126	49.88	-59.72	16.	145.	.1	.0
74	51.13	-57.29	2.	270.	.2	.1	127	49.89	-59.66	5.	76.	.1	.0
75	51.47	-56.36	87.	60.	.1	.0	128	49.75	-59.91	28.	229.	.0	.7
76	51.61	-55.82	47.	67.	.1	.0	129	49.80	-60.03	12.	303.	.1	.1
77	51.64	-55.68	12.	71.	.1	.0	130	49.93	-59.72	31.	57.	.1	.1

DAY	LAT	LONG	U	DIR	T1	T2
131	49.97	-59.53	17.	72.	.0	.0
132	49.78	-59.54	24.	182.	.0	.1
133	49.71	-59.48	10.	151.	.2	.0
134	49.67	-59.51	6.	206.	.1	.0
135	49.59	-59.55	11.	198.	.1	.0

BUOY 2362 (1985)

DAY	LAT	LONG	U	DIR	T1	T2
12	56.26	-59.75	**********		.2	.0
13	56.14	-59.39	30.	121.	.1	.0
14	55.65	-58.91	72.	151.	.0	.1
15	55.58	-58.56	27.	109.	.0	.1
16	55.56	-58.49	6.	117.	.0	.6
17	55.75	-58.60	26.	342.	.0	.1
18	55.77	-58.81	15.	280.	.1	.0
19	55.99	-59.17	39.	317.	.1	.0
20	55.97	-59.49	23.	264.	.3	.0
21	55.86	-59.40	16.	155.	.1	.1
22	55.89	-59.37	4.	29.	.0	.1
23	55.92	-59.32	5.	43.	.0	.1
24	55.83	-59.15	17.	133.	.0	.1
25	55.79	-58.94	16.	109.	.0	.1
26	55.80	-58.70	17.	86.	.0	.1
27	55.78	-58.50	15.	100.	.1	.0
28	55.52	-58.58	34.	190.	.3	.0
29	55.26	-58.29	40.	148.	.2	.0
30	55.08	-57.84	40.	125.	.0	.1
31	54.84	-57.30	51.	128.	.3	.1
32	54.62	-56.97	38.	139.	.0	.1
33	54.59	-56.92	5.	136.	.2	.1
34	54.56	-56.86	6.	131.	.0	.0
35	54.39	-56.69	25.	150.	.1	.0
36	54.13	-56.29	45.	138.	.1	.0
37	53.86	-55.78	52.	132.	.2	.0
38	53.35	-55.42	71.	157.	.0	.1
39	52.97	-55.55	50.	192.	.0	.1
40	52.73	-55.70	33.	201.	.0	.1
41	52.63	-55.68	13.	173.	.0	.1
42	52.23	-55.52	53.	166.	.2	.0
43	51.99	-55.64	32.	197.	.2	.0
44	51.95	-55.71	8.	227.	.1	.0
45	51.93	-55.75	4.	231.	.2	.1
46	51.96	-55.75	4.	360.	.0	.1
47	52.01	-55.68	9.	41.	.0	.1
48	52.07	-55.46	19.	66.	.0	.1
49	52.08	-55.19	21.	87.	.0	.1
50	51.94	-55.16	18.	172.	.2	.0
51	51.77	-55.04	24.	156.	.1	.0
52	51.65	-55.09	16.	195.	.2	.0
53	51.54	-55.01	16.	156.	.2	.0
54	51.51	-54.87	12.	109.	.0	.1
55	51.40	-54.84	14.	170.	.3	.1
56	51.26	-54.92	19.	200.	.4	.1
57	51.08	-54.91	23.	178.	.2	.2
58	51.07	-54.74	14.	95.	.8	.1
59	50.77	-54.80	39.	187.	.2	.2
60	50.53	-54.78	31.	177.	.8	.1
61	50.52	-54.77	2.	147.	.1	.0
62	50.62	-54.77	13.	360.	.0	.1
63	50.43	-54.20	53.	118.	.0	.1
64	50.18	-53.61	58.	123.	.0	.1
65	49.78	-53.17	63.	145.	.1	.0
66	49.46	-52.94	45.	155.	.2	.0
67	49.19	-52.78	37.	159.	.0	.0
68	49.02	-52.69	23.	161.	.1	.0
69	48.94	-52.40	27.	113.	.1	.0
70	49.14	-52.20	31.	33.	.1	.0
71	49.33	-52.01	29.	33.	.0	.1
72	49.49	-52.01	21.	360.	.2	.2
73	49.70	-51.95	27.	11.	.8	.2
74	49.86	-51.60	36.	55.	.2	.1
75	49.95	-51.14	40.	73.	.0	.0
76	49.96	-50.75	32.	88.	.1	.0
77	49.98	-50.65	9.	73.	.2	.0
78	49.78	-50.67	26.	184.	.1	.0
79	49.64	-50.88	25.	224.	.1	.2
80	49.60	-50.80	8.	128.	.1	.0
81	49.86	-50.70	34.	14.	.0	.1
82	49.87	-50.55	13.	84.	.0	.4
83	49.84	-50.45	9.	115.	.0	.1
84	49.83	-50.39	5.	104.	.0	.0
85	49.71	-50.37	16.	174.	.1	.0
86	49.49	-50.18	32.	151.	.1	.0
87	49.32	-49.91	32.	134.	.1	.0
88	49.09	-49.66	36.	145.	.1	.0
89	48.68	-49.61	53.	175.	.1	.0
90	48.15	-49.33	72.	161.	.0	.0
91	47.55	-49.00	82.	160.	.0	.1
92	47.23	-48.69	49.	147.	.0	.5
93	47.16	-48.73	10.	201.	.0	.0
94	47.15	-48.72	2.	146.	.0	.0
95	47.06	-48.74	12.	189.	.1	.0
96	46.87	-48.69	25.	170.	.1	.0
97	46.94	-48.55	15.	54.	.1	.0
98	47.05	-48.30	26.	57.	.1	.0
99	47.11	-48.03	25.	72.	.0	.1
100	46.97	-47.99	18.	169.	.0	.1
101	46.85	-47.68	31.	119.	.0	.2

BUOY 2363 (1985)

DAY	LAT	LONG	U	DIR	T1	T2
44	57.00	-59.86	**********		.2	.0
45	56.91	-59.81	12.	163.	.2	.1
46	56.91	-59.82	1.	270.	.0	.1
47	56.91	-59.68	10.	90.	.0	.1
48	56.81	-59.48	19.	132.	.0	.1

