

NOAA Technical Memorandum ERL MESA-22



SURFACE DRIFTER MOVEMENTS OBSERVED
IN OUTER STRAIT OF JUAN DE FUCA, JULY 1977

C. C. Ebbesmeyer
J. M. Helseth
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Marine Ecosystems Analysis Program
Boulder, Colorado
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NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION /

Environmental
Research Laboratories

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**UNITED STATES
DEPARTMENT OF COMMERCE**
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NATIONAL OCEANIC AND
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Environmental Research
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by

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SURFACE DRIFTER MOVEMENTS OBSERVED

IN OUTER STRAIT OF JUAN DE FUCA, JULY 1977

C.C. Ebbesmeyer, J.M. Helseth, and J.M. Cox

Description is given of the experiment and of the movements of 77 thin, floatable drifters (1.3 x 1.3 x 0.0032 m) launched at 1/4 - 1 mile intervals cross channel from Pillar Point in the Outer Strait of Juan de Fuca during 19-23 July 1977. Provided herein are positions, velocities, trajectories, and spatial vector diagrams for six to eight hour intervals during which drifter positions were observed several times per hour. An apparent net cross channel drift toward U.S. was observed, with shore recoveries high in Clallam Bay and in the lee of Pillar Point, suggesting these as possible entrapment areas. The cross channel drift appears highest on flood tides concurrent with westerly winds.

1. INTRODUCTION

An oceanographic experiment was conducted in the Outer Strait of Juan de Fuca off Pillar Point during 19-23 July 1977 (Figure 1). This exploratory experiment was designed for dual purposes: 1) to observe movements of surface drifters which approximate movements of potential oil slicks; and 2) to measure surface currents for comparison with observations from moored current meters and a moored anemometer both deployed by Pacific Marine Environmental Laboratory (abbreviated PMEL).

The experiment is considered exploratory for at least three reasons: 1) a surface drifter which simulates oil slick movement cannot, at present be properly designed because dependencies on currents, winds, and waves is poorly understood (see Stolzenbach, et al., 1977); 2) observations of surface currents have not been reported previously for the study area; and 3) the present observations span brief temporal and spatial intervals which are too few to be considered a representative sample.

This report is intended primarily as an observational summary. Comparison with PMEL's observations will be the subject of other reports.

2. EXPERIMENT DESCRIPTION

2.1 Drifter Design

The behavior of oil slicks on water is complex. After spillage a slick spreads, drifts and disperses in patches. Present understanding of this behavior has been summarized by Stolzenbach, et al. (1977) and will

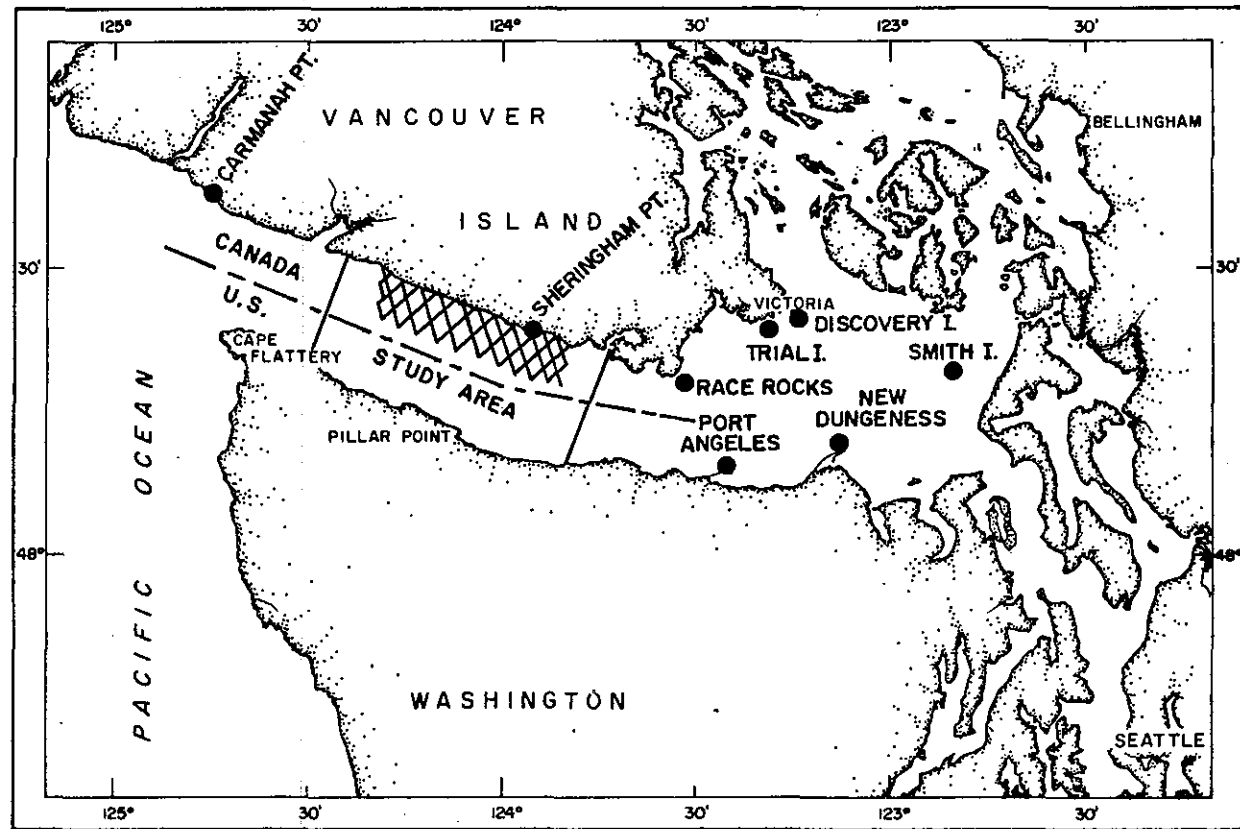


Figure 1. Strait of Juan de Fuca and study area. Notation: dots, locations of wind observations; cross hatching, area periodically closed to flight by Canadian military.

not be repeated here. The present experiment is addressed to that portion of a slick's history when a steady or equilibrium thickness has been attained and dispersion in patches is occurring. A thickness on the order of one millimeter has been suggested by Teeson, et al. (1970) as reasonable for inshore conditions.

Many designs can be envisioned for simulation of oil slicks. Beside oil itself, devices previously used include: 1) drift cards (e.g., Tomczak, 1964); drift poles (e.g., Doebler, 1966); remotely tracked buoys (e.g., Fingas, 1977); and plastic sheets (e.g., Teeson, et al., 1970). Because of theoretical and experimental difficulties it is not at present possible to predict with certainty winds and currents at and near the air-water interface. Selection of objective criteria for design of surface drifters simulating oil slick movement is ambiguous at best, and considerably beyond the scope of the present, modest effort.

The experiment by Teeson, et al. (1970) is particularly appealing in the use of thin polyethylene sheet. This material has a specific gravity (≈ 0.92) near that for some oils, and can be fabricated in thickness near that for some slicks (e.g., 1 mm). A major practical difficulty occurs in the presence of moderate winds and waves, when polyethylene sheet buckles and overturns. To overcome this difficulty it was decided to utilize polyethylene foam stiffened and weighted with flexible metallic strips.

The present modification grew from a requirement for approximately 100 drifters capable of being launched and monitored from an aircraft at several hundred meters altitude. A design meeting these constraints is shown schematically in Figure 2. The design consists of polyethylene foam (closed-cell type) measuring 1.3 x 1.3 x 0.0032 m, reinforced and weighted on bottom with 12 m of venetian blind slats (≈ 0.4 kg) and lead strips (≈ 0.5 kg); and painted on top a black alphameric code superimposed on a fluorescent red background (see Table 1 for materials list). Considering the mass and dimensions of the various materials, water pooled on the drifter's surface, and the double-layering of venetian blind slats, the computed ratio of cross-sectional area above to that below the water surface is approximately 0.11 and comparable to 0.12 for polyethylene sheet.

For aerial launch the drifters were rolled and fastened by strings having dissolvable linkage (in this case Alka-Seltzer tablets). After jettison, drifters land in tubular configuration whereupon lead weights on the strings cause rotation of the tubes, submerging and dissolving the linkages. In sequence, the weighted strings sink and the drifter unrolls by spring-action of the venetian blind slats thus exposing the drifters' coded upper surface. Taped to each drifter were plastic cards requesting finders to report drifters' codes and times and places of recoveries.

Field tests revealed two difficulties: 1) without lead weights, drifters were overturned by winds at speeds exceeding roughly 15 knots; and 2) it is impractical to launch weighted drogues from an aircraft with side-opening type doors. Because of these difficulties lead weights were added on 21, 22 and 23 July and all drifters were launched from a small boat.

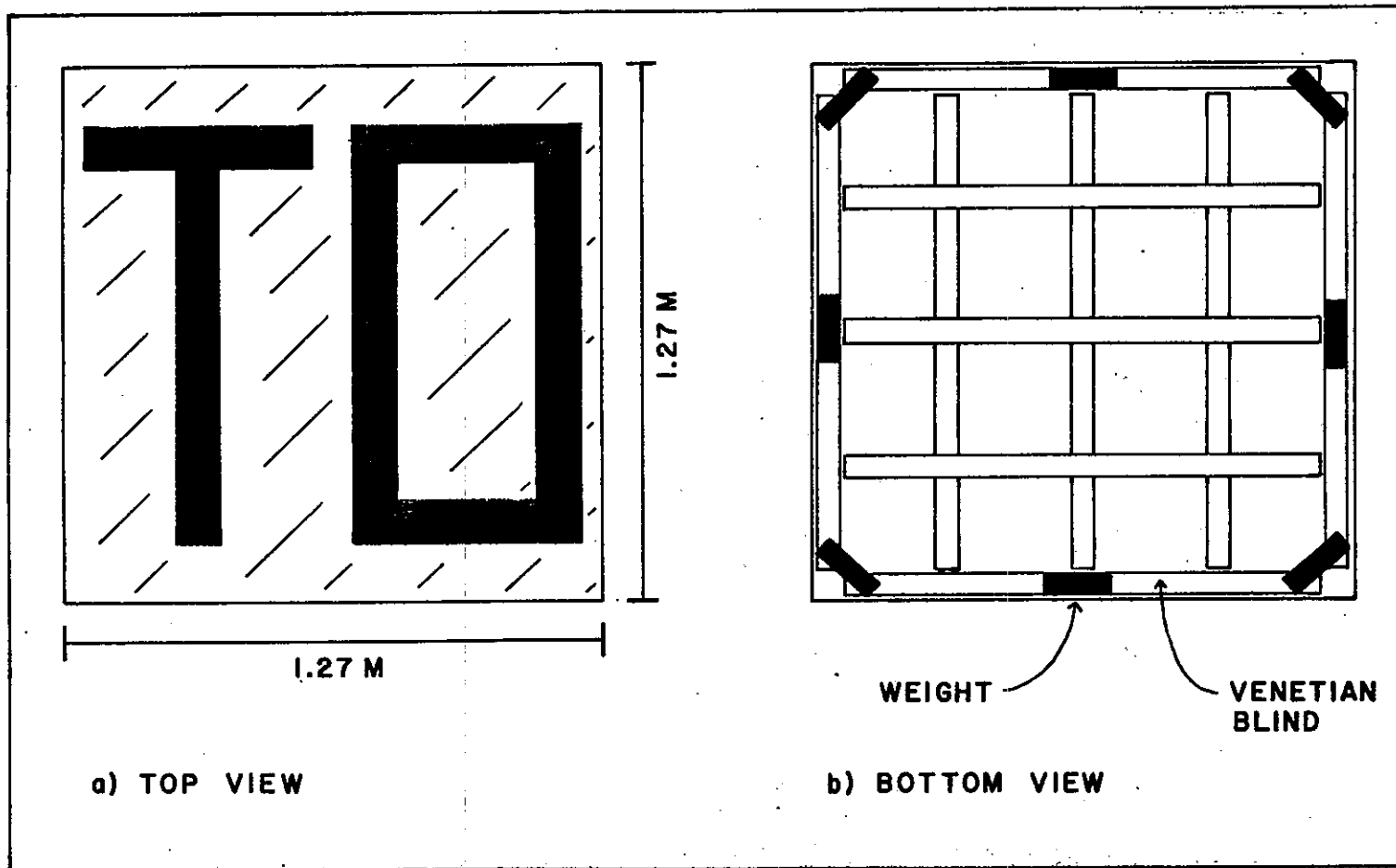


Figure 2. Schematic of drifter, top and bottom views.

Table 1. Materials list for drifter.

| Item description | Amount used per drifter | Mass/drifter (kg) | Dimensions | Remarks |
|-------------------------|-------------------------|-------------------|--------------------------|---------------------------------------|
| Polyethylene foam | 1.61 m ² | ~ 0.18 | 1.3 x 1.3 x 0.0032 m | Packaging material known as Ethafoam. |
| Flourescent paint | 0.114 l | | | |
| Weights | 0.53 kg | 0.53 | ~ 0.15 x 0.03 x 0.0016 m | Plummers lead. |
| Underside reinforcement | 11.2 m | 0.40 | 1.2 x 0.05 x 0.0048 m | Aluminum venetian blind slats. |
| Tape | 9.1 m | <u>0.03</u> | | Nashua brand filament tape. |
| Total | | 1.14 ^a | | |

^a Under field conditions it is estimated that typically two liters (~2.1 kg) of water formed in shallow pools on the drogues' topside. The mass of water displaced by the drifter's volume \approx 5.3 kg.

2.2 Drifter Positioning

A total of 77 drifters were launched 13-18 per day during 19-23 July (Table 2). Positions of each drifter were periodically recorded using a Mini-Ranger III System (abbreviated MRS) manufactured by Motorola Inc. The MRS operates on the principle of pulse radar and uses a mobile transmitter to interrogate two transponders within line-of-sight located onshore at known positions. The transmitter's position is displayed as ranges to the two transponders. Within the MRS' 37 km maximum range, the probable accuracy of the range measurement is three meters (Motorola Inc., 1974).

For this experiment the MRS transmitter was mounted on the port strut of a Cessna 172 aircraft, and wired to the MRS display console read manually within the aircraft. Transponders were positioned near Shipwreck Point (designated code 1), and near the mouth of Twin River (designated code 4) (Figure 3). With the aircraft suitably oriented above a drifter it was determined that reasonably accurate positions could be obtained from an altitude of about 100 m at speeds of 30-40 m/sec. Ten test runs over a fixed object gave a standard deviation in position of approximately ten meters.

In the morning 13-18 drifters were released at 1/4 - 1 mile intervals along a transect north from Pillar Point (Figure 3). Canadian military operations in a restricted area (Figure 1) prevented releases in Canadian waters on selected days. Initially positions of each drifter were obtained three times per hour when patterns were regular and waves lower. In the afternoon with irregular patterns and higher waves, positions were obtained one to two times per hour.

Approximately 33 flight hours were spent in the study area obtaining 700 positions of 77 drifters; or an average of two to three minutes per position; nine positions per drifter; and six to seven flight hours per day. Additionally 23 flight hours were spent as follows: 7 hours - transit time between study area and Port Angeles airfield at four hour intervals for refueling and crew changes; 6 hours - field tests; 7 hours - searches for drifters on or near shore; and 3 hours - transit time between Port Angeles airfield and base hangar of Snohomish Flying Service at Harvey Field.

3. DATA REDUCTION AND PRESENTATION

The time and ranges for each drifter position were digitized and the following computations performed (Plate 1): 1) latitude and longitude (degrees and minutes); 2) speed and direction; 3) speed components in a coordinate system aligned approximately with axes of Outer Strait of Juan de Fuca (positive cross channel reckoned along 24° True, and positive long channel 114° True). With a probable positioning error of ten meters and 20-60 minutes between positions, the estimated error in drifter speed is less than two cm/sec, a few percent of typical speeds.

From these tabulations were obtained trajectories of each drifter (Plate 2), and spatial vector diagrams for selected time intervals (Plate 3). The vector diagrams portray speed and direction as functions of

Table 2. Summary of observations.

| Date | Number of Drifters Launched | (1) Time (GMT) First Position Obtained | (2) Time (GMT) Last Position Obtained | (2) (1) hours | Tidal Phase | Maximum components of mean current ^a | | Weights Attached to Underside |
|---------|-----------------------------|--|---------------------------------------|---------------|-------------|---|----------------------------|-------------------------------|
| | | | | | | Long channel ^a | Cross channel ^a | |
| 19 July | 14 | 2035 | 0235 | 6.0 | Flood | 76.8 | -23.9 | No |
| 20 July | 18 | 1727 | 2211 | 4.7 | Ebb | -92.5 | 25.9 | No |
| 21 July | 15 | 1739 | 0032 | 6.9 | Ebb | -67.3 | -19.9 | Yes |
| | | | | | Flood | 45.1 | -33.1 | |
| 22 July | 13 | 1846 | 0207 | 7.3 | Ebb | -51.4 | -10.0 | Yes |
| | | | | | Flood | 78.4 | -26.5 | |
| 23 July | 17 | 1918 | 0334 | 8.3 | Ebb | -34.5 | 11.1 | Yes |
| | | | | | Flood | 50.9 | -11.9 | |
| Total | 77 | | | 33.2 | | | | |

^aPositive reckoned as follows: Positive long channel direction = 114° True.
Positive cross channel direction = 24° True.

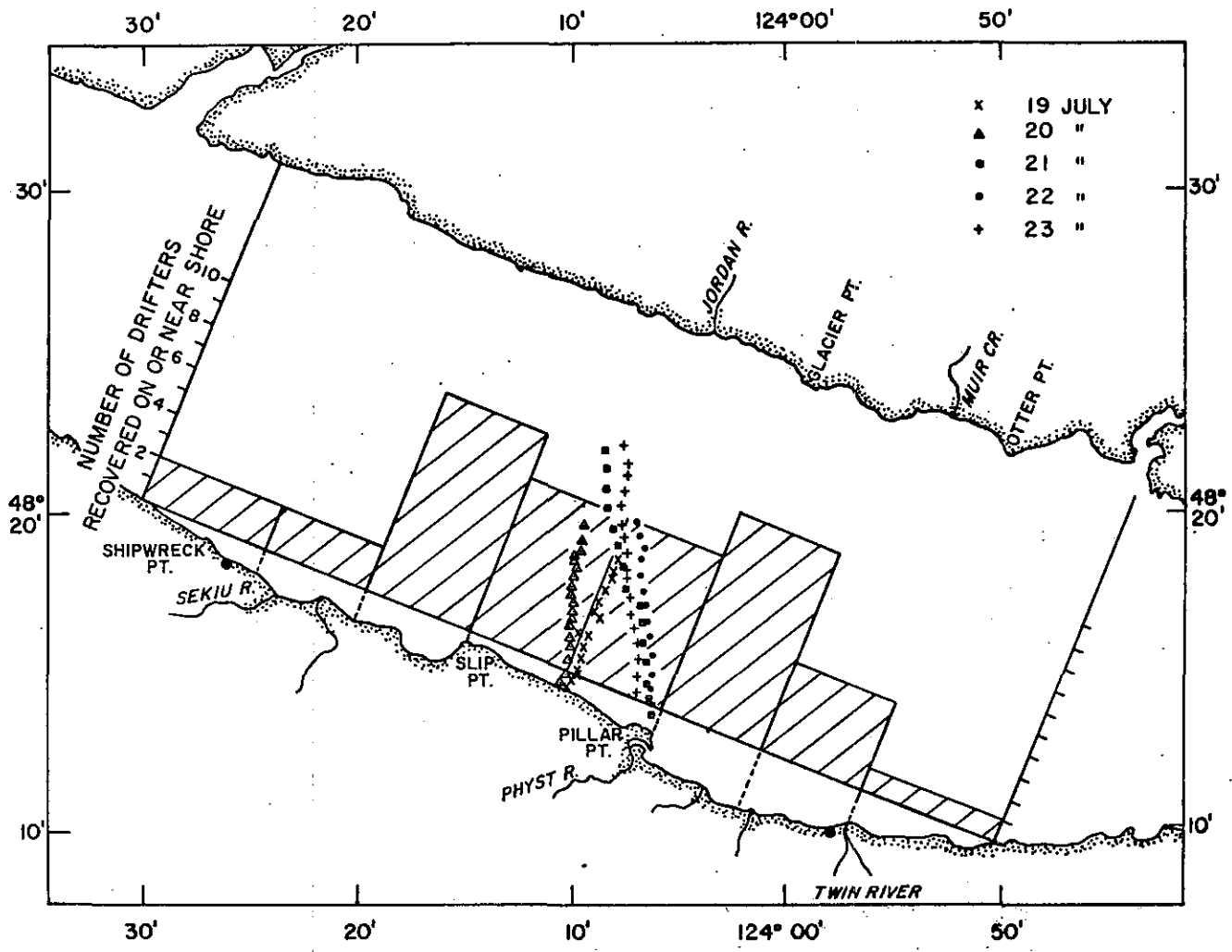


Figure 3. Release positions (legend at upper right) and histogram of drifter sightings and recoveries on or near shore. Dots mark transponder positions.

latitude and longitude, where the latter scale has been segmented for editorial purposes.

Winds recorded at selected shore stations (Figure 1) have been tabulated in Plate 4 and displayed graphically in Figure 4 together with tidal currents predicted for Pillar Point.

4. DISCUSSION

Drifter movement depends on winds, waves and currents. In the absence of results from PMEL's moorings qualitative discussion is given.

In Outer Strait of Juan de Fuca winds are constrained by topography to primarily easterly and westerly directions. Winds observed at Victoria during 1922-1946 have been summarized by Boughner and Thomas (1948). Analysis of percentage frequencies suggests that easterly winds prevail in the study area during October-March; and that westerly winds predominate April-September. During the present experiment westerlies prevailed almost exclusively, typically increasing in speed from morning to afternoon (Figure 4).

Tidal current predictions are given by the National Oceanic and Atmospheric Administration (1977) for Pillar Point (Figure 4). These predictions are reference to the Strait of Juan de Fuca's entrance, and include some contribution of mean current. Figure 5 shows long channel speeds, averaged for drifters at selected times, superimposed on predicted currents. The difference in speed appears on the order of several percent of prevailing wind speeds.

Inspection of the trajectories indicates that on flood under westerlies there is an apparent cross channel movement toward U.S. shore. This tendency is particularly apparent in Figure 6 where launch positions are connected to sighting and recoveries on or near shore (41 of 77 drifters). No sightings or recoveries were reported on or near Canadian shore. Complementary to Figure 6 is Figure 3 showing a histogram of sightings/recoveries near shore versus longshore position. The occurrences in Clallam Bay and in the lee of Pillar Point appear high and indicate these as possible entrapment areas.

Figure 7 shows intervals between releases and sightings/recoveries on or near shore. Because near shore surveys were conducted only twice a day these intervals may be overestimated by as much as twenty hours.

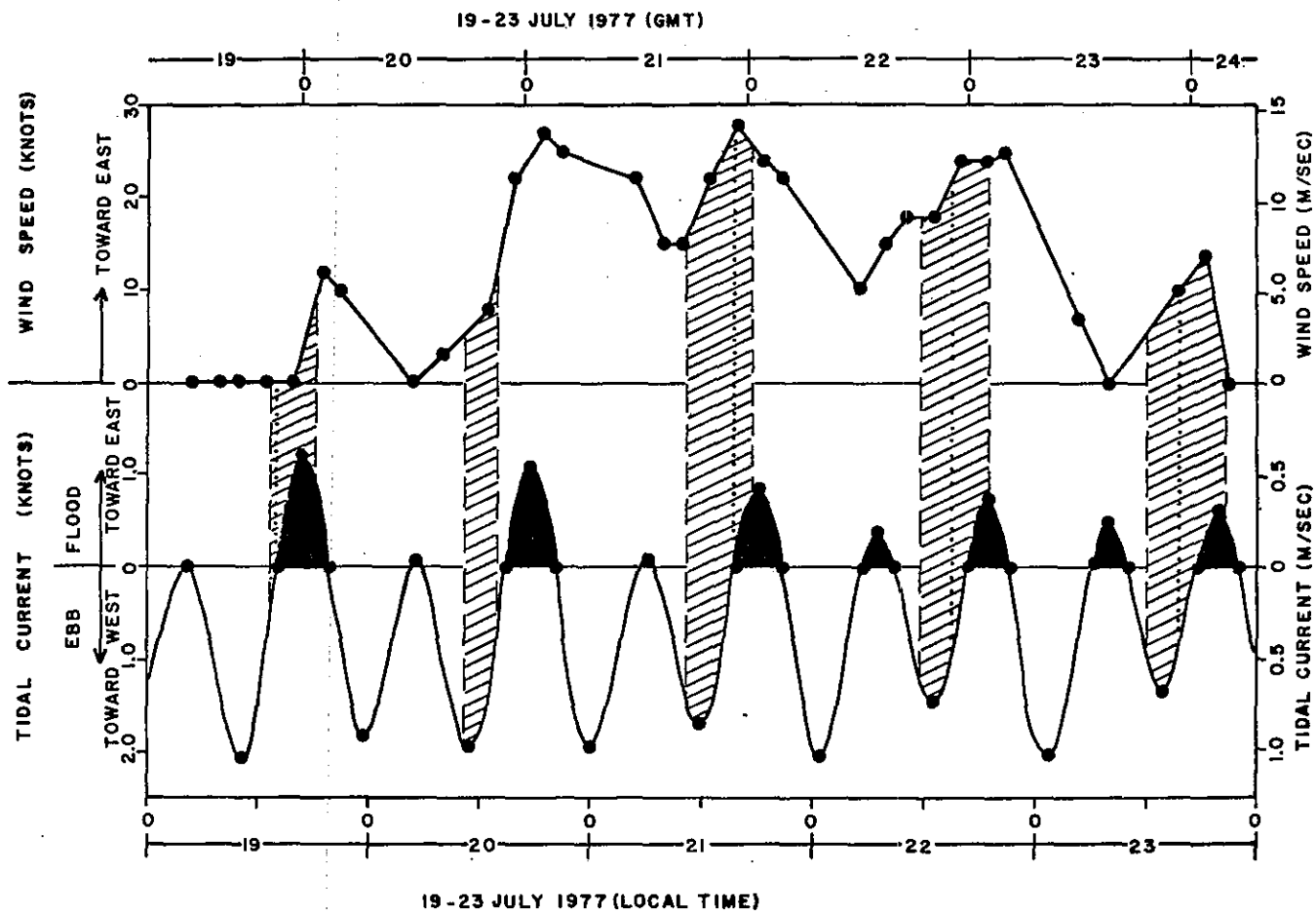


Figure 4. Top: westerly winds observed (●) at Sheringham Point. Bottom: currents predicted (●) at Pillar Point by National Oceanic and Atmospheric Administration (1977). Notation: hatched area denote intervals of drifter trajectories (Plate 1); vertical dotted lines denote approximate times of slack water from drifter trajectories; and shaded areas denote flood tide currents from west.

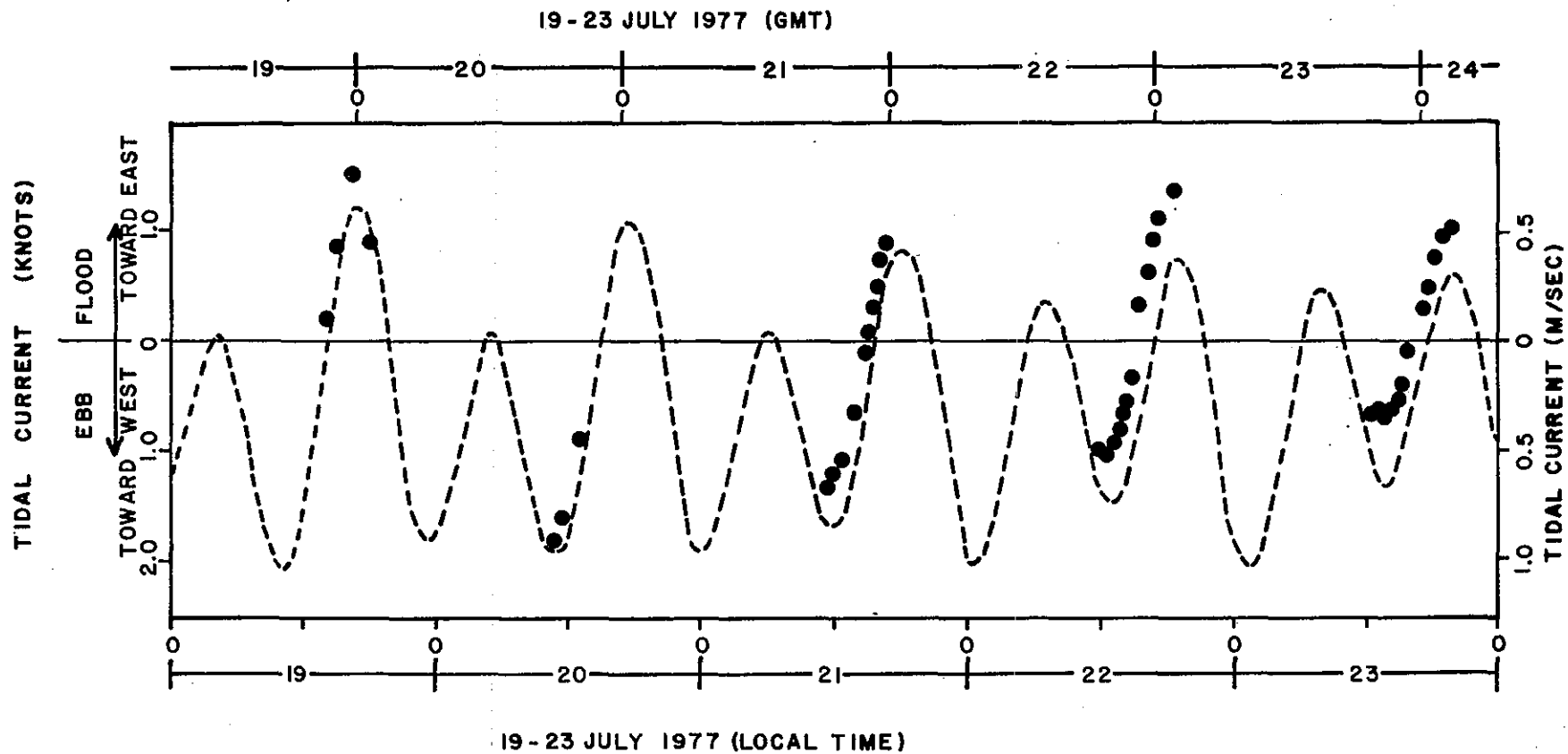


Figure 5. Mean observed long channel current speed (●) and predicted currents (---). See Table 3 for values of mean currents.

