

I.O.S.

RRS DISCOVERY

CRUISE 69

21 JANUARY – 18 MARCH, 1975

UPWELLING OFF N.W. AFRICA

CRUISE REPORT NO 51

1977

**NATURAL ENVIRONMENT
INSTITUTE OF OCEANOGRAPHIC SCIENCES
RESEARCH COUNCIL**

INSTITUTE OF OCEANOGRAPHIC SCIENCES

Wormley, Godalming,
Surrey, GU8 5UB.
(0428 - 79 - 4141)

(Director: Professor H. Charnock)

Bidston Observatory,
Birkenhead,
Merseyside, L43 7RA.
(051-653-8633)

(Assistant Director: Dr. D. E. Cartwright)

Crossway,
Taunton,
Somerset, TA1 2DW.
(0823-86211)

(Assistant Director: M.J. Tucker)

Marine Scientific Equipment Service
Research Vessel Base,
No. 1 Dock,
Barry,
South Glamorgan, CF6 6UZ.
(04462-77451)
(Officer-in-Charge: Dr. L.M. Skinner)

*On citing this report in a bibliography the reference should be followed by
the words UNPUBLISHED MANUSCRIPT.*

RRS DISCOVERY

CRUISE 69

21 January - 18 March, 1975

Upwelling off N.W. Africa

CRUISE REPORT No. 51

1977

Institute of Oceanographic Sciences,
Wormley, Godalming, Surrey,
GU8 5UB

CONTENTS

	Page
Scientific Staff	ii
Abbreviations used in text and station list	iii
Introduction	1
Itinerary	1
Narrative	2
Physical Oceanography	7
Current meter moorings	10
Tide gauge	11
Optical studies	11
Protas	13
Surface currents	14
Chemistry	15
Biology	18
Fluorescence profiling	20
Fish	23
Euphausiids	24
Computer	24
Tables 1-4	26-30
Station lists	31-74
Figures 1-6	

SCIENTIFIC PERSONNEL

M.I. Abdullah	LUDO *	N. Mathers	LUDO *
A. de C. Baker	IOS (Principal Scientist)	L. Mee	LUDO
J.E. Banham	IOS	N.R. Merrett	IOS *
R. Bentley	IOS +	W. Miller	IOS *
C. Brockmann	IFM	J. Murphy	LUDO +
A. Clarke	DAMTP *	C. Pattinson	LUDO +
E. Darlington	IOS	K.-H. Prien	IFM *
P. Hartland	IOS	P.R. Pugh	IOS +
M.R. Howe	LUDO +	D.M. Shale	IOS
P. Hughes	LUDO *	L.M. Skinner	IOS *
H. Hundahl	IPO +	R. Spencer	IOS X
J. Kinzer	IFM	W.J. Stratford	MSL +
P. Koutsoudakis	LUDO *	M. Tomczak	IFM +
G. Kullenberg	IPO +	R. Wild	IOS
A.W. Lewis	MSL +		

IOS Institute of Oceanographic Sciences

LUDO Department of Oceanography, University of Liverpool

IFM Institut für Meereskunde an der Universität Kiel

DAMTP Dept. of Applied Maths and Theoretical Physics, University of Cambridge.

IPO Institute of Physical Oceanography, University of Copenhagen.

MSL Dept. of Physical Oceanography, Marine Science Labs. Menai Bridge.

* First leg (21 Jan. - 18 Feb.) only

+ Second leg (18 Feb. - 18 Mar.) only

X 21 Jan.-30 Jan. and 7 Mar. - 18 Mar.

OFFICERS AND PETTY OFFICERS

Master	G.L. Howe	Chief Engineer	C.S. Storrier
Chief Officer	E.M. Bowen	Second Engineer	D.G. Woodward
Second Officer	A.R. Neil	Third Engineer	W.G. Barrett
Third Officer	W.R. Austin	Fourth Engineer	T. Warburton
Radio Officer	R.I. Hammerton	Fifth Engineer	R.G. Whitton
Catering Officer	D.G. Brailey	Fifth Engineer	C.B.A. Harman
		Chief Electrical	
		Engineer	B.J.H. Winchester
		Electrical Engineer	P.G. Parker
Boatswain	L.A. Haggis		
Netman	R.G. Burt		
Carpenter	L. Cromwell		
Bosun's Mate	D.S. Knox		

ABBREVIATIONS

RMT 1 1m² Rectangular Midwater Trawl (0.32mm mesh)
 RMT 8 8m² " " " (4.5mm mesh)

These nets were always used in combination.

BGN Paired Vertical Bongo nets (0.5mm and 0.3mm meshes).
 NN Neuston Net.
 BN1.5/5C 1.5m² opening/closing epibenthic sledge.
 TSD Temperature, salinity, depth probe.
 MS Multi-sampler.
 WB1 1.35l water bottle.
 WB7.4 7.4l water bottle.
 PUMP Pump sampler.
 FL Fluorometer.
 CM Current Meter.
 PROTAS Probe recording ocean temperature and shear.
 Q-meter Quanta meter.
 C-meter Beam transmittance meter) Light meters

ABBREVIATIONS contd.

β -(θ) - meter	Angular scattering meter	
Colour-meter	Ocean colour index meter) light meters
B-meter	Integrating scattering meter	

INTRODUCTION

This was a cruise in conjunction with scientists of the Institut für Meereskunde, Kiel, on board F.S. Meteor. It was organised jointly by the Institute of Oceanographic Sciences, the Department of Oceanography of the University of Liverpool and the Institut für Meereskunde. Scientists from the Marine Science Laboratories, Menai Bridge, the Department of Applied Mathematics and Theoretical Physics of the University of Cambridge and the Institute of Physical Oceanography of the University of Copenhagen also took part in the cruise and there was an interchange of British and German scientists between the two ships.

The aims were to study the physical, biological and chemical processes involved in upwelling off the N.W. African coast with particular emphasis on the measurement of onshore/offshore and longshore water movements and the relationships of phytoplankton, zooplankton and micronekton distribution to them.

Three lines of stations normal to the coast were established with current meter moorings on each. Discovery worked line A in 25°N and line B in $22^{\circ}40'\text{N}$ and Meteor worked line B and line C in $21^{\circ}20'\text{N}$. There were ten nominal station positions on each line. During the 'Discovery' Cruise three TSD and water bottle surveys were made of the A line and four of the B line and nets were fished on two of the surveys of each line.

In addition to the work in the upwelling area a deep sea tide gauge was laid and recovered west of Cape St. Vincent, a current meter mooring was laid on the abyssal plain at 41°N , $13^{\circ}40'\text{W}$ as part of the Cruise 70 topographic experiment and a series of RMT 1+8 samples were taken at 44°N , 13°W as part of a continuing programme.

ITINERARY

1230/21 January	Sailed from Barry.
2000/24 January	Arrived 44°N , 13°W .
1300/27 January	Laying tide gauge off Cape St. Vincent.
1040-1400/30 January	Anchored off Santa Cruz, Tenerife.
0930/31 Jan.-2000/1 Feb.	Laying current meter moorings, A Line.

1045/2 Feb. - 1100/3 Feb. Laying current meter moorings, B line.
 1900/2 Feb. - 1030/5 Feb. 1st full survey of B line (Stns 8666-8679).
 1500/6 Feb. - 0700/8 Feb. " " " " A " (Stns 8681-8690).
 0200/9 Feb. - 0000/11 Feb. 2nd full survey of B line (Stns 8692-8701)
 0000/11 Feb. - 1400/12 Feb. Closely spaced TSD's and RMT 1+8's on B line.
 1200/13 Feb. - 0100/15 Feb. 2nd full survey of A line (Stns 8719-8728).
 0100/15 Feb. - 0740/16 Feb. Closely spaced TSD's and RMT 1+8 on A line.
 0930/17 Feb. - 0930/20 Feb. In Santa Cruz, Tenerife.
 0100/21 Feb. - 2130/21 Feb. 3rd survey of A line (TSD and WB) (Stns 8738-8747).
 1600/22 Feb. - 1100/23 Feb. " " " B line " " " (Stns 8749-8758).
 1100/23 Feb. - 0800/4 Mar. Detailed studies incl. 4th survey (Stns 8785-8793)
 of B line.
 1400/4 Mar. - 2220/6 Mar. Recovery of current meter moorings.
 1630/7 Mar. - 1115/8 Mar. In Santa Cruz, Tenerife.
 1300/11 Mar. Recovery of tide gauge.
 0600/13 Mar. Laying topographic experiment mooring.
 0340/14 Mar. - 0510/15 Mar. Repeat RMT series at 44°N, 13°W.
 1000/18 Mar. Arrive Barry.

NARRATIVE

LEG 1

Discovery sailed from Barry at 1200h on 21 January and the PES fish and surface temperature and salinity probe were streamed during the afternoon. On the run to the first station at 44°N, 13°W gale force winds reduced the speed to 6-7 kts and during the night of 22/23 January a surface buoy broke adrift on the boat deck damaging the pure sea water supply header tank and the after rail. At 1400h on 23rd there was enough depth of water to tension the new main warp that had been wound onto the trawl winch in Barry. 8546m of the total 9039m were tensioned and passage was resumed at 1845h. The magnetometer was streamed at 1100h on 24 January. At 2000h on 24 January a position just to the north of 44°N, 13°W was reached. It was intended to fish 3 day and 3 night RMT 1+8 hauls at this position as a continuation of the seasonal sampling done during 1974. Although the weather had moderated slightly, after one net haul further attempts were abandoned as recovery presented considerable difficulty; then the ship proceeded towards 41°N, 13°40'W where a deep current meter mooring was to be laid on the

abyssal plain as part of the topographic experiment to be carried out on Cruise 70. At 1414h on 25 January the deep sea tide gauge was tested to 2000m and at 1900h the same day wire tests were carried out on the acoustic releases to be used on the current meter mooring. The L.U.D.O. TSD was also tested to 300m at this station. As the acoustic releases did not operate at 5000m the mooring could not be laid and a course was set for Cape St. Vincent where the tide gauge was to be sited. The position was reached at 1300h on 27 January; after a box echo-sounder survey the tide gauge was laid (St. 8652) in 1983m and a course was made for Tenerife. At 1100h on 28 January the RMT 1+8 was fished to test a net monitor. The opportunity was taken to test the TSD again and the new integrated circuit net monitor was also tested on the vertical wire. On passage to Tenerife a very slight alteration of course was made to pass over the top of Dacia Bank. A further trial haul with the RMT 1+8 was made at 1400h on 29 January. The net release gear was tested on the vertical wire at 0800h on 30th and at 1047h the ship reached Santa Cruz where she lay off at anchor.

At Santa Cruz Mr. Spencer and Mr. Barrett, the R.V.B. Catering Superintendent, left the ship and Dr. Skinner joined. Discovery sailed from Santa Cruz at 1418h on 30 January for position A9. (The line of stations in 25°N is referred to as the 'A' line and that in $22^{\circ}40'\text{N}$ as the 'B' line. Predetermined positions on these lines, which were worked several times during the cruise, were numbered from 1-10 inshore to offshore. These nominal station positions are given in Table 1 and are marked on Fig. 2). Wire tests on the acoustic release for the first of the current meter moorings were made during the evening of 30th and the A9 position was reached at 0930h on 31 January. After working an echo-sounder grid the mooring was laid in 3026m one cable from the A9 position. As it was not possible to reach the 500m mooring position at A6 and still have time to lay the mooring during daylight the night was spent working TSD's at A10, A8 and A6, testing the acoustic release for the mooring and doing an echo-sounder survey of the proposed site. As the mooring was to be laid on the slope a dahn buoy was anchored about 3 miles off the mooring position for radar fixes. The mooring was completed by 1330h on 1 February and a course made for the 65m mooring position. A depth of 65m was reached sooner than anticipated so this inshore U-mooring was laid between A2 and A3 and was completed by 2000h on 1 February when a course was made towards the B line keeping approximately to the 100m contour. Two moorings were to be laid one in 500m and one in 65m. The 500m (B5) position was reached at 1045h on 2 February and the echo-sounder