DAY	LAT	LONG	U	DIR	T1	T2
49	56.69	-59.18	26.	126.	.0	.1
50	56.58	-59.01	19.	140.	.1	.0
51	56.32	-58.89	35.	166.	.1	.0
52	56.12	-59.18	33.	219.	.1	.0
53	55.93	-59.11	25.	168.	.1	.0
54	55.87	-58.45	48.	99.	.0	.1
55	55.78	-57.44	74.	99.	.3	.1
56	55.34	-56.71	78.	137.	.3	.1
57	55.02	-55.93	71.	126.	.9	.2
58	54.67	-55.45	58.	142.	.8	.7
59	54.36	-55.10	48.	147.	.3	1.1
60	54.12	-54.94	33.	159.	1.3	.1
61	54.05	-54.89	10.	157.	.3	.0
62	53.97	-55.08	18.	234.	.0	.5
63	53.36	-54.78	82.	164.	.0	.2
64	52.79	-54.15	88.	146.	.0	.1
65	52.48	-53.93	43.	157.	.0	.1
66	52.18	-53.86	39.	172.	.2	.2
67	52.06	-53.70	20.	141.	.0	.0
68	52.02	-53.66	6.	148.	.1	.1
69	51.92	-53.64	13.	173.	.1	.2
70	51.88	-53.64	5.	180.	.1	.0
71	51.88	-53.60	3.	90.	.1	.0
72	51.85	-53.66	6.	231.	.3	.7
73	51.83	-53.80	11.	257.	.4	.1
74	51.77	-53.86	9.	212.	.3	.1
75	51.77	-53.46	32.	90.	.1	.1
76	51.72	-53.05	33.	101.	.1	.1
77	51.71	-52.90	12.	96.	.1	.0
78	51.59	-52.84	16.	163.	.1	.0
79	51.57	-52.86	3.	212.	.2	.6
80	51.60	-52.79	7.	55.	.3	.0
81	51.81	-52.82	27.	355.	.0	.1
82	51.74	-52.84	9.	190.	.0	.6
83	51.68	-52.76	10.	140.	.0	.5
84	51.67	-52.72	3.	112.	.1	.1
85	51.63	-52.71	5.	171.	.2	.2
86	51.57	-52.52	17.	117.	.2	.2
87	51.64	-52.40	13.	47.	.1	.0
88	51.65	-52.53	10.	277.	.1	.0
89	51.65	-52.69	13.	270.	.1	.0
90	51.54	-52.78	16.	207.	.0	.0
91	51.28	-52.82	34.	185.	.0	.2
92	51.10	-52.88	24.	192.	.0	.6
93	51.05	-53.02	13.	240.	.0	.1
94	51.04	-53.13	9.	262.	.2	.5
95	51.02	-53.22	8.	251.	.3	.5
96	50.94	-53.20	10.	171.	.1	.0
97	51.07	-53.11	18.	24.	.3	.0
98	51.13	-52.84	23.	71.	.1	.2
99	51.15	-52.49	28.	85.	.8	.1
100	51.12	-52.27	18.	102.	.0	.5
101	51.09	-52.24	5.	148.	.3	.2

DAY	LAT	LONG	U	DIR	T1	T2
102	51.20	-52.03	22.	50.	.0	.9
103	51.06	-51.86	23.	143.	.0	.1
104	50.82	-51.82	31.	174.	.9	1.0
105	50.61	-51.77	27.	171.	.0	1.5
106	50.64	-51.67	9.	65.	1.0	.5
107	50.77	-51.55	19.	30.	.5	.6
108	50.98	-51.23	38.	44.	.1	.1
109	51.00	-50.87	29.	85.	.0	.5
110	50.88	-50.90	16.	189.	.0	.2
111	50.76	-50.70	22.	133.	.0	.5
112	50.55	-50.68	27.	177.	.1	.1
113	50.37	-50.75	24.	194.	.4	1.9
114	50.29	-50.92	17.	234.	1.4	.9
115	50.30	-51.07	12.	276.	.1	.0
116	50.54	-51.01	31.	9.	.1	.1
117	50.57	-50.88	11.	70.	.1	.0
118	50.52	-50.76	12.	123.	.2	.1
119	50.62	-51.08	29.	296.	.4	.1
120	50.68	-50.95	13.	54.	.0	.1

BUOY 2364 (1985)

DAY	LAT	LONG	U	DIR	T1	T2
13	54.41	-56.28**********			.1	.0
14	54.04	-56.00	52.	156.	.0	.1
15	53.79	-55.58	45.	135.	.0	.1
16	53.64	-55.70	21.	205.	.0	.6
17	53.82	-55.90	28.	327.	.0	.1
18	53.82	-56.05	11.	270.	.2	.0
19	53.92	-56.17	16.	325.	.1	.0
20	53.95	-56.28	9.	295.	.3	.0
21	53.95	-56.37	7.	270.	.1	.0
22	54.32	-56.28	48.	8.	.0	.1
23	54.52	-56.16	27.	19.	.0	.1
24	54.52	-55.91	19.	90.	.0	.1
25	54.55	-55.63	21.	80.	.0	.1
26	54.55	-55.43	15.	90.	.0	.1
27	54.49	-55.44	8.	186.	.1	.0
28	54.13	-55.78	53.	209.	.3	.0
29	53.81	-55.85	42.	187.	.2	.0
30	53.31	-55.57	68.	162.	.0	.1
31	52.60	-55.34	93.	169.	.1	.1
32	52.05	-55.19	72.	171.	.0	.1
33	51.73	-55.18	41.	179.	.2	.1
34	51.65	-55.25	12.	209.	.0	.0
35	51.34	-55.36	41.	192.	.1	.0
36	51.13	-55.11	34.	143.	.3	.0
37	50.83	-54.70	51.	139.	.1	.0
38	50.59	-54.54	34.	157.	.0	.1
39	50.37	-54.29	35.	144.	.0	.1
40	50.15	-54.40	30.	198.	.0	.1
41	49.98	-54.37	22.	174.	.0	.1
42	49.92	-54.28	11.	136.	.0	.1
43	49.90	-54.13	13.	102.	.1	.0

DAY	LAT	LONG	U	DIR	T1	T2
44	49.90	-53.97	13.	90.	.1	.0
45	49.94	-53.90	8.	48.	.2	.1
46	50.04	-53.63	26.	60.	.0	.1
47	50.15	-53.27	33.	65.	.0	.1
48	49.96	-52.74	50.	119.	.0	.1
49	49.79	-52.46	32.	133.	.0	.1
50	49.61	-52.28	28.	147.	.2	.1
51	49.55	-51.98	26.	107.	.1	.0
52	49.40	-51.80	25.	142.	.1	.0
53	49.25	-51.38	40.	119.	.1	.0
54	49.28	-50.77	52.	86.	.1	.0
55	49.09	-50.27	49.	120.	.3	.1
56	48.71	-49.96	56.	152.	.3	.1
57	48.26	-49.79	60.	166.	.2	.2
58	48.19	-49.55	23.	114.	.8	.1
59	48.28	-49.04	45.	75.	.3	.2
60	47.95	-48.29	77.	123.	.8	.1
61	47.75	-47.63	63.	114.	.1	.0
62	47.73	-47.26	32.	95.	.0	.1
63	47.61	-46.65	55.	106.	.0	.2
64	47.40	-46.24	45.	127.	.0	.1
65	47.53	-45.86	37.	63.	.0	.1
66	47.31	-45.68	32.	151.	.0	.0
67	47.17	-45.52	23.	142.	.0	.0
68	47.47	-45.36	41.	20.	.1	.0
69	47.38	-45.34	12.	171.	.1	.0

BUOY 2365 (1985)

DAY	LAT	LONG	U	DIR	T1	T2
43	57.02	-59.52	*****	*****	.1	.0
44	56.86	-59.42	22.	161.	.1	.0
45	56.72	-59.41	18.	178.	.1	.1
46	56.71	-59.47	4.	253.	.0	.1
47	56.72	-59.29	13.	84.	.0	.1
48	56.59	-59.03	25.	132.	.0	.1
49	56.46	-58.58	36.	118.	.0	.1
50	56.25	-58.40	30.	155.	.1	.0
51	56.04	-58.20	31.	152.	.1	.0
52	55.93	-57.64	43.	109.	.1	.1
53	55.63	-56.68	80.	119.	.1	.0
54	55.31	-55.84	74.	124.	.1	.0
55	55.05	-54.45	108.	108.	.1	.1
56	54.68	-53.47	87.	123.	.1	.1
57	54.28	-53.02	62.	147.	.2	.2
58	54.14	-52.91	20.	155.	.8	.1
59	53.67	-52.98	61.	185.	.2	.2
60	53.07	-52.41	89.	150.	.8	.1
61	52.88	-51.85	50.	119.	.1	.0
62	52.81	-51.80	10.	157.	.0	.1