Table 3. Summary of mean currents.

| Date | Mean Time (GMT) | Speed (cm/S) | Direction ($^{\circ}$ True) | Current Speed Components (cm/s) | |
|------|-----------------|--------------|------------------------------|-------------------------------------|-------------------------------------|
| | | | | Long channel (+ at 114° T) | Cross channel (+ at 24° T) |
| 19 | 2120 | 11.8 | 145.6 | 10.0 | -6.1 |
| | 2216 | 44.9 | 127.2 | 43.7 | -10.2 |
| | 2344 | 79.3 | 128.4 | 76.8 | -19.5 |
| | 0120 | 52.8 | 141.1 | 47.1 | -23.9 |
| 20 | 1800 | 93.1 | 300.5 | -92.5 | 10.4 |
| | 1844 | 84.3 | 312.0 | -80.2 | 25.9 |
| | 2007 | 50.5 | 324.3 | -43.6 | 25.4 |
| 21 | 1835 | 67.4 | 292.2 | -67.3 | -2.3 |
| | 1909 | 60.4 | 296.6 | -60.4 | 2.6 |
| | 1950 | 54.6 | 296.3 | -54.5 | 2.1 |
| | 2056 | 34.3 | 290.7 | -34.2 | -2.1 |
| | 2158 | 20.8 | 221.1 | -6.1 | -19.9 |
| | 2220 | 19.7 | 192.1 | 4.1 | -19.3 |
| | 2240 | 27.7 | 172.1 | 14.7 | -23.5 |
| | 2303 | 36.0 | 159.1 | 25.4 | -25.4 |
| | 2323 | 49.3 | 156.3 | 36.5 | -33.1 |
| | 2345 | 52.1 | 144.1 | 45.1 | -26.0 |
| 22 | 1909 | 51.6 | 282.9 | -50.6 | -10.0 |
| | 1947 | 51.6 | 289.5 | -51.4 | -4.1 |
| | 2024 | 48.1 | 296.3 | -48.0 | 1.8 |
| | 2047 | 40.8 | 298.8 | -40.7 | 3.3 |
| | 2109 | 33.5 | 296.2 | -33.5 | 1.2 |
| | 2132 | 28.9 | 290.0 | -28.8 | -2.0 |
| | 2155 | 17.9 | 283.1 | -17.6 | -3.4 |
| | 2240 | 10.1 | 168.6 | 5.9 | -8.2 |
| | 2333 | 34.9 | 135.8 | 32.4 | -12.9 |
| | 2357 | 49.4 | 134.2 | 46.4 | -17.0 |
| | 0021 | 59.5 | 129.5 | 57.4 | -15.8 |
| | 0103 | 71.8 | 128.3 | 69.6 | -17.7 |
| | 0143 | 82.7 | 132.8 | 78.4 | -26.5 |

Table 3 Cont'd.

| Date | Mean Time (GMT) | Speed (cm/S) | Direction ($^{\circ}$ True) | Long channel (+ at 114° T) | Cross channel (+ at 24° T) |
|------|-----------------|--------------|------------------------------|-------------------------------------|-------------------------------------|
| 23 | 1942 | 34.0 | 301.6 | -33.7 | 4.5 |
| | 2010 | 33.9 | 308.7 | -32.8 | 8.5 |
| | 2036 | 35.8 | 309.7 | -34.5 | 9.5 |
| | 2104 | 35.4 | 312.4 | -33.6 | 11.1 |
| | 2130 | 32.8 | 312.3 | -31.2 | 10.2 |
| | 2158 | 30.2 | 314.1 | -28.4 | 10.3 |
| | 2220 | 23.0 | 311.6 | -21.9 | 6.9 |
| | 2247 | 6.1 | 307.4 | -5.9 | 1.4 |
| | 0014 | 14.7 | 109.5 | 14.7 | 1.2 |
| | 0047 | 24.1 | 118.5 | 24.1 | -1.9 |
| | 0124 | 38.1 | 120.5 | 37.9 | -4.2 |
| | 0202 | 49.1 | 126.1 | 48.0 | -10.2 |
| | 0251 | 52.3 | 127.3 | 50.9 | -11.9 |

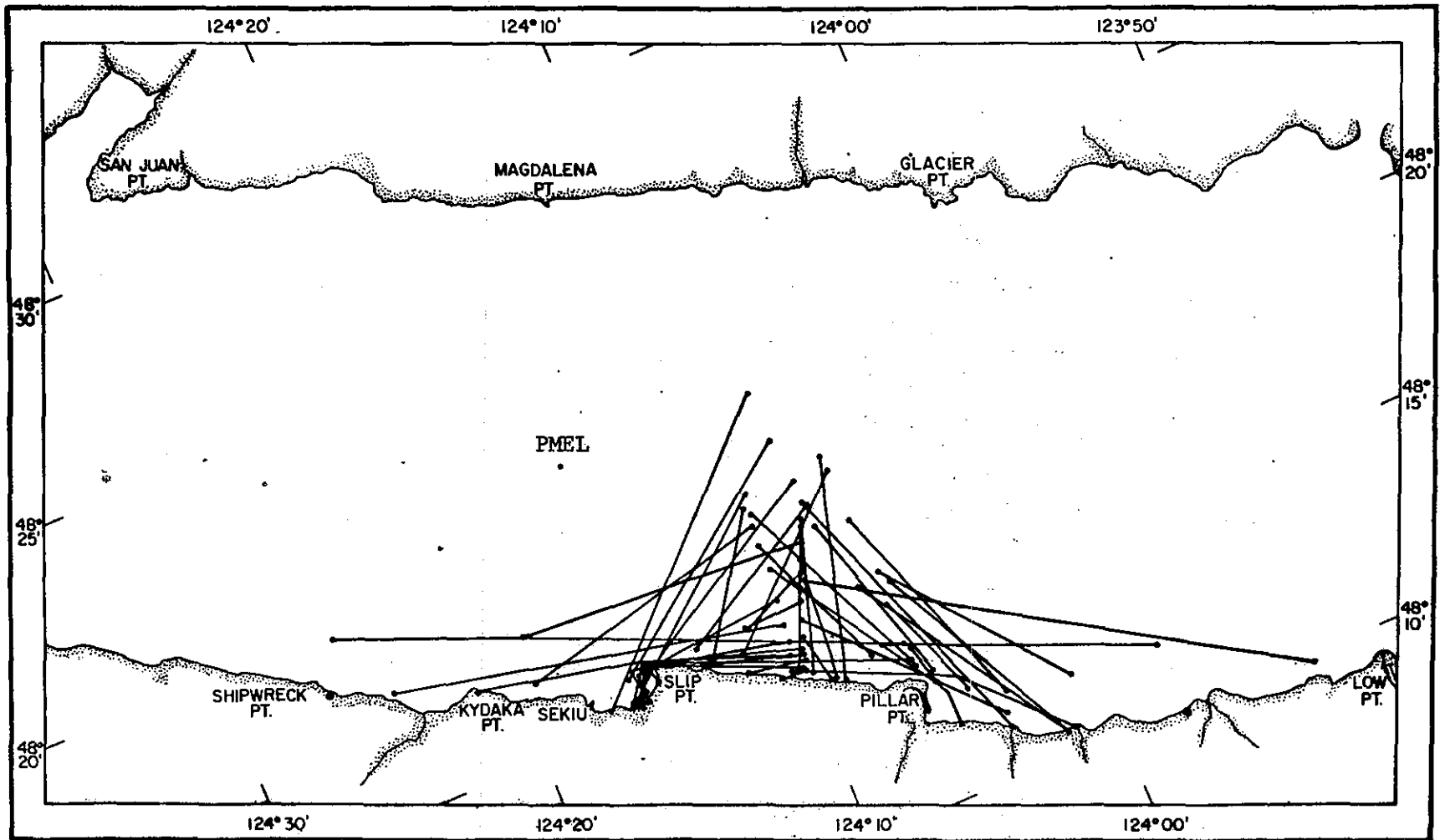


Figure 6. Shoreward drifter movement. Lines connect drifter release positions to sightings and recoveries on or near shore. Dot at left marks PMEL's mooring.

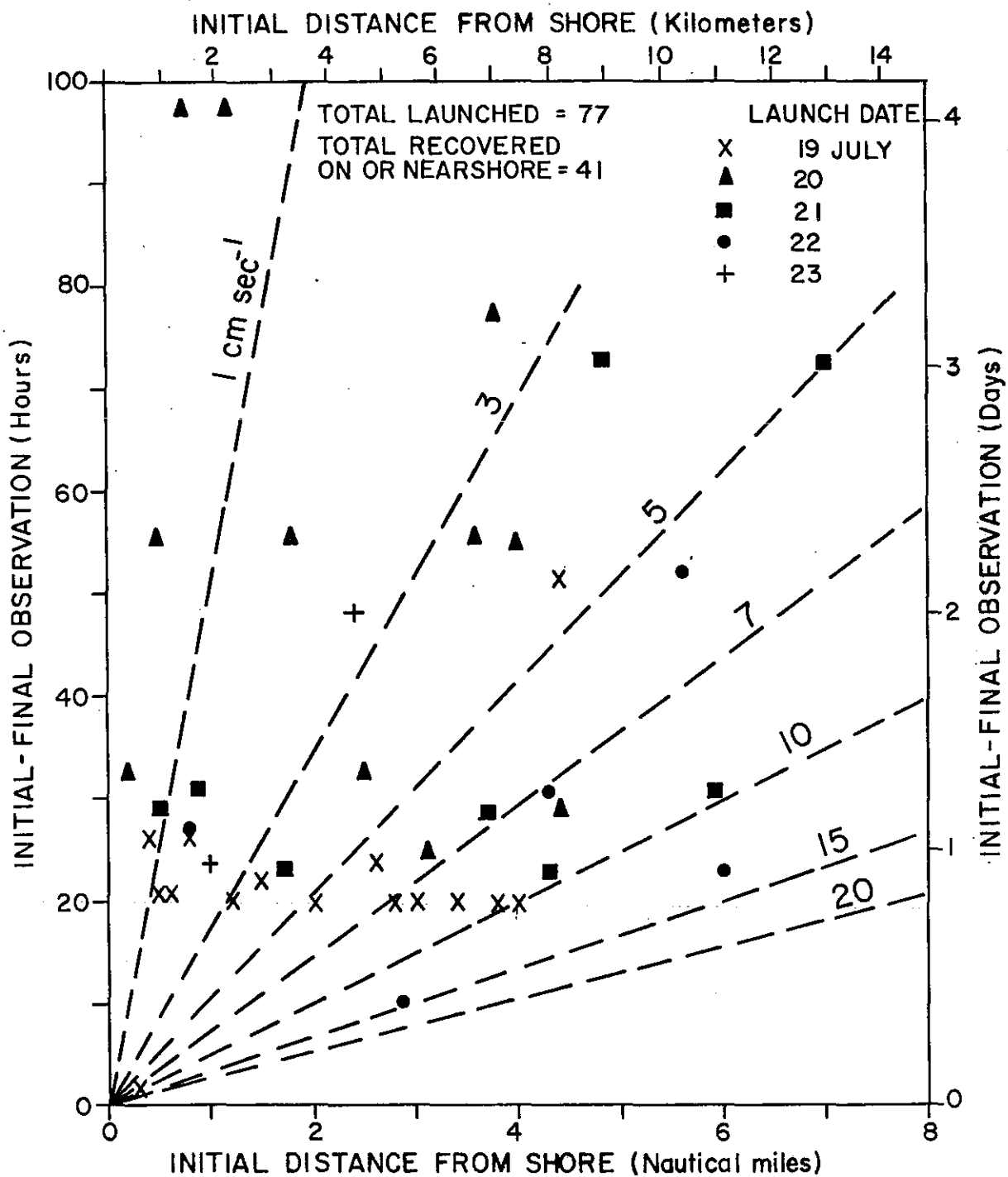


Figure 7. Estimated time between release and recovery and/or sighting on or near shore versus distance offshore. Note: Arrival times nearshore may be in error by as much as twenty hours.

5. ACKNOWLEDGEMENTS

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We are also grateful to Ronald Kopenski and R. Michael Reynolds for providing liaison with the MESA Puget Sound Project office and PMEL, respectively.

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Plate 1a. Drifter positions and velocities.

DATE - 19 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|-------------|------------|-----|-----|-------------|-------------|----------|-----------|----------------|----------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| A6 | 14 | 17 | 0 | 21129 | 19238 | 48 16.20 | 124 9.74 | | | | |
| A6 | 14 | 27 | 50 | 20946 | 19372 | 48 16.18 | 124 9.90 | 30.5 | 259.6 | -25.1 | -17.3 |
| A6 | 14 | 35 | 37 | 20700 | 19608 | 48 16.23 | 124 10.09 | 53.0 | 290.0 | -52.6 | -3.8 |
| A6 | 14 | 48 | 28 | 20295 | 19978 | 48 16.28 | 124 10.41 | 52.5 | 282.4 | -51.4 | -10.6 |
| NO | 21 | 2 | 8 | 23182 | 20134 | 48 18.30 | 124 7.71 | | | | |
| NO | 22 | 4 | 42 | 24566 | 18493 | 48 17.75 | 124 6.62 | 45.0 | 127.5 | 43.8 | -10.4 |
| NO | 22 | 50 | 7 | 25979 | 16341 | 48 16.80 | 124 5.61 | 79.1 | 144.5 | 68.2 | -40.1 |
| NO | 0 | 52 | 18 | 30853 | 10196 | 48 14.30 | 124 2.35 | 83.9 | 138.9 | 76.2 | -35.2 |
| NO | 2 | 34 | 32 | 32490 | 7541 | 48 12.81 | 124 1.65 | 47.1 | 162.6 | 31.2 | -35.3 |
| N1 | 20 | 59 | 42 | 22933 | 19848 | 48 17.98 | 124 7.93 | | | | |
| N1 | 22 | 3 | 6 | 24360 | 18353 | 48 17.55 | 124 6.81 | 41.8 | 119.8 | 41.6 | -4.2 |
| N1 | 22 | 48 | 44 | 26003 | 16286 | 48 16.77 | 124 5.60 | 76.1 | 133.9 | 71.5 | -25.8 |
| N1 | 0 | 45 | 51 | 30826 | 10242 | 48 14.32 | 124 2.36 | 86.2 | 138.5 | 78.5 | -35.6 |
| N1 | 2 | 8 | 1 | 32309 | 7951 | 48 13.11 | 124 1.65 | 48.8 | 158.6 | 34.8 | -34.2 |
| N1 | 2 | 29 | 40 | 32586 | 7486 | 48 12.83 | 124 1.56 | 41.6 | 167.8 | 24.6 | -33.5 |
| N2 | 20 | 58 | 38 | 22784 | 19689 | 48 17.78 | 124 8.06 | | | | |
| N2 | 22 | 1 | 13 | 24017 | 18447 | 48 17.45 | 124 7.10 | 35.6 | 117.0 | 35.5 | -1.8 |
| N2 | 22 | 51 | 43 | 25941 | 16321 | 48 16.77 | 124 5.65 | 72.6 | 125.3 | 71.2 | -14.1 |
| N2 | 0 | 54 | 41 | 31002 | 10023 | 48 14.23 | 124 2.25 | 85.5 | 139.2 | 78.1 | -34.9 |
| N2 | 2 | 23 | 42 | 32473 | 7664 | 48 12.94 | 124 1.60 | 47.4 | 161.5 | 32.1 | -34.9 |
| N3 | 20 | 55 | 23 | 22570 | 19371 | 48 17.41 | 124 8.28 | | | | |
| N3 | 21 | 59 | 7 | 23556 | 18423 | 48 17.19 | 124 7.52 | 27.0 | 113.1 | 27.0 | .5 |
| N3 | 22 | 46 | 55 | 25134 | 16614 | 48 16.58 | 124 6.35 | 63.9 | 128.1 | 62.0 | -15.5 |
| N3 | 0 | 49 | 51 | 30697 | 10324 | 48 14.32 | 124 2.47 | 86.3 | 131.0 | 82.6 | -25.1 |
| N3 | 2 | 6 | 19 | 32254 | 8016 | 48 13.14 | 124 1.68 | 52.2 | 156.1 | 38.8 | -35.0 |
| N3 | 2 | 27 | 50 | 32491 | 7582 | 48 12.86 | 124 1.63 | 41.0 | 172.1 | 21.7 | -34.7 |

Plate 1a. continued.

DATE - 19 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| N4 | 20 | 52 | 9 | 22286 | 19164 | 48 17.05 | 124 8.57 | | | | |
| N4 | 21 | 56 | 51 | 22910 | 18436 | 48 16.80 | 124 8.12 | 18.8 | 129.1 | 18.2 | -4.9 |
| N4 | 22 | 45 | 1 | 24596 | 16688 | 48 16.32 | 124 6.85 | 62.5 | 120.1 | 62.1 | -6.5 |
| N4 | 0 | 44 | 58 | 30176 | 10482 | 48 14.16 | 124 2.97 | 86.9 | 129.8 | 83.6 | -23.5 |
| N4 | 2 | 1 | 51 | 32183 | 7719 | 48 12.74 | 124 1.95 | 63.0 | 154.1 | 48.3 | -40.6 |
| N5 | 20 | 50 | 14 | 22208 | 16901 | 48 16.75 | 124 8.70 | | | | |
| N5 | 21 | 53 | 3 | 22879 | 18224 | 48 16.58 | 124 8.19 | 18.7 | 116.6 | 18.7 | -.8 |
| N5 | 22 | 43 | 17 | 24451 | 16519 | 48 16.06 | 124 7.05 | 57.2 | 124.5 | 56.3 | -10.4 |
| N5 | 0 | 40 | 52 | 29944 | 10523 | 48 14.04 | 124 3.22 | 85.5 | 128.3 | 82.9 | -21.0 |
| N5 | 1 | 52 | 42 | 32188 | 7762 | 48 12.80 | 124 1.91 | 65.0 | 144.7 | 55.9 | -33.0 |
| N5 | 1 | 59 | 17 | 32346 | 7539 | 48 12.68 | 124 1.85 | 63.6 | 160.7 | 43.7 | -46.2 |
| N6 | 20 | 48 | 35 | 22336 | 18699 | 48 16.65 | 124 8.62 | | | | |
| N6 | 21 | 55 | 6 | 22901 | 18038 | 48 16.42 | 124 8.22 | 16.6 | 131.0 | 15.8 | -4.8 |
| N6 | 22 | 42 | 1 | 24549 | 16375 | 48 15.98 | 124 6.99 | 61.2 | 117.7 | 61.0 | -3.8 |
| N6 | 0 | 35 | 11 | 29883 | 10640 | 48 14.11 | 124 3.24 | 85.3 | 126.8 | 83.2 | -18.8 |
| N7 | 20 | 46 | 50 | 21952 | 18485 | 48 16.10 | 124 9.10 | | | | |
| N7 | 21 | 50 | 42 | 22314 | 18222 | 48 16.13 | 124 8.79 | 10.1 | 81.7 | 8.5 | 5.4 |
| N7 | 22 | 40 | 6 | 23794 | 16728 | 48 15.75 | 124 7.69 | 51.6 | 117.1 | 51.6 | -2.7 |
| N7 | 0 | 42 | 33 | 29915 | 10472 | 48 13.96 | 124 3.28 | 86.9 | 121.3 | 86.2 | -10.9 |
| N8 | 20 | 45 | 15 | 21841 | 18276 | 48 15.71 | 124 9.32 | | | | |
| N8 | 21 | 48 | 52 | 21880 | 18385 | 48 15.90 | 124 9.22 | 9.8 | 19.7 | -.6 | 9.8 |
| N8 | 22 | 38 | 3 | 23156 | 17147 | 48 15.64 | 124 8.25 | 43.7 | 111.5 | 43.6 | 2.0 |
| N8 | 0 | 32 | 0 | 28625 | 11660 | 48 14.21 | 124 4.26 | 82.1 | 118.2 | 81.9 | -5.9 |

Plate 1a. Continued.

DATE - 19 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DFG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| N9 | 20 | 42 | 3 | 21768 | 18069 | 48 15.29 | 124 9.56 | | | | |
| N9 | 21 | 46 | 5 | 20848 | 18855 | 48 15.24 | 124 10.35 | 25.8 | 265.0 | -22.5 | -12.6 |
| N9 | 22 | 34 | 57 | 21286 | 18374 | 48 15.05 | 124 10.07 | 16.9 | 135.7 | 15.7 | -6.2 |
| N9 | 0 | 13 | 46 | 24716 | 14918 | 48 14.20 | 124 7.58 | 58.5 | 117.1 | 58.4 | -3.0 |
| N9 | 1 | 38 | 26 | 28416 | 11455 | 48 13.72 | 124 4.66 | 73.1 | 103.7 | 71.9 | 13.2 |
| | | | | | | | | | | | |
| T0 | 20 | 40 | 5 | 21763 | 17918 | 48 14.99 | 124 9.70 | | | | |
| T0 | 21 | 44 | 29 | 20532 | 16982 | 48 14.83 | 124 10.83 | 37.1 | 258.2 | -30.0 | -21.7 |
| T0 | 22 | 32 | 50 | 20687 | 18806 | 48 14.72 | 124 10.76 | 7.6 | 155.1 | 5.7 | -5.0 |
| T0 | 0 | 6 | 1 | 23679 | 15811 | 48 14.04 | 124 8.56 | 53.7 | 114.9 | 53.7 | -8 |
| T0 | 1 | 24 | 44 | 26694 | 12874 | 48 13.57 | 124 6.22 | 64.0 | 106.6 | 63.5 | 8.3 |
| | | | | | | | | | | | |
| T1 | 21 | 42 | 8 | 20335 | 19112 | 48 14.61 | 124 11.13 | | | | |
| T1 | 22 | 31 | 3 | 20380 | 19058 | 48 14.55 | 124 11.12 | 3.6 | 176.4 | 1.7 | -3.2 |
| | | | | | | | | | | | |
| T2 | 20 | 35 | 20 | 21866 | 17732 | 48 14.77 | 124 9.72 | | | | |
| T2 | 21 | 40 | 22 | 20419 | 19017 | 48 14.53 | 124 11.10 | 45.2 | 255.3 | -35.3 | -28.3 |
| T2 | 22 | 29 | 21 | 20361 | 19072 | 48 14.52 | 124 11.15 | 2.3 | 262.8 | -1.9 | -1.2 |

Plate 1b. Drifter positions and velocities.

DATE - 20 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| E0 | 17 | 54 | 50 | 21283 | 23109 | 48 19.51 | 124 9.29 | | | | |
| E0 | 18 | 29 | 30 | 19554 | 24754 | 48 19.85 | 124 10.75 | 91.5 | 289.0 | -91.1 | -8.1 |
| E0 | 19 | 1 | 36 | 19007 | 26001 | 48 20.41 | 124 11.32 | 65.3 | 325.7 | -55.6 | 34.2 |
| E1 | 17 | 53 | 29 | 20995 | 22579 | 48 19.03 | 124 9.48 | | | | |
| E1 | 18 | 28 | 8 | 19557 | 24231 | 48 19.50 | 124 10.69 | 83.3 | 300.3 | -82.8 | 9.0 |
| E1 | 19 | 0 | 17 | 18505 | 25550 | 48 19.90 | 124 11.61 | 70.4 | 303.0 | -69.5 | 10.9 |
| E1 | 22 | 11 | 26 | 17569 | 27204 | 48 20.54 | 124 12.54 | 14.4 | 315.9 | -13.4 | 5.4 |
| E2 | 17 | 52 | 18 | 20891 | 22172 | 48 18.69 | 124 9.55 | | | | |
| E2 | 18 | 24 | 47 | 19493 | 23778 | 48 19.15 | 124 10.71 | 85.5 | 301.2 | -84.8 | 10.6 |
| E2 | 18 | 58 | 49 | 18299 | 25270 | 48 19.61 | 124 11.73 | 74.6 | 304.0 | -73.5 | 12.8 |
| E3 | 17 | 57 | 17 | 20529 | 22314 | 48 18.61 | 124 9.85 | | | | |
| E3 | 18 | 26 | 13 | 19298 | 23776 | 48 19.05 | 124 10.86 | 86.2 | 303.4 | -85.1 | 13.9 |
| E3 | 18 | 57 | 6 | 18215 | 25172 | 48 19.50 | 124 11.78 | 76.3 | 306.1 | -74.6 | 15.9 |
| E4 | 17 | 50 | 58 | 20832 | 21980 | 48 18.51 | 124 9.60 | | | | |
| E4 | 17 | 58 | 41 | 20357 | 22271 | 48 18.48 | 124 9.99 | 103.4 | 263.4 | -88.9 | -52.7 |
| E4 | 18 | 23 | 1 | 19271 | 23507 | 48 18.84 | 124 10.87 | 87.2 | 301.1 | -86.6 | 10.7 |
| E4 | 19 | 4 | 1 | 17819 | 25395 | 48 19.46 | 124 12.09 | 77.4 | 307.1 | -75.4 | 17.4 |
| E5 | 17 | 49 | 31 | 20668 | 21604 | 48 18.14 | 124 9.75 | | | | |
| E5 | 18 | 32 | 45 | 18630 | 23910 | 48 18.80 | 124 11.38 | 91.2 | 301.2 | -90.5 | 11.3 |
| E5 | 19 | 6 | 58 | 17350 | 25593 | 48 19.36 | 124 12.46 | 82.3 | 307.9 | -80.0 | 19.6 |
| E6 | 17 | 48 | 0 | 20579 | 21355 | 48 17.88 | 124 9.84 | | | | |
| E6 | 18 | 21 | 19 | 18968 | 23148 | 48 18.39 | 124 11.11 | 91.8 | 301.0 | -91.1 | 11.0 |
| E6 | 19 | 5 | 29 | 17203 | 25472 | 48 19.19 | 124 12.56 | 87.8 | 309.5 | -84.7 | 23.3 |

Plate 1b. Continued.

DATE - 20 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| E7 | 17 | 46 | 18 | 20597 | 21052 | 48 17.63 | 124 9.85 | | | | |
| E7 | 18 | 19 | 55 | 18947 | 22863 | 48 18.14 | 124 11.14 | 91.7 | 300.6 | -91.1 | 10.4 |
| E7 | 19 | 8 | 44 | 17034 | 25392 | 48 19.03 | 124 12.69 | 86.4 | 310.8 | -82.7 | 24.8 |
| E8 | 17 | 43 | 3 | 20653 | 20683 | 48 17.34 | 124 9.85 | | | | |
| E8 | 17 | 44 | 35 | 20633 | 20723 | 48 17.36 | 124 9.86 | 49.5 | 340.4 | -34.2 | 35.8 |
| E8 | 18 | 17 | 21 | 18954 | 22576 | 48 17.89 | 124 11.15 | 95.6 | 301.8 | -94.7 | 12.8 |
| E8 | 19 | 10 | 18 | 16967 | 25314 | 48 18.93 | 124 12.73 | 86.3 | 314.6 | -80.9 | 30.2 |
| E8 | 19 | 15 | 0 | 16822 | 25508 | 48 19.00 | 124 12.85 | 68.8 | 309.3 | -66.4 | 18.1 |
| E9 | 17 | 39 | 52 | 20732 | 20343 | 48 17.07 | 124 9.84 | | | | |
| E9 | 17 | 41 | 38 | 20620 | 20469 | 48 17.11 | 124 9.92 | 119.4 | 305.5 | -117.0 | 23.5 |
| E9 | 18 | 18 | 43 | 18825 | 22556 | 48 17.79 | 124 11.27 | 94.0 | 307.0 | -91.6 | 21.0 |
| E9 | 19 | 16 | 10 | 16744 | 25445 | 48 18.90 | 124 12.91 | 84.1 | 315.5 | -78.3 | 30.7 |
| H0 | 17 | 38 | 16 | 20739 | 20098 | 48 16.83 | 124 9.89 | | | | |
| H0 | 18 | 15 | 50 | 18833 | 22273 | 48 17.53 | 124 11.30 | 96.6 | 306.5 | -94.4 | 20.8 |
| H0 | 19 | 11 | 56 | 16706 | 25192 | 48 18.68 | 124 12.94 | 87.3 | 316.5 | -80.7 | 33.3 |
| H1 | 17 | 36 | 41 | 20799 | 19779 | 48 16.53 | 124 9.91 | | | | |
| H1 | 18 | 11 | 19 | 18969 | 21852 | 48 17.21 | 124 11.25 | 99.8 | 307.3 | -97.2 | 22.7 |
| H1 | 19 | 17 | 51 | 16270 | 25478 | 48 18.63 | 124 13.29 | 91.6 | 316.4 | -84.8 | 34.7 |
| H2 | 17 | 35 | 25 | 20822 | 19551 | 48 16.28 | 124 9.97 | | | | |
| H2 | 18 | 9 | 43 | 19009 | 21569 | 48 16.93 | 124 11.28 | 98.1 | 306.7 | -95.7 | 21.4 |
| H2 | 19 | 19 | 25 | 16126 | 25383 | 48 18.46 | 124 13.41 | 92.4 | 317.0 | -85.1 | 36.0 |
| H2 | 20 | 55 | 37 | 14782 | 28180 | 48 19.83 | 124 14.63 | 51.4 | 329.2 | -42.1 | 29.5 |
| H3 | 17 | 33 | 43 | 20939 | 19178 | 48 15.92 | 124 10.00 | | | | |
| H3 | 18 | 13 | 28 | 18779 | 21457 | 48 16.56 | 124 11.57 | 95.8 | 301.6 | -94.9 | 12.5 |

Plate 1b. Continued.