survey and laying the mooring took until 1600h. The 65m mooring at B3 could not be completed in the daytime left and, after a trial haul with the paired Bongo nets, a start was made on the vertical work of the first survey of the B line. The surveys includes TSD's and water sampling at each of the ten stations and RMT 1+8, Bongo and neuston net hauls at alternate stations. During the night of 2/3 February stations B1 - B5 were worked and at 0730h the ship returned to B3 to lay the shallow mooring. When this was completed at 1100h a boat was sent to F.S. Meteor, which had been lying off nearby, to transfer a bathythermograph and to take the netman Mr. R.G. Burt, for treatment to an arm injury. The opportunity was taken for discussions about the programme with Prof. Hempel, the Principal Scientist on board F.S. Meteor. Work on the survey was resumed at 1600h on 3 Feb. and was completed by 1030h on 5 Feb. when a course was set for the A line along approximately the 500m contour. At 1915h on 5 Feb. an RMT 1+8 haul was made in which a strong scattering layer was followed up from 250m to near the surface and the previous course was resumed at 2030h. Although it was intended to work the A line from offshore to inshore it was necessary first to visit the inshore current meter mooring in order to seize a shackle just below the surface buoy which had not been done when it was laid. The first survey of the A line, which included a bottom net haul in 3000m, was started at 1500h on 6 Feb. and completed by 0700h on 8 Feb. Although the sea was calm a long high swell from the NW, and so at right angles to the wind, made station keeping very uncomfortable. The wave recorder showed a maximum height of 24 feet and a period of 12-14 s. On completing the survey the ship returned to the B line again along the 100m contour. During the southerly passage a short test haul was made with the bottom net to confirm that the pinger switching was working correctly. The second survey of the B line started at B10 at 0200h on 9 February and was completed at B1 by 0000h on 11th. The two surveys had shown the steep part of the slope in about 800-200m to be the most interesting physically, chemically and biologically and over the next day and a half two series of TSD's were worked up the slope in soundings of approximately 100m intervals, a daytime 25m layer RMT 1+8 series was worked between 400-15m in a sounding of about 500m and casts of 7.41 water bottles were made. When this work was completed at 1400h on 12 February the ship returned north along the 1000m contour to the A line. At 0900h on 13 Feb. the E.M. logs were calibrated by putting the wind on the starboard beam and maintaining speeds of 10, 8, 6, 4 and 2 kts. for 20 minutes each. The second survey of the A line was started at A10 at 1200h on 13 February and completed at A1 at 0100h on 15 February. The three inshore

stations were worked in rapidly deteriorating weather and at A2 and A1 water bottle casts were done instead of using the TSD. An abbreviated daytime RMT 1+8 series was worked in 500m and this was followed during the night of 15/16 February by a series of TSD casts at closely spaced intervals up the slope. The A line was left at 0700h on 16 Feb. and the ship docked in Santa Cruz at 0930h on 17 Feb.

LEG 2

While in Santa Cruz nine scientists left the ship and ten joined. Meteor occupied a berth next to Discovery and there were helpful informal discussions between the two scientific parties. During the first leg of the cruise Meteor had been providing surface temperature and chlorophyll data to the German research aircraft team for calibration of their instruments during flights over the area. Arrangements were made for Discovery to continue this work during the second leg.

Discovery sailed from Santa Cruz for the second leg of the cruise at 0930h on 20 February heading for A10 which was reached at 0200h on 21 Feb. A third TSD and water bottle survey of the A line was started on arrival and completed by 2130h on 21 Feb. when a course was set so as to arrive in water deep enough to test Protas and Dr. Kullenberg's light meters at 0930h on 22 Feb. These tests were satisfactory and the ship proceeded to the B line, where work was to be concentrated during the second leg, and a third TSD and water bottle survey was made between 1600h on 22 and 1100h on 23 Feb. The light meters, Protas, TSD and RMT 1+8 were worked at B9 in 2000m before moving out again to B10 for water bottle samples for trace metals and to start a series of light meter and fluorescence pump stations at and between B10 and B9 during the night. On 24 February a 13h Protas and TSD time series was worked to 300m with dips every hour. This station was completed with lowerings of the light meters and pump which were then worked at each position from B8 to B5 during the night. Six RMT 1+8 hauls were fished in the vicinity of B5 (about 500m sounding) during day of 25 Feb. with a TSD at the start and finish of the hauls. The colour, 'Q' and 'C' light meters were used at midday to coincide with a flight of the research aircraft and again at 1400h. Again the night was used to work the light meters and the fluorescence pump, this time a repeated series at the same position. At 0630h on 26 Feb. a 13h Protas and TSD time series was started near the 500m current meter mooring; this was completed by 1900h when the ship moved offshore to the 1000m contour between B6 and B7 for a pump time series which was followed by a short

time series with the $\beta \theta$ meter. On 27 February a day and night RMT 1+8 series was worked in the vicinity of the 1000m contour, the day series being preceded by a Protas drop and a TSD. From midnight onwards the pump and light meters were worked at stations in towards the coast finishing at B5 and then the ship moved inshore to the 200m contour where two Protas drops were made. During the morning of 28 February a series of RMT 1+8 hauls were made on the shelf and during the afternoon and evening light meter and pump stations were worked inshore to B1. The fourth TSD and water bottle survey of the B line was started at B1 at 0000h on 1 March and completed at 2230 the same day. The $\beta \theta$ meter was also used at these stations. During this survey it was not possible to work at B4 as there were 50-60 trawlers on the position. A rendezvous had been arranged with Meteor between lines B and C to transfer Drs Tomczak and Brockmann for the recovery of current meter moorings and on the run south to the meeting point the opportunity was taken to work an oblique transect of $\beta \theta$ meter stations requested by Dr. Kullenberg. The transfer was completed by 0830h on 2 March with Herr Spychola joining Discovery as Meteor had a full complement. Discovery returned north to B1 and a closely spaced series of TSD's were worked to examine the extent of the bottom mixed layer. During the night of 2/3 March an RMT 1+8 series was worked between B4 and B5 in soundings of 200-350m and this was followed the next morning by a daytime series in the same area. The afternoon and evening of 3 March was devoted to a second detailed survey of the bottom mixed layer near the shelf break using the TSD and $\beta \theta$ meter; Protas was dropped twice at the offshore end of this survey line. In the early morning of 4 March the pump was used for fluorescence and nutrient profiling at two positions between B4 and B5 and the $\beta \theta$ meter was used at B5, B6 and B7. At 1030h on 4 March Drs. Tomczak and Brockmann returned to Discovery having successfully recovered two of the moorings on the C line and the mooring near B9; Herr Spychola returned to Meteor. In the afternoon the moorings near B5 and B3 were recovered and a course was made for the inshore U-mooring on the A line. The surface buoy was sighted at 1400h on 5 March and the mooring recovered by 1530 with the loss of one current meter and the subsurface float. The position of the current meter mooring near A6 was reached at 1820h on 5 March but despite repeated attempts to release the anchor the mooring could not be made to surface. Attempts were abandoned at dusk and the night used for zooplankton sampling with the pump and light meter dops. Further efforts were made to release the mooring in the morning but these and dragging were unsuccessful and the ship moved to the mooring position at A9. Neither the command pinger nor the release could be operated, however, after a good satellite fix the float was sighted just below

the surface and the mooring recovered. Discovery berthed in Santa Cruz at 1630h on 7 March and five of the visiting scientists left the ship and Mr. Spencer joined.

The ship left Tenerife at 1100h on 8 March and set course for Cape St. Vincent to recover the tide gauge laid earlier in the cruise. The weather deteriorated during the passage but had moderated sufficiently by mid-day on 11 March for the tide gauge to be recovered without incident. The ship then made for 41°N , $13^{\circ}40'\text{W}$ where the topographic experiment current meter mooring was to be laid. Two brief stops were made on 12 March to test the acoustic releases for the mooring and the position was reached at 0600h on 13 March; the mooring (IOS 187) was laid and the ship was on passage again for 44°N , 13°W by 0930h. On 14 March the three day and night RMT 1+8 hauls attempted at this position at the start of the cruise were fished and a 32 inch diameter subsurface sphere was pressure tested for Mr. Gaunt; the sphere imploded 10m shallower than the 600m test depth required. The passage to Barry was started at 0550h on 15 March and except for a short RMT haul on the morning of 16 March no more overside work was done. The E.M. log was calibrated during the afternoon of 16 March and the direction finder calibrated north of the Scillies using Round Island Beacon on the morning of 17 March. Discovery docked in Barry at 1000h on 18 March.

I would like to thank all those participating in the cruise for their help and co-operation, particularly Captain G.L. Howe, his officers, petty officers and crew.

PHYSICAL OCEANOGRAPHY

Objectives

The main part of the physical programme consisted of observations of temperature and salinity off Spanish Sahara on two lines A and B shown on the cruise track chart. The purpose of these hydrographic observations was primarily to describe the spatial distributions of T,S and hence density in support of concurrent fixed level current meter mooring data. They were also required for the identification of interesting features where special biological sampling could profitably be carried out.

Hydrographic Observations

The first part of Leg 1 was characterized by unusually calm conditions with little evidence of active coastal upwelling. Of the two sections the southerly one (Section B) appeared to be the most interesting, the TSD traces showing rich structure particularly near hydrographic station B9 where large inversions of temperature and salinity were present to depths greater than 300m suggesting interleaving of the northerly and southerly upper layer water masses. Along the B line the ships drift estimates indicated significant variation of velocity in the surface layer with alternating sectors of northerly and southerly flow. Variability in the T/S structure was particularly clear in the proximity of the shelf break, a region which was covered separately by a series of stations whose positions were chosen by depth rather than their geographical position.

Towards the end of Leg 1 winds more favourable for upwelling developed and provided the prospect of active upwelling conditions on the second part of the cruise.

Equipment

The Bisset Berman TSD system with analogue and digital recording was used at each hydrographic station. Data storage was effected on paper tape and separately on disc in the ship's IBM 1800 computer. There were troublesome faults on the salinity sensor which produced an occasional loss of signal when hauling in. The intermittent nature of the malfunction made it difficult to locate, but the problem was eventually resolved by changing the interconnecting harness between the mixer and sensor units and by making good a suspect connection on a circuit board in the salinity unit. Despite these difficulties TSD casts were made successfully at all the proposed positions. An IOS water sampling bottle with associated reversing thermometers was located as near to the probe as possible on each cast for calibration purposes. Consistent calibrations within the makers specified tolerances were determined.

The rosette multi-sampler was initially used for salinity calibrations and to take samples at standard depths for chemical determinations. Its use was eventually discontinued in favour of separate bottle casts because it suffered from intermittent failures and bottle leakage.

The IOS surface temperature/salinity recorder was in operation whilst the ship was underway to investigate the occurrence of surface fronts and patches of upwelled water. After initial troubles associated mainly with the towing cable the instrument performed well until the end of the first leg.

The aim of the hydrographic work on the second leg was mainly to repeat the stations along lines A and B and thereby provide a comparison with the observations that were made during Leg 1. A preliminary plot of the Leg 1 results did however suggest that line B might be the more interesting from the point of view of observing any short term changes in the hydrographic conditions, and therefore most of the time was spent on this line.

After leaving Tenerife, line A was started at 0145h on 21 Feb. (Stn 8738) and completed by 2126h on 21 Feb. (Stn 8747). TSD observations were made to a depth of 600m at the offshore stations and to within 2m of the bottom on the slope and shelf stations. These were also supplemented by water bottle casts for the chemical determinations. The same procedure was then carried out on line B which was started on 1606h on 22 Feb. (Stn 8749) and completed at 1034h on 23 Feb. (Stn. 8758).

The T-S structure along line B certainly appeared to be more complicated than that on line A, and since it seemed possible that certain changes might be monitored over a comparatively short time period, it was decided to conduct a 13h time series at two stations, B9 (Stn 8765) and B5 (Stn 8772). The TSD was lowered to 300m every hour and synchronised with the Protas measurements of vertical velocity shear. It should be noted that these stations were also in close proximity to current meter moorings on this line. The first TSD/Protas time series was made at B9 between 0630h and 1830h on 24 Feb. and that at B5 between 0630h and 1830h on 26 Feb.

These time series indicated sufficiently large changes in the water mass structure to justify a complete survey of line B yet again. The TSD/water bottle survey was therefore repeated along line B between 0008h (Stn 8785) and 2157h on 1 March (Stn 8793).

Before finally leaving this line to recover the current meter moorings, short periods of time were made available for further hydrographic work. During the

surveys an apparently well developed bottom mixed layer was observed at several of the shelf stations, and it was decided to investigate this feature in more detail. Closely spaced TSD casts were therefore made between B1 (Stn 8798) and B4 (Stn 8805) from 1552h to 2113h on 2 March.

Finally, to complete this more detailed investigation, a series of TSD stations were made in conjunction with Dr. Kullenberg's transparency meter at closely spaced positions at the edge of the continental slope and up on to the shelf. This series (Stns 8811/1 to 8811/4), was made between 1903h and 2223h on 3 March.

P. Hughes and M.R. Howe

CURRENT METER MOORINGS

The study of longshore variations of current in the upwelling area necessitated a comparatively large programme of current measurement using nine moorings of which five (a1, a2, a3, b1, b2)* were set in position by Discovery and four (b3, c1, c2, c3)* by Meteor. The equipment for a1, a2 and a3 was provided by IOS (Barry) and the rest of the instrumentation was provided by IFM Kiel, except for two Bergen meters (Liverpool University) which were sited near the bottom on the shallow German b1 mooring to study shear currents in the bottom mixed layer on the continental shelf.