BUOY 2366 (1985)

DAY	LAT	LONG	U	DIR	T1	T2
12	56.41	-60.36	*****	*****	.1	.0
13	56.35	-60.26	11.	137.	.1	.0
14	56.00	-60.09	47.	165.	.0	.1
15	55.96	-59.97	10.	121.	.0	.1
16	55.94	-59.92	4.	125.	.0	.6
17	56.00	-60.04	12.	312.	.0	.0
18	55.99	-60.09	4.	250.	.1	.0
19	55.98	-60.17	6.	257.	.1	.0
20	55.98	-60.17	0.	*****	.3	.0
21	55.98	-60.18	1.	270.	.2	.0
22	55.98	-60.18	0.	*****	.0	.1
23	55.98	-60.18	0.	*****	.0	.1
24	55.98	-60.17	1.	90.	.0	.1
25	55.98	-60.17	0.	*****	.0	.1
26	55.98	-60.16	1.	90.	.0	.0
27	55.96	-60.14	3.	151.	.1	.0
28	55.92	-60.12	5.	164.	.3	.0
29	55.92	-60.12	0.	*****	.2	.0
30	55.92	-60.12	0.	*****	.0	.1
31	55.92	-60.12	0.	*****	.3	.1
32	55.92	-60.11	1.	90.	.0	.1
33	55.92	-60.12	1.	270.	.2	.0
34	55.91	-60.06	5.	107.	.0	.0
35	55.89	-60.00	5.	121.	.1	.0
36	55.87	-59.94	5.	121.	.1	.0
37	55.86	-59.93	1.	151.	.1	.0
38	55.85	-59.93	1.	180.	.1	.0
39	55.85	-59.93	0.	*****	.0	.1
40	55.85	-59.93	0.	*****	.0	.1
41	55.85	-59.93	0.	*****	.0	.1
42	55.85	-59.93	0.	*****	.0	.0
43	55.85	-59.93	0.	*****	.1	.0
44	55.85	-59.93	0.	*****	.1	.0
45	55.85	-59.93	0.	*****	.2	.1
46	55.85	-59.93	0.	*****	.0	.1
47	55.85	-59.93	0.	*****	.0	.1
48	55.85	-59.93	0.	*****	.0	.1
49	55.85	-59.93	0.	*****	.0	.0
50	55.85	-59.93	0.	*****	.2	.0
51	55.85	-59.93	0.	*****	.2	.0
52	55.85	-59.93	0.	*****	.1	.0
53	55.85	-59.93	0.	*****	.1	.0
54	55.85	-59.93	0.	*****	.2	.1
55	55.84	-59.91	2.	132.	.3	.1
56	55.73	-59.65	24.	127.	.3	.1
57	55.63	-59.39	23.	124.	.2	.2
58	55.53	-59.29	15.	150.	.8	.8
59	55.44	-59.22	13.	156.	.2	.2
60	55.45	-59.18	3.	66.	.8	.1
61	55.43	-59.18	3.	180.	.1	.0
62	55.43	-59.18	0.	*****	.0	.1

DAY	LAT	LONG	U	DIR	T1	T2
BUOY 2367 (1985)						
12	56.23	-59.27	*****	*****	.2	.0
13	56.02	-59.18	28.	167.	.1	.0
14	55.54	-58.68	72.	150.	.0	.1
15	55.48	-58.31	28.	106.	.0	.1
16	55.47	-58.42	8.	261.	.0	.6
17	55.62	-58.63	25.	322.	.0	.1
18	55.63	-58.85	16.	275.	.1	.0
19	55.64	-58.97	9.	278.	.1	.0
20	55.67	-58.98	4.	349.	.3	.0
21	55.70	-58.87	9.	64.	.1	.1
22	56.00	-58.94	39.	353.	.0	.1
23	56.31	-59.42	53.	319.	.0	.1
24	56.38	-59.39	9.	13.	.0	.1
25	56.40	-59.39	3.	360.	.8	.1
26	56.48	-59.37	10.	8.	.0	.1
27	56.44	-59.30	7.	136.	.1	.1
28	56.04	-59.39	52.	187.	.3	.0
29	55.72	-59.05	48.	149.	.1	.0
30	55.54	-58.63	38.	127.	.0	.1
31	55.33	-58.17	43.	129.	.3	.1
32	55.21	-57.81	31.	120.	.2	.1
33	55.20	-57.74	5.	104.	.2	.1
34	55.14	-57.64	11.	136.	.2	.0
35	54.93	-57.31	36.	138.	1.0	2.1
36	54.72	-56.98	37.	138.	2.0	1.1
37	54.51	-56.66	36.	139.	3.0	.1
38	54.21	-56.48	41.	161.	.0	.1
39	54.09	-56.80	29.	237.	.0	.1
40	54.08	-56.81	1.	210.	.0	.1
41	54.05	-56.78	4.	150.	.0	.1
42	54.05	-56.77	1.	90.	.0	.1
43	54.05	-56.79	2.	270.	.1	.0
44	54.05	-56.79	0.	*****	.2	.0
45	54.04	-56.79	1.	180.	.2	.1
46	54.05	-56.78	1.	30.	.0	.1
47	54.07	-56.73	5.	56.	.0	.1
48	54.04	-56.59	11.	110.	.0	.1
49	54.04	-56.53	5.	90.	.0	.1
50	53.99	-56.45	9.	137.	.2	.0
51	53.88	-56.24	21.	132.	.3	.0
52	53.79	-56.08	17.	134.	.2	.0
53	53.78	-56.04	3.	113.	.4	.1
54	53.72	-55.94	11.	135.	.1	.0
55	53.71	-55.91	3.	119.	.4	.1
56	53.69	-55.90	3.	163.	.8	2.7
57	53.65	-55.88	5.	163.	1.8	1.7
58	53.62	-55.85	4.	149.	2.8	.7
59	53.51	-55.75	16.	152.	.2	1.1
60	53.22	-55.54	41.	157.	1.2	.1
61	53.17	-55.50	7.	154.	.1	.0
62	53.11	-55.71	18.	245.	.0	.1
63	52.49	-55.47	82.	167.	.0	.2
64	51.87	-55.21	82.	166.	.0	.1
65	51.52	-55.27	45.	186.	.8	.1
66	51.24	-55.28	36.	181.	.5	.0
67	51.20	-55.17	10.	120.	.2	.0
68	51.27	-55.15	9.	10.	.1	.0
69	51.24	-55.08	7.	124.	.1	.0
70	51.25	-55.09	2.	328.	.1	.0
71	51.31	-55.09	8.	360.	.1	.2
72	51.34	-55.15	6.	309.	.2	.2
73	51.33	-55.28	11.	263.	.8	.2
74	51.27	-55.25	8.	163.	.2	.1
75	51.30	-54.95	25.	81.	.1	.0
76	51.13	-54.57	38.	125.	.1	.0
77	50.97	-54.43	24.	151.	.1	.0
78	50.75	-54.51	29.	193.	.1	.0
79	50.60	-54.71	25.	220.	.1	.2
80	50.60	-54.81	8.	270.	.1	.0
81	50.72	-54.95	19.	323.	.1	.1
82	50.43	-54.82	39.	164.	.0	.6
83	50.27	-54.58	29.	136.	.0	.1
84	50.16	-54.44	18.	141.	.1	.0
85	50.06	-54.29	18.	136.	.1	.0
86	50.03	-53.84	38.	96.	.1	.0
87	49.99	-53.55	25.	102.	.1	.0
88	49.84	-53.54	19.	178.	.1	.6
89	49.67	-53.58	22.	189.	.1	.0
90	49.49	-53.62	23.	188.	.0	.2
91	49.16	-53.43	45.	159.	.0	.1
92	48.82	-53.37	44.	173.	.0	.1
93	48.84	-53.30	6.	67.	.3	.1
94	48.85	-53.15	13.	84.	.4	.0
95	48.77	-53.06	13.	143.	.0	.1
96	48.81	-53.10	6.	327.	.1	.1
97	49.11	-52.93	41.	20.	.1	.7
98	49.16	-52.68	22.	73.	.1	.1
99	49.26	-52.34	31.	66.	.8	.0
100	49.14	-52.26	17.	156.	.0	.5
101	48.93	-52.34	28.	194.	.0	.2
102	48.92	-52.31	3.	117.	.0	.9
103	48.74	-52.11	29.	144.	.1	.0
104	48.56	-51.96	26.	151.	.1	.6
105	48.71	-51.57	38.	60.	.0	.0
106	48.73	-51.15	36.	86.	.1	.0
107	48.92	-50.74	43.	55.	.4	.0
108	49.08	-50.02	64.	71.	.1	.1
109	48.81	-49.55	53.	131.	.3	.4
110	48.64	-49.17	39.	124.	.0	.2
111	48.58	-48.67	43.	100.	.1	.5
112	48.48	-48.25	38.	110.	.1	.1
113	48.42	-47.94	28.	106.	.1	.0
114	48.48	-47.97	8.	342.	.5	.1
115	48.82	-47.77	47.	21.	.1	.0