DATE - 20 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| H4 | 17 | 31 | 57 | 20997 | 18972 | 48 15.68 | 124 10.04 | | | | |
| H4 | 18 | 7 | 46 | 18857 | 21157 | 48 16.23 | 124 11.61 | 102.3 | 297.5 | -102.2 | 6.0 |
| H5 | 17 | 30 | 18 | 21089 | 18667 | 48 15.29 | 124 10.13 | | | | |
| H5 | 18 | 4 | 43 | 19026 | 20710 | 48 15.71 | 124 11.68 | 100.4 | 292.1 | -100.3 | -3.5 |
| H5 | 19 | 23 | 21 | 14768 | 25596 | 48 17.55 | 124 14.60 | 105.4 | 313.3 | -99.6 | 34.7 |
| H5 | 20 | 52 | 44 | 12827 | 28501 | 48 18.88 | 124 16.08 | 57.2 | 323.5 | -49.9 | 28.1 |
| H5 | 21 | 4 | 3 | 12720 | 28682 | 48 18.97 | 124 16.17 | 27.9 | 322.8 | -24.5 | 13.4 |
| H6 | 17 | 28 | 45 | 21142 | 18471 | 48 14.97 | 124 10.23 | | | | |
| H6 | 18 | 6 | 7 | 18978 | 20615 | 48 15.40 | 124 11.86 | 96.7 | 291.6 | -96.6 | -4.2 |
| H6 | 19 | 24 | 50 | 15004 | 24978 | 48 16.99 | 124 14.55 | 94.1 | 311.5 | -89.7 | 28.2 |
| H6 | 21 | 6 | 44 | 12653 | 28055 | 48 18.33 | 124 16.22 | 52.8 | 320.2 | -47.4 | 23.2 |
| H7 | 17 | 27 | 3 | 21139 | 18343 | 48 14.58 | 124 10.45 | | | | |
| H7 | 18 | 3 | 6 | 19118 | 20391 | 48 15.12 | 124 11.89 | 94.7 | 299.5 | -94.3 | 9.0 |
| H7 | 19 | 26 | 12 | 14930 | 24917 | 48 16.79 | 124 14.68 | 92.9 | 311.7 | -88.5 | 28.1 |
| H7 | 20 | 50 | 30 | 12553 | 27768 | 48 17.92 | 124 16.34 | 58.1 | 315.5 | -54.1 | 21.2 |
| H7 | 21 | 9 | 32 | 12258 | 28143 | 48 18.06 | 124 16.56 | 33.7 | 315.0 | -31.4 | 12.0 |
| N5 | 19 | 32 | 59 | 20882 | 18787 | 48 15.16 | 124 10.36 | | | | |
| N5 | 20 | 41 | 33 | 19436 | 20483 | 48 15.95 | 124 11.23 | 44.3 | 323.7 | -38.5 | 21.9 |
| N6 | 19 | 30 | 2 | 19673 | 20030 | 48 15.50 | 124 11.23 | | | | |
| N6 | 20 | 45 | 59 | 18319 | 21793 | 48 16.49 | 124 11.97 | 45.0 | 333.3 | -34.9 | 28.4 |
| N7 | 19 | 32 | 59 | 20882 | 18787 | 48 15.16 | 124 10.36 | | | | |
| N7 | 20 | 39 | 34 | 19339 | 20591 | 48 15.99 | 124 11.30 | 48.3 | 323.0 | -42.3 | 23.4 |

Plate 1c. Drifter positions and velocities.

DATE - 21 JULY 1977

| DRIFTER NO. | TIME (GMT) HOUR MIN SEC | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS LONGSHORE | COMPONENTS OFFSHORE |
|-------------|----------------------------|----------------|----------------|----------|-----------|-------------------|-------------------------|-------------------------|------------------------|
| A2 | 19 6 55 | 22706 | 26585 | 48 22.05 | 124 8.83 | | | | |
| A2 | 19 46 44 | 21949 | 27185 | 48 22.14 | 124 9.51 | 36.0 | 281.4 | -35.1 | -7.9 |
| A2 | 21 57 29 | 19626 | 27759 | 48 21.67 | 124 11.26 | 29.7 | 248.3 | -20.7 | -21.3 |
| A2 | 22 16 13 | 19413 | 27587 | 48 21.50 | 124 11.36 | 30.7 | 201.6 | 1.4 | -30.7 |
| A2 | 22 36 47 | 19263 | 27390 | 48 21.33 | 124 11.42 | 25.7 | 192.5 | 5.2 | -25.2 |
| A2 | 22 57 20 | 19248 | 27008 | 48 21.11 | 124 11.34 | 34.7 | 167.3 | 20.8 | -27.8 |
| A2 | 23 22 31 | 19380 | 26425 | 48 20.82 | 124 11.13 | 39.8 | 154.2 | 30.4 | -25.6 |
| A2 | 23 41 46 | 19603 | 25788 | 48 20.52 | 124 10.86 | 55.8 | 148.3 | 46.1 | -31.4 |
| A2 | 0 3 28 | 19929 | 25030 | 48 20.18 | 124 10.51 | 58.5 | 145.2 | 50.1 | -30.2 |
| T5 | 18 30 56 | 23266 | 24821 | 48 21.25 | 124 8.06 | | | | |
| T5 | 19 4 59 | 22532 | 25525 | 48 21.41 | 124 8.72 | 43.0 | 290.5 | -42.9 | -2.7 |
| T5 | 19 44 8 | 21844 | 26186 | 48 21.56 | 124 9.35 | 35.1 | 289.4 | -35.0 | -2.9 |
| T5 | 20 21 25 | 20982 | 26719 | 48 21.57 | 124 10.08 | 40.1 | 271.2 | -36.9 | -15.6 |
| T5 | 21 56 33 | 19323 | 27260 | 48 21.28 | 124 11.35 | 29.1 | 251.3 | -21.4 | -19.8 |
| T5 | 22 35 39 | 19002 | 26768 | 48 20.87 | 124 11.46 | 33.0 | 190.6 | 7.7 | -32.1 |
| T5 | 23 40 46 | 19537 | 24866 | 48 19.91 | 124 10.77 | 50.5 | 154.3 | 38.6 | -32.6 |
| T5 | 0 2 21 | 19945 | 24013 | 48 19.53 | 124 10.38 | 66.4 | 145.6 | 56.6 | -34.7 |
| T5 | 0 32 5 | 20735 | 22686 | 48 18.98 | 124 9.69 | 74.4 | 140.0 | 66.9 | -32.5 |
| T6 | 18 28 57 | 23153 | 23895 | 48 20.68 | 124 7.99 | | | | |
| T6 | 19 2 53 | 22209 | 24841 | 48 20.92 | 124 8.83 | 55.4 | 292.9 | -55.4 | -1.2 |
| T6 | 19 41 39 | 21448 | 25739 | 48 21.18 | 124 9.54 | 43.0 | 298.5 | -42.9 | 3.3 |
| T6 | 20 19 6 | 20613 | 26510 | 48 21.32 | 124 10.29 | 43.0 | 286.6 | -42.6 | -5.6 |
| T6 | 21 54 49 | 18857 | 27393 | 48 21.18 | 124 11.70 | 30.7 | 261.3 | -25.8 | -16.6 |
| T6 | 22 14 24 | 18614 | 27213 | 48 20.98 | 124 11.82 | 34.3 | 202.8 | .8 | -34.3 |

Plate 1c. Continued.

DATE - 21 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HOOR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| T7 | 18 | 26 | 59 | 23073 | 22822 | 48 20.02 | 124 7.91 | | | | |
| T7 | 19 | 0 | 57 | 21949 | 23917 | 48 20.28 | 124 8.88 | 63.4 | 292.2 | -63.4 | -2.1 |
| T7 | 19 | 39 | 56 | 20923 | 24968 | 48 20.54 | 124 9.78 | 51.8 | 293.0 | -51.7 | -1.0 |
| T7 | 20 | 17 | 10 | 20044 | 25844 | 48 20.73 | 124 10.56 | 45.8 | 290.2 | -45.7 | -3.1 |
| T7 | 21 | 53 | 45 | 18375 | 27097 | 48 20.81 | 124 11.96 | 30.2 | 275.3 | -28.6 | -9.7 |
| T7 | 22 | 13 | 22 | 18193 | 27048 | 48 20.71 | 124 12.08 | 20.5 | 216.3 | -4.3 | -20.0 |
| T7 | 22 | 33 | 20 | 16087 | 26845 | 48 20.54 | 124 12.11 | 26.4 | 187.6 | 7.5 | -25.3 |
| T7 | 22 | 53 | 56 | 18096 | 26543 | 48 20.36 | 124 12.05 | 28.4 | 167.6 | 16.9 | -22.8 |
| T7 | 23 | 20 | 44 | 18295 | 25964 | 48 20.07 | 124 11.82 | 37.2 | 151.0 | 29.7 | -22.3 |
| T7 | 23 | 39 | 40 | 18561 | 25333 | 48 19.78 | 124 11.54 | 56.7 | 147.9 | 47.1 | -31.5 |
| T7 | 0 | 1 | 15 | 18934 | 24573 | 48 19.44 | 124 11.19 | 59.5 | 145.3 | 50.9 | -30.8 |
| T7 | 0 | 21 | 43 | 19372 | 23743 | 48 19.07 | 124 10.80 | 68.5 | 144.9 | 58.8 | -35.1 |
| | | | | | | | | | | | |
| C5 | 18 | 25 | 8 | 23094 | 21869 | 48 19.43 | 124 7.82 | | | | |
| C5 | 18 | 58 | 46 | 21931 | 22904 | 48 19.64 | 124 8.78 | 62.4 | 288.1 | -62.1 | -6.5 |
| C5 | 19 | 37 | 58 | 20809 | 24006 | 48 19.90 | 124 9.73 | 53.8 | 291.7 | -53.8 | -2.3 |
| C5 | 20 | 14 | 58 | 19842 | 25033 | 48 20.15 | 124 10.57 | 51.3 | 294.3 | -51.3 | .2 |
| C5 | 21 | 52 | 44 | 17935 | 26661 | 48 20.36 | 124 12.19 | 34.7 | 281.0 | -33.8 | -7.8 |
| C5 | 22 | 12 | 29 | 17692 | 26687 | 48 20.27 | 124 12.36 | 23.2 | 231.7 | -10.8 | -20.6 |
| C5 | 22 | 32 | 12 | 17580 | 26575 | 48 20.14 | 124 12.42 | 20.3 | 198.0 | 2.2 | -20.2 |
| C5 | 22 | 52 | 49 | 17538 | 26345 | 48 19.97 | 124 12.41 | 25.6 | 178.7 | 11.0 | -23.1 |
| C5 | 23 | 19 | 8 | 17626 | 25788 | 48 19.64 | 124 12.28 | 40.8 | 164.8 | 25.8 | -31.5 |
| C5 | 23 | 37 | 22 | 17780 | 25318 | 48 19.38 | 124 12.12 | 46.6 | 156.9 | 34.2 | -31.7 |
| C5 | 23 | 58 | 50 | 16155 | 24637 | 48 19.09 | 124 11.78 | 53.6 | 143.3 | 46.8 | -26.2 |
| C5 | 0 | 20 | 37 | 18623 | 23822 | 48 18.72 | 124 11.39 | 63.4 | 143.8 | 55.1 | -31.4 |

Plate 1c. Continued.

DATE - 21 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| T8 | 18 | 23 | 9 | 23178 | 20965 | 48 18.88 | 124 7.71 | | | | |
| T8 | 18 | 56 | 50 | 21899 | 22064 | 48 19.08 | 124 8.75 | 66.5 | 286.2 | -65.9 | -9.2 |
| T8 | 19 | 35 | 50 | 20545 | 23354 | 48 19.35 | 124 9.87 | 63.1 | 290.3 | -62.9 | -4.1 |
| T8 | 20 | 13 | 2 | 19485 | 24502 | 48 19.65 | 124 10.77 | 55.4 | 296.2 | -55.4 | 2.0 |
| T8 | 21 | 51 | 17 | 17533 | 26383 | 48 20.00 | 124 12.42 | 36.4 | 287.5 | -36.2 | -4.2 |
| T8 | 22 | 11 | 30 | 17307 | 26441 | 48 19.93 | 124 12.59 | 20.3 | 238.5 | -11.4 | -16.7 |
| T8 | 22 | 31 | 12 | 17225 | 26370 | 48 19.84 | 124 12.64 | 14.7 | 200.2 | 1.0 | -14.6 |
| T8 | 22 | 51 | 44 | 17145 | 26214 | 48 19.69 | 124 12.68 | 22.4 | 189.6 | 5.6 | -21.7 |
| T8 | 23 | 18 | 16 | 17253 | 25735 | 48 19.41 | 124 12.55 | 34.5 | 162.7 | 22.8 | -25.9 |
| T8 | 23 | 36 | 33 | 17467 | 25219 | 48 19.14 | 124 12.34 | 50.0 | 152.9 | 39.0 | -31.3 |
| T8 | 23 | 58 | 1 | 17785 | 24575 | 48 18.83 | 124 12.07 | 52.3 | 149.4 | 42.6 | -30.2 |
| T8 | 0 | 19 | 28 | 18265 | 23801 | 48 18.50 | 124 11.68 | 61.0 | 141.9 | 54.0 | -28.5 |
| | | | | | | | | | | | |
| T9 | 18 | 21 | 8 | 23315 | 19936 | 48 18.22 | 124 7.60 | | | | |
| T9 | 18 | 54 | 48 | 21959 | 21091 | 48 18.42 | 124 8.69 | 69.2 | 285.2 | -68.3 | -10.7 |
| T9 | 19 | 33 | 33 | 20615 | 22440 | 48 18.74 | 124 9.78 | 63.3 | 294.1 | -63.3 | -0 |
| T9 | 20 | 10 | 57 | 19519 | 23620 | 48 19.05 | 124 10.68 | 55.7 | 297.1 | -55.6 | 2.9 |
| T9 | 21 | 50 | 29 | 17410 | 25737 | 48 19.49 | 124 12.43 | 38.8 | 290.6 | -38.8 | -2.4 |
| T9 | 22 | 10 | 42 | 17211 | 25790 | 48 19.43 | 124 12.58 | 18.5 | 237.0 | -10.1 | -15.5 |
| T9 | 22 | 30 | 12 | 17105 | 25701 | 48 19.30 | 124 12.65 | 20.6 | 201.3 | 1.0 | -20.6 |
| T9 | 22 | 50 | 48 | 17108 | 25492 | 48 19.15 | 124 12.64 | 23.1 | 175.5 | 11.1 | -20.3 |
| T9 | 23 | 17 | 29 | 17291 | 25063 | 48 18.93 | 124 12.47 | 28.9 | 153.9 | 22.2 | -18.5 |
| | | | | | | | | | | | |
| V0 | 18 | 19 | 10 | 23438 | 19073 | 48 17.64 | 124 7.55 | | | | |
| V0 | 19 | 31 | 33 | 20685 | 21753 | 48 18.26 | 124 9.73 | 67.5 | 293.1 | -67.5 | -1.2 |
| V0 | 20 | 8 | 54 | 19537 | 22994 | 48 18.59 | 124 10.65 | 57.8 | 298.4 | -57.6 | 4.3 |
| V0 | 21 | 49 | 28 | 17421 | 24909 | 48 18.88 | 124 12.36 | 36.3 | 284.1 | -35.7 | -6.3 |
| V0 | 22 | 9 | 51 | 17243 | 25014 | 48 18.86 | 124 12.51 | 14.8 | 257.0 | -11.8 | -8.9 |
| V0 | 22 | 29 | 12 | 17147 | 24946 | 48 18.75 | 124 12.58 | 19.5 | 203.8 | .1 | -19.5 |
| V0 | 22 | 49 | 51 | 17164 | 24721 | 48 18.57 | 124 12.56 | 26.0 | 176.6 | 12.0 | -23.1 |
| V0 | 23 | 16 | 32 | 17353 | 24325 | 48 18.36 | 124 12.42 | 27.2 | 155.1 | 20.6 | -17.9 |
| V0 | 23 | 34 | 49 | 17548 | 23764 | 48 17.99 | 124 12.28 | 63.9 | 166.4 | 39.1 | -50.5 |
| V0 | 23 | 54 | 47 | 17973 | 23195 | 48 17.77 | 124 11.96 | 47.9 | 136.5 | 44.3 | -18.2 |

Plate 1c. Continued.

DATE - 21 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|-------------|------------|-----|-----|-------------|-------------|----------|-----------|----------------|----------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| V1 | 17 | 59 | 17 | 24425 | 17576 | 48 16.98 | 124 6.85 | | | | |
| V1 | 18 | 17 | 26 | 23599 | 18242 | 48 17.06 | 124 7.50 | 76.0 | 280.9 | -74.0 | -17.3 |
| V1 | 18 | 50 | 30 | 22192 | 19565 | 48 17.35 | 124 8.60 | 73.3 | 291.1 | -73.2 | -3.8 |
| V1 | 19 | 29 | 28 | 20756 | 21101 | 48 17.77 | 124 9.71 | 67.8 | 300.1 | -67.4 | 7.0 |
| V1 | 20 | 6 | 48 | 19554 | 22448 | 48 18.17 | 124 10.65 | 61.3 | 302.2 | -60.7 | 8.6 |
| V1 | 21 | 48 | 23 | 17589 | 24333 | 48 18.52 | 124 12.22 | 33.7 | 288.5 | -33.6 | -3.3 |
| V1 | 22 | 9 | 12 | 17442 | 24351 | 48 18.44 | 124 12.34 | 16.6 | 225.7 | -6.1 | -15.5 |
| V1 | 22 | 28 | 33 | 17386 | 24228 | 48 18.30 | 124 12.39 | 23.4 | 193.3 | 4.4 | -23.0 |
| V1 | 22 | 49 | 10 | 17434 | 23962 | 48 18.09 | 124 12.37 | 30.7 | 175.2 | 14.9 | -26.9 |
| V1 | 23 | 15 | 32 | 17704 | 23332 | 48 17.70 | 124 12.19 | 48.5 | 163.6 | 31.5 | -36.9 |
| V1 | 23 | 33 | 40 | 17948 | 22845 | 48 17.40 | 124 12.04 | 53.9 | 161.7 | 36.4 | -39.8 |
| | | | | | | | | | | | |
| V2 | 17 | 57 | 41 | 24684 | 16760 | 48 16.44 | 124 6.75 | | | | |
| V2 | 18 | 15 | 36 | 23849 | 17464 | 48 16.54 | 124 7.41 | 77.8 | 282.7 | -76.3 | -15.3 |
| V2 | 18 | 48 | 20 | 22510 | 18799 | 48 16.87 | 124 8.43 | 71.4 | 296.0 | -71.4 | 2.4 |
| V2 | 19 | 27 | 16 | 21067 | 20359 | 48 17.32 | 124 9.52 | 68.0 | 302.0 | -67.4 | 9.4 |
| V2 | 20 | 3 | 25 | 19820 | 21717 | 48 17.71 | 124 10.47 | 63.8 | 301.2 | -63.3 | 7.9 |
| V2 | 21 | 47 | 21 | 18026 | 23411 | 48 18.01 | 124 11.89 | 29.6 | 287.5 | -29.4 | -3.4 |
| V2 | 22 | 8 | 22 | 17889 | 23378 | 48 17.88 | 124 12.02 | 22.4 | 212.8 | -3.4 | -22.2 |
| V2 | 22 | 27 | 39 | 17878 | 23220 | 48 17.72 | 124 12.05 | 25.8 | 186.8 | 7.6 | -24.6 |
| V2 | 22 | 48 | 5 | 17934 | 22921 | 48 17.51 | 124 11.99 | 33.0 | 170.6 | 18.2 | -27.5 |
| V2 | 23 | 9 | 7 | 18189 | 22526 | 48 17.26 | 124 11.87 | 37.8 | 161.7 | 25.5 | -27.9 |
| V2 | 23 | 14 | 54 | 18252 | 22411 | 48 17.19 | 124 11.84 | 39.8 | 160.8 | 27.3 | -28.9 |
| V2 | 23 | 32 | 53 | 18525 | 21952 | 48 16.92 | 124 11.68 | 50.2 | 158.6 | 35.8 | -35.2 |

Plate 1c. Continued.

DATE - 21 JULY 1977

| DRIFTER NO. | TIME (GMT) HOUR MIN SEC | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|-------------|----------------------------|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | | | | | | | | LONGSHORE | OFFSHORE |
| V3 | 17 56 13 | 24931 | 15972 | 48 15.86 | 124 6.71 | | | | |
| V3 | 18 12 44 | 24143 | 16661 | 48 15.97 | 124 7.33 | 79.6 | 283.9 | -78.3 | -14.1 |
| V3 | 18 46 7 | 22644 | 18157 | 48 16.34 | 124 8.45 | 77.5 | 296.2 | -77.4 | 2.8 |
| V3 | 19 25 24 | 21068 | 19897 | 48 16.88 | 124 9.60 | 74.2 | 305.3 | -72.7 | 14.4 |
| V3 | 20 4 54 | 19675 | 21506 | 48 17.41 | 124 10.63 | 68.0 | 307.7 | -66.1 | 16.0 |
| V3 | 20 35 50 | 18921 | 22373 | 48 17.69 | 124 11.21 | 46.9 | 305.6 | -45.9 | 9.4 |
| V3 | 21 46 6 | 18006 | 23201 | 48 17.80 | 124 11.93 | 21.9 | 283.2 | -21.5 | -4.2 |
| V3 | 22 7 15 | 17807 | 23230 | 48 17.68 | 124 12.11 | 25.0 | 223.9 | -8.5 | -23.5 |
| V3 | 22 26 29 | 17837 | 23064 | 48 17.53 | 124 12.11 | 23.1 | 179.4 | 9.6 | -21.0 |
| V3 | 22 46 58 | 17938 | 22819 | 48 17.36 | 124 12.06 | 26.5 | 168.8 | 15.3 | -21.6 |
| V3 | 23 11 56 | 18197 | 22371 | 48 17.10 | 124 11.90 | 35.2 | 158.6 | 25.1 | -24.6 |
| V3 | 23 31 0 | 18505 | 21866 | 48 16.79 | 124 11.73 | 52.4 | 158.6 | 37.3 | -36.7 |
| V4 | 17 44 43 | 25676 | 14801 | 48 15.22 | 124 6.31 | | | | |
| V4 | 17 54 28 | 25262 | 15165 | 48 15.27 | 124 6.64 | 70.8 | 282.8 | -69.4 | -13.9 |
| V4 | 18 9 4 | 24665 | 15715 | 48 15.37 | 124 7.10 | 68.3 | 287.3 | -67.8 | -8.0 |
| V4 | 18 44 10 | 23095 | 17272 | 48 15.74 | 124 8.27 | 76.2 | 295.4 | -76.1 | 1.8 |
| V4 | 19 23 29 | 21457 | 19021 | 48 16.26 | 124 9.45 | 74.4 | 303.5 | -73.4 | 12.2 |
| V4 | 19 59 29 | 20162 | 20515 | 48 16.79 | 124 10.37 | 69.2 | 310.6 | -66.4 | 19.7 |
| V4 | 20 33 54 | 19332 | 21519 | 48 17.16 | 124 10.96 | 48.8 | 313.3 | -46.1 | 16.0 |
| V4 | 21 45 11 | 18586 | 22165 | 48 17.21 | 124 11.56 | 17.4 | 278.1 | -16.8 | -4.8 |
| V4 | 22 5 48 | 18460 | 22178 | 48 17.12 | 124 11.68 | 19.1 | 220.5 | -5.4 | -18.3 |
| V4 | 22 25 29 | 18469 | 22038 | 48 16.97 | 124 11.71 | 24.0 | 187.1 | 7.0 | -23.0 |
| V4 | 22 45 49 | 18629 | 21712 | 48 16.73 | 124 11.64 | 36.5 | 169.0 | 21.0 | -29.9 |
| V4 | 23 3 35 | 18864 | 21343 | 48 16.50 | 124 11.52 | 41.9 | 159.5 | 29.4 | -29.8 |
| V4 | 23 7 49 | 18911 | 21262 | 48 16.45 | 124 11.49 | 42.5 | 166.2 | 26.1 | -33.5 |
| V4 | 23 29 51 | 19235 | 20789 | 48 16.16 | 124 11.32 | 43.1 | 158.2 | 31.0 | -30.0 |
| V4 | 23 49 24 | 19607 | 20313 | 48 15.92 | 124 11.11 | 45.1 | 149.4 | 36.8 | -26.1 |
| V4 | 0 11 36 | 20104 | 19696 | 48 15.60 | 124 10.82 | 51.7 | 149.2 | 42.3 | -29.7 |

Plate 1c. Continued.

DATE - 21 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| V5 | 17 | 43 | 5 | 26020 | 14039 | 48 14.61 | 124 6.27 | | | | |
| V5 | 17 | 52 | 57 | 25615 | 14429 | 48 14.69 | 124 6.58 | 68.7 | 291.6 | -68.6 | -2.9 |
| V5 | 18 | 7 | 19 | 24974 | 15036 | 48 14.80 | 124 7.07 | 74.4 | 288.6 | -74.1 | -7.1 |
| V5 | 18 | 42 | 22 | 23367 | 16619 | 48 15.16 | 124 8.27 | 77.1 | 293.8 | -77.1 | -.3 |
| V5 | 19 | 21 | 25 | 21590 | 18463 | 48 15.67 | 124 9.55 | 78.9 | 301.2 | -78.3 | 9.8 |
| V5 | 19 | 57 | 42 | 20138 | 19988 | 48 16.11 | 124 10.59 | 70.2 | 302.0 | -69.5 | 9.6 |
| V5 | 20 | 32 | 16 | 19122 | 21077 | 48 16.44 | 124 11.32 | 52.5 | 303.8 | -51.8 | 8.8 |
| V5 | 21 | 44 | 5 | 18186 | 22091 | 48 16.74 | 124 12.00 | 23.5 | 304.1 | -23.2 | 4.1 |
| V5 | 22 | 4 | 56 | 18025 | 22133 | 48 16.62 | 124 12.17 | 25.0 | 222.3 | -7.8 | -23.7 |
| V5 | 22 | 24 | 38 | 18022 | 22128 | 48 16.61 | 124 12.18 | 1.7 | 200.1 | .1 | -1.7 |
| V5 | 22 | 44 | 42 | 18203 | 21880 | 46 16.47 | 124 12.07 | 23.4 | 152.1 | 18.4 | -14.4 |
| V5 | 23 | 6 | 28 | 18421 | 21545 | 48 16.25 | 124 11.97 | 33.2 | 162.9 | 21.9 | -25.0 |
| V5 | 23 | 28 | 47 | 18754 | 21098 | 48 15.99 | 124 11.79 | 39.8 | 155.5 | 29.8 | -26.3 |
| V6 | 17 | 41 | 28 | 26284 | 13513 | 48 14.14 | 124 6.27 | | | | |
| V6 | 17 | 49 | 28 | 25963 | 13819 | 48 14.19 | 124 6.52 | 66.9 | 287.6 | -66.5 | -7.6 |
| V6 | 18 | 5 | 46 | 25284 | 14470 | 48 14.31 | 124 7.04 | 69.4 | 288.1 | -69.1 | -7.2 |
| V6 | 18 | 40 | 37 | 23733 | 16013 | 48 14.66 | 124 8.18 | 74.7 | 294.9 | -74.7 | 1.0 |
| V6 | 19 | 19 | 24 | 21955 | 17806 | 48 15.11 | 124 9.48 | 77.5 | 297.0 | -77.4 | 4.0 |
| V6 | 19 | 55 | 33 | 20422 | 19359 | 48 15.49 | 124 10.60 | 71.9 | 297.3 | -71.8 | 4.0 |
| V6 | 20 | 30 | 32 | 19182 | 20626 | 48 15.82 | 124 11.50 | 60.5 | 298.4 | -60.3 | 4.5 |
| V6 | 21 | 40 | 43 | 17337 | 22035 | 48 16.22 | 124 12.46 | 33.5 | 302.3 | -33.1 | 4.7 |
| V6 | 22 | 3 | 50 | 17634 | 22253 | 48 16.29 | 124 12.61 | 15.8 | 305.9 | -15.4 | 3.2 |
| V6 | 22 | 23 | 34 | 17651 | 22189 | 48 16.21 | 124 12.63 | 13.3 | 188.0 | 3.7 | -12.8 |
| V6 | 22 | 43 | 30 | 17739 | 22024 | 48 16.05 | 124 12.62 | 25.0 | 177.9 | 11.0 | -22.4 |
| V6 | 23 | 5 | 24 | 17957 | 21777 | 48 15.94 | 124 12.48 | 19.7 | 138.1 | 18.0 | -8.0 |
| V6 | 23 | 27 | 23 | 18253 | 21415 | 48 15.74 | 124 12.32 | 32.3 | 152.3 | 25.4 | -20.0 |
| V6 | 23 | 46 | 34 | 18610 | 21026 | 48 15.59 | 124 12.09 | 34.8 | 134.2 | 32.7 | -12.0 |
| V6 | 0 | 10 | 14 | 19208 | 20390 | 48 15.36 | 124 11.69 | 45.5 | 130.0 | 43.8 | -12.5 |
| V7 | 17 | 38 | 45 | 26607 | 12995 | 48 13.67 | 124 6.24 | | | | |
| V7 | 17 | 51 | 35 | 26037 | 13557 | 48 13.79 | 124 6.66 | 74.1 | 292.3 | -74.1 | -2.3 |
| V7 | 18 | 4 | 17 | 25403 | 14417 | 48 14.40 | 124 6.89 | 152.1 | 345.7 | -94.4 | 119.3 |
| V7 | 18 | 30 | 55 | 23814 | 15682 | 48 14.03 | 124 8.45 | 127.8 | 250.4 | -92.4 | -88.4 |
| V7 | 20 | 28 | 48 | 19273 | 20170 | 48 14.84 | 124 11.90 | 64.2 | 280.5 | -63.9 | -5.1 |

Plate 1d. Drifter positions and velocities.