The mooring operations on Discovery were carried out successfully on 31 Jan. (a3 - IOS 184), 1 Feb. (a2 - IOS 185, a1 - IOS 186) and 2 Feb. (b2, b1) although it is worth remarking that the Plessey meters were much more difficult to handle than the Bergen meters.

Recovery of b2 and b1 was accomplished without incident on 4 March and on the following day a1 (IOS 186) was retrieved. The subsurface float and the top current meter were missing and the available evidence seemed to indicate that this mooring had been damaged by one of the many trawlers fishing in the vicinity. Later the same day (5 March) attempts to trigger the acoustic release mechanism of a2 (IOS 185) on the continental slope were made without success. Release

* Footnote

These numbers are independent of the numbers given to the nominal positions on the three lines. Positions of the moorings are given in Fig. 2 & Table 2.

procedures were continued as soon as practicable on 6 March but in the absence of any response, dragging was carried out. No contact was made and the mooring was eventually abandoned. At the a3 (IOS 184) mooring site neither the command pinger nor the acoustic release operated and it was extremely fortunate that a visual sighting of the subsurface float was made. All the equipment from this 3000m mooring was retrieved.

There were 17 Plessey meters deployed on the three moorings and of these 10 were recovered. The failure of the moorings is bitterly disappointing because of the sustained effort made by everyone concerned in the preparation of the equipment and in the work at sea.

P. Hughes

TIDE GAUGE

It was proposed to lay a tide gauge capsule 20 miles west of Cape St. Vincent. This position was chosen as part of a line of observations made between southern Portugal and the Azores used to study North Atlantic ocean tides. The capsules' acoustic systems were first tested en route at a depth of 2000m. The gauge was then laid at $36^{\circ}55.5'N$: $09^{\circ}42'W$ at a depth of 1983m, on 27 January. It was recovered on 11 March without difficulty, the capsule being located, released and inboard within 75 minutes. All data channels functioned correctly and should produce a good tidal record.

R. Spencer

OPTICAL STUDIES (Leg 2)

Instruments

1. Angular scattering meter ($\beta(\theta)$ -meter) measuring the light scattering in discrete angles and with the possibility of sweeping the range $7^{\circ} - 170^{\circ}$ so as to obtain a complete scattering function; the measurements were performed in one wavelength, selected by a broad-band glass filter, centred at 650nm. The instrument was operated from the accompanying electro-hydraulic winch with a 12mm 7-conductor wire cable.

2. Integrating scattering meter (b-meter) measuring the total scattering coefficient in one wavelength centred at 650nm. This instrument was lowered on its cable. The reason for measuring the scattering in red light is that there the scattering caused by the water itself and the dissolved salts is insignificant compared to the scattering caused by the suspended particulate matter.

3. Beam transmittance meter (C-meter) measuring the total attenuation in three wavelengths centred at 380, 525 and 650nm. This instrument was operated from the electric hydro winch.

4. Quanta meter (Q-meter) measuring the total number of quanta in the spectral range 350-700nm; it was lowered by hand on its cable.

5. Colour meter measuring the upward irradiance in the top few metres in two wavelengths, 447 and 521nm; the ratio of these two signals defines a significant ocean colour index. The instrument was lowered by hand on its own cable.

Objectives

To study the optical characteristics of the upwelling area and to investigate the distribution of suspended (particulate) matter by optical (scattering) techniques and to furnish ground data for the aerial surveys.

Measurements

During the ten days working period the stations including optical measurements were essentially of two kinds.

i) Daytime stations only where the colour, quanta and beam transmittance were used; in a few cases when time was available one of the scattering meters was also lowered. These stations were generally worked at midday or local noon. In all seven stations of this kind were completed.

ii) Particulate matter distribution stations where one or both of the scattering meters were used. These observations were mainly carried out in conjunction with TSD profiles and were centred at the B line. One complete section was done from B1 to B10 and a number of half-way sections were also obtained. Near-bottom

surveys were made at depths less than 400m. An oblique section, running SSE from B10 to 22°05'N, 17°25'W, with four optical stations was also made. At the A line only one station (A6) could be occupied due to time limitations. In all 58 light scattering profiles were obtained.

The observations appear to be very reasonable. The intention is now to interpret them on their own merit and in the light of the other measurements carried out during the cruise.

The performance of the equipment was satisfactory. Some problems with the β (θ)-meter could be solved but the operational depth of the instrument was limited to 400-450m. Therefore near-bottom observations beyond this range could not be obtained, as was originally intended. All the other instruments worked without any problems.

G. Kullenberg

PROTAS

Protas (Probe Recording Ocean Temperature and Shear) is a free-fall micro-structure probe which continually measures temperature, conductivity, pressure and velocity shear in its descent through the ocean.

Objectives

The data may be used for constructing a profile of Richardson number allowing such factors as stability and turbulent mixing to be investigated. It is hoped that data collected on this cruise will be used in a comparison of Richardson number profiles collected in other parts of the ocean under different dynamic conditions.

The Work

In all 32 drops were successfully completed, 30 of these being data collecting drops along the B line. Two 13 hour time series were performed (one at B5 and one at B9) at points where the microstructure looked particularly worthy of study and where current moorings were positioned. By performing the time series it is hoped that a 'dynamic' picture of the development and decay of certain

features of the microstructure may be built up.

Unfortunately trouble was experienced on board in recovering the data from approximately 75% of the drops due probably to mechanical trouble with the Protas cassette tape deck, though analogue traces from the remaining 25% of the drops were obtainable. It is felt that the remaining data can be retrieved on return home where equipment and expertise are available.

Further trouble has been experienced in interfacing the 'good' Protas data with the computer. It is still not clear where the fault lies and work is still continuing in an effort to solve the problem so that some primary analysis may be performed before reaching Barry.

I can make no criticism of either the ship's equipment or personnel arising from our work with Protas. Launch and recovery went as smoothly as possible on all 32 drops, and I would like to express my gratitude to all deck crew, especially to Messrs L. Haggis (Bos'n) and R. Burt (Netman) without whom this statement may not have been possible.

J. Stratford

SURFACE CURRENTS

These remarks refer to surface currents derived from satellite fixes and computer D.R. positions.

In general the surface currents produced by the computer appear to have been very reasonable on this cruise. Often in the past, after a period of plotting them, it has become evident from changes of current with changes of course, or a preponderance of currents from port to starboard or starboard to port, that error existed in the two-component log. There has been no sign of this during Cruise 69.

Assuming that the two-component log is accurate there remain two other sources of error. Scatter of the satellite fixes and gyro error, the latter only becoming significant when steaming at speed.

In the plots in Figs. 4a-e, consecutive currents over periods ranging from 10 to 15 hours are shown at times when the vessel has been hove-to or steaming at low speed in approximately the same geographical position.

Very sharp dog-legs in the plot suggest errors in the satellite fixes, while the general pattern of divergence from and convergence upon the mean direction suggests a tidal cycle.

It is apparent from these plots that a single current observations taken on passage is of doubtful value but when the ship is working at low speed in a small area over a period of 12 or 24 hours an average of the computer currents becomes meaningful. This was demonstrated on Discovery Cruise 61 when the currents were averaged daily.

In Figs. 5 and 6 the current vectors shown are a mixture, some are single observations, some are the average of half a dozen or more. At the western ends of both Line A and Line B the current is fairly consistent but at the edge of the shelf the picture is by no means clear.

G.L. Howe

CHEMISTRY

The principal objectives of the chemical programme were:-

1. The use of nutrient (Nitrate-Nitrite, Silicate, Phosphate) and dissolved oxygen sections, to help characterise the physical and biochemical processes involved in upwelling.
2. To examine the particulate and dissolved trace metal concentrations in sections along the two lines studied.
3. Particulate nitrate, phosphate, carbon and chlorophyll measurements.
4. Continuous surface fluorescence measurements and continuous autoanalysis of 100m profiles.

1) NUTRIENT AND OXYGEN SECTIONS

Samples were taken from casts made at the ten stations on both lines A and B, at as many of the standard depths as were available. Depths selected were surface, 5, 10, 20, 50, 75, 100, 150, 200, 250, 300, 350, 400, and 500m. Owing to early problems with the Niskin rosette sampler, N.I.O 1.31 bottles were used for all but the first few stations. Two visits were made to each section in Leg 1 and a further visit in Leg 2, together with an additional section along the B line. Providing a total of about 700 samples for analysis.

Silicate and nitrate sampler were membrane filtered immediately upon sampling the bottles, and chloroform treated to prevent biological activity. Unfiltered phosphate samples were similarly treated with mercuric chloride solution. Simultaneous analyses of samples were carried out within 24 hours, using a triple autoanalyzer system. Chart records were returned to Liverpool University for computer processing.

Oxygen was determined by the conventional Winkler method and concentrations immediately calculated and plotted.

Whilst data is yet to be fully processed, it is reasonable to make a few preliminary observations. There was little or no evidence to suggest that upwelling was the predominant water movement during the first leg of the expedition. However, on the B line, the intense surface layer, nitrogen limited, phytoplanktonic activity was reflected by the considerable depletion of surface dissolved nutrients of the nitrogen cycle, together with extremely low oxygen levels below 150m (reaching a minimum of 1.22 ml O₂/l). Oxygen profiles of the A line revealed a more or less stable and relatively less biologically active regime than that observed on the B line. Nutrient and oxygen profiles of the final visit to the B line suggested an upwelling condition, confirmation awaits further data evaluation.

2) TRACE METALS

The object of this experiment was to examine the general distribution of trace metals including iron, manganese, copper, lead, cadmium, zinc, nickel and cobalt in the sections along the two lines of the expedition and to consider any relationship between their dissolved and particulate forms.

With the exception of surface samples (taken from the laboratory seawater supply), samples were drawn from 7.41 N.I.O. water bottles. The samples were taken at 5 selected stations from each line, and at the following depths:- surface, 10, 50, 100, 200, 400, 600, 800, 1000, 1200 and 1500m.

Samples were filtered through 0.45 μ membrane filters (previously washed, dried and weighed) to separate the particulate fraction. Filters were returned to the laboratory for further analysis.

In order to preconcentrate the trace metals, filtered samples were passed through columns containing the calcium form of a chelating resin which was later acid eluted, the small volume of eluate being stored prior to return to Liverpool University for analysis. Columns were prepared and regenerated at sea.

3) PARTICULATE ANALYSIS

The aim of this study was to interrelate the distribution (surface and with depth) of biochemical particulate material and chlorophylls (as an indicator of phytoplankton).

For the surface series, 151 samples (from the laboratory seawater supply) were taken at 2-hourly intervals on the return passage between the A and B lines along the 50 and 100m depth contours. A particulate section along the B line was made during Leg 1 using 5 bottle casts of 5 x 7.41 NIO bottles (together with surface samples) to a maximum depth of 150m. Further particulate sampling was carried out on three of the pumping stations (see below), in 10m increments to 100m.

Samples were generally taken for particulate components of nitrogen, phosphorus and carbon and for pigment analysis. Filtration utilized laboratory pre-tested glass fibre (GF/C) filters (in the case of pigments, coated with magnesium carbonate).

The refrigerated C, N and P particulates await laboratory analysis. Extraction and determination of chlorophyll pigments was carried out on board. Computation of results was performed by the shipboard computer using the equations of Parsons and Strickland. Highest surface chlorophyll values were found between

stations 8738 and 8739 and attained 7.2mg chlorophyll a/m³.

4) CONTINUOUS ANALYSIS

Continuous fluorescence measurements were made from the Bay of Biscay to the final visit to Tenerife on the return voyage. The system employed was a Turner Fluorometer incorporating a thermistor and fed by the laboratory seawater supply via a debubbler. The output from the fluorometer and thermistor was fed to a two pen chart recorder. Standardisation (only valid for the species distribution in a particular area) was performed during the surface seawater stations.

Continuous fluorescence/autoanalysis measurements were made during some of the pump profile stations. A large volume peristaltic pump was used to regulate the supply through the debubbler and fluorometer system to bleed-off points for continuous nitrate, phosphate and silicate analysis. Traces are currently being analysed at Liverpool University.

5) OTHER PROJECTS

Various large volume sea water samples were returned to Liverpool for general laboratory use.

A cast of 1.31 bottles was made at station 8761 at 13 depths to 2350m. These were sampled for determinations of nitrate-nitrite, phosphate, silicate, oxygen, organo-phosphorus compounds and organo-metallic compounds. A further series (to 200m) at the same station was used for a light and dark bottle radiocarbon productivity experiment, the bottles being exposed to fixed intensity light in constant temperature conditions.