BUOY 2368 (1985)

DAY	LAT	LONG	U	DIR	T1	T2
43	56.95	-60.36**********			.1	.0
44	56.90	-60.30	8.	147.	.2	.0
45	56.82	-60.28	10.	172.	.2	.0
46	56.83	-60.29	1.	331.	.0	.1
47	56.81	-60.18	8.	108.	.0	.1
48	56.71	-60.04	16.	142.	.0	.1
49	56.59	-59.76	25.	128.	.0	.1
50	56.52	-59.69	10.	151.	.1	.0
51	56.33	-59.57	26.	161.	.1	.0
52	56.12	-59.40	30.	156.	.1	.0
53	55.81	-58.92	53.	139.	.1	.0
54	55.96	-58.36	45.	65.	.1	.0
55	55.98	-57.81	40.	86.	.2	.1
56	55.51	-56.92	89.	133.	.1	.1
57	55.16	-56.29	65.	134.	.2	.2
58	54.91	-55.98	40.	145.	.8	.1
59	54.57	-55.58	53.	146.	.2	.2
60	54.28	-55.17	48.	140.	.8	.1
61	54.21	-54.95	19.	119.	.1	.0
62	54.16	-55.08	12.	237.	.0	.1
63	53.51	-54.91	85.	171.	.0	.1
64	52.89	-54.27	94.	148.	.0	.1
65	52.58	-54.03	44.	155.	.1	.0
66	52.28	-53.93	39.	168.	.1	.0
67	52.20	-53.84	13.	145.	.2	.0
68	52.14	-53.82	8.	168.	.1	.0
69	52.02	-53.83	15.	183.	.1	.0
70	51.95	-53.85	9.	190.	.1	.0
71	51.93	-53.83	3.	148.	.0	.0
72	51.88	-53.87	7.	206.	.2	.2
73	51.86	-54.05	15.	260.	.4	.1
74	51.77	-54.15	14.	215.	.2	.1
75	51.74	-53.81	27.	98.	.1	.0
76	51.60	-53.35	41.	116.	.1	.0
77	51.55	-53.12	20.	109.	.1	.0
78	51.42	-53.00	19.	150.	.1	.0
79	51.38	-53.05	7.	218.	.1	.2
80	51.39	-52.98	6.	77.	.1	.0
81	51.59	-52.94	26.	7.	.0	.1
82	51.49	-52.87	14.	156.	.0	.1
83	51.41	-52.68	18.	124.	.0	.1
84	51.42	-52.54	11.	83.	.0	.0
85	51.41	-52.44	8.	99.	.1	.0
86	51.35	-52.22	19.	114.	.1	.0
87	51.39	-52.05	15.	69.	.1	.0
88	51.36	-52.18	11.	250.	.1	.0
89	51.30	-52.36	16.	242.	.1	.0
90	51.17	-52.53	22.	219.	.0	.0
91	50.91	-52.59	34.	188.	.1	.1
92	50.73	-52.64	24.	190.	.0	.1
93	50.73	-52.83	16.	270.	.0	.1
94	50.72	-52.91	7.	259.	.1	.0
95	50.76	-52.97	7.	316.	.1	.0
96	50.73	-52.92	6.	133.	.1	.0
97	50.91	-52.83	24.	18.	.1	.0
98	50.96	-52.65	16.	66.	.1	.1
99	51.00	-52.39	22.	76.	.8	.0
100	50.96	-52.21	16.	109.	.0	.1
101	50.83	-52.24	17.	188.	.0	.1
102	50.84	-52.11	11.	83.	.0	.1
103	50.70	-51.99	21.	151.	.0	.0
104	50.36	-51.91	44.	171.	.1	.0
105	50.28	-51.80	14.	139.	.0	.0
106	50.40	-51.79	15.	3.	.1	.0
107	50.61	-51.71	28.	14.	.1	.0
108	50.76	-51.26	42.	62.	.1	.0
109	50.74	-50.90	30.	95.	.0	.4
110	50.59	-50.92	19.	185.	.0	.2
111	50.43	-50.67	29.	135.	.0	.1
112	50.40	-50.26	34.	97.	.0	.1
113	50.44	-50.04	19.	74.	.1	.0
114	50.52	-50.15	14.	319.	.4	.0
115	50.54	-50.48	27.	275.	.1	.0
116	50.53	-50.43	4.	107.	.1	.1
117	50.46	-50.28	15.	126.	.1	.0

BUOY 2341 (1985)