DATE - 22 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|-------------|------------|-----|-----|-------------|-------------|----------|-----------|----------------|----------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| X1 | 19 | 6 | 29 | 24647 | 21393 | 48 19.68 | 124 6.59 | | | | |
| X1 | 19 | 33 | 18 | 23897 | 21901 | 48 19.74 | 124 7.20 | 47.9 | 278.3 | -46.1 | -13.1 |
| X1 | 19 | 58 | 21 | 23217 | 22419 | 48 19.82 | 124 7.77 | 47.5 | 282.2 | -46.4 | -9.8 |
| X1 | 20 | 21 | 8 | 22638 | 22908 | 48 19.91 | 124 8.25 | 45.7 | 286.1 | -45.2 | -6.4 |
| X1 | 20 | 44 | 58 | 21989 | 23465 | 48 20.02 | 124 8.80 | 49.1 | 285.9 | -48.6 | -7.0 |
| X1 | 21 | 6 | 58 | 21411 | 23932 | 48 20.09 | 124 9.28 | 46.4 | 282.2 | -45.4 | -9.6 |
| X1 | 21 | 29 | 14 | 20932 | 24250 | 48 20.10 | 124 9.67 | 36.4 | 272.4 | -33.8 | -13.5 |
| X1 | 21 | 51 | 2 | 20518 | 24505 | 48 20.09 | 124 10.01 | 31.8 | 268.5 | -28.7 | -13.8 |
| X1 | 22 | 13 | 42 | 20204 | 24635 | 48 20.05 | 124 10.25 | 23.3 | 254.2 | -17.9 | -15.0 |
| X1 | 23 | 23 | 21 | 19991 | 24072 | 48 19.59 | 124 10.35 | 20.5 | 187.9 | 5.7 | -19.7 |
| X1 | 23 | 53 | 51 | 20243 | 23342 | 48 19.21 | 124 10.10 | 42.1 | 156.7 | 31.0 | -28.5 |
| X1 | 0 | 16 | 46 | 20606 | 22597 | 48 18.85 | 124 9.79 | 55.4 | 149.3 | 45.3 | -31.9 |
| X1 | 0 | 42 | 32 | 21149 | 21660 | 48 18.44 | 124 9.35 | 61.1 | 144.7 | 52.7 | -31.1 |
| | | | | | | | | | | | |
| X2 | 19 | 4 | 42 | 24622 | 20668 | 48 19.23 | 124 6.56 | | | | |
| X2 | 19 | 31 | 39 | 23805 | 21174 | 48 19.25 | 124 7.23 | 50.9 | 273.7 | -47.7 | -17.7 |
| X2 | 19 | 56 | 40 | 23065 | 21712 | 48 19.32 | 124 7.83 | 50.5 | 279.4 | -48.8 | -12.9 |
| X2 | 20 | 19 | 50 | 22386 | 22201 | 48 19.37 | 124 8.38 | 49.8 | 277.7 | -47.8 | -14.0 |
| X2 | 20 | 43 | 31 | 21753 | 22759 | 48 19.48 | 124 8.91 | 47.7 | 287.0 | -47.4 | -5.9 |
| X2 | 21 | 5 | 32 | 21223 | 23253 | 48 19.58 | 124 9.35 | 43.9 | 289.2 | -43.7 | -3.7 |
| X2 | 21 | 27 | 47 | 20795 | 23660 | 48 19.67 | 124 9.71 | 35.4 | 289.7 | -35.2 | -2.7 |
| X2 | 21 | 49 | 26 | 20442 | 23967 | 48 19.72 | 124 10.00 | 28.9 | 284.4 | -28.5 | -4.9 |
| X2 | 22 | 12 | 18 | 20157 | 24115 | 48 19.69 | 124 10.23 | 20.8 | 260.2 | -17.3 | -11.6 |
| X2 | 23 | 21 | 56 | 19953 | 23701 | 48 19.32 | 124 10.35 | 16.8 | 192.0 | 3.5 | -16.5 |
| X2 | 23 | 52 | 35 | 20246 | 23057 | 48 19.01 | 124 10.09 | 36.0 | 150.7 | 28.9 | -21.5 |
| X2 | 0 | 15 | 36 | 20614 | 22342 | 48 18.67 | 124 9.78 | 52.9 | 149.5 | 43.6 | -29.8 |
| X2 | 0 | 41 | 26 | 21211 | 21383 | 48 18.26 | 124 9.30 | 62.2 | 142.4 | 54.8 | -29.5 |
| X2 | 1 | 34 | 24 | 23004 | 18988 | 48 17.34 | 124 7.94 | 75.4 | 135.3 | 70.3 | -27.2 |
| X2 | 1 | 58 | 33 | 24016 | 17783 | 48 16.92 | 124 7.19 | 83.8 | 130.2 | 80.5 | -23.2 |
| X2 | 2 | 0 | 44 | 24104 | 17667 | 48 16.87 | 124 7.13 | 88.6 | 138.2 | 80.9 | -36.1 |

Plate 1d. Continued.

DATE - 22 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | | LONGITUDE | | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-------|-----------|-------|-------------------|-------------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | | | LONGSHORE | OFFSHORE |
| X3 | 19 | 2 | 58 | 24707 | 19899 | 48 | 18.77 | 124 | 6.47 | | | | |
| X3 | 19 | 29 | 49 | 23854 | 20454 | 48 | 18.81 | 124 | 7.16 | 53.2 | 274.9 | -50.3 | -17.5 |
| X3 | 19 | 55 | 12 | 23009 | 21008 | 48 | 18.83 | 124 | 7.85 | 55.7 | 273.6 | -52.1 | -19.5 |
| X3 | 20 | 18 | 12 | 22289 | 21599 | 48 | 18.93 | 124 | 8.43 | 54.0 | 283.7 | -53.2 | -9.7 |
| X3 | 20 | 42 | 8 | 21584 | 22268 | 48 | 19.08 | 124 | 9.01 | 53.3 | 291.0 | -53.3 | -2.8 |
| X3 | 21 | 4 | 4 | 21046 | 22776 | 48 | 19.19 | 124 | 9.45 | 44.3 | 290.0 | -44.2 | -3.2 |
| X3 | 21 | 26 | 23 | 20566 | 23198 | 48 | 19.26 | 124 | 9.85 | 37.8 | 285.2 | -37.3 | -5.9 |
| X3 | 21 | 47 | 56 | 20133 | 23543 | 48 | 19.29 | 124 | 10.20 | 34.3 | 279.0 | -33.1 | -8.9 |
| X3 | 22 | 10 | 48 | 19768 | 23778 | 48 | 19.29 | 124 | 10.49 | 26.6 | 267.3 | -23.8 | -12.0 |
| X3 | 23 | 20 | 35 | 19558 | 23541 | 48 | 19.01 | 124 | 10.64 | 12.8 | 200.1 | .9 | -12.8 |
| X3 | 23 | 51 | 10 | 19912 | 22983 | 48 | 18.79 | 124 | 10.35 | 30.5 | 139.0 | 27.6 | -12.8 |
| X3 | 0 | 13 | 44 | 20304 | 22348 | 48 | 18.52 | 124 | 10.03 | 47.2 | 141.8 | 41.6 | -22.0 |
| X3 | 0 | 40 | 39 | 20955 | 21384 | 48 | 18.12 | 124 | 9.52 | 59.8 | 139.0 | 54.2 | -25.2 |
| X3 | 1 | 30 | 2 | 22566 | 19263 | 48 | 17.32 | 124 | 8.30 | 71.6 | 134.8 | 67.0 | -25.2 |
| X3 | 2 | 1 | 34 | 23693 | 17649 | 48 | 16.60 | 124 | 7.52 | 86.4 | 143.9 | 74.9 | -43.0 |
| X4 | 19 | 1 | 22 | 24645 | 19278 | 48 | 18.33 | 124 | 6.52 | | | | |
| X4 | 19 | 27 | 54 | 23717 | 19868 | 46 | 18.35 | 124 | 7.27 | 58.3 | 272.4 | -54.2 | -21.5 |
| X4 | 19 | 53 | 40 | 22811 | 20527 | 48 | 18.41 | 124 | 8.00 | 59.0 | 277.3 | -56.5 | -17.0 |
| X4 | 20 | 16 | 45 | 22112 | 21133 | 46 | 18.52 | 124 | 8.57 | 52.4 | 286.2 | -51.9 | -7.2 |
| X4 | 20 | 40 | 39 | 21435 | 21790 | 48 | 18.67 | 124 | 9.11 | 51.1 | 292.4 | -51.1 | -1.5 |
| X4 | 21 | 2 | 34 | 20940 | 22277 | 48 | 18.79 | 124 | 9.52 | 41.0 | 292.6 | -41.0 | -1.1 |
| X4 | 21 | 24 | 54 | 20436 | 22741 | 48 | 18.87 | 124 | 9.93 | 39.8 | 287.8 | -39.5 | -4.4 |
| X4 | 21 | 46 | 30 | 19984 | 23093 | 48 | 18.90 | 124 | 10.29 | 35.3 | 276.9 | -33.7 | -10.4 |
| X4 | 22 | 6 | 25 | 19622 | 23318 | 48 | 18.68 | 124 | 10.59 | 30.4 | 264.1 | -26.3 | -15.2 |
| X4 | 23 | 55 | 22 | 19751 | 22672 | 48 | 18.46 | 124 | 10.48 | 12.1 | 170.2 | 6.8 | -10.0 |
| X4 | 0 | 18 | 27 | 20237 | 22015 | 48 | 18.22 | 124 | 10.09 | 47.4 | 133.6 | 44.7 | -15.8 |

Plate 1d. Continued.

DATE - 22 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|-------------|------------|-----|-----|-------------|-------------|----------|-----------|----------------|----------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| X5 | 18 | 59 | 42 | 24601 | 18638 | 48 17.87 | 124 6.59 | | | | |
| X5 | 19 | 26 | 17 | 23709 | 19208 | 48 17.88 | 124 7.31 | 56.0 | 270.9 | -51.5 | -22.0 |
| X5 | 19 | 52 | 3 | 22874 | 19872 | 48 17.97 | 124 7.98 | 54.6 | 281.3 | -53.2 | -12.1 |
| X5 | 20 | 15 | 24 | 22174 | 20539 | 48 18.12 | 124 8.53 | 53.0 | 292.1 | -53.0 | -1.8 |
| X5 | 20 | 39 | 5 | 21558 | 21149 | 48 18.26 | 124 9.02 | 46.8 | 294.0 | -46.8 | -.1 |
| X5 | 21 | 1 | 5 | 21064 | 21636 | 48 18.38 | 124 9.42 | 40.3 | 293.1 | -40.3 | -.7 |
| X5 | 21 | 23 | 25 | 20602 | 22052 | 48 18.45 | 124 9.79 | 35.8 | 286.3 | -35.4 | -4.8 |
| X5 | 21 | 45 | 41 | 20206 | 22378 | 48 18.49 | 124 10.11 | 30.0 | 279.9 | -29.1 | -7.4 |
| X5 | 22 | 8 | 22 | 19941 | 22551 | 48 18.47 | 124 10.32 | 19.5 | 265.5 | -17.2 | -9.3 |
| X5 | 23 | 19 | 17 | 19918 | 22287 | 48 18.25 | 124 10.35 | 9.7 | 184.4 | 3.3 | -9.1 |
| X5 | 23 | 50 | 1 | 20375 | 21689 | 48 18.03 | 124 9.99 | 32.4 | 132.5 | 30.8 | -10.3 |
| X5 | 0 | 19 | 54 | 21038 | 20820 | 48 17.71 | 124 9.49 | 48.5 | 134.0 | 45.6 | -16.5 |
| X5 | 0 | 38 | 10 | 21569 | 20142 | 48 17.46 | 124 9.09 | 61.9 | 133.5 | 58.4 | -20.6 |
| X5 | 1 | 38 | 51 | 23734 | 17552 | 48 16.54 | 124 7.50 | 71.2 | 130.9 | 68.2 | -20.5 |
| X6 | 18 | 58 | 9 | 24748 | 17935 | 48 17.42 | 124 6.51 | | | | |
| X6 | 19 | 24 | 34 | 23922 | 18507 | 48 17.45 | 124 7.18 | 52.1 | 273.8 | -48.9 | -18.1 |
| X6 | 19 | 50 | 27 | 23106 | 19235 | 48 17.60 | 124 7.82 | 54.1 | 288.5 | -53.8 | -5.3 |
| X6 | 20 | 13 | 54 | 22408 | 19907 | 48 17.75 | 124 8.37 | 52.4 | 293.0 | -52.4 | -1.0 |
| X6 | 20 | 37 | 30 | 21805 | 20519 | 48 17.91 | 124 8.85 | 46.1 | 296.2 | -46.1 | 1.7 |
| X6 | 20 | 59 | 33 | 21288 | 21048 | 48 18.04 | 124 9.25 | 42.5 | 296.2 | -42.5 | 1.5 |
| X6 | 21 | 22 | 6 | 20820 | 21482 | 48 18.12 | 124 9.63 | 36.0 | 288.5 | -35.8 | -3.5 |
| X6 | 21 | 44 | 58 | 20305 | 21858 | 48 18.13 | 124 10.04 | 37.5 | 271.5 | -34.7 | -14.4 |
| X6 | 22 | 6 | 36 | 20139 | 22069 | 48 18.21 | 124 10.17 | 16.3 | 310.5 | -15.6 | 4.6 |
| X6 | 23 | 17 | 54 | 20237 | 21743 | 48 18.00 | 124 10.11 | 9.2 | 168.2 | 5.4 | -7.5 |
| X6 | 23 | 49 | 34 | 20719 | 21130 | 48 17.78 | 124 9.74 | 32.3 | 131.9 | 30.7 | -9.9 |
| X6 | 0 | 12 | 14 | 21189 | 20527 | 48 17.55 | 124 9.38 | 44.3 | 133.5 | 41.8 | -14.7 |
| X6 | 0 | 39 | 12 | 21981 | 19588 | 48 17.23 | 124 8.79 | 58.3 | 128.8 | 56.4 | -14.7 |
| X6 | 1 | 28 | 34 | 23850 | 17336 | 48 16.42 | 124 7.44 | 76.0 | 132.1 | 72.3 | -23.5 |
| X6 | 1 | 56 | 28 | 24988 | 15960 | 48 15.89 | 124 6.65 | 82.2 | 134.8 | 76.9 | -29.1 |
| X6 | 2 | 2 | 57 | 25273 | 15610 | 48 15.75 | 124 6.46 | 90.4 | 137.6 | 82.9 | -36.0 |

Plate 1d. Continued.

DATE - 22 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|-------------|------------|-----|-----|-------------|-------------|----------|-----------|----------------|----------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| X7 | 18 | 57 | 43 | 24883 | 17265 | 48 16.97 | 124 6.48 | | | | |
| X7 | 19 | 22 | 52 | 24067 | 17862 | 48 17.01 | 124 7.13 | 54.1 | 275.4 | -51.2 | -17.4 |
| X7 | 19 | 48 | 53 | 23287 | 18558 | 48 17.15 | 124 7.74 | 50.9 | 287.9 | -50.6 | -5.5 |
| X7 | 20 | 12 | 23 | 22626 | 19167 | 48 17.27 | 124 8.26 | 48.1 | 289.6 | -48.0 | -3.8 |
| X7 | 20 | 36 | 0 | 22043 | 19788 | 48 17.45 | 124 8.71 | 45.3 | 300.6 | -45.0 | 5.1 |
| X7 | 20 | 58 | 4 | 21592 | 20285 | 48 17.59 | 124 9.05 | 38.4 | 302.7 | -38.0 | 5.7 |
| X7 | 21 | 20 | 59 | 21163 | 20756 | 48 17.73 | 124 9.38 | 35.1 | 301.9 | -34.8 | 4.7 |
| X7 | 21 | 44 | 12 | 20796 | 21112 | 48 17.81 | 124 9.67 | 27.6 | 291.7 | -27.6 | -1.1 |
| X7 | 22 | 3 | 10 | 20626 | 21249 | 48 17.82 | 124 9.81 | 15.0 | 277.3 | -14.3 | -4.3 |
| X7 | 23 | 16 | 57 | 20847 | 20714 | 48 17.50 | 124 9.67 | 14.1 | 164.0 | 9.1 | -10.8 |
| X7 | 23 | 46 | 38 | 21343 | 20072 | 48 17.25 | 124 9.31 | 36.1 | 135.5 | 33.6 | -13.1 |
| X7 | 0 | 6 | 35 | 21795 | 19502 | 48 17.03 | 124 8.98 | 47.7 | 135.0 | 44.6 | -17.0 |
| X7 | 0 | 32 | 21 | 22592 | 18653 | 48 16.78 | 124 8.39 | 55.8 | 122.3 | 55.3 | -8.0 |
| X7 | 0 | 36 | 44 | 22738 | 18488 | 48 16.74 | 124 8.27 | 64.2 | 121.0 | 63.7 | -7.7 |
| X8 | 18 | 55 | 14 | 25064 | 16546 | 48 16.48 | 124 6.43 | | | | |
| X8 | 19 | 21 | 14 | 24195 | 17296 | 48 16.61 | 124 7.11 | 56.1 | 285.6 | -55.5 | -8.3 |
| X8 | 19 | 47 | 27 | 23449 | 17982 | 48 16.75 | 124 7.69 | 48.3 | 289.7 | -48.2 | -3.7 |
| X8 | 20 | 11 | 7 | 22667 | 18753 | 48 16.93 | 124 8.29 | 57.6 | 295.0 | -57.5 | .9 |
| X8 | 20 | 34 | 28 | 22038 | 19447 | 48 17.14 | 124 8.76 | 50.2 | 304.1 | -49.5 | 8.7 |
| X8 | 21 | 19 | 35 | 21056 | 20569 | 48 17.50 | 124 9.50 | 41.8 | 306.0 | -40.9 | 8.6 |
| X8 | 21 | 42 | 50 | 20580 | 21024 | 48 17.60 | 124 9.87 | 35.3 | 290.4 | -35.2 | -2.3 |
| X8 | 23 | 31 | 52 | 20633 | 20304 | 48 16.95 | 124 9.94 | 18.3 | 184.3 | 6.2 | -17.2 |
| X8 | 2 | 6 | 48 | 26058 | 14178 | 48 14.83 | 124 6.14 | 65.9 | 129.9 | 63.4 | -17.9 |

Plate 1d. Continued.

DATE - 22 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| X9 | 18 | 52 | 43 | 25348 | 15836 | 48 16.02 | 124 6.32 | | | | |
| X9 | 19 | 19 | 44 | 24459 | 16652 | 48 16.19 | 124 7.00 | 55.6 | 289.9 | -35.4 | -4.0 |
| X9 | 19 | 45 | 31 | 23689 | 17409 | 48 16.38 | 124 7.58 | 51.6 | 295.4 | -51.6 | 1.2 |
| X9 | 20 | 9 | 37 | 22974 | 18190 | 48 16.62 | 124 8.11 | 54.6 | 304.7 | -53.7 | 10.0 |
| X9 | 20 | 32 | 48 | 22404 | 18622 | 48 16.82 | 124 8.53 | 45.8 | 305.4 | -44.9 | 9.0 |
| X9 | 20 | 56 | 26 | 21905 | 19387 | 48 17.00 | 124 8.90 | 40.1 | 306.7 | -39.1 | 8.7 |
| X9 | 21 | 18 | 9 | 21506 | 19813 | 48 17.12 | 124 9.20 | 33.4 | 300.9 | -33.1 | 4.0 |
| X9 | 21 | 41 | 21 | 21124 | 20231 | 48 17.24 | 124 9.49 | 30.5 | 302.7 | -30.1 | 4.6 |
| X9 | 22 | 2 | 3 | 20873 | 20465 | 48 17.29 | 124 9.68 | 20.6 | 288.1 | -20.5 | -2.2 |
| X9 | 23 | 16 | 13 | 21059 | 20097 | 48 17.07 | 124 9.57 | 9.5 | 161.0 | 6.5 | -6.9 |
| X9 | 23 | 47 | 59 | 21599 | 19415 | 48 16.81 | 124 9.19 | 35.9 | 136.2 | 33.3 | -13.5 |
| X9 | 0 | 7 | 57 | 22100 | 18836 | 48 16.61 | 124 8.83 | 48.3 | 129.3 | 46.7 | -12.7 |
| X9 | 0 | 31 | 37 | 22774 | 18039 | 48 16.32 | 124 8.35 | 56.1 | 132.4 | 53.3 | -17.6 |
| X9 | 1 | 26 | 50 | 24671 | 15747 | 48 15.58 | 124 6.85 | 69.5 | 126.2 | 67.9 | -14.5 |
| X9 | 1 | 46 | 30 | 25724 | 14818 | 48 15.28 | 124 6.25 | 79.0 | 127.2 | 77.0 | -17.9 |
| X9 | 1 | 53 | 10 | 26023 | 14470 | 48 15.15 | 124 6.05 | 87.1 | 134.9 | 81.4 | -30.9 |
| X0 | 18 | 51 | 0 | 25779 | 14952 | 48 15.47 | 124 6.14 | | | | |
| X0 | 19 | 16 | 34 | 25064 | 15691 | 48 15.68 | 124 6.66 | 49.2 | 301.4 | -48.8 | 6.3 |
| X0 | 19 | 44 | 1 | 24264 | 16456 | 48 15.85 | 124 7.26 | 49.4 | 292.6 | -49.4 | -1.3 |
| X0 | 20 | 6 | 13 | 23553 | 17119 | 48 15.97 | 124 7.81 | 49.4 | 289.1 | -49.2 | -4.3 |
| X0 | 20 | 31 | 5 | 22975 | 17749 | 48 16.17 | 124 8.23 | 46.1 | 305.6 | -45.2 | 9.2 |
| X0 | 20 | 54 | 45 | 22483 | 18308 | 48 16.36 | 124 8.58 | 39.4 | 309.3 | -38.0 | 10.3 |
| X0 | 21 | 16 | 57 | 22121 | 18720 | 48 16.50 | 124 8.84 | 30.9 | 308.9 | -29.9 | 7.9 |
| X0 | 21 | 40 | 8 | 21831 | 19038 | 48 16.60 | 124 9.05 | 23.0 | 304.8 | -22.6 | 4.3 |
| X0 | 22 | 0 | 53 | 21663 | 19233 | 48 16.67 | 124 9.17 | 15.7 | 310.1 | -15.1 | 4.3 |
| X0 | 23 | 15 | 13 | 22145 | 18654 | 48 16.45 | 124 8.83 | 13.0 | 133.7 | 12.3 | -4.4 |
| X0 | 23 | 44 | 48 | 22788 | 17912 | 48 16.19 | 124 8.37 | 41.8 | 130.6 | 40.0 | -11.9 |
| X0 | 0 | 4 | 20 | 23384 | 17250 | 48 15.98 | 124 7.95 | 56.6 | 127.7 | 55.0 | -13.3 |
| X0 | 0 | 30 | 19 | 24283 | 16213 | 48 15.60 | 124 7.33 | 66.6 | 132.6 | 63.1 | -21.1 |

Plate 1d. Continued.

DATE - 22 JULY 1977

| DRIFTER NO. | TIME (GMT) HOUR MIN SEC | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) LONGSHORE OFFSHORE | |
|-------------|----------------------------|----|----|----------------|----------------|----------|-----------|-------------------|-------------------------|---|-------|
| Y0 | 18 | 49 | 19 | 25959 | 14315 | 48 14.91 | 124 6.20 | | | | |
| Y0 | 19 | 15 | 12 | 25275 | 15072 | 48 15.17 | 124 6.66 | 48.7 | 310.3 | -46.8 | 13.6 |
| Y0 | 19 | 42 | 23 | 24424 | 15896 | 48 15.35 | 124 7.30 | 52.8 | 293.0 | -52.8 | -1.0 |
| Y0 | 20 | 6 | 38 | 24025 | 16618 | 48 15.83 | 124 7.47 | 61.8 | 347.0 | -37.3 | 49.3 |
| Y0 | 20 | 29 | 36 | 23201 | 17204 | 48 15.76 | 124 8.17 | 64.1 | 261.7 | -54.1 | -34.3 |
| Y0 | 20 | 53 | 15 | 22648 | 17794 | 48 15.94 | 124 8.57 | 41.7 | 303.8 | -41.1 | 7.1 |
| Y0 | 21 | 15 | 37 | 22307 | 18184 | 48 16.07 | 124 8.81 | 29.1 | 311.5 | -27.8 | 8.7 |
| Y0 | 21 | 38 | 41 | 21981 | 18560 | 48 16.21 | 124 9.04 | 27.2 | 311.8 | -25.9 | 8.3 |
| Y0 | 21 | 59 | 21 | 21814 | 18770 | 48 16.30 | 124 9.15 | 17.3 | 320.1 | -15.5 | 7.6 |
| Y0 | 23 | 14 | 2 | 22182 | 18413 | 48 16.22 | 124 8.87 | 8.4 | 111.8 | 8.3 | .3 |
| Y0 | 23 | 43 | 32 | 22836 | 17703 | 48 16.00 | 124 8.39 | 40.2 | 125.0 | 39.5 | -7.6 |
| Y0 | 0 | 2 | 59 | 23358 | 17084 | 48 15.76 | 124 8.04 | 53.3 | 135.6 | 49.6 | -19.5 |
| Y0 | 0 | 26 | 31 | 24172 | 16226 | 48 15.51 | 124 7.46 | 61.2 | 122.9 | 60.5 | -9.4 |
| Y0 | 1 | 25 | 1 | 26602 | 13672 | 48 14.74 | 124 5.73 | 73.3 | 123.7 | 72.2 | -12.2 |
| Y0 | 1 | 50 | 27 | 27746 | 12515 | 48 14.42 | 124 4.90 | 77.3 | 120.1 | 76.9 | -8.0 |
| Y1 | 18 | 47 | 44 | 26251 | 13676 | 48 14.36 | 124 6.19 | | | | |
| Y1 | 19 | 13 | 48 | 25455 | 14443 | 48 14.51 | 124 6.79 | 51.0 | 290.7 | -50.9 | -3.0 |
| Y1 | 19 | 40 | 56 | 24653 | 15322 | 48 14.83 | 124 7.33 | 54.2 | 311.5 | -51.7 | 16.2 |
| Y1 | 20 | 5 | 10 | 23871 | 16060 | 48 14.95 | 124 7.93 | 53.8 | 286.7 | -53.3 | -6.9 |
| Y1 | 20 | 28 | 10 | 23204 | 16734 | 48 15.12 | 124 8.42 | 49.3 | 297.5 | -49.2 | 2.9 |
| Y1 | 20 | 51 | 52 | 22695 | 17282 | 48 15.30 | 124 8.77 | 38.6 | 307.7 | -37.5 | 9.1 |
| Y1 | 21 | 14 | 4 | 22296 | 17734 | 48 15.48 | 124 9.03 | 34.4 | 314.7 | -32.2 | 12.1 |
| Y1 | 21 | 37 | 17 | 22008 | 18089 | 48 15.64 | 124 9.21 | 26.9 | 324.5 | -23.2 | 13.6 |
| Y1 | 21 | 57 | 56 | 21833 | 18291 | 48 15.72 | 124 9.33 | 16.6 | 316.1 | -15.4 | 6.2 |
| Y1 | 23 | 42 | 17 | 22646 | 17456 | 48 15.50 | 124 8.73 | 13.4 | 119.4 | 13.4 | -1.2 |
| Y1 | 0 | 2 | 3 | 23224 | 16844 | 48 15.31 | 124 8.32 | 51.6 | 123.8 | 50.8 | -8.7 |
| Y1 | 0 | 29 | 36 | 24301 | 15806 | 48 15.11 | 124 7.51 | 65.4 | 110.7 | 65.3 | 3.8 |

Plate 1d. Continued.

DATE - 22 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | | LONGITUDE | | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-------|-----------|------|-------------------|-------------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | | | LONGSHORE | OFFSHORE |
| Y2 | 18 | 46 | 14 | 26443 | 13268 | 48 | 13.95 | 124 | 6.23 | | | | |
| Y2 | 19 | 12 | 12 | 25649 | 14023 | 48 | 14.06 | 124 | 6.85 | 51.1 | 285.4 | -50.5 | -7.8 |
| Y2 | 19 | 39 | 19 | 24791 | 14901 | 48 | 14.31 | 124 | 7.46 | 54.0 | 301.3 | -53.6 | 6.8 |
| Y2 | 20 | 3 | 42 | 24044 | 15663 | 48 | 14.51 | 124 | 7.99 | 52.1 | 300.2 | -51.8 | 5.6 |
| Y2 | 20 | 26 | 41 | 23375 | 16338 | 48 | 14.68 | 124 | 8.48 | 49.2 | 297.4 | -49.1 | 2.8 |
| Y2 | 20 | 50 | 25 | 22871 | 16878 | 48 | 14.87 | 124 | 8.81 | 38.2 | 310.0 | -36.8 | 10.4 |
| Y2 | 21 | 12 | 36 | 22530 | 17261 | 48 | 15.03 | 124 | 9.03 | 29.7 | 317.9 | -27.2 | 12.0 |
| Y2 | 21 | 35 | 53 | 22233 | 17579 | 48 | 15.14 | 124 | 9.23 | 22.9 | 308.9 | -22.2 | 5.8 |
| Y2 | 21 | 56 | 32 | 22093 | 17741 | 48 | 15.21 | 124 | 9.32 | 13.6 | 320.5 | -12.2 | 6.0 |
| Y2 | 23 | 12 | 33 | 22289 | 17619 | 48 | 15.29 | 124 | 9.12 | 6.4 | 58.5 | 3.6 | 5.3 |
| Y2 | 23 | 35 | 2 | 22673 | 17238 | 48 | 15.20 | 124 | 8.83 | 28.7 | 114.3 | 28.7 | -0.1 |
| Y2 | 0 | 0 | 4 | 23371 | 16535 | 48 | 15.03 | 124 | 8.32 | 47.3 | 116.8 | 47.2 | -2.2 |
| Y2 | 0 | 24 | 28 | 24338 | 15575 | 48 | 14.81 | 124 | 7.60 | 57.3 | 114.7 | 57.3 | -0.6 |
| Y2 | 1 | 22 | 49 | 26575 | 12367 | 48 | 14.30 | 124 | 5.94 | 69.2 | 114.6 | 69.2 | -0.6 |
| Y2 | 1 | 48 | 50 | 27697 | 12194 | 48 | 13.94 | 124 | 5.17 | 75.2 | 125.0 | 73.9 | -14.2 |

Plate 1e. Drifter positions and velocities.