L. Mee

BIOLOGY

During the two surveys of the A and B lines on the first leg of the cruise biological sampling was done at five of the stations (1,3,5,7 and 9) on each line. At each of these stations Bongo, neuston and RMT nets were fished. The paired 500 and 300 micron Bongo nets were fished vertically from 200m or near the bottom, whichever was the shallower, to the surface using the fo'c'sle winch.

The combination of the length of the nets and the weight required below them made this a somewhat energetic operation. The RMT 1+8 was fished obliquely from approximately 10m down to 500m or to about 10m from the bottom, whichever was the shallower and then closed prior to hauling. In order to avoid very large catches of phytoplankton in the RMT 1 samples, which subsequently would be almost impossible to sort satisfactorily, the nets were opened at a depth of about 10m wherever the surface layers appeared very dark green. Seven horizontal samples were taken at various depths down the slope to augment the oblique samples.

When the second survey of the B line was completed a daytime series of RMT 1+8 hauls was worked between 20m and 400m, in 25m and 50m strata, in the region of the 500m contour (B5). A similar daytime RMT 1+8 series was worked on the A line around A6, this time between 100m and 400m in 50m strata.

The BN1.5 was fished four times during the first leg. In the first haul at A9 in 3000m, although the acoustic signals which indicate that the net is on the bottom and the blind is open were not working properly due to misalignment of the switch, a large sample of grey mud with few animals was collected. The second haul was done in shallow water as a test of the switch setting and produced a small catch. The next two hauls were done on the B line at B9 and B8. During the first of these in 2400m the net turned over and there was no catch and in the second, in 1800m, another large catch of grey mud was taken but again there were few animals.

The RMT samples taken on the B line slope during the first leg were very large and consisted predominantly of euphausiids. On the second leg, when most of the time was spent on the B line, work with the RMT was concentrated on fishing short vertical series in narrow strata on the shelf and at various soundings down the slope. The purpose was to provide vertical distribution data that hopefully could be correlated with the physical data provided by the TSD, current meters and Protas. At the first series, in a sounding of 500-600m, a TSD was lowered first and the RMT horizons chosen to coincide with features on the TSD record. However a second TSD during the early afternoon showed that the depths of some of these features had changed and others had disappeared and arbitrary 25m, or 50m thick strata were fished during subsequent series. In all, six vertical series were worked; a day series on the shelf, a day and a night series over the upper part of the slope (100-300m), a day series at a sounding of 500-700m and a day and a night

series at a sounding of about 1000m. During the first leg F.S. Meteor had worked a night series on the B line in about 850m. These series were concentrated in the upper 300m although a few hauls extended down to 500m. For reference purposes all the RMT 1+8 hauls; including those fished by F.S. Meteor, are listed in Table 4. They are arranged in depth order within broad categories according to the soundings over which they were fished.

The RMT 1+8 was, in general, fished in the manner described in IOS Cruise Report No. 10. However, the oblique hauls on the shelf and over the upper part of the slope were of such short duration that there was little opportunity to adjust the ship's speed to make any necessary correction to the net speed as indicated by the flowmeter. To some extent this also applied to those of the horizontal series hauls where the duration of the tow could be reduced because of the large biomass near the surface at night.

This was the first time that the IOS had fished a closely spaced series of hauls over the steeper upper part of the slope where maintaining approximately the same sounding for all the hauls in a series is difficult. Table 4 and Fig. 3 show that the range of soundings during a series was considerable and this resulted from the inevitable compromise between utilising the maximum ship time for fishing and maintaining a reasonably uniform sounding throughout a series. The relationship between the direction of the wind and that of the bottom contours plays an important part in determining the range of soundings covered, even in one haul, because, when fishing beam on to the wind, the course sometimes crosses the contours at right angles. Thus the ship time used in maintaining position relative to particular soundings is inevitably longer when fishing in the upper slope area than in the area more offshore.

A further, purely practical, compromise also has to be made between keeping a very close watch on the fishing depth of the net and switching the Mufax to echo-sounding so that the depth of the bottom can be observed. It is important that several soundings are taken during each haul.

A de C. Baker

FLUORESCENCE PROFILING

A Turner Model 111 fluorometer was used to estimate the levels of chlorophyll

a present in sea water. Horizontal profiles of the fluorescence, at a depth of ca. 4m, were made during the passage of the ship by passing the ship's clean sea water supply through the machine. The voltage output from the fluorometer was monitored every second by the shipborne computer. Most of this profiling was concentrated in the upwelling region under study but due to problems with the computer and the pumping system it has not been possible yet to analyse the data fully. In general, however, on the B line, the levels of chlorophyll a were low over the shelf region but increased towards the more oceanic stations. Very high levels were sometimes found when the machine itself, even on its most insensitive range, was off scale. The chlorophyll distribution appeared to be fairly patchy at the offshore stations. For instance, the highest levels were found at the B5 and B9 stations with lower levels between and at B10, but even at the individual stations quite large variations were found. The passage between the A and B lines also showed that there was patchiness in the chlorophyll a distribution, and quite high levels were found even over the shelf region.

On the second leg of the cruise the vertical distribution of chlorophyll was also studied using the fluorometer. For these experiments a submersible pump was used. The inlet probe for the pumping system was attached to a TSD probe and was then connected, using varying lengths of 2" bore plastic tubing, to the pump. The maximum depths to which profiling was carried out was 110m, when 400ft of tubing was used. On the positive pressure side of the system, on deck, a small bleed was taken off and fed to the fluorometer and the flow adjusted to ca. 500 ml/min. The TSD and inlet probe were lowered and raised at a rate of about 0.1 m/sec. This slow speed was necessary to overcome the problem of the slight turbulent mixing in the tube and thereby to obtain a reasonable profile of the vertical distribution of chlorophyll. The outputs from the TSD and fluorometer were sampled by the computer.

Thirty-three profiles were obtained in this way, of which thirty were on the B line and encompassed all of the stations on it. The profiles obtained showed that the vertical distribution of chlorophyll a was extremely variable, not only at different stations but also at the same one. In general the levels were highest at the outermost stations. There the thermocline was also more pronounced as was the associated drop in fluorescence. However, the water structure was often complex, with many temperature inversions, and their effects on the fluorescence have yet to be analysed in detail.

It was noted at B5 that the small shallow thermocline disappeared completely during the course of a few hours and so a series of ten dips was made at a station in slightly deeper water in order to assess these changes. Although the overall result was not as dramatic as at B5 there were still considerable changes in the level and magnitude of the thermocline during this series, and similar changes occurred in the fluorescence profiles. Sampling on the shelf showed that not only were the chlorophyll a levels lower, but that the fluorescence profile was often confused and could change considerably even during the course of the down and up parts of a single dip. Quite often the chlorophyll levels were higher in the deeper waters than at the surface and this probably reflects the complex temperature structure of the water in this region.

In addition to the vertical profiling of fluorescence it was found possible to connect the outflow of the fluorometer into an autoanalyser and thereby profiles of the nutrients nitrate, phosphate, and silicate were also obtained. Because of the additional delay time involved in these measurements the data has yet to be interpreted properly.

The main outflow from the pump, ca. 200 l/min, was also used for the collection of other water samples for chemical analyses. Also zooplankton samples were collected from this water. Using a dividing tap system the water could be directed through either one of two 10" netting screens, with mesh size of 320 μ . The samples collected on these screens were backwashed onto smaller filters of the same mesh size and these were then stored in tubes of 5% formalin for later analysis. This procedure was primarily developed for use during two 4h experiments to study the spatial pattern of distribution of both the phyto- and zooplankton at a single depth. In these cases the TSD and inlet probe were placed and left at a predetermined depth, dependent on the fluorescent and physical features of the water. The changes in the chlorophyll a fluorescence, temperature and salinity were then monitored continuously while zooplankton samples were collected every minute. Using the two filter system it was thus possible to collect zooplankton samples all the time. The results obtained from these two long "turbulence" experiments were not as good as hoped mainly due to the instability of the water column in this region. In both cases the shallow thermocline into which the probe had been placed at the start of the experiment had completely disappeared by the end. Zooplankton samples were also taken during several of the vertical profiling experiments from the regions just above,

in and below the thermocline.

P.R. Pugh

FISH Leg 1

Preliminary shipboard identification and analysis of the catches on the first leg suggested some interesting differences in the fish fauna found along the A and B lines. The volume of the catches from the B line were, in general, greater than those from the A line. A total of at least 64 species were caught from the upper 500m of both lines, of which the majority were mesopelagic in origin. Species diversity was greater on the B line (c. 51 spp. vs c. 40 spp. on the A line), although admittedly the sampling effort was nearly twice as great. While the B line apparently was richer in myctophids, the A line nevertheless yielded double the number of gonostomatid species. Along the B line, Benthoosema glaciale was the ubiquitously dominant species, which appeared to be far from the case on the more northerly A line. If any species did predominate in the A line samples, then it was probably Lampanyctus alatus. The apogonid, Howella, and the alepocephalid, Xenodermichthys, were notably numerous also among the B line catches. A large number of fish eggs and larvae, including clupeoid larvae, were sampled in the area B. In contrast, the A line catches revealed few eggs and larvae, and of the latter the gonostomatid, Maurolicus, appeared to predominate.

A day time vertical series was carried out over the shelf edge-slope break in about 500m depth on both the A and B lines, which sampled the upper 400m. Comparatively large catches were taken in the B series, with B. glaciale again conspicuously dominating. The mesopelagic element of the catches was largely migrant species. The very much more sparse samples from the A line series, however, differed somewhat in that only a few myctophid species were present and a relatively large number of non-migrant gonostomatids, such as M. mulleri and Cyclothone braueri, occurred. The samples were, however, too few for positive conclusions to be drawn.

N.R. Merrett

EUPHAUSIIDS

Very large catches of euphausiids were taken in the RMT 1+8 hauls fished on the slope; in terms of biomass they were probably the dominant group in many of the samples. This high abundance was due almost entirely to two species, Euphausia krohnii (Brandt) and Nematoscelis megalops G.O. Sars. Larger catches of both species were taken on the B line than on the A line. Even though the working area is towards the southern limit of the distribution of these two species the catches were very much larger than those taken at 40°N, 20°W nearer to the supposed centres of their latitudinal ranges.

The daytime vertical series with the RMT 1+8 show that E. krohnii had its maximum abundance between 50m and 150m whereas N. megalops occurred mostly below 150m and may have extended nearly to the bottom in the vicinity of the 500m contour. Both these vertical distributions are much shallower than at 40°N, 20°W where E. krohnii is centred at 300-400m and N. megalops at 600-700m.

A. de C. Baker

COMPUTER Leg 2

The computer throughout Leg 2 was a constant source of problems. The leg was slow to start up due to the typewriter jamming for several hours thus making it impossible to enter the start functions. Having obtained a working system problems arose due to a fault in the Camac crate power supply.

TSD data was collected throughout the leg with only minor problems, however it proved difficult to draw graphs of the final results, and thus the graph-plotting was left until modifications could be made to the software in the laboratory.

The major problem on the leg was due to the external clock interface which would momentarily power down. The time would go to 0000 hours i.e. midnight, and the internal computer clock would re-synchronise. When the clock interface recovered the internal clock would re-synchronise again to the correct time, but in the process the computer had gained a day. This led to some problems with the satellite fixes and navigation.

Another problem in the navigation was the one which has been occurring for some time now, that is the computer failed to write a record to disc and thus when it updated the DR position after the next 2 minute interval it added the distance travelled to the position shown by the last record. This last 'junk' record was usually of the right format and was in fact the position stored on the disc from a past day or cruise. Thus the navigation jumped to some false position and carried on from there. If the error had not been seen and corrected before the following satellite fix, then the fix was given a bad result and rejected.

Attempts at replaying the Protas tapes failed completely, this was partly due to faults in the interface wiring and partly due to an electronics fault in the Protas monitor box.

The Omega navigation system was tried out and tested. Several faults were found and repaired. It now appears fully operational although no fixes could be obtained due to lack of documentation.

The leg proved as difficult to stop as it was to start, with the end leg program failing. This was due to the RAW 1 file having been moved to DRIVE 2 for the EM log calibration. Restoring this file allowed the leg to end normally.

R. Bentley

P. Hartland

Table 1. Nominal positions for the stations on the A and B lines.

A 1	24°54.5'N, 15°31'W	B 1	22°41' N, 16° 51.5'W
A 2	25°00' N, 15°40'W	B 2	22°42' N, 16°57' W
A 3	25°06' N, 15°49'W	B 3	22°43' N, 17°02' W
A 4	25°10' N, 15°56'W	B 4	22°44' N, 17°08'W W
A 5	25°15' N, 16°03'W	B 5	22°46' N, 17°15' W
A 6	25°19' N, 16°10'W	B 6	22°47' N, 17°20.5' W
A 7	25°25' N, 16°19'W	B 7	22°48' N, 17°27' W
A 8	25°30.5'N, 16°28'W	B 8	22°50.5'N, 17°36.5' W
A 9	25°37.5'N, 16°39'W	B 9	22°53.5'N, 17°47.5' W
A10	25°44' N, 16°49.5'W	B10	22°55' N, 17°58' W

Table 2. Current meter mooring positions.