DAY	LAT	LONG	U	DIR	T1	T2
44	55.43	-57.48**********			.1	.0
45	55.42	-57.48	1.	180.	.1	.1
46	55.50	-57.59	13.	322.	.0	.1
47	55.55	-57.52	8.	38.	.0	.1
48	55.42	-57.32	22.	139.	.0	.1
49	55.34	-57.15	16.	130.	.0	.1
50	55.30	-56.93	17.	108.	.2	.0
51	55.17	-56.55	33.	121.	.1	.0
52	54.96	-56.41	29.	159.	.2	.0
53	54.90	-56.35	9.	150.	.2	.0
54	54.78	-56.17	20.	139.	.0	.1
55	54.59	-55.94	30.	145.	.3	.1
56	54.39	-55.69	32.	144.	.2	.1
57	54.25	-55.52	22.	145.	.2	.2
58	54.19	-55.48	8.	159.	.8	.1
59	53.86	-55.36	43.	168.	.2	.2
60	53.62	-55.09	37.	146.	.8	.1
61	53.57	-55.01	9.	136.	.1	.0
62	53.48	-55.18	17.	228.	.0	.5
63	52.88	-54.78	83.	158.	.0	.1
64	52.34	-54.49	73.	162.	.0	.1
65	51.97	-54.47	48.	178.	.1	.0
66	51.67	-54.38	39.	169.	.1	.0
67	51.55	-54.16	23.	131.	.0	.0
68	51.52	-54.06	9.	116.	.1	.0
69	51.41	-53.91	19.	140.	.1	.0

DAY	LAT	LONG	U	DIR	T1	T2
70	51.35	-53.80	12.	131.	.3	.0
71	51.35	-53.64	13.	90.	.0	.0
72	51.30	-53.61	7.	159.	.3	.2
73	51.28	-53.69	7.	248.	.4	.2
74	51.22	-53.62	10.	144.	.2	.1
75	51.22	-53.21	33.	90.	.1	.0
76	51.13	-52.74	40.	107.	.1	.0
77	51.13	-52.48	21.	90.	.1	.0
78	50.99	-52.40	19.	160.	.1	.0
79	50.96	-52.54	12.	251.	.1	.2
80	50.99	-52.54	4.	360.	.1	.0
81	51.25	-52.50	34.	6.	.0	.1
82	51.20	-52.40	10.	129.	.1	.6
83	51.18	-52.19	17.	99.	.0	.1
84	51.16	-52.11	7.	112.	.0	.1
85	51.06	-52.10	13.	176.	.1	.0
86	50.88	-51.99	25.	159.	.1	.0
87	50.83	-51.88	11.	126.	.1	.0
88	50.82	-51.98	8.	261.	.1	.0
89	50.70	-52.03	16.	195.	.1	.0
90	50.55	-52.13	21.	203.	.0	.0
91	50.14	-52.16	53.	183.	.0	.1
92	49.81	-52.02	44.	165.	.0	.6
93	49.66	-52.16	23.	211.	.0	.1
94	49.61	-52.20	7.	207.	.1	.0
95	49.54	-52.16	10.	160.	.1	.2
96	49.46	-51.89	25.	114.	.1	.0
97	49.37	-51.69	20.	125.	.1	.0
98	49.32	-51.61	9.	134.	.1	.0
99	49.31	-51.44	14.	95.	.8	.0
100	49.29	-51.24	17.	99.	.0	.1
101	49.17	-51.02	24.	130.	.0	.1
102	49.20	-50.46	47.	85.	.0	.1
103	49.07	-50.04	39.	115.	.0	.1
104	48.62	-49.59	69.	147.	.1	.0
105	48.34	-49.13	53.	132.	.5	.0
106	48.19	-48.42	64.	108.	.1	.0
107	48.28	-47.77	57.	78.	.4	.0
108	48.39	-46.97	70.	78.	.1	.0

BUOY 2361 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
67	55.40	-58.47**********			.1	.1
68	55.14	-57.84	57.	126.	.0	.1
69	54.90	-57.25	54.	125.	.0	.0
70	54.83	-56.94	25.	111.	.0	.0
71	54.58	-56.57	42.	139.	.1	.0
72	54.29	-56.22	46.	145.	.1	.0
73	54.02	-55.88	43.	144.	.9	1.5
74	53.75	-55.57	42.	146.	1.9	.5
75	53.37	-55.29	53.	156.	.0	.1
76	53.09	-55.19	37.	168.	.1	.1
77	52.88	-54.93	34.	143.	.1	.1
78	52.85	-54.47	36.	96.	.0	.0
79	52.87	-53.99	38.	86.	.0	.0
80	52.60	-53.70	42.	147.	.0	.0
81	52.50	-53.64	14.	160.	.1	.0
82	52.36	-53.52	20.	152.	.1	.0
83	52.49	-53.32	23.	43.	.1	.0
84	52.27	-53.21	30.	163.	.0	.1
85	52.03	-53.00	35.	152.	.0	.1
86	52.09	-52.85	14.	57.	.1	.1
87	52.11	-52.95	8.	288.	.1	.0
88	52.14	-53.16	17.	283.	.0	.0
89	52.24	-53.03	16.	39.	.0	.0
90	52.43	-53.19	28.	333.	.1	.0
91	52.33	-53.01	19.	132.	.1	.0
92	52.18	-52.80	25.	139.	.1	.0
93	52.03	-52.64	23.	147.	.1	.0
94	51.64	-52.60	50.	176.	.0	.1
95	51.48	-52.25	35.	126.	.1	.1
96	51.56	-51.79	38.	74.	.1	.0
97	51.49	-51.33	38.	104.	.1	.0
98	51.32	-51.26	23.	166.	.0	.0
99	51.09	-51.18	30.	168.	.1	.0
100	51.08	-51.44	21.	267.	.1	.0
101	51.26	-51.64	28.	325.	.1	.0
102	51.48	-51.74	29.	344.	.1	.0
103	51.69	-51.49	34.	37.	.0	.1

BUOY 2394 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
45	56.31	-59.57**********			.1	.0
46	56.20	-59.40	19.	139.	.1	.0
47	56.01	-59.12	32.	141.	.1	.1
48	55.85	-58.39	57.	111.	.1	11.5
49	55.84	-58.32	5.	104.	1.1	10.5
50	55.83	-58.26	5.	106.	2.1	9.5
51	55.81	-58.19	6.	117.	3.1	8.5
52	55.80	-58.12	5.	104.	4.1	7.5
53	55.79	-58.05	5.	104.	5.1	6.5
54	55.78	-57.99	5.	106.	6.1	5.5
55	55.77	-57.92	5.	104.	7.1	4.5
56	55.76	-57.85	5.	104.	8.1	3.5
57	55.75	-57.79	5.	106.	9.1	2.5
58	55.74	-57.72	5.	104.	10.1	1.5
59	55.73	-57.65	5.	104.	11.1	.5
60	55.83	-57.44	20.	50.	.0	.0
61	55.70	-56.96	39.	116.	.0	.0
62	55.21	-56.30	80.	143.	.1	.0
63	55.18	-56.19	9.	115.	.1	.0
64	55.25	-55.80	30.	73.	.2	.0
65	54.87	-55.41	57.	149.	.1	.0
66	54.72	-55.18	26.	138.	1.0	1.6
67	54.57	-54.96	25.	140.	2.0	.6
68	54.38	-54.81	27.	155.	.1	.0

DAY	LAT	LONG	U	DIR	T1	T2
69	54.01	-54.62	50.	163.	.0	.0
70	53.92	-54.66	12.	195.	.1	1.5
71	53.85	-54.51	15.	128.	1.1	.5

BUOY 2395 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
26	55.62	-57.71	**********		.1	.0
27	55.59	-57.60	9.	116.	.1	.0
28	55.66	-57.49	12.	42.	.0	.1
29	55.70	-56.42	78.	86.	.1	.1
30	55.67	-55.23	87.	93.	.1	.1
31	55.51	-55.05	24.	147.	.2	.0