DATE - 23 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| Y9 | 19 | 39 | 20 | 24426 | 25545 | 48 21.98 | 124 7.36 | | | | |
| Y9 | 20 | 6 | 5 | 24345 | 25650 | 48 22.01 | 124 7.44 | 7.5 | 302.4 | -7.4 | 1.1 |
| Y9 | 20 | 33 | 3 | 24334 | 25785 | 48 22.08 | 124 7.48 | 8.4 | 340.1 | -5.9 | 6.1 |
| Y9 | 21 | 0 | 20 | 24144 | 25981 | 48 22.13 | 124 7.66 | 15.0 | 293.8 | -15.0 | -0.1 |
| Y9 | 21 | 27 | 57 | 24036 | 26216 | 48 22.23 | 124 7.79 | 14.6 | 317.4 | -13.4 | 5.8 |
| Y9 | 21 | 54 | 28 | 23864 | 26377 | 48 22.27 | 124 7.95 | 13.4 | 289.6 | -13.3 | -1.1 |
| Y9 | 22 | 21 | 47 | 23619 | 26551 | 48 22.29 | 124 8.17 | 16.7 | 279.6 | -16.1 | -4.2 |
| Y9 | 0 | 11 | 41 | 23576 | 26246 | 48 22.12 | 124 8.13 | 5.0 | 171.1 | 2.7 | -4.2 |
| Y9 | 0 | 43 | 58 | 23859 | 26104 | 48 22.12 | 124 7.89 | 15.1 | 88.8 | 13.7 | 6.5 |
| Y9 | 1 | 15 | 10 | 24338 | 25616 | 48 21.99 | 124 7.44 | 32.8 | 113.2 | 32.8 | .5 |
| Y9 | 2 | 0 | 15 | 25206 | 24527 | 48 21.63 | 124 6.58 | 46.3 | 122.1 | 45.8 | -6.5 |
| Y9 | 2 | 34 | 34 | 26038 | 23505 | 48 21.28 | 124 5.79 | 57.2 | 123.1 | 56.5 | -9.0 |
| Y9 | 3 | 33 | 53 | 27726 | 21450 | 48 20.54 | 124 4.22 | 66.6 | 125.3 | 65.3 | -13.0 |
| Y8 | 19 | 36 | 18 | 24301 | 24588 | 48 21.42 | 124 7.26 | | | | |
| Y8 | 20 | 4 | 51 | 24166 | 24930 | 48 21.57 | 124 7.42 | 20.1 | 324.0 | -17.4 | 10.0 |
| Y8 | 20 | 31 | 47 | 24097 | 25058 | 48 21.62 | 124 7.50 | 8.2 | 315.2 | -7.6 | 3.0 |
| Y8 | 20 | 59 | 12 | 23913 | 25283 | 48 21.69 | 124 7.68 | 15.7 | 300.7 | -15.6 | 1.8 |
| Y8 | 21 | 23 | 40 | 23662 | 25557 | 48 21.77 | 124 7.92 | 22.4 | 296.0 | -22.4 | .8 |
| Y8 | 21 | 53 | 9 | 23499 | 25795 | 48 21.85 | 124 8.09 | 14.6 | 306.2 | -14.3 | 3.1 |
| Y8 | 22 | 20 | 31 | 23366 | 26039 | 48 21.95 | 124 8.23 | 15.4 | 313.2 | -14.6 | 5.1 |
| Y8 | 0 | 10 | 32 | 23149 | 26062 | 48 21.90 | 124 8.39 | 3.3 | 244.7 | -2.2 | -2.5 |
| Y8 | 0 | 40 | 32 | 23444 | 25804 | 48 21.84 | 124 8.13 | 19.3 | 106.8 | 19.1 | 2.5 |
| Y8 | 1 | 16 | 26 | 24009 | 25243 | 48 21.70 | 124 7.60 | 32.7 | 112.2 | 32.7 | 1.1 |
| Y8 | 1 | 59 | 7 | 24903 | 24279 | 48 21.42 | 124 6.76 | 45.4 | 116.7 | 45.3 | -2.1 |
| Y8 | 2 | 33 | 42 | 25826 | 23233 | 48 21.08 | 124 5.90 | 59.4 | 120.3 | 59.0 | -6.4 |
| Y8 | 3 | 30 | 8 | 27435 | 21215 | 48 20.35 | 124 4.42 | 67.3 | 126.6 | 65.7 | -14.6 |

Plate 1e. Continued.

DATE - 23 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | | LONGITUDE | | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-------|-----------|-------|-------------------|-------------------------|---------------------|----------|
| | HR | MIN | SEC | | | | | | | | | LONGSHORE | OFFSHORE |
| Y7 | 19 | 35 | 8 | 24126 | 23976 | 48 | 21.03 | 124 | 7.28 | | | | |
| Y7 | 20 | 3 | 34 | 23688 | 24237 | 48 | 21.11 | 124 | 7.50 | 17.9 | 297.8 | -17.9 | 1.1 |
| Y7 | 20 | 30 | 32 | 23623 | 24434 | 48 | 21.14 | 124 | 7.73 | 17.8 | 281.7 | -17.4 | -3.8 |
| Y7 | 20 | 57 | 47 | 23239 | 24758 | 48 | 21.20 | 124 | 8.07 | 26.6 | 286.2 | -26.3 | -3.7 |
| Y7 | 21 | 25 | 8 | 22743 | 25139 | 48 | 21.26 | 124 | 8.50 | 33.1 | 281.8 | -32.3 | -7.1 |
| Y7 | 21 | 51 | 35 | 22347 | 25545 | 48 | 21.36 | 124 | 8.86 | 30.7 | 292.8 | -30.7 | -0.7 |
| Y7 | 22 | 18 | 43 | 22047 | 25957 | 48 | 21.50 | 124 | 9.16 | 27.3 | 303.9 | -26.9 | 4.6 |
| Y7 | 0 | 6 | 25 | 21849 | 26953 | 48 | 21.98 | 124 | 9.52 | 15.3 | 333.3 | -11.8 | 9.6 |
| Y7 | 0 | 42 | 26 | 22226 | 26660 | 48 | 21.94 | 124 | 9.19 | 20.7 | 100.4 | 20.1 | 4.9 |
| Y7 | 1 | 12 | 56 | 22683 | 26191 | 48 | 21.83 | 124 | 8.76 | 31.5 | 111.7 | 31.4 | 1.3 |
| Y7 | 1 | 57 | 6 | 23433 | 25047 | 48 | 21.42 | 124 | 7.98 | 46.0 | 127.9 | 44.6 | -10.9 |
| Y7 | 2 | 30 | 58 | 24209 | 24039 | 48 | 21.09 | 124 | 7.23 | 54.8 | 123.8 | 54.0 | -9.3 |
| Y7 | 3 | 25 | 36 | 25481 | 22201 | 48 | 20.41 | 124 | 6.03 | 59.7 | 130.2 | 57.4 | -16.6 |
| | | | | | | | | | | | | | |
| Y6 | 19 | 33 | 53 | 23946 | 23338 | 48 | 20.61 | 124 | 7.32 | | | | |
| Y6 | 20 | 2 | 14 | 23636 | 23731 | 48 | 20.74 | 124 | 7.61 | 25.2 | 304.4 | -24.8 | 4.5 |
| Y6 | 20 | 29 | 5 | 23286 | 23927 | 48 | 20.74 | 124 | 7.90 | 22.1 | 270.8 | -20.3 | -8.7 |
| Y6 | 20 | 56 | 26 | 22848 | 24214 | 48 | 20.77 | 124 | 8.26 | 27.7 | 275.7 | -26.3 | -8.7 |
| Y6 | 21 | 23 | 56 | 22284 | 24619 | 48 | 20.82 | 124 | 8.74 | 36.1 | 278.5 | -34.8 | -9.7 |
| Y6 | 21 | 50 | 10 | 21781 | 24961 | 48 | 20.84 | 124 | 9.16 | 33.3 | 275.4 | -31.5 | -10.7 |
| Y6 | 22 | 17 | 26 | 21409 | 25601 | 48 | 21.08 | 124 | 9.54 | 39.8 | 313.4 | -37.6 | 13.2 |
| Y6 | 22 | 40 | 2 | 21167 | 25968 | 48 | 21.21 | 124 | 9.79 | 28.2 | 307.8 | -27.4 | 6.7 |
| Y6 | 0 | 7 | 15 | 20982 | 26604 | 48 | 21.51 | 124 | 10.05 | 12.2 | 329.2 | -10.0 | 7.0 |
| Y6 | 0 | 38 | 49 | 21315 | 26473 | 48 | 21.55 | 124 | 9.79 | 17.6 | 77.5 | 14.1 | 10.5 |
| Y6 | 1 | 11 | 38 | 21821 | 26017 | 48 | 21.46 | 124 | 9.33 | 29.8 | 106.0 | 29.5 | 4.2 |
| Y6 | 1 | 55 | 59 | 22629 | 25042 | 48 | 21.17 | 124 | 8.56 | 41.0 | 119.1 | 40.9 | -3.6 |
| Y6 | 2 | 36 | 0 | 23491 | 23816 | 48 | 20.74 | 124 | 7.73 | 54.1 | 127.5 | 52.7 | -12.5 |

Plate 1e. Continued.

DATE - 23 JULY 1977

| DRIFTER NO. | TIME (GMT) HOUR MIN SEC | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) LONGSHORE OFFSHORE | |
|-------------|----------------------------|----|----|----------------|----------------|----------|-----------|-------------------|-------------------------|---|-------|
| Y5 | 19 | 32 | 44 | 23893 | 22561 | 48 20.14 | 124 7.27 | | | | |
| Y5 | 20 | 1 | 5 | 23483 | 23102 | 48 20.32 | 124 7.64 | 33.8 | 307.1 | -32.9 | 7.6 |
| Y5 | 20 | 27 | 38 | 22975 | 23615 | 48 20.46 | 124 8.08 | 37.9 | 294.4 | -37.9 | .2 |
| Y5 | 20 | 54 | 57 | 22393 | 24162 | 48 20.58 | 124 8.59 | 40.8 | 290.4 | -40.7 | -2.7 |
| Y5 | 21 | 22 | 25 | 21777 | 24658 | 48 20.66 | 124 9.11 | 40.4 | 282.5 | -39.6 | -8.1 |
| Y5 | 21 | 48 | 36 | 21245 | 25138 | 48 20.76 | 124 9.58 | 38.1 | 286.8 | -37.6 | -4.9 |
| Y5 | 22 | 15 | 47 | 20705 | 25720 | 48 20.90 | 124 10.07 | 40.7 | 294.1 | -40.7 | -0 |
| Y5 | 0 | 1 | 43 | 19449 | 26863 | 48 21.10 | 124 11.17 | 22.3 | 285.0 | -22.1 | -3.5 |
| Y5 | 0 | 34 | 52 | 19564 | 26817 | 48 21.12 | 124 11.08 | 5.7 | 74.3 | 4.4 | 3.7 |
| Y5 | 1 | 5 | 27 | 19840 | 26551 | 48 21.07 | 124 10.84 | 17.5 | 107.0 | 17.3 | 2.2 |
| Y5 | 1 | 51 | 17 | 20463 | 25942 | 48 20.94 | 124 10.28 | 26.5 | 108.3 | 26.3 | 2.7 |
| Y4 | 19 | 31 | 34 | 23794 | 21829 | 48 19.66 | 124 7.28 | | | | |
| Y4 | 19 | 59 | 42 | 23288 | 22279 | 48 19.76 | 124 7.70 | 32.9 | 289.5 | -32.8 | -2.7 |
| Y4 | 20 | 26 | 20 | 22756 | 22801 | 48 19.89 | 124 8.15 | 38.1 | 293.5 | -38.1 | -4 |
| Y4 | 20 | 53 | 55 | 22219 | 23436 | 48 20.09 | 124 8.62 | 41.4 | 301.8 | -41.0 | 5.5 |
| Y4 | 21 | 19 | 1 | 21692 | 24058 | 48 20.27 | 124 9.09 | 44.7 | 300.8 | -44.4 | 5.2 |
| Y4 | 21 | 47 | 20 | 21065 | 24753 | 48 20.46 | 124 9.64 | 45.4 | 296.8 | -45.4 | 2.1 |
| Y4 | 22 | 14 | 35 | 20625 | 25281 | 48 20.61 | 124 10.05 | 34.9 | 299.6 | -34.7 | 3.3 |
| Y4 | 1 | 0 | 59 | 19864 | 23573 | 48 20.49 | 124 10.64 | 7.7 | 253.3 | -5.8 | -5.0 |
| Y4 | 1 | 49 | 25 | 20445 | 24931 | 48 20.33 | 124 10.12 | 24.4 | 115.3 | 24.4 | -5 |
| Y4 | 2 | 21 | 36 | 20912 | 24240 | 48 20.09 | 124 9.69 | 36.4 | 130.1 | 35.0 | -10.1 |
| Y4 | 3 | 15 | 23 | 21853 | 22935 | 48 19.63 | 124 8.85 | 41.4 | 128.9 | 40.0 | -10.6 |
| Y3 | 19 | 30 | 22 | 23795 | 21102 | 48 19.20 | 124 7.23 | | | | |
| Y3 | 19 | 58 | 40 | 23205 | 21684 | 48 19.36 | 124 7.72 | 39.3 | 294.9 | -39.3 | .5 |
| Y3 | 20 | 25 | 6 | 22662 | 22231 | 48 19.50 | 124 8.17 | 39.2 | 295.2 | -39.2 | .7 |
| Y3 | 20 | 52 | 39 | 21987 | 22970 | 48 19.71 | 124 8.75 | 48.9 | 298.6 | -48.8 | 3.9 |
| Y3 | 21 | 21 | 8 | 21415 | 23784 | 48 20.00 | 124 9.26 | 48.6 | 310.3 | -46.7 | 13.6 |
| Y3 | 21 | 46 | 4 | 21059 | 24451 | 48 20.27 | 124 9.61 | 44.6 | 319.6 | -40.3 | 19.2 |
| Y3 | 22 | 13 | 12 | 20776 | 25010 | 48 20.51 | 124 9.89 | 34.3 | 320.9 | -30.7 | 15.5 |
| Y3 | 0 | 34 | 5 | 19922 | 25722 | 48 20.61 | 124 10.62 | 10.9 | 281.7 | -10.6 | -2.3 |
| Y3 | 1 | 4 | 44 | 20125 | 25486 | 48 20.54 | 124 10.44 | 14.0 | 117.2 | 14.0 | -8 |
| Y3 | 1 | 50 | 27 | 20717 | 24827 | 48 20.37 | 124 9.91 | 26.5 | 115.9 | 26.5 | -8 |
| Y3 | 2 | 20 | 46 | 21165 | 24185 | 48 20.15 | 124 9.49 | 36.2 | 128.6 | 35.0 | -9.1 |
| Y3 | 3 | 12 | 50 | 22133 | 22868 | 48 19.70 | 124 8.63 | 43.5 | 128.0 | 42.2 | -10.4 |

Plate 1e. Continued.

DATE - 23 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|-------------|------------|-----|-----|-------------|-------------|----------|-----------|----------------|----------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| K9 | 19 | 29 | 15 | 23799 | 20363 | 48 18.72 | 124 7.21 | | | | |
| K9 | 19 | 57 | 28 | 23159 | 21136 | 48 18.98 | 124 7.73 | 47.7 | 306.3 | -46.6 | 10.1 |
| K9 | 20 | 23 | 45 | 22517 | 21926 | 48 19.24 | 124 8.27 | 52.1 | 306.2 | -51.0 | 11.0 |
| K9 | 20 | 51 | 19 | 21966 | 22741 | 48 19.55 | 124 8.74 | 49.7 | 314.1 | -46.7 | 17.0 |
| K9 | 21 | 17 | 42 | 21621 | 23408 | 48 19.84 | 124 9.06 | 42.2 | 323.5 | -36.7 | 20.7 |
| K9 | 21 | 44 | 49 | 21409 | 24089 | 48 20.18 | 124 9.30 | 43.0 | 335.3 | -32.3 | 28.3 |
| K9 | 22 | 12 | 0 | 21203 | 24588 | 48 20.41 | 124 9.52 | 30.7 | 327.2 | -25.7 | 16.8 |
| K9 | 22 | 38 | 35 | 21006 | 24864 | 48 20.50 | 124 9.70 | 17.9 | 307.0 | -17.5 | 4.0 |
| K9 | 23 | 59 | 2 | 20564 | 25126 | 48 20.50 | 124 10.06 | 9.2 | 267.8 | -8.3 | -4.1 |
| K9 | 0 | 33 | 37 | 20618 | 24980 | 48 20.43 | 124 10.00 | 7.1 | 149.2 | 5.8 | -4.1 |
| K9 | 1 | 2 | 19 | 20828 | 24705 | 48 20.34 | 124 9.81 | 16.7 | 124.0 | 16.5 | -2.9 |
| K9 | 1 | 47 | 57 | 21414 | 23944 | 48 20.10 | 124 9.28 | 29.1 | 124.5 | 28.6 | -5.2 |
| K9 | 2 | 23 | 54 | 22031 | 23097 | 48 19.80 | 124 8.73 | 40.5 | 128.3 | 39.2 | -9.9 |
| K9 | 3 | 11 | 25 | 22897 | 21848 | 48 19.34 | 124 7.97 | 44.6 | 132.4 | 42.3 | -14.0 |
| | | | | | | | | | | | |
| K8 | 19 | 28 | 10 | 23723 | 19710 | 48 18.25 | 124 7.27 | | | | |
| K8 | 19 | 56 | 6 | 22986 | 20595 | 48 18.54 | 124 7.86 | 54.6 | 306.7 | -53.3 | 11.9 |
| K8 | 20 | 22 | 31 | 22423 | 21446 | 48 18.88 | 124 8.32 | 53.8 | 318.1 | -49.1 | 21.8 |
| K8 | 20 | 50 | 6 | 21994 | 22270 | 48 19.26 | 124 8.69 | 50.0 | 326.5 | -42.2 | 26.8 |
| K8 | 21 | 16 | 26 | 21647 | 22998 | 48 19.59 | 124 9.01 | 46.4 | 327.7 | -38.6 | 25.7 |
| K8 | 21 | 43 | 35 | 21353 | 23771 | 48 19.97 | 124 9.30 | 48.3 | 332.2 | -38.0 | 29.8 |
| K8 | 22 | 10 | 33 | 21064 | 24388 | 48 20.24 | 124 9.59 | 38.2 | 324.5 | -32.9 | 19.3 |
| K8 | 22 | 37 | 23 | 20798 | 24733 | 48 20.35 | 124 9.84 | 22.5 | 304.0 | -22.1 | 3.9 |
| K8 | 23 | 57 | 43 | 20194 | 25225 | 48 20.41 | 124 10.35 | 13.3 | 280.9 | -13.0 | -3.0 |
| K8 | 0 | 32 | 14 | 20170 | 25167 | 48 20.37 | 124 10.35 | 4.1 | 187.5 | 1.2 | -3.9 |
| K8 | 1 | 0 | 37 | 20313 | 24930 | 48 20.28 | 124 10.22 | 14.0 | 134.0 | 13.2 | -4.8 |
| K8 | 1 | 46 | 31 | 20880 | 24270 | 48 20.09 | 124 9.71 | 25.8 | 118.9 | 25.7 | -2.2 |
| K8 | 2 | 22 | 15 | 21407 | 23488 | 48 19.81 | 124 9.23 | 37.0 | 131.5 | 35.3 | -11.1 |
| K8 | 3 | 10 | 37 | 22313 | 22206 | 48 19.34 | 124 8.44 | 44.9 | 131.2 | 42.9 | -13.2 |

Plate 1e. Continued.

DATE - 23 JULY 1977

| DRIFTER NO. | TIME (GMT) HOUR MIN SEC | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) LONGSHORE OFFSHORE | |
|-------------|----------------------------|----|----|----------------|----------------|----------|-----------|-------------------|-------------------------|---|-------|
| K7 | 19 | 27 | 4 | 23964 | 18906 | 48 17.77 | 124 7.11 | | | | |
| K7 | 19 | 54 | 57 | 23234 | 19772 | 48 18.07 | 124 7.68 | 53.0 | 307.6 | -51.5 | 12.4 |
| K7 | 20 | 21 | 24 | 22678 | 20539 | 48 18.36 | 124 8.11 | 48.5 | 315.5 | -45.1 | 17.6 |
| K7 | 20 | 48 | 53 | 22191 | 21450 | 48 18.78 | 124 8.51 | 55.8 | 328.1 | -46.3 | 31.3 |
| K7 | 21 | 15 | 17 | 21836 | 22283 | 48 19.20 | 124 8.81 | 54.0 | 333.6 | -41.7 | 34.3 |
| K7 | 21 | 42 | 23 | 21481 | 22976 | 48 19.51 | 124 9.13 | 42.8 | 325.6 | -36.5 | 22.3 |
| K7 | 22 | 9 | 21 | 21133 | 23650 | 48 19.80 | 124 9.45 | 41.7 | 323.7 | -36.3 | 20.6 |
| K7 | 22 | 36 | 11 | 20835 | 24134 | 48 19.99 | 124 9.73 | 30.2 | 315.6 | -28.1 | 11.1 |
| K7 | 23 | 56 | 21 | 20120 | 24767 | 48 20.10 | 124 10.33 | 16.1 | 285.1 | -15.9 | -2.5 |
| K7 | 0 | 30 | 51 | 20045 | 24726 | 48 20.04 | 124 10.38 | 6.0 | 210.2 | -6.6 | -5.9 |
| K7 | 0 | 59 | 32 | 20176 | 24515 | 48 19.96 | 124 10.26 | 12.3 | 134.3 | 11.5 | -4.3 |
| K7 | 1 | 45 | 47 | 20704 | 23341 | 48 19.75 | 124 9.79 | 25.2 | 124.4 | 24.8 | -4.5 |
| K7 | 2 | 19 | 13 | 21179 | 23147 | 48 19.49 | 124 9.37 | 34.9 | 132.1 | 33.2 | -10.8 |
| K7 | 3 | 9 | 3 | 22141 | 21961 | 48 19.11 | 124 8.56 | 41.2 | 125.1 | 40.4 | -7.8 |
| | | | | | | | | | | | |
| K6 | 19 | 26 | 5 | 24162 | 18080 | 48 17.24 | 124 7.02 | | | | |
| K6 | 19 | 53 | 52 | 23533 | 18728 | 48 17.42 | 124 7.50 | 41.2 | 299.2 | -41.0 | 3.6 |
| K6 | 20 | 20 | 20 | 22983 | 19517 | 48 17.75 | 124 7.91 | 49.7 | 320.5 | -44.6 | 22.1 |
| K6 | 20 | 47 | 57 | 22510 | 20340 | 48 18.14 | 124 8.26 | 50.5 | 328.6 | -41.6 | 28.6 |
| K6 | 21 | 14 | 9 | 22097 | 21032 | 48 18.44 | 124 8.58 | 44.3 | 325.1 | -38.0 | 22.8 |
| K6 | 21 | 41 | 9 | 21612 | 21739 | 48 18.72 | 124 8.97 | 43.7 | 316.8 | -40.3 | 16.8 |
| K6 | 22 | 8 | 5 | 21180 | 22382 | 48 18.97 | 124 9.33 | 39.8 | 316.6 | -36.8 | 15.2 |
| K6 | 22 | 35 | 3 | 20716 | 22875 | 48 19.10 | 124 9.71 | 32.8 | 296.7 | -32.7 | 1.5 |
| K6 | 23 | 55 | 12 | 19854 | 23663 | 48 19.25 | 124 10.42 | 19.0 | 286.9 | -18.9 | -2.4 |
| K6 | 0 | 29 | 21 | 19729 | 23613 | 48 19.15 | 124 10.51 | 10.3 | 213.1 | -1.6 | -10.2 |
| K6 | 0 | 55 | 59 | 19730 | 23469 | 48 19.05 | 124 10.51 | 11.9 | 176.9 | 5.4 | -10.6 |
| K6 | 1 | 36 | 11 | 20040 | 22889 | 48 18.78 | 124 10.24 | 24.5 | 146.6 | 20.6 | -13.1 |
| K6 | 2 | 17 | 50 | 20801 | 22092 | 48 18.58 | 124 9.63 | 34.0 | 116.0 | 34.0 | -1.1 |
| K6 | 3 | 6 | 28 | 21850 | 20850 | 48 18.19 | 124 8.79 | 43.5 | 125.3 | 42.7 | -8.4 |

Plate 1e. Continued.

DATE - 23 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (N) | LATITUDE | | LONGITUDE | | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-------|-----------|------|-------------------|-------------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | | | LONGSHORE | OFFSHORE |
| K5 | 19 | 24 | 55 | 24295 | 17393 | 48 | 16.75 | 124 | 7.00 | | | | |
| K5 | 19 | 52 | 33 | 23706 | 17965 | 48 | 16.89 | 124 | 7.45 | 37.1 | 294.7 | -37.1 | .4 |
| K5 | 20 | 19 | 14 | 23176 | 18650 | 48 | 17.16 | 124 | 7.83 | 42.8 | 316.4 | -39.6 | 16.3 |
| K5 | 20 | 46 | 45 | 22716 | 19304 | 48 | 17.44 | 124 | 8.16 | 39.8 | 321.5 | -35.3 | 18.3 |
| K5 | 21 | 12 | 54 | 22259 | 19954 | 48 | 17.71 | 124 | 8.50 | 41.5 | 320.3 | -37.3 | 18.3 |
| K5 | 21 | 39 | 53 | 21773 | 20588 | 48 | 17.94 | 124 | 8.87 | 39.2 | 313.7 | -36.9 | 13.2 |
| K5 | 22 | 6 | 43 | 21293 | 21185 | 48 | 18.15 | 124 | 9.24 | 37.3 | 309.7 | -36.0 | 10.0 |
| K5 | 22 | 33 | 48 | 20978 | 21659 | 48 | 18.35 | 124 | 9.49 | 29.2 | 320.2 | -26.3 | 12.9 |
| K5 | 23 | 53 | 55 | 20516 | 22125 | 48 | 18.46 | 124 | 9.86 | 10.4 | 294.3 | -10.4 | .0 |
| K5 | 0 | 25 | 22 | 20561 | 21874 | 48 | 18.29 | 124 | 9.83 | 16.8 | 172.9 | 8.7 | -14.3 |
| K5 | 0 | 54 | 40 | 20837 | 21476 | 48 | 18.13 | 124 | 9.61 | 22.7 | 138.4 | 20.7 | -9.3 |
| K5 | 1 | 38 | 29 | 21557 | 20613 | 48 | 17.84 | 124 | 9.05 | 33.1 | 127.3 | 32.3 | -7.6 |
| K5 | 2 | 16 | 10 | 22411 | 19581 | 48 | 17.49 | 124 | 8.40 | 45.9 | 129.2 | 44.4 | -11.9 |
| K5 | 3 | 3 | 2 | 23634 | 18274 | 48 | 17.11 | 124 | 7.47 | 48.1 | 121.3 | 47.7 | -6.1 |
| K4 | 19 | 23 | 49 | 24502 | 16737 | 48 | 16.30 | 124 | 6.94 | | | | |
| K4 | 19 | 51 | 19 | 23883 | 17413 | 48 | 16.51 | 124 | 7.39 | 41.6 | 305.1 | -40.8 | 8.0 |
| K4 | 20 | 18 | 1 | 23309 | 18084 | 48 | 16.75 | 124 | 7.80 | 42.0 | 310.3 | -40.3 | 11.7 |
| K4 | 20 | 45 | 36 | 22790 | 18768 | 48 | 17.02 | 124 | 8.17 | 41.4 | 318.7 | -37.7 | 17.3 |
| K4 | 21 | 11 | 45 | 22410 | 19350 | 48 | 17.29 | 124 | 8.43 | 38.0 | 327.1 | -31.8 | 20.7 |
| K4 | 21 | 38 | 39 | 22071 | 19866 | 48 | 17.53 | 124 | 8.67 | 32.5 | 325.4 | -27.8 | 16.9 |
| K4 | 22 | 5 | 42 | 21602 | 20396 | 48 | 17.69 | 124 | 9.03 | 33.2 | 304.4 | -32.7 | 5.9 |
| K4 | 22 | 32 | 34 | 21253 | 20857 | 48 | 17.87 | 124 | 9.30 | 28.6 | 314.9 | -26.7 | 10.1 |
| K4 | 23 | 49 | 29 | 21104 | 21125 | 48 | 18.00 | 124 | 9.40 | 6.1 | 331.3 | -4.8 | 3.7 |
| K4 | 0 | 23 | 21 | 21338 | 20765 | 48 | 17.84 | 124 | 9.23 | 17.9 | 143.3 | 15.6 | -8.7 |
| K4 | 0 | 53 | 53 | 21727 | 20269 | 48 | 17.66 | 124 | 8.93 | 27.1 | 132.8 | 25.7 | -8.7 |
| K4 | 1 | 32 | 23 | 22595 | 19380 | 48 | 17.43 | 124 | 8.26 | 40.6 | 117.1 | 40.5 | -2.1 |
| K4 | 2 | 14 | 9 | 23524 | 18239 | 48 | 17.02 | 124 | 7.57 | 45.6 | 132.0 | 43.4 | -14.0 |
| K4 | 2 | 59 | 12 | 24816 | 16870 | 48 | 16.61 | 124 | 6.60 | 52.4 | 122.0 | 51.9 | -7.2 |

Plate 1e. Continued.