	A line		B line
a1	25°01.85'N, 15°47.65'W (IOS 186)	b1	22°44.12'N, 17°03.60'W
a2	25°19.10'N, 16°11.31'W (IOS 185)	b2	22°47.65'N, 17°12.60'W
a3	25°37.37'N, 16°38.90'W (IOS 184)	b3	22°53.8'N, 17°45.2'W *

* Deployed by F.S. Meteor.

Table 3. Magnetometer surveys.

Streamed		Recovered	
Time/Date	Position	Time/Date	Position
1120/24/1	45°04.5'N, 11°47'W	1933/24/1	44°17.8'N, 12°55.5'W
0037/25/1	44°07.2'N, 12°57.0'W	1359/25/1	42°09'N, 13°24'W
0323/26/1	41°51.5'N, 13°28.1'W	1619/26/1	39°55'N, 11°52'W
1732/26/1	39°53.1'N, 11°49.7'W	1259/27/1	36°56'N, 09°43'W
1536/27/1	36°55.3'N, 09°42.0'W	1046/28/1	34°06.5'N, 11°55.1'W
1557/28/1	34°02'N, 11°54'W	1402/29/1	30°28'N, 14°02'W
1802/29/1	30°19.1'N, 14°07.5'W	0712/30/1	28°37.6'N, 15°55.8'W
1415/12/2	22°40'N, 17°16'W	1039/13/2	25°33'N, 16°49'W
0728/16/2	25°09'N, 15°55'W	0700/17/2	28°17.1'N, 16°14.5'W
1018/20/2	28°23.8'N, 16°14.9'W	0122/21/2	25°47.1'N, 16°48.1'W
1348/8/3	28°38'N, 16°00'W	1300/11/3	36°55.5'N, 09°42.3'W
1428/11/3	36°55.5'N, 09°42.3'W	1848/12/3	40°14.5'N, 12°58.2'W
1513/13/3	41°53'N, 13°26'W	0342/14/3	44°00'N, 13°00'W
0522/15/3	44°09.5'N, 12°55'W	0900/16/3	47°37'N, 09°11'W

Positions given are for the start and finish of runs. Consult bridge logs for details of any course alterations between these positions.

Table 4. RMT 1+8 hauls fished on Lines A, B and C by RRS Discovery and F.S. Meteor. Meteor station numbers are underlined.

Stn. No.	Series No.	DAY		Stn. No.	Series No.	NIGHT	
		Depth of Net	Approx. Sounding			Depth of Net	Approx. Sounding
<u>A line</u>							
<u>Oblique Hauls</u>							
8690	4	10-30	41(Dawn)				
8726	3	10-60	75(Dusk)	8688	4	20-60	75
8724	4	10-135	173	8686	4	10-195	222
8684	4	10-500	785	8722	6	10-500	1225
				8682	4	10-500	3010
				8720	8	10-500	ca. 2800
<u>Hauls in restricted strata ("Horizontal")</u>							
8729	5	100-150	252				
"	1	150-200	599				
"	2	200-250	410				
"	4	250-300	497				
"	3	300-400	540				
8684	3	210-380	ca. 800				
8720	7	10-200	ca. 2800 (Dusk)				
<u>B line</u>							
<u>Oblique Hauls</u>							
<u>52</u>		5-40	51	8701	4	10-35	53
8672		0-68	68				
8699	4	0-70	72 (Dusk)				
8673		0-86	98				
<u>83</u>		0-350	500	<u>55</u>		0-450	120-550
8697	3	0-500	550	8674	3	0-500	893
8676	4	0-500	1203	8695	4	15-500	ca. 1170
<u>56</u>	5	10-450	1375(Dawn)				
8693	4	0-500	2141(Dawn)	8678	1	20-500	1873
<u>46</u>	1	10-450	2800				
<u>46</u>	2	0-120	2800				

Stn. No.	Series No.	DAY Depth of Net	Approx. sounding	Stn. No.	Series No.	NIGHT Depth of Net	Approx. sounding
<u>Horizontal hauls</u>							
8780	4	10-20	59				
"	2	15-30	59				
"	1	30-45	53				
8808	3	50-100	247	8806	6	0-10	114
"	2	100-150	369	"	5	12-25	152
"	1	150-200	232	"	4	25-50	323
				"	2	50-100	266
				"	1	100-150	219
				"	3	150-200	322
8697	5	375-475	514	8674	4	25-200	ca.900
8718	3	18-50	617	8807	1	20-95	830
8708	4	50-75	454	<u>84</u>	7	10-25	800
"	2	75-100	450	"	6	24-49	900
"	1	100-128	540	"	5	50-76	910
"	3	125-150	570	"	4	50-82	900 RMT I ONLY
"	5	150-200	651	"	3	75-100	900
"	6	200-250	569	"	2	100-125	900
8718	1	240-300	492	"	1	115-168	900
"	2	300-400	557				
8770	12	0-15	751				
"	3	25-55	684				
"	2	100-150	682				
"	7	195-220	550				
"	11	270-300	575				
"	13	300-500	778 (Dusk)				
8807	2	300-500	632 (Dawn)				
8775	10	0-12	905	8776	5	12-25	1278
"	11	13-50	912	"	4	25-50	1168
"	5	53-75	720	"	3	50-100	1087
"	4	75-100	960	"	2	100-150	960
"	2	100-150	1065	"	1	505-600	912
"	3	155-200	1210	8695	5	25-200	994

Stn. No.	Series No	DAY		Stn. No.	Series No.	NIGHT	
		Depth of Net	Approx. Sounding			Depth of Net	Approx. Sounding
8775	12	200-250	923				
"	13	250-300	990				
8676	5	390-500	1153				
				<u>56</u>	4	10-25	1410
				"	3	25-50	1370
				"	2	50-76	1390
				"	1	76-103	1460
				<u>90</u>		100-200	1330
8759	7	80-110	1965	8678	2	35-200	ca. 2200
"	6	180-250	1965	<u>91</u>		100-205	1920
<u>92</u>	2	100-200	2820	<u>93</u>		108-200	2700
"	1	304-450	2800				

C Line

Oblique hauls

<u>25</u>		0-22	33				
				<u>23</u>		0-87	99
				<u>62</u>		0-77	84
<u>21</u>	1	15-455	555(RMT 1 only)				
"	2	0-396	ca. 500				
<u>60</u>	3	10-410	420				
<u>58</u>	1	0-450	1785	<u>19</u>		0-450	2038
<u>18</u>		12-555	2800	<u>57</u>		10-425	2850

Horizontal hauls

<u>33</u>	3	0-140	450	<u>67</u>	5	8-25	750
"	2	220-305	500	"	4	25-50	750
"	1	302-450	630	"	3	50-77	760
<u>60</u>	2	10-105	400-500?	"	2	75-100	740(RMT 8 only)
"	1	302-450	405				
<u>67</u>	7	300-450	600				
<u>58</u>		300-450	1650				

STN.	DATE	POSITION	GEAR	DEPTH	FISHING TIME	REMARKS	WATER
#	1975	LAT LONG		(M)	GMT		DEPTH (M)
R649	24/ 1	44 15.3N 12 59.7W	RMT 1	0-	2051-0010	NET FAILED TO CLOSE	4979
# 0		44 7.6N 12 57.0W	RMT 8		NIGHT		
R650	25/ 1	42 8.5N 13 23.4W		0-2000	1424-1650	* TIME GAUGE - ACOUSTIC TEST	
# 0		42 7.2N 13 24.9W			DAY		
R651	25/ 1	41 51.6N 13 27.9W	CM	0-5000	1944-2245	RELEASE SYSTEM TEST	
# 1		41 51.4N 13 28.0W			NIGHT		
R651	25/ 1	41 51.3N 13 27.9W	TSD	0- 300	2342-0011	TEST DIP WR AT 300M.	
# 2		41 51.3N 13 27.8W			NIGHT		
R651	26/ 1	41 51.3N 13 27.8W	CM	0-5000	0028-0320	RELEASE SYSTEM TEST	
# 3		41 51.5N 13 27.0W			NIGHT		
R652	27/ 1	36 55.3N 9 42.0W		1983-1983	1525-	* TIME GAUGE - TG7 LAID	1983
# 0					DAY		
R653	28/ 1	34 2.8N 11 54.5W	RMT 1	240- 385	1241-1312	NET MONITOR TEST	
# 1		34 2.1N 11 53.8W	RMT 8		DAY		
R653	28/ 1	34 2.1N 11 53.3W	TSD	0- 300	1408-1446	WR AT 10 & 90 M.	4453
# 2		34 2.6N 11 53.5W			DAY		
R654	29/ 1	30 26.5N 14 2.0W	RMT 1	0- 600	1400-1605	TRIAL - NO CATCH	2890
# 1		30 22.6N 14 4.9W	RMT 8		DAY		
R654	29/ 1	30 21.2N 14 5.9W	RMT 1	325- 400	1651-1735	CATCH NOT RETAINED	
# 2		30 20.0N 14 6.8W	RMT 8		DAY	FLOW DIST. 2.35 KM.	
R655	30/ 1	28 34.9N 15 58.6W		0-1200	0830-0912	* NET MONITOR DEPTH CALIBRATION	
# 0		28 34.4N 15 58.7W			DAY		
R656	30/ 1	27 33.7N 16 19.7W	CM	0-1200	2015-2115	RELEASE SYSTEM TEST	
# 0		27 33.9N 16 19.7W			NIGHT		

STN.	DATE 1975	POSITION		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
		LAT	LONG					
R657 # 0	30/ 1	27 27.8N	16 20.0W	CM	0-1000	2200-2355 NIGHT	RELEASE SYSTEM TEST	
R658 # 0	31/ 1	25 37.4N	16 38.9W	CM	3026-3026	1651- DAY	A9 MOORING	3026
R659 # 0	31/ 1	25 41.8N	16 50.1W	TSD	0- 755	1834-1922 DUSK	A10 CALIR. WB AT 98M.	
R660 # 0	31/ 1	25 31.0N	16 29.2W	TSD	0- 750	2215-2314 NIGHT	A8 CALIR. WB AT 75 & 7M.	
R661 # 1	1/ 2	25 21.6N	16 11.3W	CM	0- 500	0218-0245 NIGHT	RFLSAFE SYSTEM TEST	510
R661 # 2	1/ 2	25 19.7N	16 9.4W	TSD	0- 385	0329-0409 NIGHT	A6 CALIR. WB AT 100 & 10M.	410
R662 # 0	1/ 2	25 19.1N	16 11.3W	CM	500- 500	1334- DAY	A6 MOORING	500
R663 # 0	1/ 2	25 1.9N	15 47.6W	CM	64- 64	1915- DUSK	A2 MOORING	64
R664 # 0	2/ 2	22 47.6N	17 12.6W	CM	501- 501	1511- DAY	B5 MOORING	501
R665 # 0	2/ 2	22 42.4N	17 3.0W	BGM	0- 50	1747-1748 DAY	R3 BONGON NET TRIAL	60
R666 # 1	2/ 2	22 42.1N	16 54.2W	TSD	0- 42	1924-1945 DUSK	R1 POSITION DOUBTFUL	47
R666 # 2	2/ 2	22 41.9N	15 54.3W	MS				
R666 # 2	2/ 2	22 41.6N	16 54.4W	BGM	0- 50	2011-2015 NIGHT	R1 POSITION DOUBTFUL	50
R666 # 2	2/ 2	22 41.6N	15 54.4W					

STN.	DATE 1975	POSITION LAT L O M G	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
R666 # 3	2/ 2	22 41.8N 16 54.2W 22 42.4N 16 53.4W	NN	0- 0	2103-2115 NIGHT	R1 POSITION DOUBTFUL	
R667 # 1	2/ 2	22 42.0N 16 56.3W 22 41.9N 15 56.1W	TSD MS	0- 45	2226-2241 NIGHT	R2	54
R667 # 2	2/ 2	22 41.6N 16 55.9W 22 41.5N 15 55.8W	WR 7.4	0- 40	2300-2305 NIGHT	R2 STANDARD DEPTHS	49
R668 # 1	3/ 2	22 42.8N 17 2.7W 22 42.9N 17 2.8W	RGN	0- 60	0012-0016 NIGHT	R3	64
R668 # 2	3/ 2	22 42.9N 17 2.8W 22 42.7N 17 2.9W	TSD MS	0- 60	0030-0044 NIGHT	R3	64
R668 # 3	3/ 2	22 42.9N 17 2.4W 22 43.3N 17 1.5W	NN	0- 0	0055-0107 NIGHT	R3	
R669 # 1	3/ 2	22 43.4N 17 7.9W 22 43.2N 17 8.2W	TSD MS	0- 75	0200-0235 NIGHT	R4	83
R669 # 2	3/ 2	22 43.1N 17 8.2W 22 43.0N 17 8.0W	WR 7.4	0- 75	0240-0252 NIGHT	R4 STANDARD DEPTHS	83
R670 # 1	3/ 2	22 45.9N 17 14.6W 22 45.9N 17 14.6W	RGN	0- 150	0345-0402 NIGHT	R5	686
R670 # 2	3/ 2	22 45.9N 17 14.7W 22 46.2N 17 14.6W	TSD MS	0- 500	0414-0500 NIGHT	R5	686
R670 # 3	3/ 2	22 46.2N 17 14.5W 22 46.2N 17 14.7W	TSD MS	0- 75	0520-0534 NIGHT	R5	686
R670 # 4	3/ 2	22 46.6N 17 15.0W 22 46.3N 17 14.0W	NN	0- 0	0707-0719 DAWN	R5	