BUOY 2396 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
27	57.37	-59.68	**********		.1	.0
28	57.30	-59.66	9.	171.	.1	.1
29	57.41	-59.37	25.	55.	.1	.1
30	57.10	-58.48	74.	123.	.1	.1
31	56.77	-57.77	66.	130.	.0	.0

BUOY 2397 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
27	57.45	-59.06	**********		.1	.0
28	57.44	-59.00	4.	107.	.1	.1
29	57.56	-58.62	31.	60.	.1	.1
30	57.66	-57.68	66.	79.	.4	.2
31	57.57	-57.34	26.	116.	.0	.0

BUOY 2398 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
26	55.77	-56.11	**********		.1	.0
27	55.94	-55.48	51.	64.	.1	.0
28	56.08	-55.56	19.	342.	.0	.1

BUOY 2399 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
27	57.21	-59.97	**********		.1	.0
28	57.28	-59.95	9.	9.	.1	.1
29	57.45	-59.65	30.	44.	.1	.1
30	57.19	-58.85	65.	121.	.1	.1
31	56.88	-58.48	48.	147.	.0	.0
32	56.45	-57.92	68.	144.	.0	.0
33	56.18	-56.91	80.	116.	.0	.0
34	56.18	-56.46	32.	90.	.1	.0

BUOY 2407 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
66	55.89	-58.10	**********		.1	.1
67	55.77	-57.66	35.	116.	.1	.1
68	55.26	-57.17	75.	151.	.0	.1
69	55.07	-56.66	45.	123.	.0	.0
70	55.01	-56.59	9.	146.	.0	.0

DAY	LAT	LONG	U	DIR	T1	T2
71	54.76	-56.25	41.	142.	.1	.0
72	54.51	-55.78	48.	133.	.1	.0
73	54.29	-55.51	35.	144.	.9	1.5
74	54.07	-55.25	34.	145.	1.9	.5
75	53.85	-55.04	33.	151.	.0	.1
76	53.84	-55.01	3.	119.	.1	.1
77	53.81	-54.89	10.	113.	.1	.1
78	53.82	-54.71	14.	85.	.0	.0
79	53.90	-54.44	23.	63.	.2	.0
80	53.59	-54.44	40.	180.	.0	.0
81	53.52	-54.01	34.	105.	.1	.0
82	53.26	-53.86	35.	161.	.1	.0
83	53.33	-53.89	9.	346.	.1	.0
84	53.06	-54.11	39.	206.	.0	.1
85	52.65	-53.64	64.	145.	.0	.1
86	52.73	-53.19	37.	74.	.1	.1
87	52.61	-53.13	16.	163.	.1	.0
88	52.64	-53.33	16.	284.	.0	.0
89	52.78	-53.10	25.	45.	.0	.0
90	52.91	-53.04	17.	16.	.1	.0
91	52.88	-52.54	39.	96.	.1	.0
92	52.64	-52.20	41.	139.	.1	.0
93	52.57	-51.85	29.	108.	.1	.0
94	52.18	-51.78	51.	174.	.0	.1
95	51.89	-51.53	42.	152.	.0	.1
96	51.61	-51.19	45.	143.	.1	.0
97	51.21	-51.05	53.	168.	.1	.0
98	50.72	-51.45	71.	207.	.0	.0
99	50.30	-51.24	57.	162.	.1	.0
100	50.22	-51.48	22.	243.	.1	.0
101	50.40	-51.83	37.	309.	.1	.0
102	50.58	-52.36	49.	298.	.1	.0
103	50.82	-52.66	39.	322.	.0	.1
104	51.16	-52.65	44.	1.	.1	.1
105	51.45	-52.46	40.	22.	.1	.1
106	51.53	-52.15	27.	68.	.2	.0
107	51.45	-52.26	14.	221.	.0	.0
108	51.19	-52.27	33.	181.	.0	.0
109	51.16	-51.84	35.	96.	.1	.0
110	51.23	-51.66	17.	58.	.1	.0
111	51.35	-51.30	33.	62.	.1	.0
112	51.28	-51.02	24.	112.	.0	.0
113	51.22	-50.78	21.	112.	.1	.1
114	51.08	-50.63	22.	146.	.0	.1

BUOY 2523 (1986)

DAY	LAT	LONG	U	DIR	T1	T2
44	56.50	-59.98	**********		.1	.0
45	56.23	-59.71	40.	151.	.1	.0
46	55.89	-59.08	63.	134.	.1	.0
47	55.79	-57.94	84.	99.	.1	.1
48	55.21	-57.30	88.	148.	.1	.1
49	54.61	-56.56	95.	145.	.1	.1

DAY	LAT	LONG	U	DIR	T1	T2
50	54.32	-56.44	38.	166.	.0	.0
51	54.27	-56.53	9.	226.	.0	.0
52	54.26	-56.54	1.	210.	.1	.0
53	54.29	-56.61	7.	306.	.1	.0
54	54.07	-56.32	36.	142.	.1	.0
55	54.00	-56.24	11.	146.	.1	.0
56	53.99	-56.24	1.	180.	.0	.1
57	53.99	-56.19	4.	90.	.2	.1
58	54.16	-56.35	25.	331.	.2	.1
59	54.32	-56.26	22.	18.	.0	.0
60	54.37	-55.98	22.	73.	.0	.0
61	54.44	-55.57	32.	74.	.0	.0
62	54.32	-55.35	23.	133.	.1	.0
63	54.26	-55.21	13.	126.	.1	.0
64	54.31	-55.06	13.	60.	.3	.0
65	54.14	-54.98	23.	165.	.0	.1
66	53.95	-54.82	27.	154.	.0	.1
67	54.02	-54.82	9.	360.	.1	.1
68	53.58	-54.43	64.	152.	.2	.0
69	53.38	-54.65	31.	213.	.0	.0
70	53.13	-54.46	35.	155.	.0	.0
71	52.96	-54.50	22.	188.	.1	.0
72	52.51	-54.11	65.	152.	.3	.0
73	52.31	-53.89	31.	146.	.8	1.5
74	52.14	-53.66	28.	140.	1.8	.5
75	52.01	-53.48	22.	140.	.0	.1
76	52.05	-53.39	9.	54.	.1	.1
77	52.05	-53.24	12.	90.	.1	.1
78	51.98	-53.03	19.	118.	.0	.0
79	52.15	-52.71	34.	49.	.5	.0
80	52.10	-52.64	9.	139.	.1	.0
81	52.05	-52.38	22.	107.	.1	.0
82	51.83	-52.03	40.	135.	.1	.0
83	51.86	-51.99	5.	40.	.1	.0
84	51.66	-51.87	27.	160.	.0	.1
85	51.35	-51.33	59.	133.	.0	.1
86	51.29	-50.99	29.	106.	.1	.1
87	51.01	-51.00	36.	181.	.1	.0
88	50.76	-51.43	48.	227.	.0	.0
89	50.74	-51.29	12.	103.	.0	.1
90	50.68	-51.13	15.	121.	.1	.0
91	50.40	-50.77	47.	141.	.1	.0

BUOY 2524 (1986)

26	55.64	-56.68	**********		.1	.1
27	55.51	-55.42	94.	100.	.1	.0
28	55.71	-55.08	36.	44.	.0	.1
29	56.09	-54.87	51.	17.	.1	.1

BUOY 2525 (1986)