DATE - 23 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | | LONGITUDE | | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|-------------|------------|-----|-----|-------------|-------------|----------|-------|-----------|------|----------------|----------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | | | LONGSHORE | OFFSHORE |
| K3 | 19 | 22 | 39 | 24720 | 16097 | 48 | 15.83 | 124 | 6.89 | | | | |
| K3 | 19 | 50 | 11 | 24170 | 16710 | 48 | 16.04 | 124 | 7.28 | 37.2 | 308.2 | -36.1 | 9.1 |
| K3 | 20 | 16 | 51 | 23650 | 17272 | 48 | 16.21 | 124 | 7.66 | 35.5 | 304.6 | -34.9 | 6.5 |
| K3 | 20 | 44 | 27 | 23165 | 17892 | 48 | 16.47 | 124 | 7.99 | 37.7 | 319.3 | -34.1 | 16.0 |
| K3 | 21 | 10 | 43 | 22808 | 18401 | 48 | 16.70 | 124 | 8.22 | 33.2 | 326.3 | -28.1 | 17.7 |
| K3 | 21 | 37 | 42 | 22432 | 18909 | 48 | 16.92 | 124 | 8.48 | 31.7 | 321.3 | -28.2 | 14.5 |
| K3 | 22 | 4 | 45 | 22179 | 19288 | 48 | 17.09 | 124 | 8.65 | 24.0 | 327.1 | -20.1 | 13.1 |
| K3 | 22 | 31 | 25 | 21832 | 19641 | 48 | 17.18 | 124 | 8.92 | 23.0 | 296.7 | -23.0 | 1.1 |
| K3 | 23 | 47 | 6 | 21838 | 19736 | 48 | 17.27 | 124 | 8.90 | 3.7 | 8.7 | -1.0 | 3.5 |
| K3 | 0 | 22 | 18 | 22239 | 19286 | 48 | 17.13 | 124 | 8.60 | 21.5 | 124.7 | 21.2 | -3.9 |
| K3 | 0 | 52 | 41 | 22804 | 18623 | 48 | 16.90 | 124 | 8.18 | 36.5 | 129.5 | 35.2 | -9.7 |
| K3 | 1 | 31 | 21 | 23793 | 17545 | 48 | 16.57 | 124 | 7.45 | 47.2 | 124.0 | 46.5 | -8.1 |
| K3 | 2 | 10 | 16 | 24856 | 16348 | 48 | 16.17 | 124 | 6.68 | 51.6 | 127.9 | 50.2 | -12.3 |
| K3 | 2 | 56 | 15 | 26237 | 14844 | 48 | 15.69 | 124 | 5.69 | 55.2 | 126.2 | 54.0 | -11.6 |
| K2 | 19 | 21 | 37 | 24945 | 15457 | 48 | 15.32 | 124 | 6.88 | | | | |
| K2 | 19 | 48 | 59 | 24436 | 16045 | 48 | 15.54 | 124 | 7.23 | 35.9 | 314.0 | -33.7 | 12.2 |
| K2 | 20 | 15 | 29 | 23997 | 16565 | 48 | 15.74 | 124 | 7.52 | 32.8 | 315.8 | -30.5 | 12.2 |
| K2 | 20 | 43 | 16 | 23447 | 17111 | 48 | 15.88 | 124 | 7.93 | 33.9 | 295.7 | -33.9 | .9 |
| K2 | 21 | 9 | 38 | 23004 | 17671 | 48 | 16.11 | 124 | 8.22 | 36.0 | 320.9 | -32.1 | 16.2 |
| K2 | 21 | 36 | 35 | 22615 | 18155 | 48 | 16.31 | 124 | 8.48 | 30.2 | 318.4 | -27.5 | 12.4 |
| K2 | 22 | 3 | 37 | 22329 | 18574 | 48 | 16.52 | 124 | 8.66 | 27.4 | 330.2 | -22.1 | 16.1 |
| K2 | 22 | 30 | 24 | 22043 | 18850 | 48 | 16.58 | 124 | 8.88 | 18.2 | 291.8 | -18.2 | -.7 |
| K2 | 23 | 46 | 28 | 22509 | 18631 | 48 | 16.71 | 124 | 8.47 | 12.5 | 64.3 | 8.0 | 9.5 |
| K2 | 0 | 21 | 21 | 23140 | 17998 | 48 | 16.55 | 124 | 7.99 | 31.6 | 116.2 | 31.6 | -1.1 |
| K2 | 0 | 51 | 40 | 23850 | 17250 | 48 | 16.34 | 124 | 7.46 | 42.0 | 121.7 | 41.7 | -5.6 |
| K2 | 1 | 30 | 26 | 25029 | 15991 | 48 | 15.95 | 124 | 6.60 | 55.0 | 123.6 | 54.3 | -9.0 |
| K2 | 2 | 8 | 25 | 26345 | 14487 | 48 | 15.42 | 124 | 5.68 | 66.1 | 131.3 | 63.2 | -19.5 |
| K2 | 2 | 47 | 19 | 27850 | 12789 | 48 | 14.81 | 124 | 4.66 | 72.9 | 131.5 | 69.5 | -21.8 |

Plate 1e. Continued.

DATE - 23 JULY 1977

| DRIFTER NO. | TIME (GMT) | | | RANGE 1 (M) | RANGE 4 (M) | LATITUDE | LONGITUDE | SPEED (CM/SEC) | DIRECTION (DEG TRUE) | COMPONENTS (CM/SEC) | |
|----------------|------------|-----|-----|----------------|----------------|----------|-----------|-------------------|-------------------------|---------------------|----------|
| | HOUR | MIN | SEC | | | | | | | LONGSHORE | OFFSHORE |
| K1 | 19 | 20 | 28 | 25187 | 14849 | 48 14.79 | 124 6.90 | | | | |
| K1 | 19 | 47 | 49 | 24717 | 15340 | 48 14.93 | 124 7.23 | 29.9 | 303.1 | -29.6 | 4.7 |
| K1 | 20 | 14 | 18 | 24370 | 15835 | 48 15.22 | 124 7.40 | 36.1 | 338.1 | -25.9 | 25.1 |
| K1 | 20 | 41 | 57 | 23977 | 16293 | 48 15.40 | 124 7.66 | 27.9 | 316.4 | -25.8 | 10.6 |
| K1 | 21 | 8 | 42 | 23558 | 16717 | 48 15.51 | 124 7.97 | 26.9 | 297.9 | -26.8 | 1.8 |
| K1 | 21 | 35 | 32 | 23159 | 17188 | 48 15.70 | 124 8.23 | 29.6 | 316.8 | -27.3 | 11.4 |
| K1 | 22 | 2 | 37 | 22861 | 17546 | 48 15.84 | 124 8.43 | 22.3 | 317.9 | -20.4 | 9.0 |
| K1 | 22 | 29 | 31 | 22664 | 17823 | 48 15.98 | 124 8.54 | 18.6 | 331.6 | -14.8 | 11.3 |
| K1 | 23 | 45 | 43 | 22817 | 17665 | 48 15.94 | 124 8.43 | 3.5 | 119.0 | 3.5 | -3.3 |
| K1 | 0 | 20 | 33 | 23575 | 17181 | 48 16.06 | 124 7.77 | 40.6 | 75.1 | 31.6 | 25.5 |
| K1 | 0 | 51 | 7 | 24374 | 16475 | 48 15.95 | 124 7.14 | 43.6 | 104.2 | 43.0 | 7.5 |
| K1 | 1 | 28 | 48 | 25634 | 15212 | 48 15.62 | 124 6.20 | 57.9 | 117.9 | 57.8 | -3.8 |
| K1 | 2 | 6 | 48 | 27051 | 13644 | 48 15.09 | 124 5.22 | 69.1 | 129.0 | 66.7 | -17.8 |
| K0 | 19 | 18 | 12 | 25407 | 14356 | 48 14.30 | 124 6.94 | | | | |
| K0 | 19 | 46 | 31 | 24849 | 14825 | 48 14.26 | 124 7.44 | 36.3 | 263.2 | -31.2 | -18.7 |
| K0 | 20 | 12 | 52 | 24388 | 15297 | 48 14.39 | 124 7.76 | 29.8 | 300.8 | -29.6 | 3.5 |
| K0 | 20 | 40 | 12 | 23904 | 15770 | 48 14.48 | 124 8.13 | 29.5 | 290.7 | -29.5 | -1.8 |
| K0 | 21 | 7 | 11 | 23481 | 16232 | 48 14.66 | 124 8.40 | 29.1 | 314.5 | -27.3 | 10.2 |
| K0 | 21 | 34 | 5 | 23127 | 16590 | 48 14.75 | 124 8.66 | 22.3 | 297.9 | -22.2 | 1.5 |
| K0 | 22 | 0 | 54 | 22846 | 16920 | 48 14.91 | 124 8.82 | 22.3 | 326.2 | -18.9 | 11.9 |
| K0 | 22 | 26 | 13 | 22807 | 17024 | 48 15.04 | 124 8.79 | 14.5 | 7.6 | -4.1 | 13.9 |
| K0 | 23 | 44 | 29 | 23099 | 16788 | 48 15.06 | 124 8.53 | 7.1 | 80.7 | 5.9 | 3.9 |
| K0 | 0 | 19 | 6 | 23972 | 16135 | 48 15.07 | 124 7.88 | 38.8 | 89.6 | 35.3 | 16.1 |
| K0 | 0 | 48 | 49 | 24686 | 15421 | 48 15.01 | 124 7.22 | 46.2 | 97.3 | 44.2 | 13.3 |
| K0 | 1 | 27 | 35 | 26066 | 14120 | 48 14.77 | 124 6.17 | 59.4 | 108.9 | 59.2 | 5.4 |
| K0 | 2 | 5 | 51 | 27579 | 12667 | 48 14.45 | 124 5.03 | 66.4 | 112.9 | 66.4 | 1.3 |

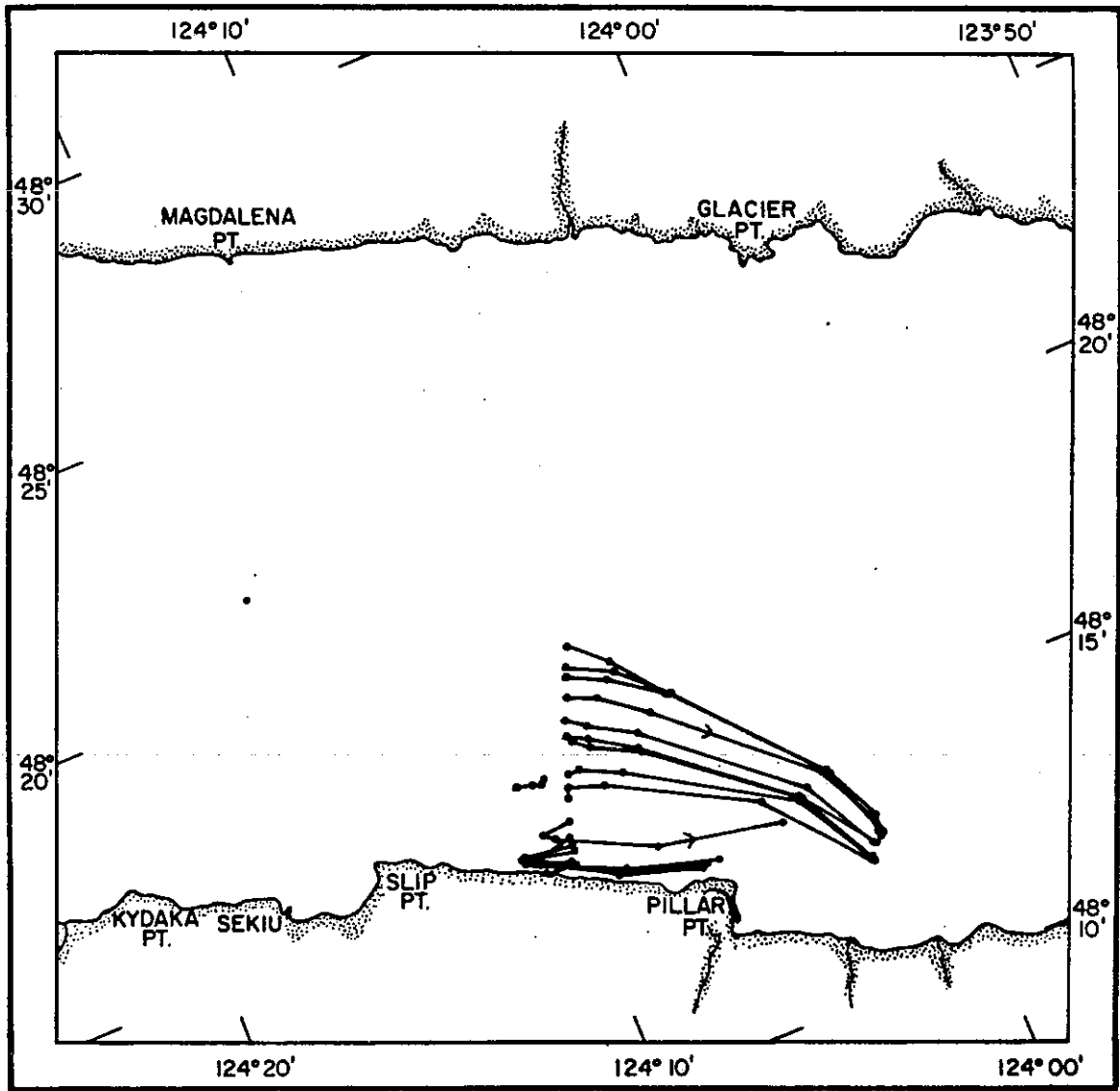
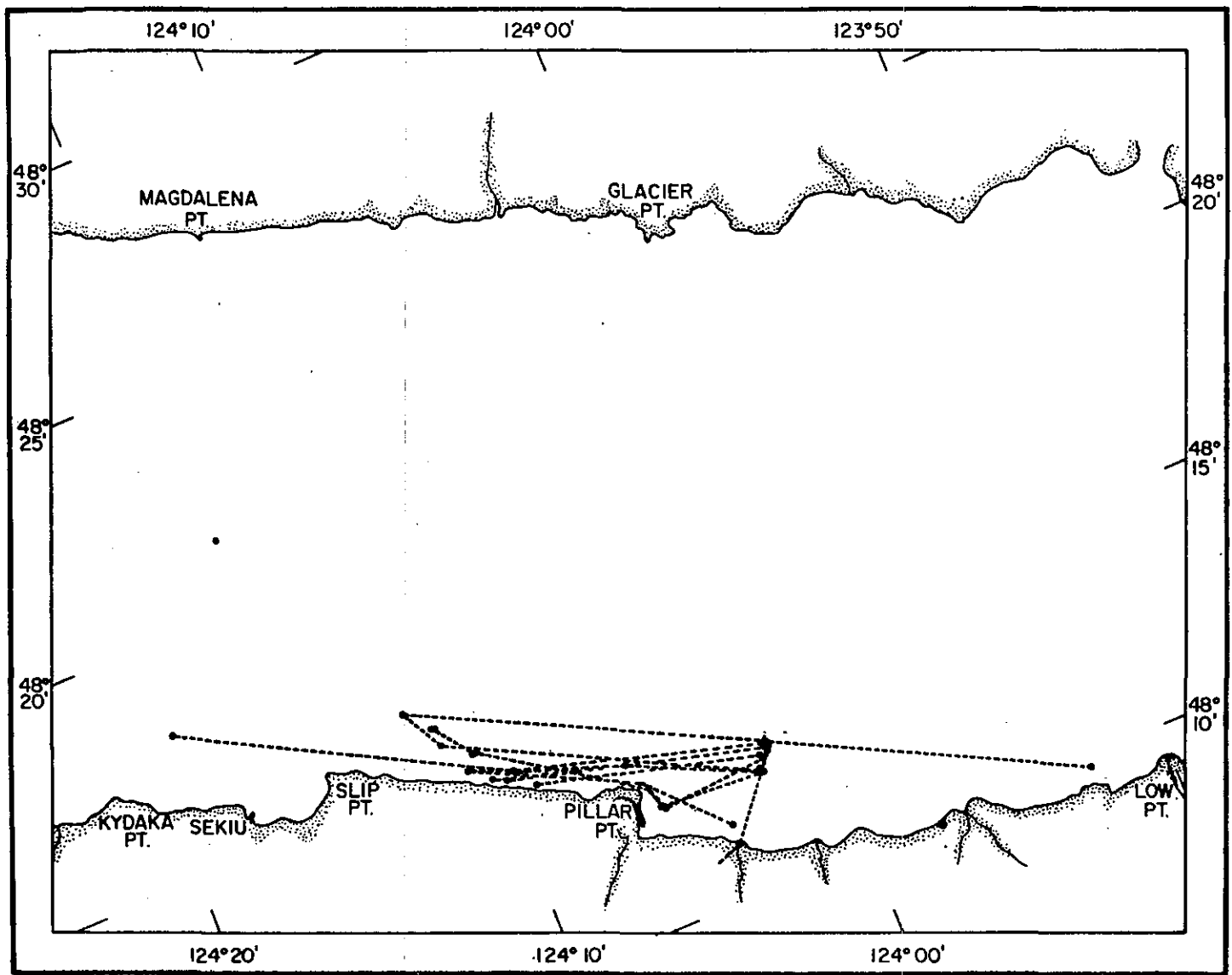


Plate 2a1. Drifter trajectories on 19 July 1977 during flood.



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Plate 2a2. Sightings and/or recoveries on or near shore relative to the last known position on 19 July 1977.

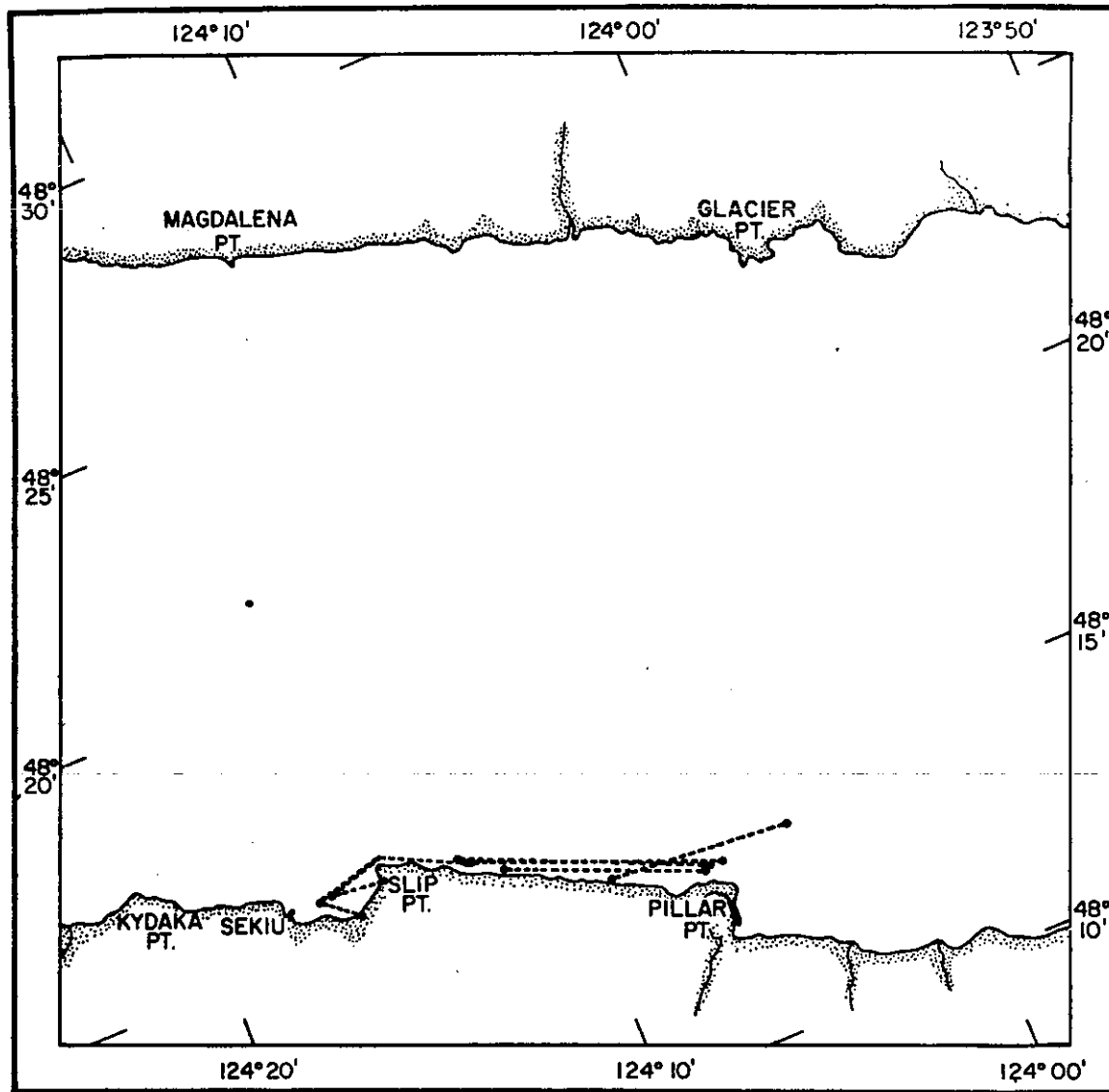


Plate 2a2 cont. Sightings and/or recoveries on or near shore relative to the last known position on 19 July 1977.

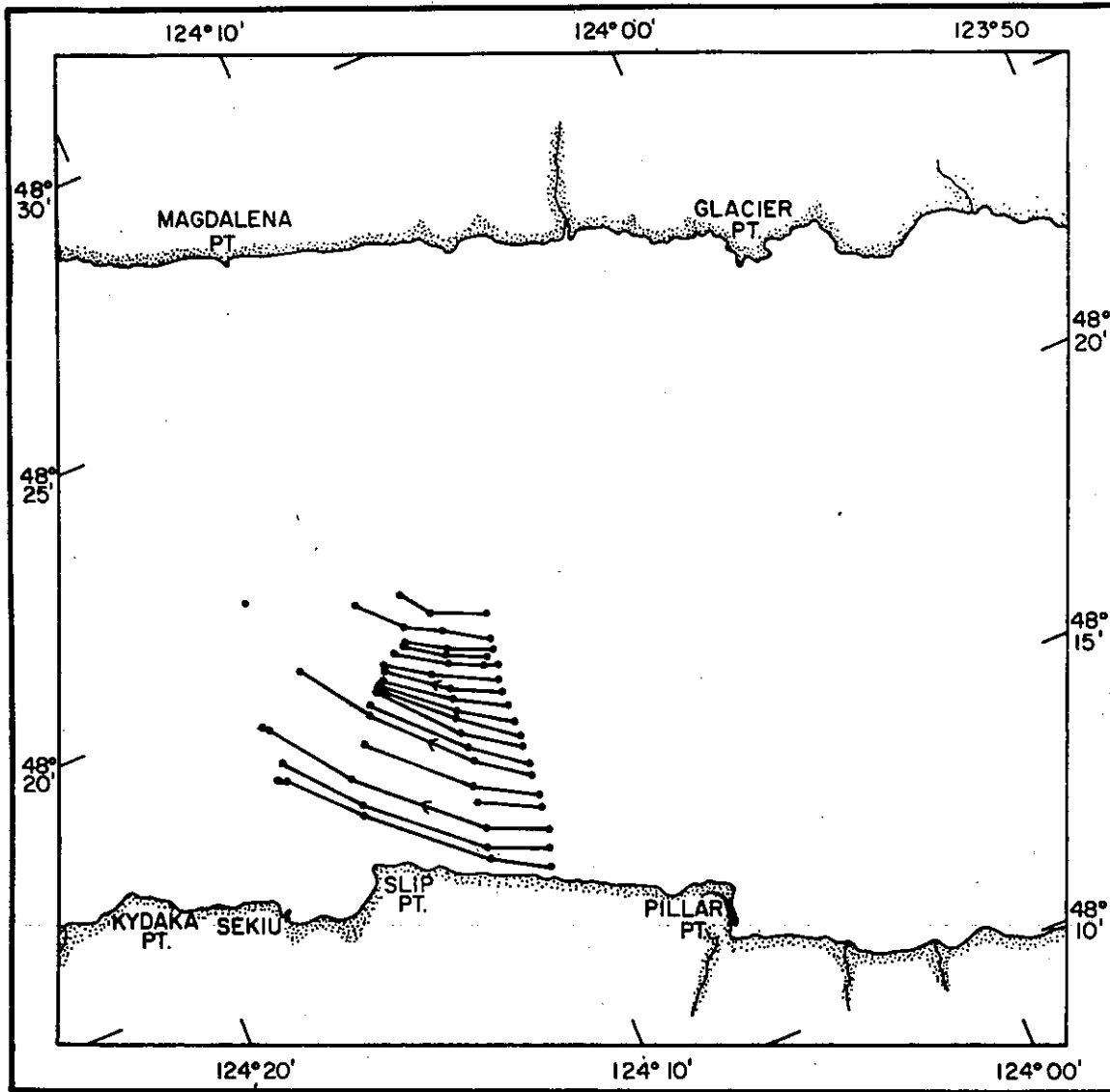
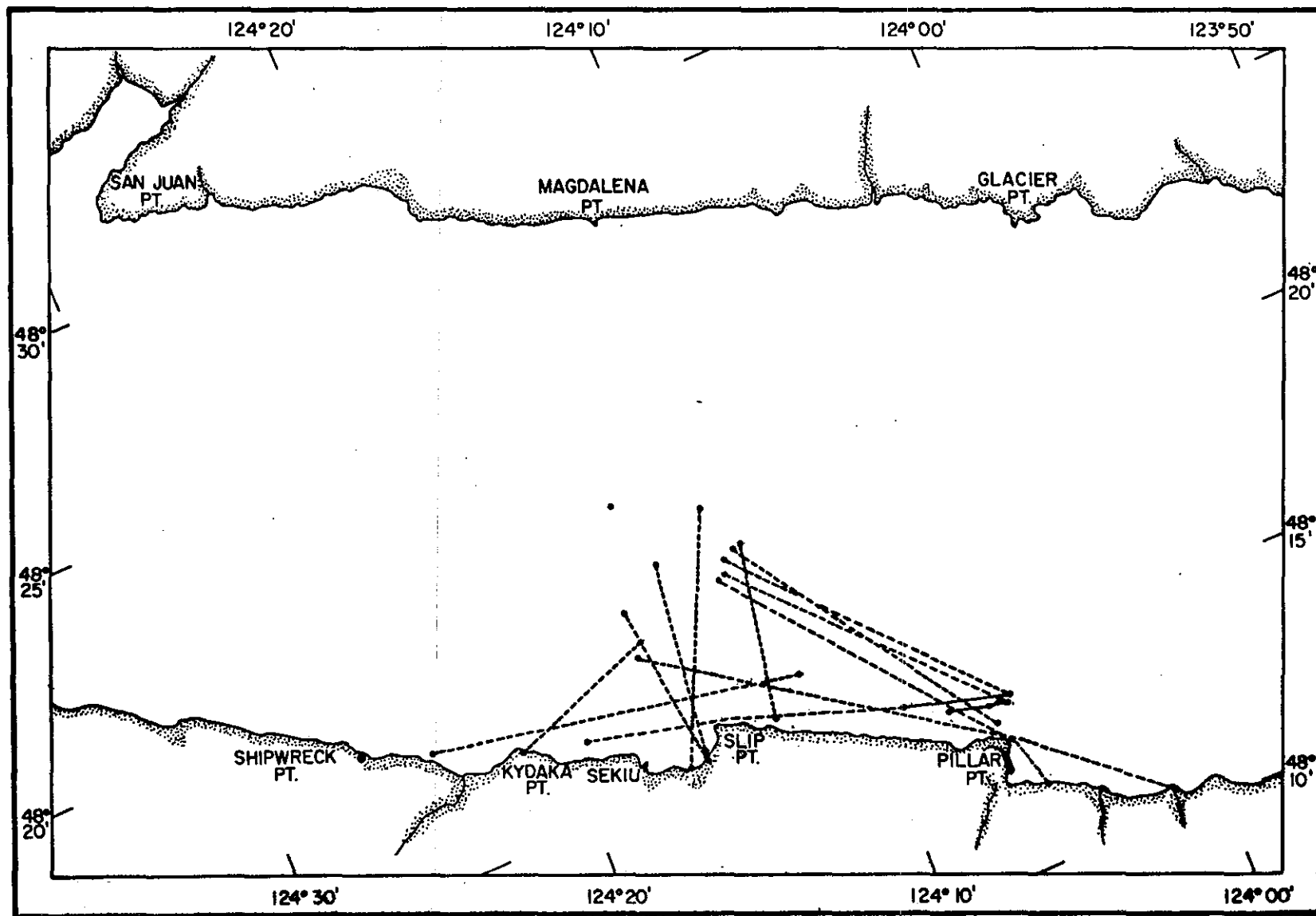


Plate 2b1. Drifter trajectories on 20 July 1977 during ebb.



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Plate 2b2. Sightings and/or recoveries on or near shore relative to the last known position on 20 July 1977.