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
R671 # 0	3/ 2	22 44.1N 17 3.6W	CM	68-	68 1105- DAY	R3 MOORING	68
R672 # 0	3/ 2	22 42.4N 17 6.0W 22 42.5N 17 6.6W	RMT 1 RMT 8	0-	68 1631-1641 DAY	R3 TOUCHED BOTTOM FLOW DIST. 0.72 KM.	68
R673 # 0	3/ 2	22 44.1N 17 10.3W 22 44.3N 17 10.8W	RMT 1 RMT 8	0-	86 1745-1754 DAY	R4 FLOW DIST. 0.59 KM.	98
R674 # 1	3/ 2	22 46.6N 17 15.4W 22 46.6N 17 15.4W	TSD	0-	511 1854-1931 DUSK	R5	716
R674 # 2	3/ 2	22 46.8N 17 16.0W 22 47.4N 17 17.1W	RMT 1 RMT 8	0-	60 2017-2020 DUSK	R5 TOW ABORTED	791
R674 # 3	3/ 2	22 48.6N 17 19.3W 22 49.3N 17 21.6W	RMT 1 RMT 8	0-	500 2104-2155 NIGHT	R5 FLOW DIST. 2.34 KM.	893
R674 # 4	3/ 2	22 46.1N 17 22.0W 22 45.5N 17 21.9W	RMT 1 RMT 8	25-	200 2338-2358 NIGHT	R5 FLOW DIST. 1.92 KM.	
R675 # 1	4/ 2	22 47.9N 17 20.9W 22 48.1N 17 21.0W	TSD	0-	500 0049-0127 NIGHT	R6 CALTR. BR.	906
R675 # 2	4/ 2	22 48.3N 17 21.0W 22 48.6N 17 22.2W	WR 7.4	0-	880 0136-0256 NIGHT	R6 STANDARD DEPTHS	946
R675 # 3	4/ 2	22 48.8N 17 22.6W 22 49.2N 17 22.2W	WR 1	0-	500 0340-0425 NIGHT	R6 STANDARD DEPTHS	946
R676 # 1	4/ 2	22 50.2N 17 28.3W 22 50.3N 17 28.9W	WR 1	0-	501 0645-0722 DAWN	R7 STANDARD DEPTHS	
R676 # 2	4/ 2	22 50.3N 17 29.1W 22 50.3N 17 29.1W	BGM	0-	200 0734-0741 DAWN	R7 DEPTH EST.	1203

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
R676 # 3	4/ 2	22 50.0N 17 29.0W 22 49.2N 17 28.2W	NN	0-	0 0807-0819 R7 DAY		
R676 # 4	4/ 2	22 49.9N 17 29.1W 22 52.2N 17 31.8W	RMT 1 RMT 8	0- 500	0848-0953 R7 DAY	FLOW DIST. 4.39 KM.	1203
R676 # 5	4/ 2	22 53.2N 17 33.1W 22 52.3N 17 32.3W	RMT 1 RMT 8	390- 500	1113-1143 R7 DAY	FLOW DIST. 1.45 KM.	1153
R676 # 6	4/ 2	22 50.0N 17 29.3W 22 50.1N 17 29.5W	TSD	0- 500	1315-1353 R7 DAY		1248
R677 # 1	4/ 2	22 52.1N 17 37.4W 22 52.2N 17 38.0W	TSD	0- 500	1456-1540 RR DAY	CALIP. WR AT 262M.	1556
R677 # 2	4/ 2	22 52.2N 17 38.1W 22 52.1N 17 38.2W	WR 7.4	0-1500	1908-1948 RR DUSK	STANDARD DEPTHS	
R677 # 3	4/ 2	22 52.1N 17 38.3W 22 52.0N 17 38.4W	WR 1	0- 500	2014-2039 RR NIGHT	STANDARD DEPTHS	
R678 # 1	4/ 2	22 49.3N 17 45.1W 22 50.3N 17 47.4W	RMT 1 RMT 8	20- 500	2300-2358 R9 NIGHT	FLOW DIST. 3.34 KM.	1873
R678 # 2	5/ 2	22 50.4N 17 51.8W 22 51.1N 17 53.2W	RMT 1 RMT 8	35- 200	0102-0132 R9 NIGHT	FLOW DIST. 2.43 KM.	
R678 # 3	5/ 2	22 51.7N 17 53.1W 22 51.8N 17 52.2W	NN	0- 0	0200-0212 R9 NIGHT		2231
R678 # 4	5/ 2	22 51.2N 17 49.5W 22 51.5N 17 50.3W	TSD MS	0-1500	0250-0410 B9 NIGHT		2100
R678 # 5	5/ 2	22 51.5N 17 50.3W 22 51.6N 17 50.5W	WR 1	0- 501	0418-0459 R9 NIGHT	STANDARD DEPTHS	

STN.	DATE 1975	POSITION LAT LONG	G.FAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
R678 # 6	5/ 2	22 51.6N 17 50.5W 22 51.6N 17 50.6W	BGN	0- 200	0509-0518 R9 NIGHT		
R679 # 1	5/ 2	22 55.4N 17 59.1W 22 55.8N 18 0.0W	TSD	0- 525	0641-0744 R10 DAWN	CALIP. WR AT 30M.	2494
R679 # 2	5/ 2	22 55.8N 18 0.1W 22 56.1N 18 0.6W	WR 7.4	0-1505	0750-1034 R10 DAY	STANDARD DEPTHS	2494
R679 # 3	5/ 2	22 55.9N 18 0.3W 22 56.0N 18 0.4W	WR 1	0- 505	0900-0945 R10 DAY	STANDARD DEPTHS	2494
R680 # 0	5/ 2	23 46.9N 17 0.9W 23 49.0N 16 58.0W	RMT 1 RMT 8	30- 220	1945-2018 NIGHT	FLOW DIST. 2.02 KM.	203
R681 # 1	6/ 2	25 43.9N 16 48.9W 25 43.6N 16 49.2W	TSD MS	0- 101	1506-1543 A10 DAY		3299
R681 # 2	6/ 2	25 43.5N 16 49.3W 25 43.1N 16 49.7W	TSD	0- 752	1557-1641 A10 DAY		3299
R681 # 3	6/ 2	25 43.0N 16 49.9W 25 42.7N 16 50.3W	WR 1	0- 500	1700-1732 A10 DAY	STANDARD DEPTHS	3299
R682 # 1	6/ 2	25 36.8N 16 41.5W 25 35.9N 15 41.5W	TSD MS	0- 500	1850-1950 A9 DUSK		3007
R682 # 2	6/ 2	25 35.8N 16 41.5W 25 35.8N 16 41.5W	BGN	0- 200	2005-2011 A9 DUSK		3052
R682 # 3	6/ 2	25 35.9N 16 41.5W 25 35.7N 16 41.5W	WR 1	0- 75	1957-2014 A9 DUSK	STANDARD DEPTHS	3052
R682 # 4	6/ 2	25 35.0N 16 41.6W 25 32.4N 16 41.6W	RMT 1 RMT 8	10- 500	2035-2127 A9 NIGHT	FLOW DIST. 3.01 KM.	3010

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
R682 # 5	7/ 2	25 33.6N 16 40.1W 25 34.1N 16 40.4W	BN1.5/5C	3000-3000	0000-0226 NIGHT	A9 EXTENDED DUE TO TELEMETRY ERROR	3000
R682 # 6	7/ 2	25 35.9N 16 38.6W 25 36.9N 16 37.8W	NN	0-	0 0522-0534 NIGHT	A9	
R683 # 1	7/ 2	25 30.7N 16 30.5W 25 30.4N 16 30.9W	TSD	0-	0723-0812 DAWN	A8 CALIB. WR AT 70M.	2336
R683 # 2	7/ 2	25 30.3N 16 31.2W 25 30.2N 16 31.4W	WR 1	0-	0835-0912 DAY	A8 STANDARD DEPTHS	2336
R684 # 1	7/ 2	25 25.8N 16 19.5W 25 25.7N 16 19.6W	TSD	0-	1046-1130 DAY	A7 CALIB. WR AT 45M.	1179
R684 # 2	7/ 2	25 25.7N 16 19.6W 25 25.9N 16 19.6W	WR 1	0-	1135-1208 DAY	A7 STANDARD DEPTHS	1179
R684 # 3	7/ 2	25 24.9N 16 18.6W 25 23.7N 16 17.2W	RMT 1 RMT 8	210-	1249-1334 DAY	A7 FLOW DIST. 2.98 KM.	
R684 # 4	7/ 2	25 22.6N 16 16.0W 25 21.7N 16 15.1W	RMT 1 RMT 8	10-	1407-1441 DAY	A7 FLOW DIST. 1.54 KM.	785
R684 # 5	7/ 2	25 21.1N 16 14.5W 25 20.4N 16 13.8W	NN	0-	1505-1517 DAY	A7	
R685 # 1	7/ 2	25 18.5N 16 11.5W 25 18.3N 16 11.7W	TSD	0-	1547-1635 DAY	A6 CALIB. WR AT 60M.	497
R685 # 2	7/ 2	25 18.3N 16 11.7W 25 18.1N 16 11.7W	WR 1	0-	1639-1719 DAY	A6 STANDARD DEPTHS	500
R685 # 3	7/ 2	25 18.1N 16 11.7W 25 17.8N 16 11.4W	NN	0-	1722-1735 DAY	A6	497

STN.	DATE 1975	POSITION		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
		LAT	LONG					
R686 # 1	7/ 2	25 15.2N	16 4.1W	TSD	0- 202	1853-1921 DUSK	A5 CALIR. WR AT 42M.	207
R686 # 2	7/ 2	25 15.2N	16 4.2W	WR 1	0- 200	1917-1942 DUSK	A5 STANDARD DEPTHS	206
R686 # 3	7/ 2	25 15.2N	16 4.2W	WR 1	0- 150	2002-2012 DUSK	A5	197
R686 # 4	7/ 2	25 14.9N	16 4.1W	BGN	10- 195	2047-2110 NIGHT	A5 FLOW DIST. 1.41 KM.	222
R687 # 1	7/ 2	25 15.1N	16 4.8W	RMT 1	0- 89	2256-2309 NIGHT	A4 CALIR. WR AT 89M.	98
R687 # 2	7/ 2	25 15.7N	16 5.8W	RMT 8	0- 90	2330-2342 NIGHT	A4 STANDARD DEPTHS	98
R687 # 3	8/ 2	25 10.2N	15 56.0W	TSD	0- 0	0002-0014 NIGHT	A4	98
R688 # 1	8/ 2	25 9.7N	15 54.9W	NN	0- 65	0058-0115 NIGHT	A3 CALIR. WR AT 40M.	75
R688 # 2	8/ 2	25 8.9N	15 53.7W		0- 65	0103-0107 NIGHT	A3	75
R688 # 3	8/ 2	25 6.1N	15 49.1W	TSD	0- 50	0117-0123 NIGHT	A3 STANDARD DEPTHS	75
R688 # 4	8/ 2	25 6.1N	15 49.1W	BGN	20- 60	0144-0155 NIGHT	A3 FLOW DIST. 0.51 KM.	75
R688 # 5	8/ 2	25 6.1N	15 49.1W	WR 1	0- 0	0221-0233 NIGHT	A3	75