43	55.29	-57.96	**********		.1	.0

DAY	LAT	LONG	U	DIR	T1	T2
44	55.19	-57.82	17.	141.	.1	.0
45	55.06	-57.61	23.	137.	.1	.1
46	54.91	-57.26	32.	127.	.1	.0
47	54.72	-56.95	34.	137.	.1	.1
48	54.20	-56.33	82.	145.	.1	.1
49	53.34	-55.44	130.	148.	.1	.0
50	52.82	-55.35	67.	174.	.0	.0
51	52.68	-55.43	19.	199.	.0	.1
52	52.49	-55.48	25.	189.	.1	.0
53	52.41	-55.51	11.	193.	.1	.0
54	52.16	-55.56	32.	187.	.1	.0
55	51.89	-55.81	40.	210.	.1	.0
56	51.70	-56.14	36.	227.	.0	.2
57	51.76	-55.99	14.	57.	.2	.1
58	51.87	-55.91	16.	24.	.0	.1
59	51.98	-55.62	27.	58.	.0	.0
60	52.12	-55.24	35.	59.	.0	.0
61	52.15	-54.97	22.	80.	.0	.0
62	52.00	-54.93	20.	171.	.1	.0
63	51.85	-54.76	24.	145.	.1	.0
64	51.79	-54.17	48.	99.	.3	.0
65	51.84	-53.58	48.	82.	.0	.1
66	51.42	-53.36	57.	162.	.0	.1
67	51.39	-53.19	14.	106.	.1	.1
68	51.17	-52.70	49.	126.	.1	.0
69	51.03	-52.20	44.	114.	.0	.0
70	50.80	-51.91	38.	141.	.0	.0
71	50.70	-52.07	18.	225.	.1	.0
72	50.41	-51.95	39.	165.	.3	.0
73	50.18	-51.65	39.	140.	.8	1.5
74	49.96	-51.38	36.	142.	1.8	.5
75	49.71	-51.23	35.	159.	.0	.1
76	49.48	-51.19	30.	174.	.0	.1
77	49.31	-51.13	22.	167.	.1	.1
78	49.27	-50.81	27.	101.	.3	.0
79	49.58	-50.38	54.	42.	.0	.0
80	49.46	-49.90	43.	111.	.1	.0
81	49.20	-49.59	42.	142.	.1	.0
82	48.86	-48.82	79.	124.	.1	.0

BUOY 2373 (1987)

19	57.30	-58.84	**********		.1	.1
20	57.00	-58.61	42.	157.	.0	.1
21	56.88	-57.71	65.	104.	.0	.1
22	56.71	-57.17	44.	120.	.0	.1
23	56.68	-56.77	29.	98.	.2	.1

BUOY 2375 (1987)

19	56.96	-60.83	**********		.0	.1
20	56.82	-60.67	21.	148.	.0	.1
21	56.76	-60.42	19.	114.	.0	.1

DAY	LAT	LONG	U	DIR	T1	T2
22	56.66	-60.32	15.	151.	.0	.1
23	56.59	-60.32	9.	180.	.0	.0
24	56.71	-60.45	18.	329.	.0	.0
25	56.58	-60.34	18.	155.	.1	.0
26	56.38	-59.81	46.	124.	.1	.0
27	56.21	-59.51	31.	136.	.1	.1
28	56.17	-59.43	8.	132.	.1	.1
29	56.05	-59.27	19.	143.	.0	.1
30	55.88	-58.95	32.	133.	.0	.1
31	55.85	-58.56	29.	98.	.0	.1
32	55.90	-57.92	47.	82.	.0	.0
33	55.79	-57.49	34.	114.	.0	.0
34	55.65	-57.47	18.	175.	.0	.0
35	55.50	-57.20	28.	134.	.1	.0
36	55.42	-57.05	15.	133.	.1	.0
37	55.36	-56.90	13.	125.	.1	.1
38	55.33	-56.60	22.	100.	.1	.1
39	55.27	-56.22	29.	105.	.0	.1
40	55.17	-55.95	24.	123.	.0	.1
41	54.85	-55.85	42.	170.	.0	.1
42	54.84	-56.31	34.	268.	.0	.0
43	54.96	-56.40	17.	337.	.0	.0
44	54.82	-56.34	19.	166.	.1	.0
45	54.69	-56.37	17.	188.	.1	.0
46	54.40	-56.33	37.	175.	.1	.1
47	54.23	-56.22	23.	159.	.1	.1
48	54.08	-56.13	20.	161.	.0	.1
49	54.08	-56.14	1.	270.	.0	.1
50	54.02	-56.02	12.	130.	.0	.1
51	53.86	-55.77	28.	137.	.0	.0
52	53.65	-55.64	29.	160.	.0	.0
53	53.30	-55.62	45.	178.	.1	.0
54	53.06	-55.69	31.	190.	.1	.0
55	53.05	-55.70	2.	211.	.1	.1
56	52.94	-55.74	15.	192.	.1	.1
57	52.88	-55.72	8.	169.	.0	.1
58	52.88	-55.72	0.	*****	.0	.1
59	52.93	-55.71	6.	7.	.0	.1
60	52.74	-55.64	25.	167.	.0	.0
61	52.59	-55.60	20.	171.	.0	.0
62	52.43	-55.58	21.	176.	.1	.0
63	52.37	-55.55	8.	163.	.1	.0
64	52.25	-55.49	16.	163.	.1	.0
65	52.30	-55.29	17.	68.	.1	.1
66	51.91	-54.97	56.	153.	.1	.1
67	51.23	-54.90	88.	176.	.0	.1
68	50.81	-54.92	54.	182.	.0	.1
69	50.57	-54.86	31.	171.	.0	.0
70	50.24	-54.59	48.	152.	.0	.0
71	50.12	-54.43	20.	139.	.0	.0
72	50.08	-54.24	17.	108.	.3	.1
73	50.01	-53.92	28.	109.	.1	.0
74	49.87	-53.77	22.	145.	.1	.1
75	49.76	-53.89	17.	215.	.1	.1
76	49.75	-53.90	2.	213.	.0	.1
77	49.75	-53.90	0.	*****	.0	.1
78	49.75	-53.90	0.	*****	.0	.1
79	49.76	-53.89	2.	33.	.0	.0
80	49.76	-53.90	1.	270.	.0	.0
81	49.75	-53.90	1.	180.	.1	.0
82	49.76	-53.90	1.	360.	.1	.0
83	49.74	-53.86	4.	128.	.1	.1
84	49.74	-53.86	0.	*****	.1	.1
85	49.80	-53.90	8.	337.	.0	.1
86	49.91	-53.78	17.	35.	.0	.2
87	50.05	-53.65	21.	31.	.0	.1
88	50.05	-53.20	37.	90.	.0	.0
89	49.95	-53.15	14.	162.	.2	.5
90	50.04	-52.89	24.	62.	.1	.0
91	50.26	-52.61	37.	39.	.1	.0
92	50.19	-52.44	17.	123.	.1	.0
93	50.06	-52.43	17.	177.	.1	.1
94	49.91	-52.49	20.	194.	.1	.1
95	49.94	-52.54	6.	313.	.0	.1
96	49.90	-52.29	21.	104.	.0	.1
97	49.86	-52.28	5.	171.	.0	.0
98	49.98	-52.24	16.	12.	.0	.0
99	50.01	-52.07	15.	75.	.0	.0
100	50.19	-51.85	29.	38.	.1	.0
101	49.83	-51.75	47.	170.	.1	.0
102	49.57	-52.17	48.	226.	.1	.1
103	49.21	-52.33	48.	196.	.1	.1
104	49.05	-52.42	22.	200.	.3	.5
105	49.05	-52.54	10.	270.	.0	.1
106	48.77	-52.62	37.	191.	.0	.0
107	48.69	-52.33	27.	113.	.0	.1
108	48.72	-52.01	28.	82.	.0	.0
109	48.84	-51.40	54.	73.	.1	.0
110	48.95	-50.77	55.	75.	.1	.0
111	48.83	-50.34	40.	113.	.1	.0