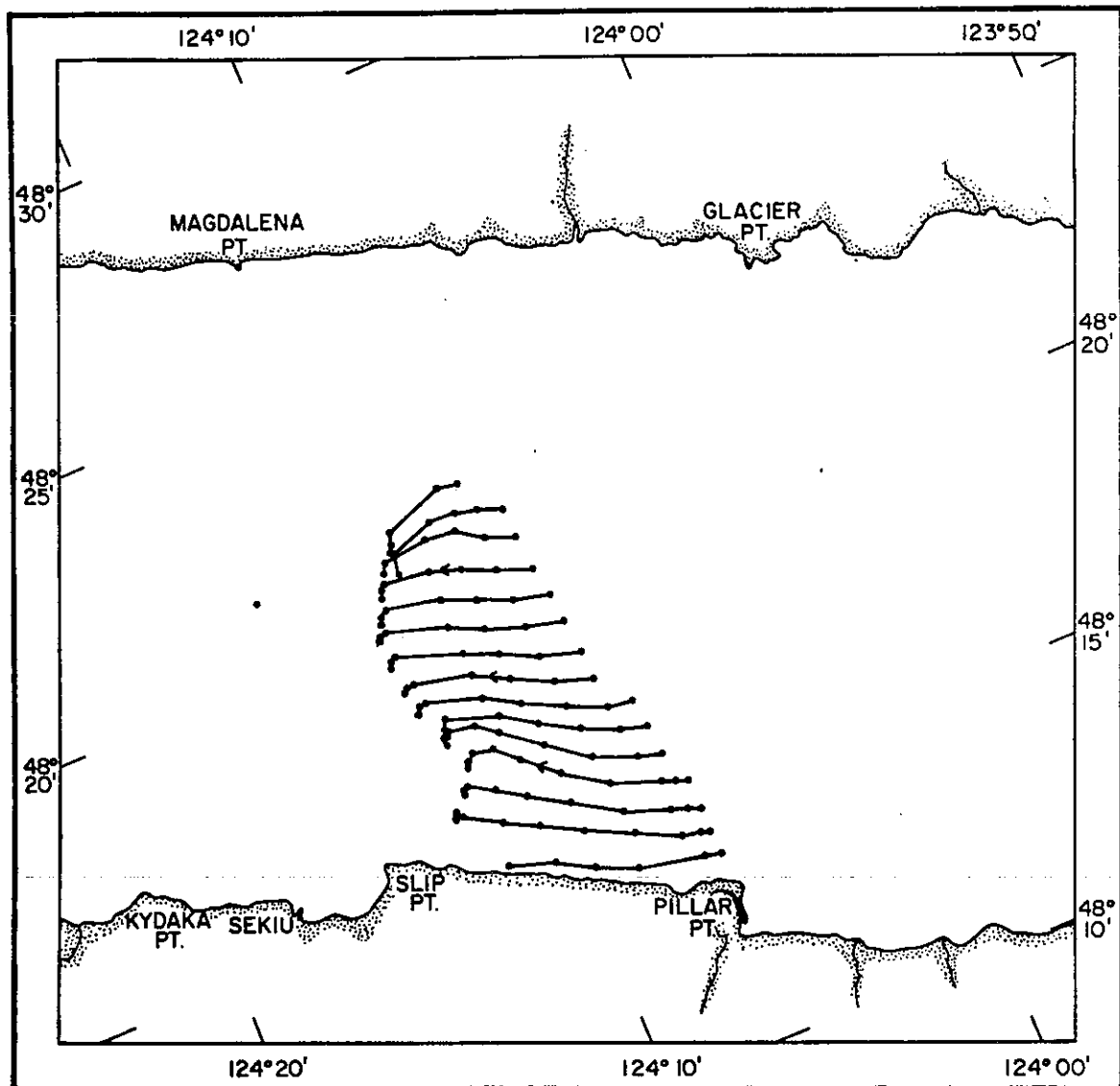


Plate 2c1. Drifter trajectories on 21 July 1977 during ebb.

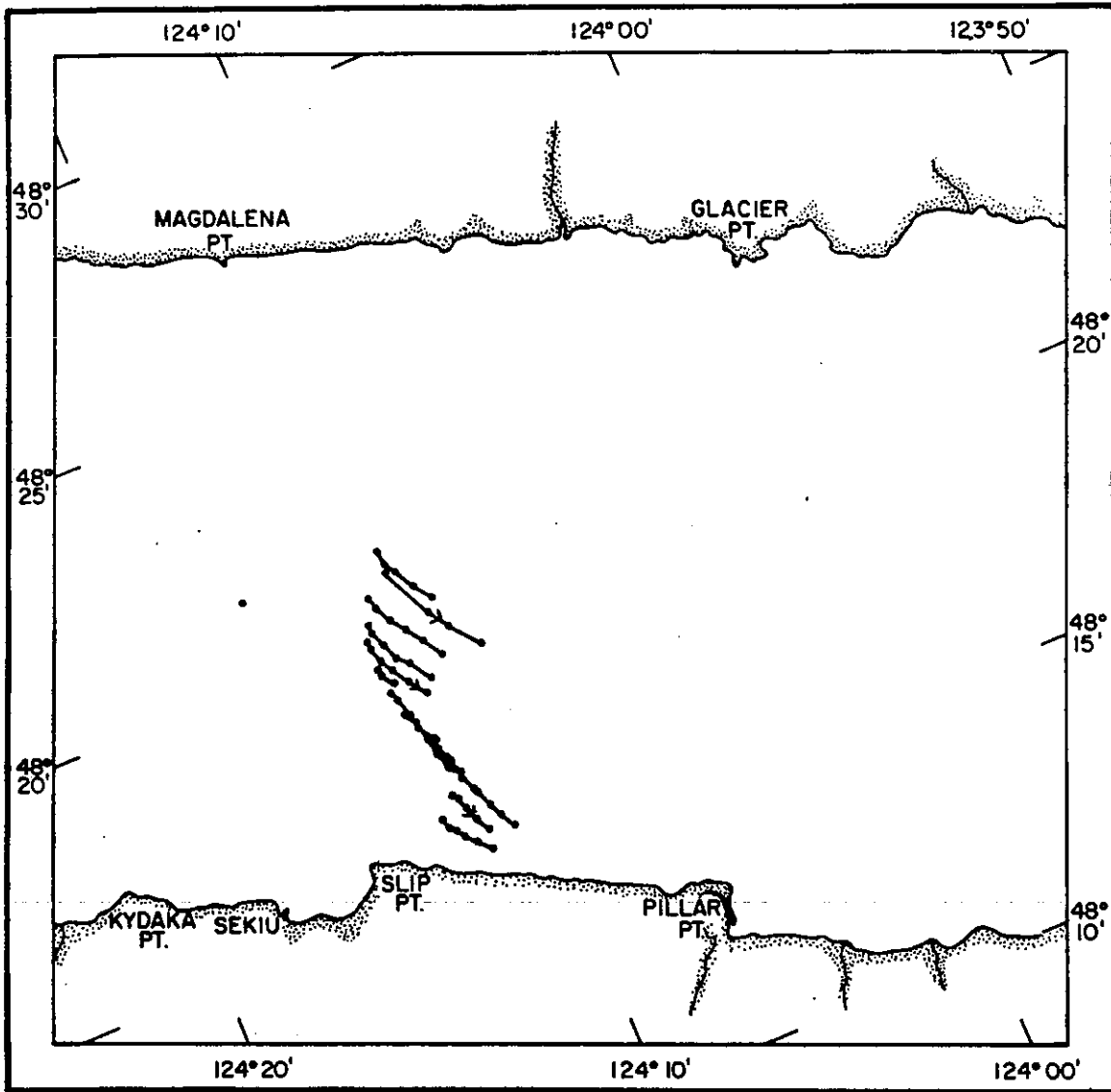


Plate 2c2. Drifter trajectories on 21 July 1977 during flood.

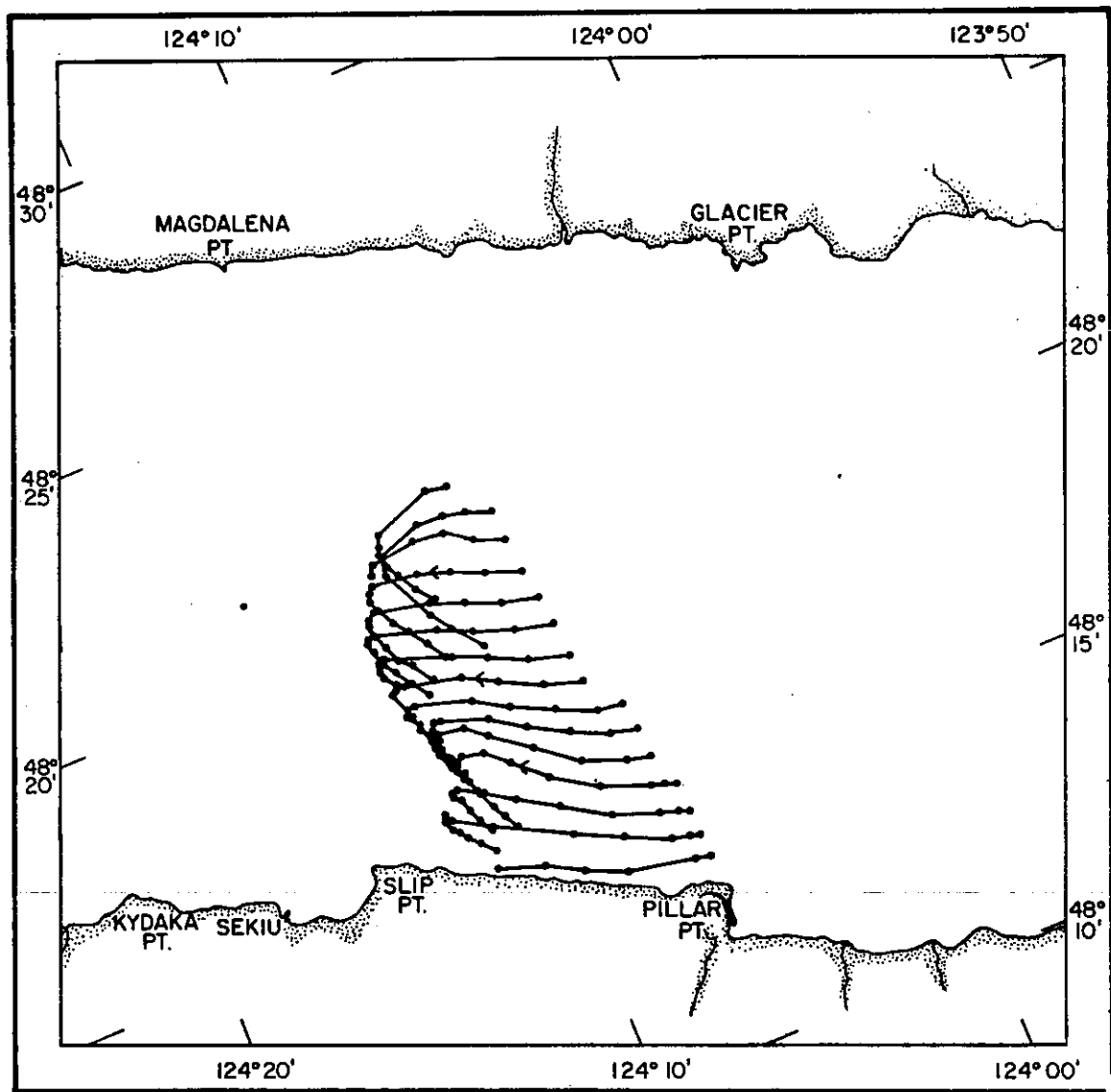
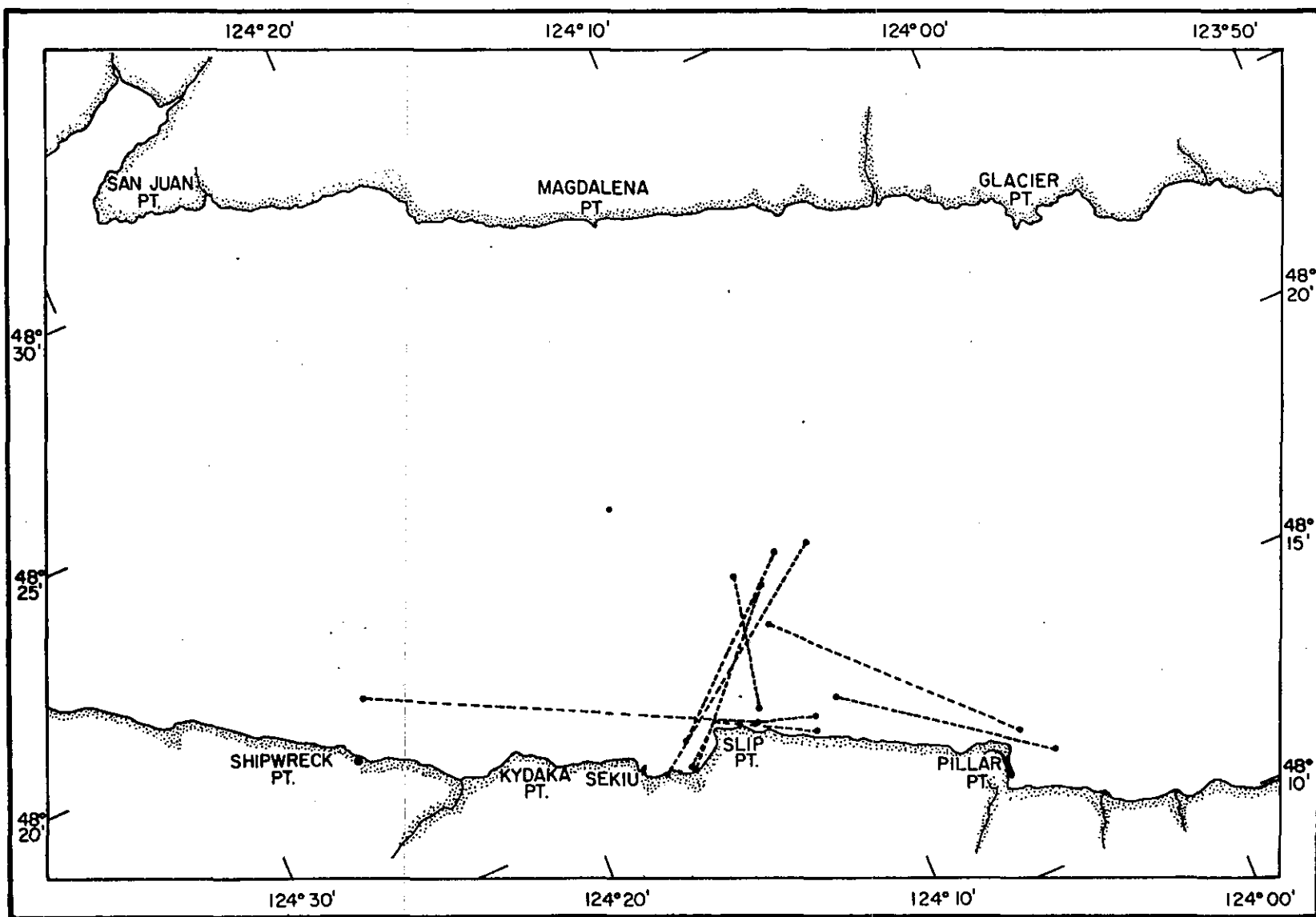


Plate 2c3. Composite of drifter trajectories on 21 July 1977 for both ebb and flood.



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Plate 2c4. Sightings and/or recoveries on or near shore relative to the last known position on 21 July 1977.

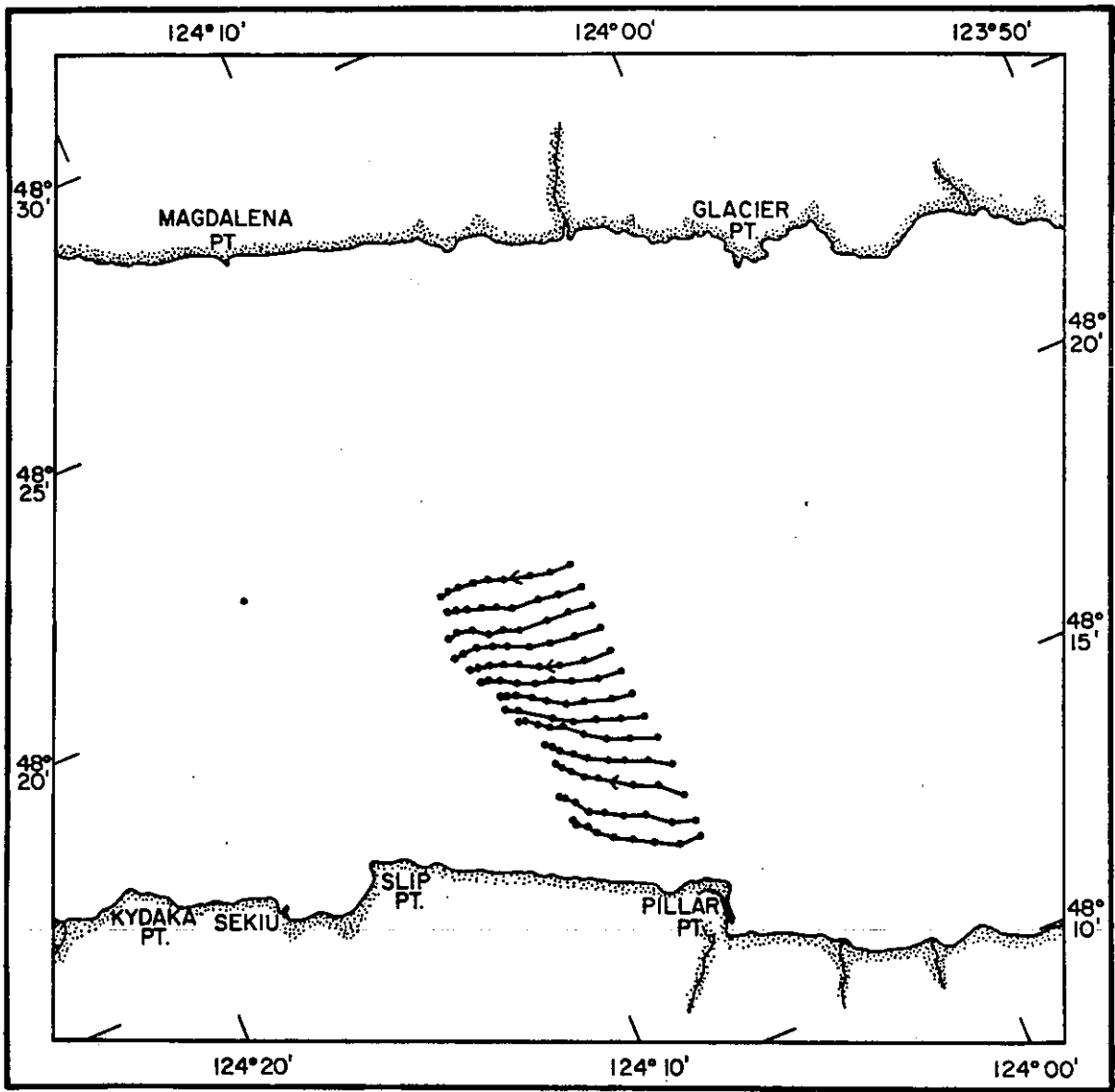


Plate 2d1. Drifter trajectories on 22 July 1977 during ebb.

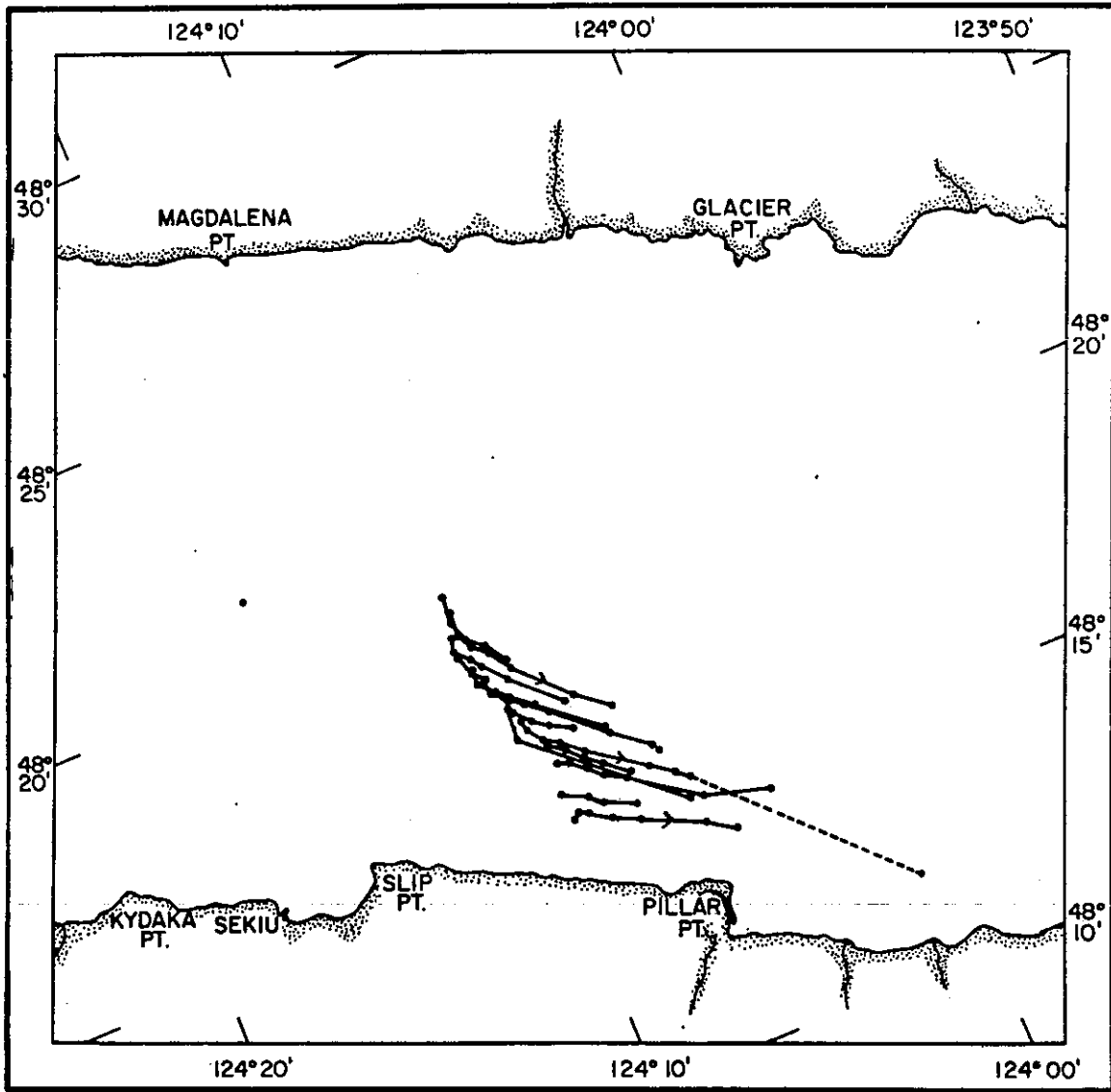


Plate 2d2. Drifter trajectories on 22 July 1977 during flood.

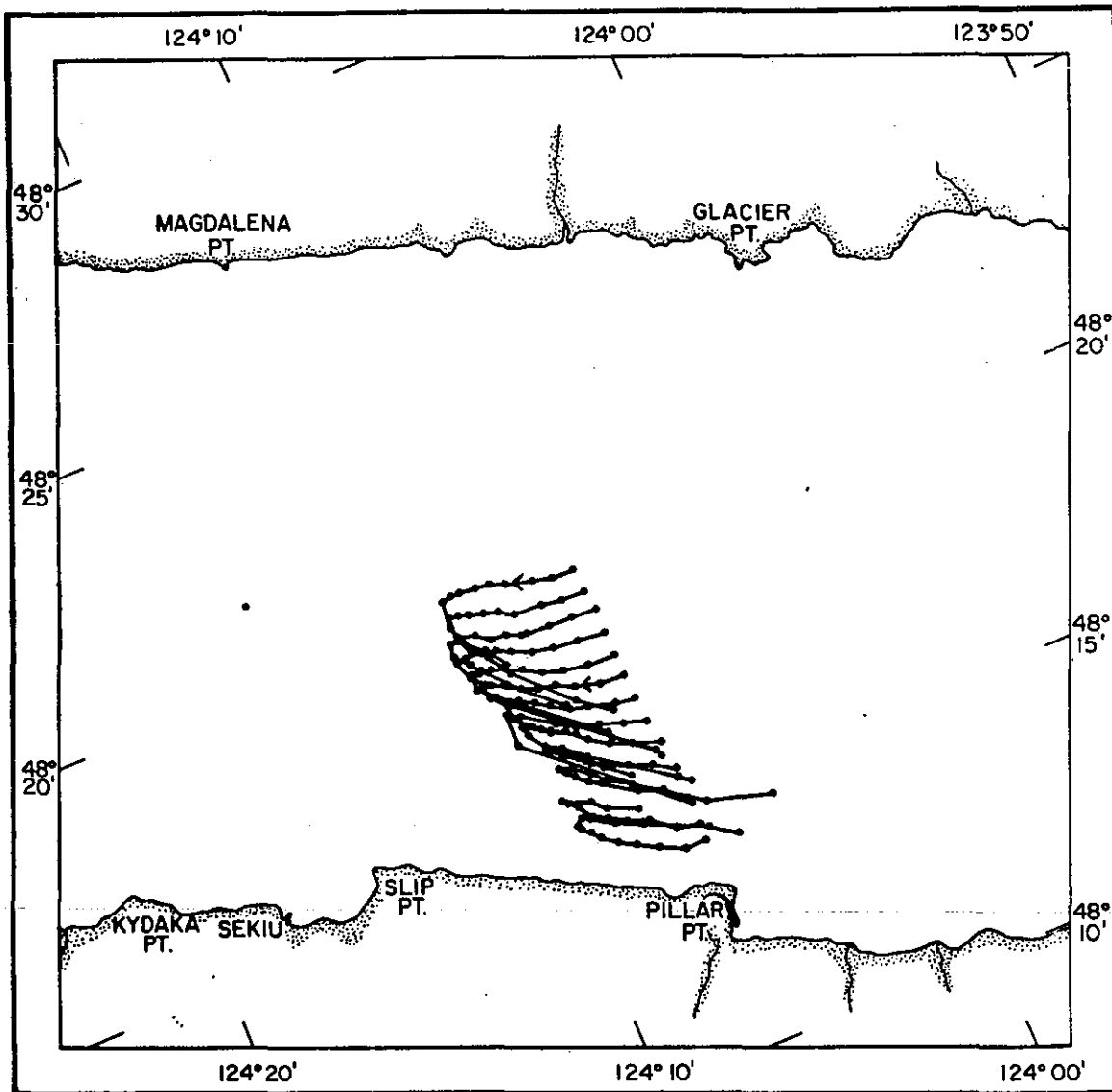


Plate 2d3. Composite of drifter trajectories on 22 July 1977 for both ebb and flood.

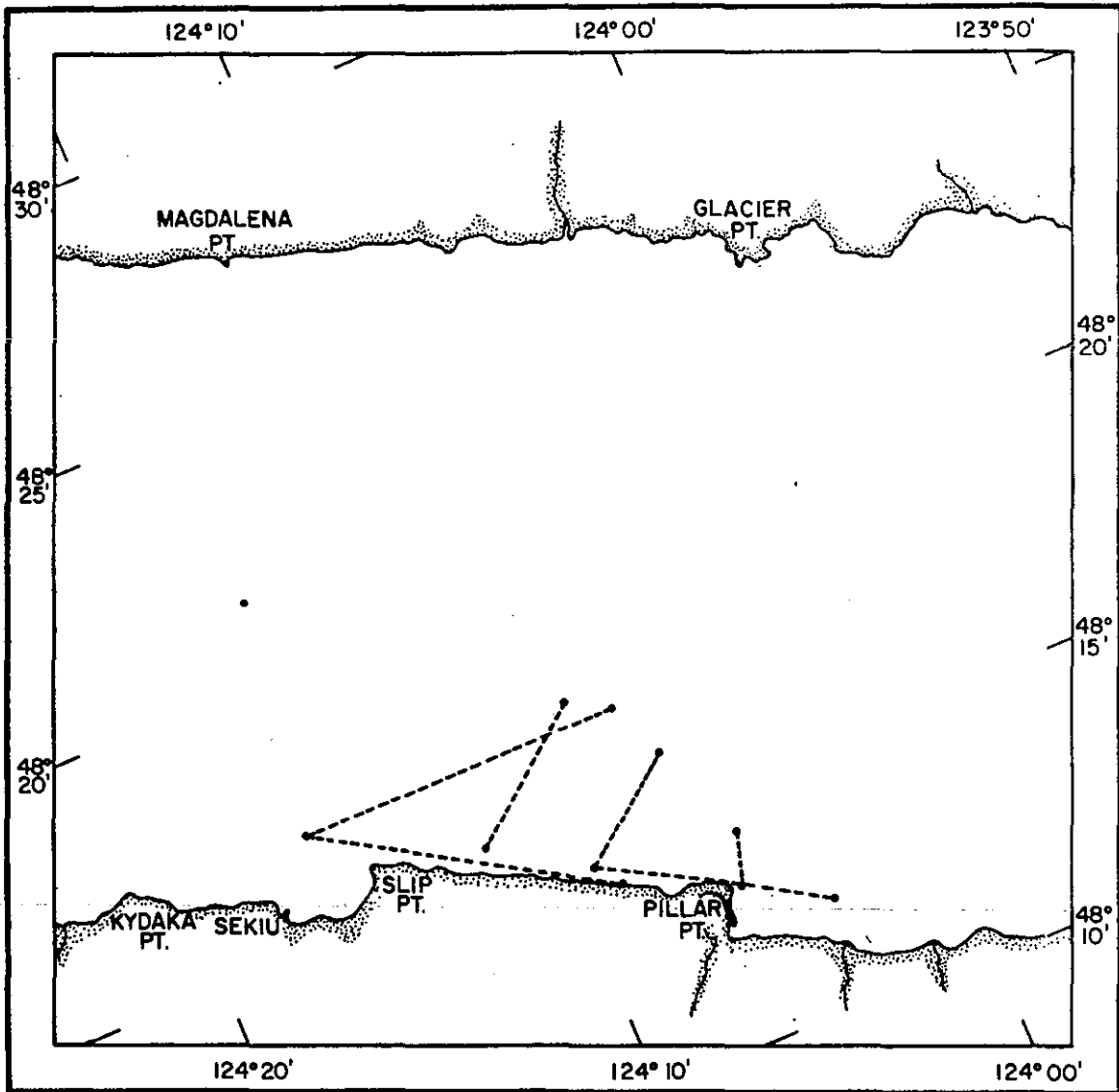


Plate 2d4. Sightings and/or recoveries on or near shore relative to the last known position on 22 July 1977.