1
∞
1

STN.	DATE	POSITION	GEAR	DEPTH	FISHING TIME	REMARKS	WATER
#	1975	LAT LONG		(M)	GMT		DEPTH
							(M)
R689	8/ 2	24 59.9N 15 41.9W	TSD	0-	0348-0359	A2 CALIP. WB	64
# 1		24 59.9N 15 42.0W			NIGHT		
R689	8/ 2	24 59.9N 15 42.0W	WR 1	0-	0402-0408	A2 STANDARD DEPTHS	64
# 2		24 59.9N 15 42.1W			NIGHT		
R690	8/ 2	24 54.3N 15 31.0W	TSD	0-	0537-0546	A1 CALIP. WB AT 2 PM.	41
# 1		24 54.3N 15 31.1W			NIGHT		
R690	8/ 2	24 54.3N 15 31.1W	RGN	0-	0539-0541	A1	45
# 2		24 54.3N 15 31.1W			NIGHT		
R690	8/ 2	24 54.3N 15 31.1W	WR 1	0-	0552-0558	A1 STANDARD DEPTHS	45
# 3		24 54.2N 15 31.1W			NIGHT		
R690	8/ 2	24 54.5N 15 31.5W	RMT 1	10-	0617-0629	A1	41
# 4		24 54.7N 15 31.9W	RMT 8		DAWN	FLOW DIST. 0.68 KM.	
R690	8/ 2	24 54.8N 15 32.8W	NN	0-	0645-0657	A1	41
# 5		24 54.6N 15 33.9W			DAWN		
R691	8/ 2	23 48.0N 16 36.3W	BNI.5/5C	160-	1648-1658		175
# 0		23 49.1N 16 37.8W			DAY		
R692	9/ 2	22 56.0N 17 57.6W	TSD	0-	0218-0303	B10 CALIP. WB AT 742M.	2403
# 1		22 56.0N 17 57.8W			NIGHT		
R692	9/ 2	22 56.0N 17 57.7W	WR 1	0-	0312-0337	B10 STANDARD DEPTHS	2403
# 2		22 56.0N 17 57.6W			NIGHT		
R692	9/ 2	22 56.0N 17 57.6W	WR 7.4	0-	0338-0349	B10 STANDARD DEPTHS	2403
# 3		22 56.0N 17 57.5W			NIGHT		
R693	9/ 2	22 53.8N 17 49.7W	TSD	0-	0455-0537	B9 CALIP. WB AT 10M.	2141
# 1		22 53.7N 17 50.0W			NIGHT		

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
R693 # 2	9/ 2	22 53.7N 17 50.0W 22 53.6N 17 49.9W	WR 1	0- 500	0540-0607 NIGHT	R9 STANDARD DEPTHS	2141
R693 # 3	9/ 2	22 53.6N 17 50.0W 22 53.7N 17 50.0W	BGN	0- 200	0620-0626 NIGHT	R9	2141
R693 # 4	9/ 2	22 53.7N 17 51.5W 22 53.6N 17 53.4W	RMT 1 RMT 8	0- 500	0712-0753 DAWN	R9 FLOW DIST. 1.95 KM.	2141
R693 # 5	9/ 2	22 53.6N 17 55.0W 22 53.1N 17 53.8W	NN	0- 0	0826-0838 DAY	R9	
R693 # 6	9/ 2	22 55.5N 17 57.7W 22 55.8N 17 58.7W	BML.5/5C	2400-2400	1046-1117 DAY	R10 NET TURNED OVER-ABORTIVE HAUL	2400

STN. #	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8694 # 1	9/ 2	22 50.8N 17 38.1W 22 50.9N 17 38.5W	TSD	0- 750	1547-1630 DAY	R8 CALIB. WB AT 285M.	1594
8694 # 2	9/ 2	22 51.0N 17 38.6W 22 51.1N 17 38.8W	WB 1	0- 500	1644-1715 DAY	B8 STANDARD DEPTHS	1594
8694 # 3	9/ 2	22 51.1N 17 38.8W 22 51.3N 17 39.0W	WB 7.4	0- 100	1720-1738 DAY	B8 STANDARD DEPTHS	1594
8694 # 4	9/ 2	22 48.8N 17 42.4W 22 49.1N 17 42.3W	BN1.5/5C	1805-1807	2033-2105 NIGHT	B8	1806
8695 # 1	9/ 2	22 50.1N 17 26.5W 22 50.1N 17 27.5W	TSD	0- 750	2352-0045 NIGHT	R7 CALIB. WB AT 270M.	1177
8695 # 2	10/ 2	22 50.1N 17 27.5W 22 50.4N 17 27.6W	WB 1	0- 500	0045-0215 NIGHT	B7 STANDARD DEPTHS	1177
8695 # 3	10/ 2	22 50.2N 17 27.7W 22 50.2N 17 27.6W	BGN	0- 200	0100-0108 NIGHT	B7	1177
8695 # 4	10/ 2	22 50.2N 17 27.2W 22 49.1N 17 25.2W	RMT 1 RMT 8	15- 500	0242-0326 NIGHT	B7 FLOW DIST. 2.26 KM.	
8695 # 5	10/ 2	22 48.0N 17 23.5W 22 47.4N 17 22.8W	RMT 1 RMT 8	25- 200	0412-0438 NIGHT	B7 FLOW DIST. 1.44 KM.	994
8695 # 6	10/ 2	22 47.3N 17 23.2W 22 47.1N 17 22.1W	NN	0- 0	0505-0517 NIGHT	B7	
8696 # 1	10/ 2	22 47.1N 17 20.7W 22 47.1N 17 20.7W	TSD	0- 752	0546-0627 NIGHT	B6 CALIB. WB AT 752M.	949
8696 # 2	10/ 2	22 47.1N 17 20.6W 22 47.3N 17 20.5W	WB 1	0- 500	0631-0700 DAWN	B6 STANDARD DEPTHS	949

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8697	10/ 2	22 46.7N 17 15.8W	WR 1	0- 500	0751-0830 DAWN	R5 STANDARD DEPTHS	
# 1		22 47.0N 17 15.8W					
8697	10/ 2	22 47.0N 17 15.8W	WR 7.4	0- 90	0835-0846 DAY	R5 STANDARD DEPTHS	
# 2		22 47.1N 17 15.9W					
8697	10/ 2	22 47.0N 17 14.9W	RMT 1	0- 500	0914-0953 DAY	R5 FLOW DIST. 2.72 KM.	550
# 3		22 46.0N 17 13.2W	RMT R				
8697	10/ 2	22 44.5N 17 12.5W	NN	0- 0	1032-1044 DAY	R5	
# 4		22 44.0N 17 13.9W					
8697	10/ 2	22 42.3N 17 15.8W	RMT 1	375- 475	1149-1215 DAY	R5 FLOW DIST. 1.78 KM.	514
# 5		22 41.9N 17 14.7W	RMT R				
8697	10/ 2	22 44.9N 17 14.7W	TSD	0- 686	1331-1423 DAY	R5 CALIB. WR AT 300M.	696
# 6		22 45.3N 17 15.1W					
8698	10/ 2	22 44.3N 17 10.0W	TSD	0- 90	1515-1528 DAY	R4 CALIB. WR AT 30 M.	103
# 1		22 44.2N 17 10.1W					
8698	10/ 2	22 44.2N 17 10.1W	WR 1	0- 100	1530-1551 DAY	R4 STANDARD DEPTHS	103
# 2		22 44.1N 17 9.9W					
8698	10/ 2	22 44.1N 17 9.8W	WR 7.4	0- 95	1553-1610 DAY	R4 STANDARD DEPTHS	103
# 3		22 44.1N 17 9.9W					
8699	10/ 2	22 40.2N 17 3.1W	TSD	0- 60	1736-1745 DAY	R3	65
# 1		22 40.1N 17 3.2W					
8699	10/ 2	22 40.1N 17 3.2W	WR 1	0- 50	1750-1759 DAY	R3 STANDARD DEPTHS	65
# 2		22 40.0N 17 3.3W					
8699	10/ 2	22 39.5N 17 3.7W	RGN	0- 56	1845-1851 DUSK	R3	65
# 3		22 39.4N 17 3.8W					

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8699 # 4	10/ 2	22 39.0N 17 3.4W 22 38.7N 17 3.2W	RMT 1 RMT 8	0- 70	1912-1920 DUSK	R3 FLOW DIST. 0.35 KM.	72
8699 # 5	10/ 2	22 38.3N 17 2.5W 22 37.8N 17 1.2W	NN	0- 0	1940-1952 DUSK	B3	
8700 # 1	10/ 2	22 40.0N 16 59.0W 22 39.9N 16 59.0W	TSD	0- 46	2035-2048 NIGHT	B2 CALIB. WR AT 46M.	55
8700 # 2	10/ 2	22 39.9N 16 59.0W 22 39.8N 16 59.1W	WB 1	0- 45	2050-2057 NIGHT	R2 STANDARD DEPTHS	55
8700 # 3	10/ 2	22 39.8N 16 59.1W 22 39.8N 16 59.2W	WB 7.4	0- 45	2058-2104 NIGHT	R2 STANDARD DEPTHS	55
8701 # 1	10/ 2	22 39.5N 16 53.0W 22 39.5N 16 53.1W	TSD	0- 48	2203-2214 NIGHT	B1	53
8701 # 2	10/ 2	22 39.4N 16 53.1W 22 39.4N 16 53.1W	WB 1	0- 45	2219-2225 NIGHT	R1 STANDARD DEPTHS	53
8701 # 3	10/ 2	22 39.3N 16 53.2W 22 39.3N 16 53.2W	RGN	0- 45	2236-2239 NIGHT	R1	53
8701 # 4	10/ 2	22 39.1N 16 52.7W 22 38.8N 16 51.9W	RMT 1 RMT 8	10- 35	2302-2321 NIGHT	R1 FLOW DIST. 1.26 KM.	53
8701 # 5	10/ 2	22 38.7N 16 51.0W 22 38.7N 16 49.8W	NN	0- 0	2336-2348 NIGHT	R1	53
8702 # 1	11/ 2	22 42.8N 17 15.3W 22 42.7N 17 16.3W	WB 7.4	0- 100	0235-0249 NIGHT	R5 STANDARD DEPTHS	569
8702 # 2	11/ 2	22 43.1N 17 16.7W 22 44.3N 17 18.3W	WB 1	0- 200	0251-0319 NIGHT	R5 STANDARD DEPTHS	569

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8702 # 3	11/ 2	22 44.3N 17 18.3W 22 44.9N 17 19.2W	WB 7.4	0- 100	0319-0335 NIGHT	R5 STANDARD DEPTHS	569
8703 # 0	11/ 2	22 45.4N 17 19.8W 22 44.4N 17 17.7W	TSD	0- 750	0406-0514 NIGHT	CALIB. WB AT 415M.	800
8704 # 0	11/ 2	22 44.2N 17 15.1W 22 44.3N 17 15.4W	TSD	0- 615	0606-0654 DAWN	CALIB. WB AT 245M.	625
8705 # 0	11/ 2	22 44.1N 17 13.8W 22 44.2N 17 13.8W	TSD	0- 495	0723-0754 DAWN	CALIB. WB AT 190M.	500
8706 # 0	11/ 2	22 43.9N 17 12.3W 22 43.9N 17 12.5W	TSD	0- 379	0824-0853 DAY	CALIB. WB AT 133M.	384
8707 # 0	11/ 2	22 43.7N 17 11.0W 22 43.6N 17 11.0W	TSD	0- 141	0927-0944 DAY	CALIB. WB AT 84M.	150
8708 # 1	11/ 2	22 42.3N 17 15.6W 22 43.1N 17 14.5W	RMT 1 RMT 8	100- 128	1148-1218 DAY	R5 FLOW DIST. 1.45 KM.	540
8708 # 2	11/ 2	22 43.5N 17 13.7W 22 43.8N 17 12.6W	RMT 1 RMT 8	75- 100	1237-1307 DAY	R5 NO FLOW	450
8708 # 3	11/ 2	22 41.5N 17 16.0W 22 41.7N 17 15.8W	RMT 1 RMT 8	125- 150	1410-1440 DAY	R5 NO FLOW	570
8708 # 4	11/ 2	22 42.4N 17 14.7W 22 43.2N 17 13.8W	RMT 1 RMT 8	50- 75	1510-1540 DAY	R5 FLOW DIST. 1.70 KM.	454
8708 # 5	11/ 2	22 41.8N 17 17.3W NOT AVAILABLE	RMT 1 RMT 8	150- 200	1639-1709 DAY	R5 FLOW DIST. 1.61 KM.	651
8708 # 6	11/ 2	22 43.6N 17 15.5W 22 44.1N 17 14.5W	RMT 1 RMT 8	200- 250	1739-1810 DAY	R5 FLOW DIST. 1.52 KM.	569