BUOY 2378 (1987)

DAY	LAT	LONG	U	DIR	T1	T2
20	55.53	-56.46	*****	*****	.0	.1
21	55.22	-55.46	84.	119.	.0	.1
22	54.94	-54.19	101.	111.	.1	.0
23	54.35	-53.75	83.	157.	.0	.0
24	54.36	-53.82	5.	284.	.0	.0
25	54.50	-53.30	43.	65.	.1	.0

BUOY 2379 (1987)

DAY	LAT	LONG	U	DIR	T1	T2
20	55.25	-58.44	*****	*****	.0	.1
21	55.26	-58.41	3.	60.	.0	.1
22	55.24	-58.43	3.	210.	.0	.1
23	55.25	-58.45	2.	311.	.0	.0

DAY	LAT	LONG	U	DIR	T1	T2
24	55.38	-58.65	22.	319.	.0	.0
25	55.26	-58.49	19.	143.	.1	.0
26	55.26	-58.34	11.	90.	.1	.0
27	55.25	-58.26	6.	102.	.1	.1
28	55.26	-58.28	2.	311.	.1	.1
29	55.22	-58.23	6.	144.	.0	.1
30	55.16	-58.11	12.	131.	.0	.1
31	55.16	-58.07	3.	90.	.0	.1
32	55.16	-58.05	1.	90.	.0	.0
33	55.15	-58.05	1.	180.	.0	.0
34	55.13	-58.03	3.	150.	.0	.0
35	55.10	-57.95	7.	123.	.1	.0
36	55.07	-57.90	5.	136.	.1	.1
37	55.03	-57.82	8.	131.	.1	.1
38	55.02	-57.79	3.	120.	.0	.1
39	55.03	-57.79	1.	360.	.0	.1
40	55.01	-57.76	3.	139.	.0	.1
41	55.01	-57.75	1.	90.	.0	.1
42	55.00	-57.80	4.	251.	.0	.0
43	55.03	-57.81	4.	349.	.0	.0
44	54.99	-57.69	10.	120.	.1	.0
45	54.97	-57.66	3.	139.	.1	.0

BUOY 3121 (1987)

DAY	LAT	LONG	U	DIR	T1	T2
19	57.17	-60.35	*****	*****	.1	.1
20	57.04	-59.89	36.	117.	.0	.1
21	57.07	-59.70	14.	74.	.0	.1
22	57.04	-59.57	10.	113.	.1	.1
23	56.99	-59.54	7.	162.	.0	.1
24	57.12	-59.66	19.	333.	.0	.0
25	56.75	-59.32	53.	153.	.1	.0
26	56.84	-58.57	54.	78.	.1	.0
27	56.50	-58.08	56.	142.	.1	.1
28	56.45	-57.84	18.	111.	.1	.1
29	56.30	-57.59	26.	137.	.1	.1
30	55.75	-56.85	89.	143.	.0	.1
31	55.24	-56.22	80.	145.	.0	.1
32	55.04	-55.73	44.	125.	.0	.0
33	54.96	-55.43	24.	115.	.0	.0
34	55.04	-55.51	12.	330.	.0	.0
35	55.09	-55.67	13.	299.	.1	.0
36	54.94	-55.84	23.	213.	.1	.0
37	54.61	-55.58	47.	156.	.1	.1
38	54.58	-54.88	53.	94.	.2	.1
39	54.54	-54.68	16.	109.	.1	.1
40	54.52	-54.67	3.	164.	.0	.1
41	54.27	-54.65	32.	177.	.0	.1
42	54.23	-55.24	45.	263.	.0	.0
43	54.49	-54.99	38.	29.	.0	.0
44	54.62	-54.58	35.	61.	.1	.0
45	54.44	-54.48	24.	162.	.1	.0
46	54.11	-54.71	46.	202.	.1	.0
47	54.06	-54.98	21.	253.	.1	.1
48	54.09	-55.14	13.	288.	.0	.1
49	54.19	-55.37	22.	307.	.0	.1
50	54.18	-55.43	5.	254.	.0	.1
51	54.13	-55.35	9.	137.	.0	.0
52	53.99	-55.36	18.	182.	.0	.0
53	53.55	-55.32	57.	177.	.1	.0
54	53.06	-55.21	64.	172.	.1	.0
55	52.90	-55.35	23.	208.	.1	.1
56	52.53	-55.38	48.	183.	.1	.1
57	52.02	-55.42	66.	183.	.0	.1
58	51.94	-55.46	11.	197.	.0	.1
59	51.95	-55.44	2.	51.	.0	.1
60	51.75	-55.43	26.	178.	.0	.0
61	51.66	-55.41	12.	172.	.0	.0
62	51.66	-55.57	13.	270.	.1	.1
63	51.66	-55.62	4.	270.	.1	.1
64	51.67	-55.71	7.	280.	.1	.1
65	51.77	-55.50	21.	53.	.1	.1
66	51.52	-55.14	43.	138.	.1	.1
67	50.98	-55.11	70.	178.	.0	.1
68	50.57	-55.17	53.	185.	.0	.1
69	50.44	-55.17	17.	180.	.0	.1
70	50.26	-54.89	33.	135.	.0	.0
71	50.09	-54.77	24.	156.	.0	.0
72	49.93	-54.79	21.	185.	.3	.1
73	49.82	-54.82	14.	190.	.1	.0
74	49.78	-54.82	5.	180.	.1	.1
75	49.67	-55.09	27.	238.	.0	.1
76	49.63	-55.21	11.	243.	.0	.1
77	49.63	-55.21	0.	*****	.0	.1
78	49.62	-55.21	1.	180.	.0	.1
79	49.63	-55.21	1.	360.	.0	.0
80	49.62	-55.21	1.	180.	.0	.0
81	49.62	-55.21	0.	*****	.1	.0
82	49.62	-55.21	0.	*****	.1	.0
83	49.65	-55.17	5.	41.	.1	.1
84	49.66	-55.18	2.	327.	.1	.1
85	49.69	-55.19	4.	348.	.0	.1
86	49.73	-55.13	7.	44.	.0	.2
87	49.85	-55.13	15.	360.	.0	.1
88	49.77	-54.99	16.	131.	.0	.0
89	49.67	-55.06	14.	204.	.2	.5
90	49.74	-54.94	13.	48.	.1	.0

BUOY 3123 (1987)

DAY	LAT	LONG	U	DIR	T1	T2
20	55.50	-57.57	*****	*****	.0	.1
21	55.48	-57.37	15.	100.	.0	.1
22	55.43	-57.09	21.	107.	.0	.1
23	55.40	-56.94	12.	109.	.0	.1
24	55.59	-56.68	31.	38.	.0	.0
25	55.63	-55.58	80.	86.	.1	.0
26	55.76	-54.78	61.	74.	.1	.0