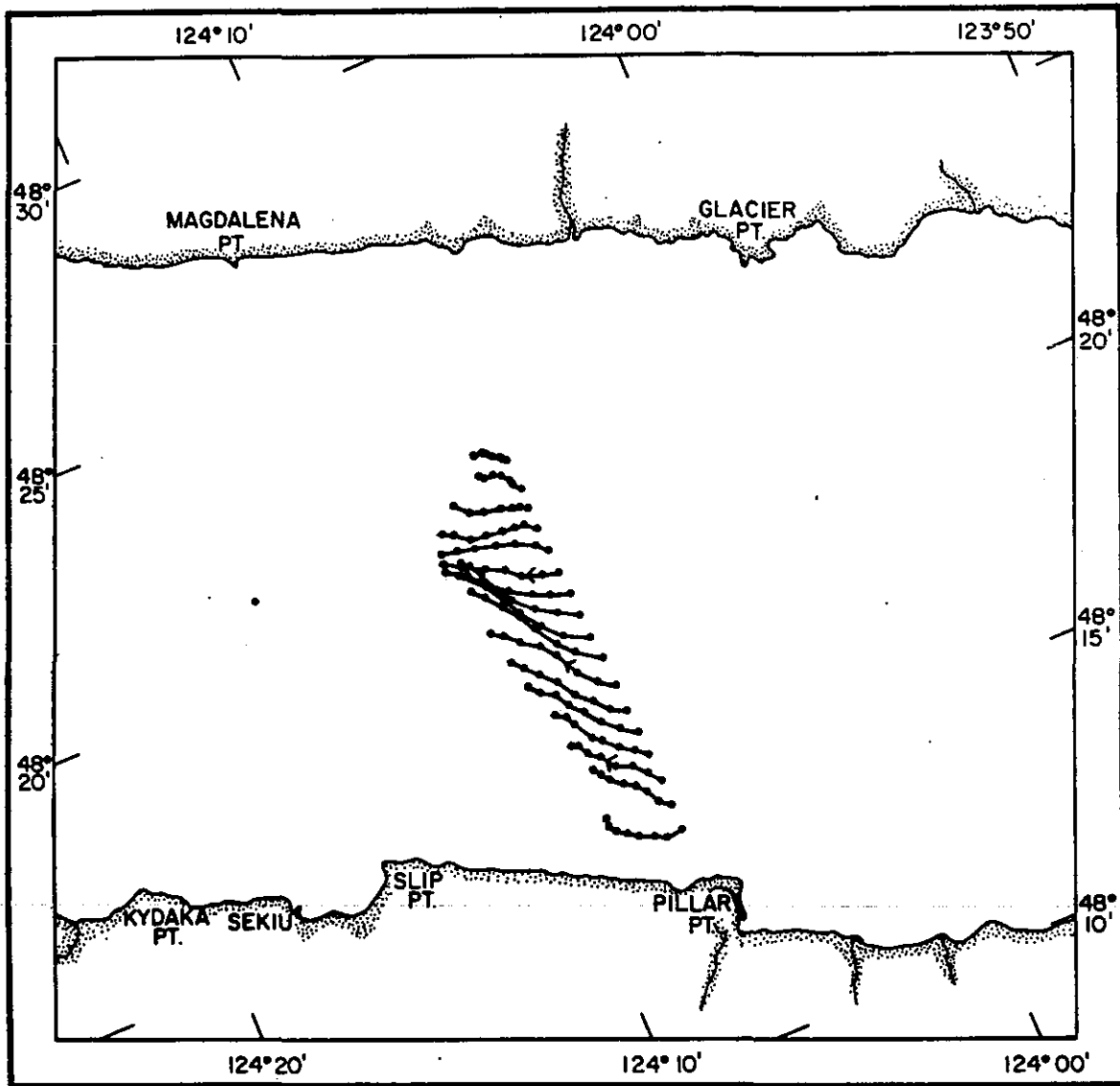


Plate 2e1. Drifter trajectories on 23 July 1977 during ebb.

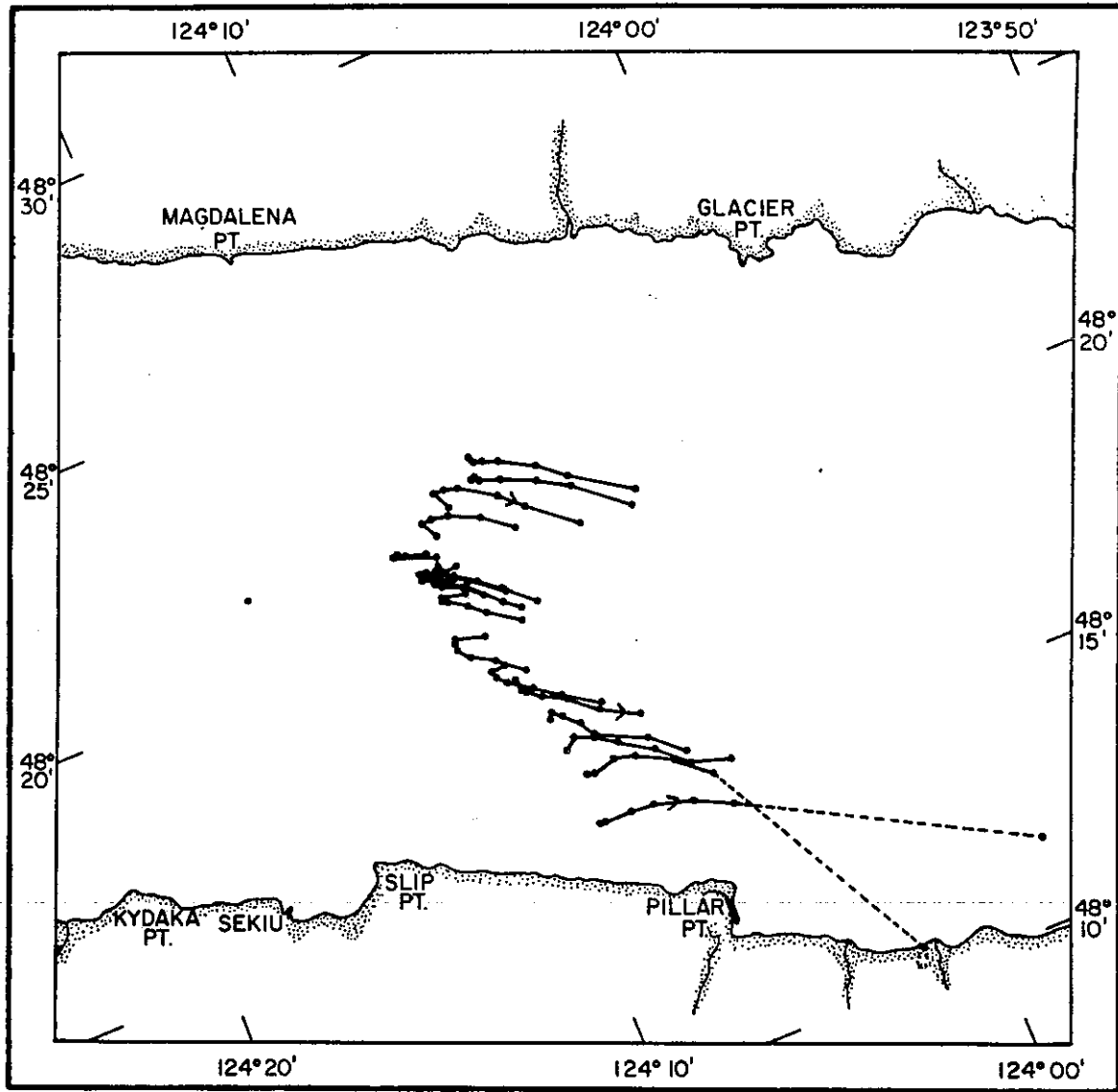


Plate 2e2. Drifter trajectories on 23 July 1977 during flood and sightings and/or recoveries on or near shore relative to the last known position on 23 July 1977.

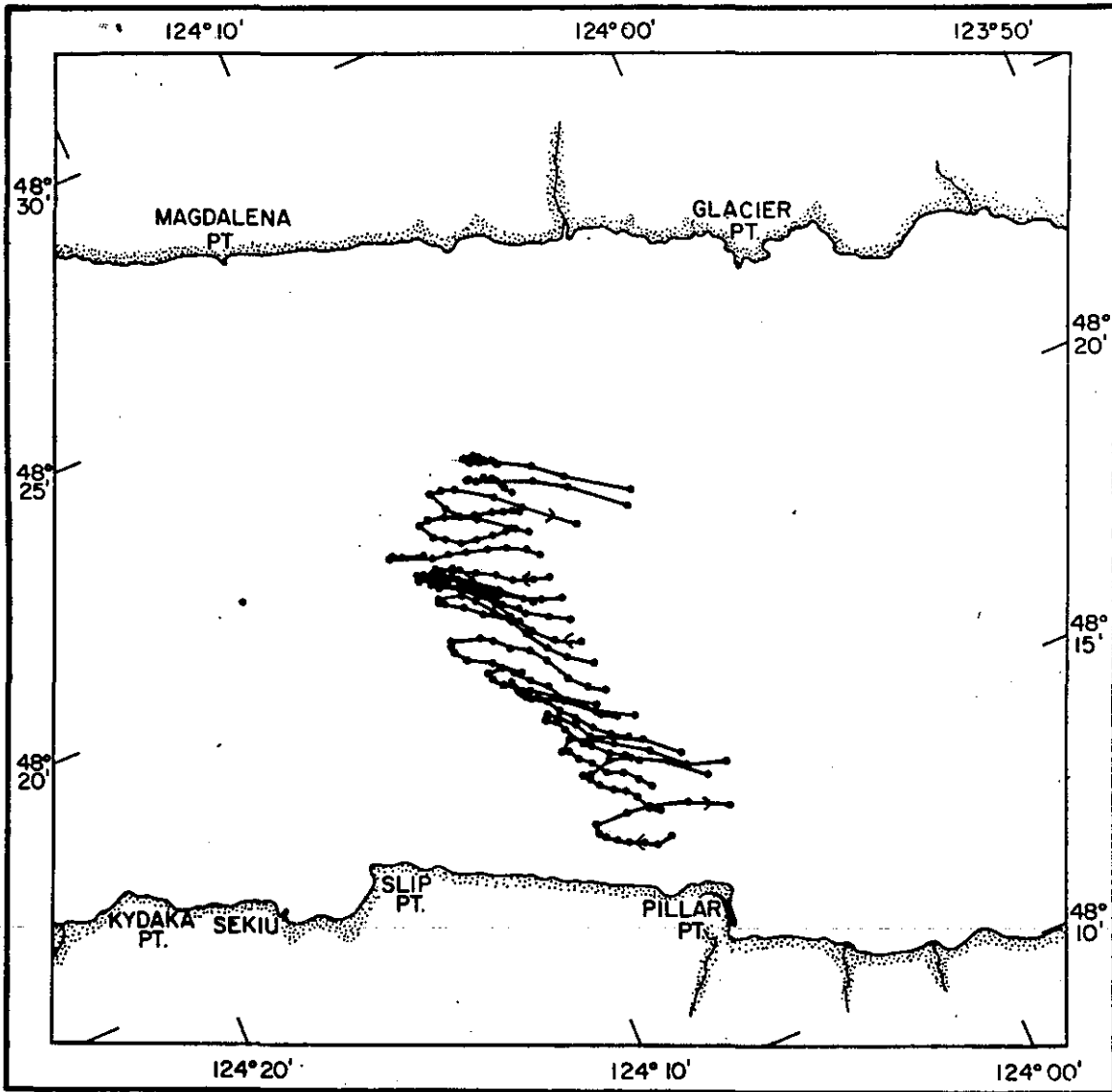


Plate 2e3. Composite of drifter trajectories on 23 July 1977 for both ebb and flood.

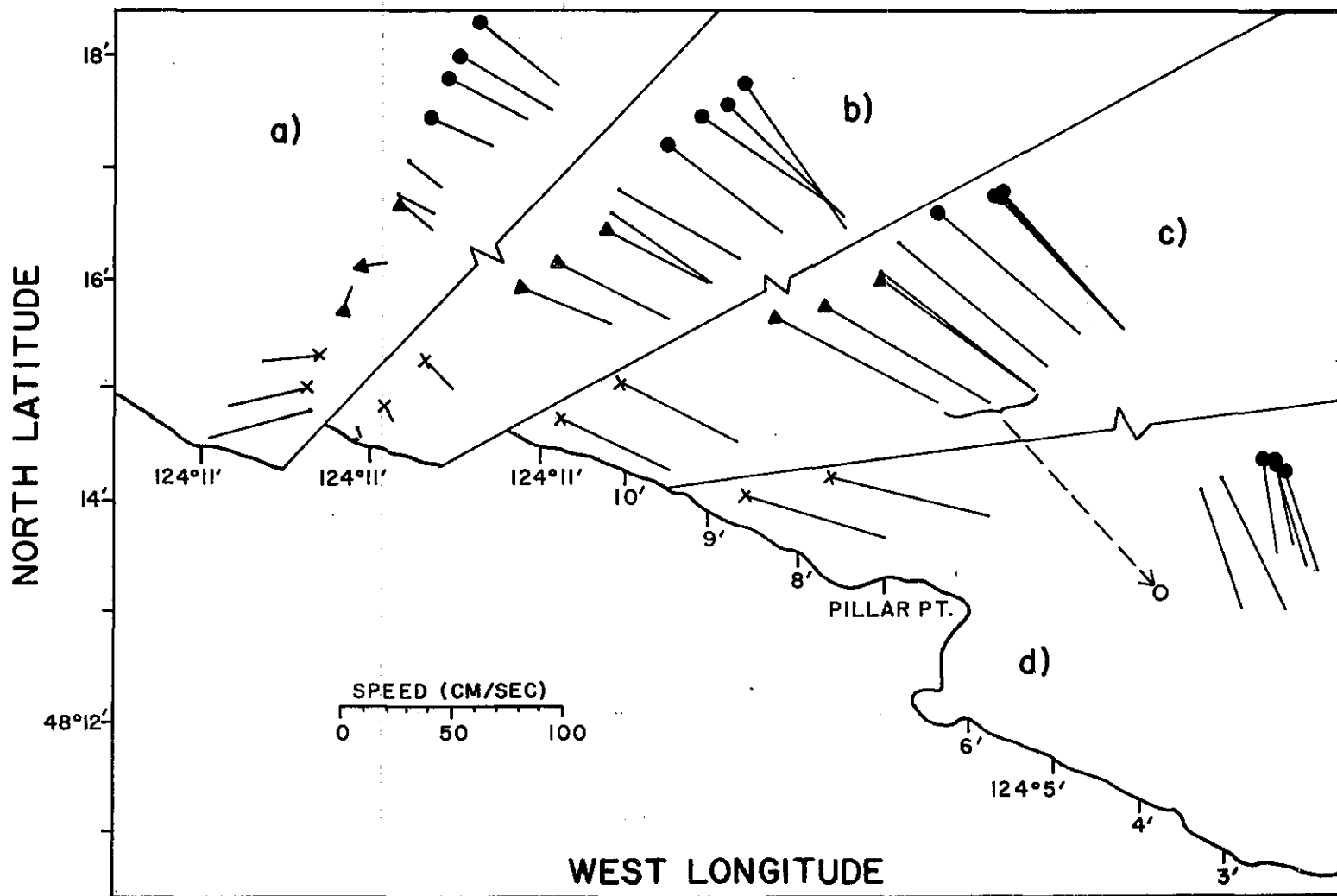


Plate 3a. Spatial vector diagrams for 19 July 1977. Mean times (GMT): flood a-d; a, 2120; b, 2216; c, 2344; and d, 0120. Symbols at vector bases denote selected drifters.

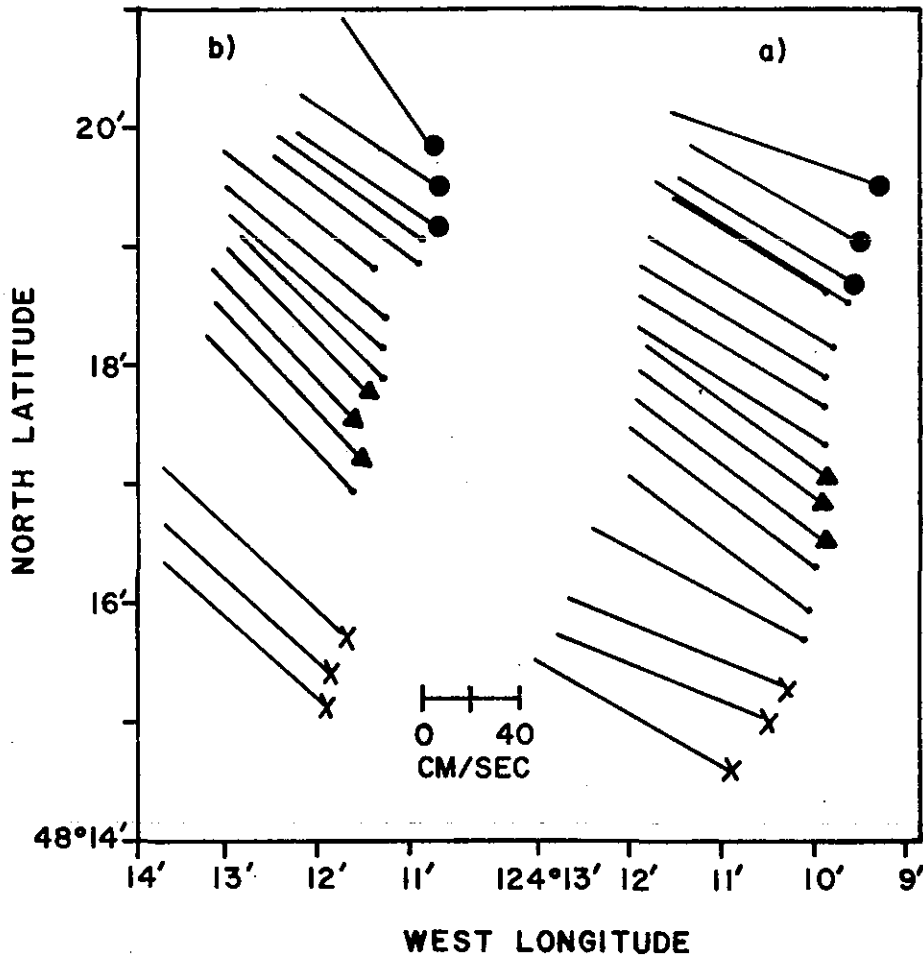


Plate 3b. Spatial vector diagrams for 20 July 1977. Mean times (GMT): ebb; a, 1800; b, 1844. Symbols at vector bases denote selected drifters.

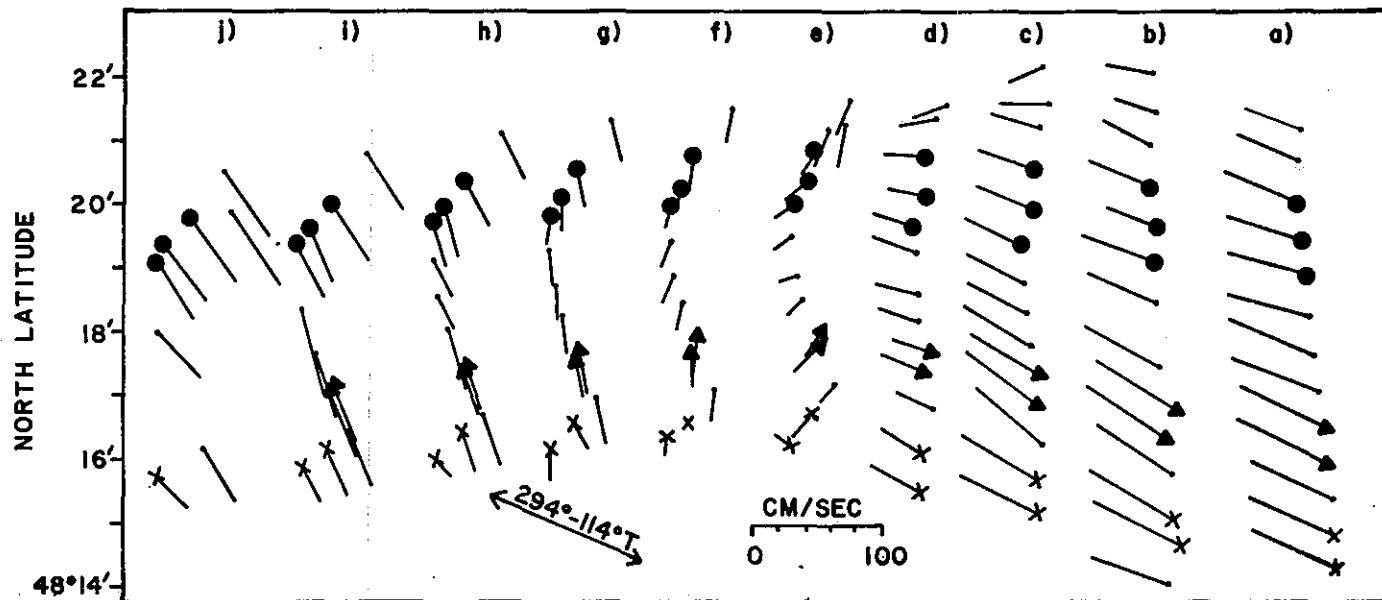


Plate 3c. Spatial vector diagrams for 21 July 1977. Mean times (GMT): ebb a-f; a, 1835; b, 1909; c, 1950; d, 2056; e, 2158; and f, 2220; flood g-j; g, 2240; h, 2303; i, 2323; and j, 2345. Symbols at vector bases denote selected drifters.

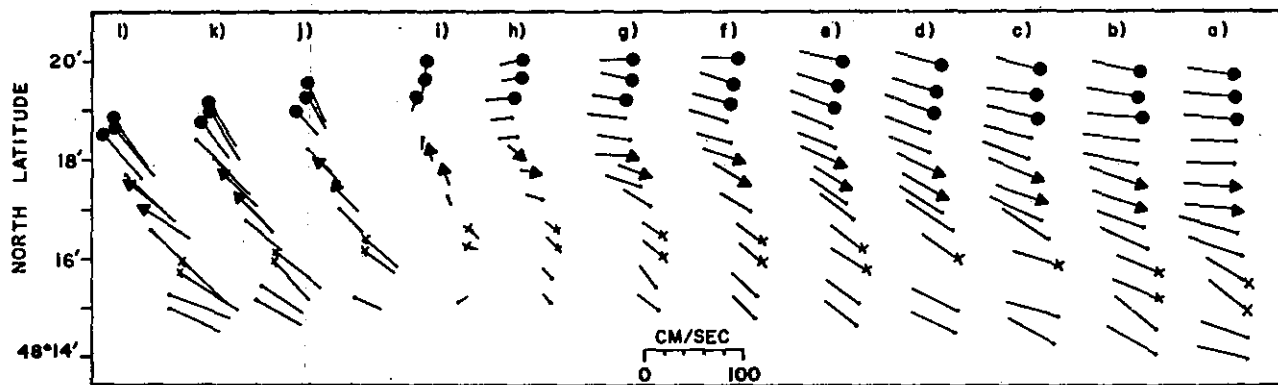


Plate 3d. Spatial vector diagrams for 22 July 1977. Mean times (GMT): ebb a-h; a, 1909; b, 1935; c, 2000; d, 2024; e, 2047; f, 2109; g, 2132; and h, 2155; flood i-l; i, 2240; j, 2333; k, 2357; and l; 0021. Symbols at vector bases denote selected drifters.

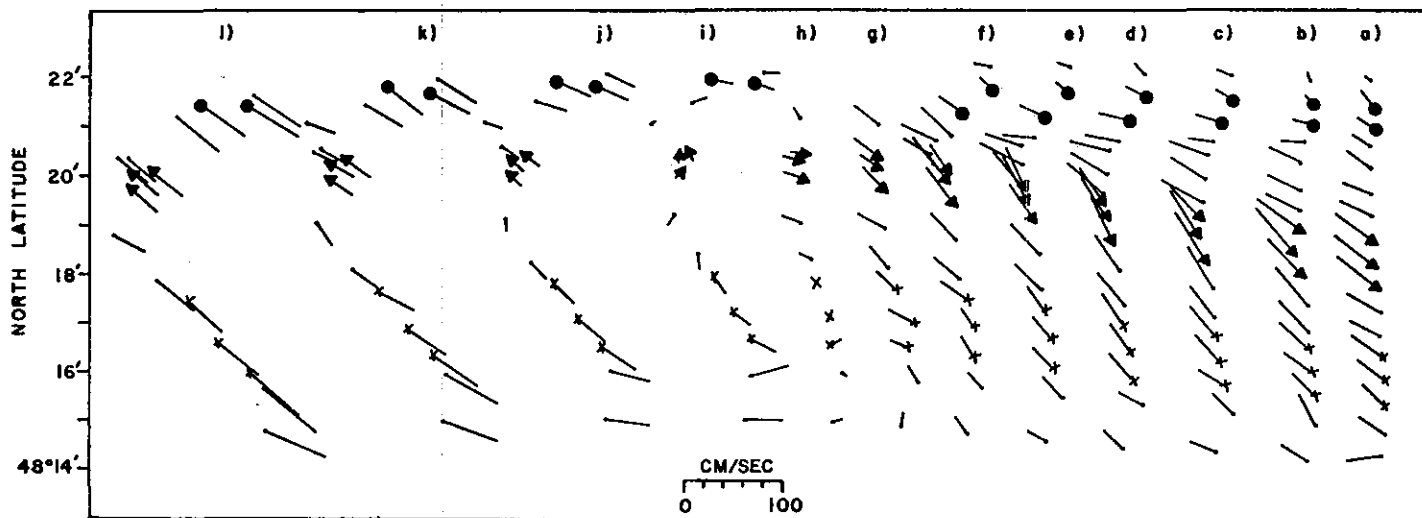


Plate 3e. Spatial vector diagrams for 23 July 1977. Mean times (GMT): ebb a-h; a, 1942; b, 2010; c, 2036; d, 2104; e, 2130; f, 2158; g, 2220; and h, 2247; flood i-l; i, 0014, j, 0047; k, 0124; and l, 0202. Symbols at vector bases denote selected drifters.

Plate 4a. Summary of wind direction and speed recorded at
shore based stations on 19 July 1977.

Example: NW 05 = 5 knots from northwest.

| Hour (PDT*) | Carmanah | Sheringham | Race Rocks | Trial | Discovery | Pt. Angeles | New Dungeness | Smith Is. |
|----------------|----------|------------|------------|-------|-----------|-------------|---------------|-----------|
| 1 | | | | | | | | |
| 2 | | | | | | | | NW 10 |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | NE 5 | Calm | W 12 | W 5 | E 4 | | | W 06 |
| 6 | Calm | | | | | | | |
| 7 | | | | | | | | |
| 8 | Calm | Calm | SW 05 | W 05 | W 03 | S 02 | W 02 | NNW 06 |
| 9 | | | | | | | | |
| 10 | SE 05 | S 02 | SW 04 | NE 07 | Calm | | | |
| 11 | | | | | | Calm | Calm | NW 04 |
| 12 | SW 05 | | | | | | | |
| 13 | | Calm | | NE 10 | E 05 | Calm | | |
| 14 | | | | | | NE 02 | Calm | |
| 15 | | | | | | | | |
| 16 | W 10 | Calm | Calm | S 06 | W 15 | | | |
| 17 | | | | | | E 02 | | |
| 18 | | | | | | | | |
| 19 | W 10 | W 12 | W 15 | W 07 | W 10 | | | |
| 20 | | | | | | W 10 | W 3 | |
| 21 | | W 10 | W 15 | SW 10 | W 05 | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | NW 09 |
| 24 | | | | | | | | |

*PDT = Pacific Daylight Time

Plate 4b. Summary of wind direction and speed recorded at
shore based stations on 20 July 1977.

Example: NW 05 = 5 knots from northwest.

| Hour (PDT*) | Carmanah | Sheringham | Race Rocks | Trial | Discovery | Pt. Angeles | New Dungeness | Smith Is. |
|----------------|----------|------------|------------|-------|-----------|-------------|---------------|-----------|
| 1 | | | | | | | | |
| 2 | | | | | | | | N 03 |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | Calm | Calm | W 08 | NW 03 | Calm | S 03 | | W 05 |
| 6 | Calm | | | | | | | |
| 7 | | | | | | | | |
| 8 | NW 05 | W 03 | Calm | Calm | E 03 | Calm | Calm | W 02 |
| 9 | | | | | | | | |
| 10 | W 05 | | | | | | | |
| 11 | | | | | | W 04 | | WNW 03 |
| 12 | W 08 | | | | | | | |
| 13 | | W 08 | W 10 | S 03 | W 08 | | | |
| 14 | | | | | | W 10 | | NW 10 |
| 15 | W 10 | | | | | | | |
| 16 | | W 22 | W 20 | SW 21 | W 10 | | | |
| 17 | | | | | | W 15 | | NW 08 |
| 18 | | | | | | | | |
| 19 | W 05 | W 27 | W 30 | W 24 | W 10 | | | |
| 20 | W 05 | | | | | WSW 15 | W 25 | WNW 19 |
| 21 | | W 25 | W 30 | SW 18 | W 10 | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | NW 16 |
| 24 | | | | | | | | |

*PDT = Pacific Daylight Time

Plate 4e. Summary of wind direction and speed recorded at
shore based stations on 23 July 1977.

Example: NW 05 = 5 knots from northwest.

| Hour (PDT*) | Carmanah | Sheringham | Race Rocks | Trial | Discovery | Pt. Angeles | New Dungeness | Smith Is. |
|----------------|----------|------------|------------|-------|-----------|-------------|---------------|-----------|
| 1 | | | | | | | | |
| 2 | | | | | | | | N 15 |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | Calm | W 07 | W 14 | SW 05 | | SW 08 | | |
| 6 | E 03 | | | | | | | |
| 7 | | | | | | | | |
| 8 | SE 03 | Calm | NW 02 | Calm | SW 03 | W 06 | W 04 | NNE 04 |
| 9 | | | | | | | | |
| 10 | SW 03 | | | | | | | |
| 11 | | | | | | WNW 03 | W 03 | N 03 |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | Calm | Calm | N 07 |
| 15 | | | | | | | | |
| 16 | | W 10 | W 10 | W 06 | Calm | | | |
| 17 | | | | | | W 05 | Calm | |
| 18 | | | | | | | | |
| 19 | NW 12 | W 14 | W 15 | SW 08 | W 08 | | | |
| 20 | | | | | | W 10 | | N 09 |
| 21 | Calm | Calm | W 20 | SW 13 | W 10 | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |

*PDT = Pacific Daylight Time