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8709 # 0	11/ 2	22 46.5N 17 24.4W 22 46.9N 17 24.2W	TSD	0- 750	2037-2130 NIGHT	CALIB. WB AT 12M.	1011
8710 # 0	11/ 2	22 46.3N 17 16.0W 22 46.5N 17 16.0W	TSD	0- 600	2307-2343 NIGHT	CALIB. WB AT 193M.	791
8711 # 0	12/ 2	22 46.5N 17 13.8W 22 46.8N 17 13.8W	TSD	0- 595	0020-0100 NIGHT	CALIB. WB AT 155M.	600
8712 # 0	12/ 2	22 45.4N 17 13.3W 22 45.4N 17 13.4W	TSD	0- 550	0206-0240 NIGHT	CALIB. WB AT 6M.	557
8713 # 0	12/ 2	22 44.5N 17 12.1W 22 44.6N 17 12.2W	TSD	0- 407	0311-0345 NIGHT	CALIB. WB AT 7M.	420
8714 # 0	12/ 2	22 44.1N 17 12.0W 22 44.1N 17 12.4W	TSD	0- 329	0415-0448 NIGHT	CALIB. WB AT 9M.	354
8715 # 0	12/ 2	22 43.2N 17 11.5W 22 42.9N 17 11.9W	TSD	0- 237	0525-0550 NIGHT	CALIB. WB AT 215M.	251
8716 # 0	12/ 2	22 42.6N 17 10.3W 22 42.5N 17 10.6W	TSD	0- 94	0645-0658 DAWN		103
8717 # 0	12/ 2	22 45.9N 17 16.4W 22 46.1N 17 16.6W	TSD	0- 500	0756-0833 DAY	CALIB. WB AT 164M.	826
8718 # 1	12/ 2	22 41.7N 17 15.7W 22 42.3N 17 14.2W	RMT 1 RMT 8	240- 300	0941-1011 DAY	B5 FLOW DIST. 1.85 KM.	492
8718 # 2	12/ 2	22 43.3N 17 14.1W 22 43.5N 17 12.5W	RMT 1 RMT 8	300- 400	1112-1142 DAY	B5 FLOW DIST. 2.03 KM.	557
8718 # 3	12/ 2	22 40.6N 17 17.1W 22 41.5N 17 16.3W	RMT 1 RMT 8	18- 50	1316-1346 DAY	B5 FLOW DIST. 1.71 KM.	617

STN.	DATE	POSITION	GEAR	DEPTH	FISHING TIME	REMARKS	WATER
	1975	LAT	LONG	(M)	GMT		DEPTH
							(M)
8719	13/ 2	25 43.8N	16 49.0W	0- 602	1230-1317	A10 CALIP. WB AT 85M.	3299
# 1		25 43.7N	16 49.3W		DAY		
8719	13/ 2	25 43.7N	16 49.3W	0- 500	1330-1402	A10 STANDARD DEPTHS	
# 2		25 43.8N	16 49.3W		DAY		
8720	13/ 2	25 37.3N	16 40.3W	0- 600	1533-1609	A9 CALIP. WR AT 600M.	3041
# 1		25 37.4N	16 40.4W		DAY		
8720	13/ 2	25 37.4N	16 40.4W	0-1500	1615-1710	A9 STANDARD DEPTHS	3041
# 2		25 37.3N	16 40.6W		DAY		
8720	13/ 2	25 37.3N	16 40.6W	0- 500	1711-1755	A9 STANDARD DEPTHS	3041
# 3		25 37.2N	16 40.7W		DAY		
8720	13/ 2	25 37.2N	16 40.7W	0- 400	1755-1812	A9 STANDARD DEPTHS	3041
# 4		25 37.1N	16 40.7W		DAY		
8720	13/ 2	25 37.1N	16 40.8W	0- 200	1820-1831	A9	2800
# 5		25 37.1N	16 40.7W		DAY		
8720	13/ 2	25 36.7N	16 40.6W	0- 0	1857-1909	A9	
# 6		25 35.9N	16 39.9W		DUSK		
8720	13/ 2	25 35.2N	16 39.4W	10- 200	1924-1954	A9 FLOW DIST. 1.52 KM.	
# 7		25 34.1N	16 38.9W		DUSK		
8720	13/ 2	25 33.3N	16 38.5W	10- 500	2017-2100	A9 FLOW DIST. 2.03 KM.	
# 8		25 31.7N	16 37.2W		NIGHT		
8721	13/ 2	25 30.0N	16 30.1W	0- 600	2236-2321	A8 CALIP. WB AT 20M.	2300
# 1		25 30.5N	16 29.2W		NIGHT		
8721	13/ 2	25 30.5N	16 29.1W	0- 500	2315-2346	A8 STANDARD DEPTHS	
# 2		25 30.3N	16 29.2W		NIGHT		

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8722 # 1	14/ 2	25 25.3N 16 20.1W 25 25.1N 16 20.3W	TSD	0- 600	0110-0151 NIGHT	A7 CALIR. WR AT 20M.	1272
8722 # 2	14/ 2	25 25.1N 16 20.3W 25 25.0N 16 20.6W	WB 7.4	0-1200	0152-0242 NIGHT	A7 STANDARD DEPTHS	1272
8722 # 3	14/ 2	25 25.0N 16 20.6W 25 24.9N 16 21.1W	WB 1	0- 500	0242-0338 NIGHT	A7 STANDARD DEPTHS	1272
8722 # 4	14/ 2	25 25.0N 16 20.8W 25 24.9N 16 20.9W	WB 7.4	0- 200	0308-0320 NIGHT	A7 STANDARD DEPTHS	1272
8722 # 5	14/ 2	25 24.9N 16 21.0W 25 24.9N 16 21.2W	RGN	0- 200	0336-0344 NIGHT	A7	1200
8722 # 6	14/ 2	25 24.3N 16 20.7W 25 22.5N 16 19.3W	RMT 1 RMT 8	10- 500	0406-0455 NIGHT	A7 FLOW DIST. 2.45 KM.	1255
8722 # 7	14/ 2	25 19.4N 16 16.8W 25 18.6N 16 15.6W	NN	0- 0	0614-0626 NIGHT	A7	824
8723 # 1	14/ 2	25 18.8N 16 11.2W 25 18.7N 16 11.6W	TSD	0- 499	0942-1023 DAY	A6 CALIR. WR AT 451M.	503
8723 # 2	14/ 2	25 18.6N 16 11.6W 25 18.7N 16 12.0W	WB 1	0- 500	1028-1108 DAY	A6 STANDARD DEPTHS	504
8724 # 1	14/ 2	25 14.9N 16 3.6W 25 15.0N 16 3.5W	TSD	0- 180	1233-1256 DAY	A5 CALIR. WR AT 54M.	188
8724 # 2	14/ 2	25 15.0N 16 3.5W 25 15.0N 16 3.3W	WB 1	0- 150	1252-1317 DAY	A5 STANDARD DEPTHS	
8724 # 3	14/ 2	25 15.0N 16 3.2W 25 15.0N 16 3.1W	RGN	0- 150	1329-1334 DAY	A5	178

STN.	DATE 1975	POSITION LAT LONG		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8724 # 4	14/ 2	25 14.2N	16 2.2W	RMT 1	10- 125	1409-1420 DAY	A5 FLOW DIST. 0.69 KM.	173
8724 # 5	14/ 2	25 13.8N	16 1.8W	RMT R	0- 0	1441-1453 DAY	A5	
8725 # 1	14/ 2	25 13.1N	16 1.0W	NN	0- 95	1528-1554 DAY	A4 CALIP. WR AT 75M.	98
8725 # 2	14/ 2	25 12.6N	16 0.2W	TSD	0- 75	1601-1611 DAY	A4 STANDARD DEPTHS	102
8726 # 1	14/ 2	25 11.1N	15 57.8W	WR 1	0- 74	1834-1854 DAY	A3 CALIP. WR AT 70M.	77
8726 # 2	14/ 2	25 11.1N	15 57.9W	TSD	0- 50	1901-1924 DUSK	A3 STANDARD DEPTHS	
8726 # 3	14/ 2	25 6.2N	15 50.5W	WR 1	10- 60	1934-1939 DUSK	A3 FLOW DIST. 0.34 KM.	75
8727 # 0	14/ 2	25 5.2N	15 50.5W	RMT 1	0- 50	2318-2332 NIGHT	A2 STANDARD DEPTHS	55
8728 # 0	14/ 2	25 4.9N	15 50.4W	RMT R	0- 35	0049-0105 NIGHT	A1 STANDARD DEPTHS	41
8729 # 1	15/ 2	24 59.6N	15 41.1W	WR 1	150- 200	1257-1327 DAY	A6 FLOW DIST. 1.85 KM.	599
8729 # 2	15/ 2	24 55.6N	15 32.5W	RMT 1	200- 250	1357-1427 DAY	A6 FLOW DIST. 1.60 KM.	410
8729 # 3	15/ 2	24 55.4N	15 32.8W	RMT R	300- 400	1535-1605 DAY	A6 FLOW DIST. 1.85 KM.	540

STN.	DATE 1975	POSITION LAT LONG		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8729 # 4	15/ 2	25 12.8N	16 10.1W	RMT 1 RMT 8	250- 300	1645-1715 DAY	A6 FLOW DIST. 1.97 KM.	497
8729 # 5	15/ 2	25 11.8N	16 9.3W	RMT 1 RMT 8	100- 150	1744-1814 DAY	A6 FLOW DIST. 2.02 KM.	252
8730 # 0	15/ 2	25 19.0N	16 17.7W	TSD MS	0- 600	2043-2126 NIGHT		1053
8731 # 0	15/ 2	25 17.3N	16 15.7W	TSD MS	0- 600	2206-2248 NIGHT		750
8732 # 0	15/ 2	25 15.2N	16 12.8W	TSD MS	0- 496	2333-0015 NIGHT		500
8733 # 0	16/ 2	25 12.7N	16 8.6W	TSD MS	0- 350	0128-0158 NIGHT	CALIR. WR AT 348M.	360
8734 # 0	16/ 2	25 10.4N	16 5.4W	TSD	0- 190	0255-0314 NIGHT	CALIR. WR AT 190M.	196
8735 # 0	16/ 2	25 9.1N	16 5.4W	TSD	0- 152	0402-0418 NIGHT	CALIR. WR AT 152M.	156
8736 # 0	16/ 2	25 8.3N	16 4.3W	TSD	0- 97	0505-0524 NIGHT		102
8737 # 0	16/ 2	25 7.9N	15 55.4W	TSD	0- 82	0654-0707 DAWN		88

STN.	DATE	POSITION	G.FAR	DEPTH	FISHING TIME	REMARKS	WATER
	1975	LAT		(M)	GMT		DEPTH
		LONG					(M)
8738	21/ 2	25 45.3N 16 48.4W	FSD	0- 600	0155-0242	A10	3326
# 1		25 45.1N 16 47.9W			NIGHT		
8738	21/ 2	25 45.1N 16 47.9W	WB 1	0- 500	0247-0324	A10	3318
# 2		25 45.1N 16 47.8W			NIGHT	STANDARD DEPTHS	
8739	21/ 2	25 36.8N 16 39.1W	FSD	0- 600	0443-0525	A 9	3007
# 1		25 36.8N 16 39.3W			NIGHT	CALIB. WR AT 267M.	
8739	21/ 2	25 36.8N 16 39.3W	WB 1	0- 500	0530-0559	A 9	3007
# 2		25 36.8N 16 39.5W			NIGHT	STANDARD DEPTHS	
8740	21/ 2	25 30.5N 16 28.6W	FSD	0- 600	0724-0803	A 8	2120
# 1		25 30.7N 16 28.6W			DAWN	CALIB. WR AT 138M.	
8740	21/ 2	25 30.7N 16 28.6W	WB 1	0- 500	0808-0842	A 8	2247
# 2		25 31.1N 16 29.1W			DAWN	STANDARD DEPTHS	
8741	21/ 2	25 25.2N 16 19.7W	FSD	0- 600	1000-1044	A 7	1138
# 1		25 25.1N 16 19.5W			DAY	CALIB WR AT 223M.	
8741	21/ 2	25 25.1N 16 19.5W	WB 1	0- 500	1049-1118	A 7	1154
# 2		25 24.9N 16 19.6W			DAY	STANDARD DEPTHS	
8742	21/ 2	25 18.7N 16 11.1W	FSD	0- 462	1226-1305	A 6	467
# 1		25 18.8N 16 10.6W			DAY	CALIB. WR AT 177M.	
8742	21/ 2	25 18.7N 16 10.5W	WB 1	0- 400	1312-1333	A 6	471
# 2		25 18.8N 16 10.5W			DAY	STANDARD DEPTHS	
8743	21/ 2	25 14.9N 16 3.7W	FSD	0- 192	1431-1449	A 5	196
# 1		25 14.9N 16 3.7W			DAY	CALIB. WR AT 95M.	
8743	21/ 2	25 15.0N 16 3.7W	WB 1	0- 150	1453-1504	A 5	196
# 2		25 15.0N 16 3.7W			DAY	STANDARD DEPTHS	

STN.	DATE 1975	POSITION		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
		LAT	LONG					
8744 # 1	21/ 2	25 10.3N	15 56.8W	TSD	0- 95	1608-1622 DAY	A 4 CALIB. WB AT 30M.	98
		25 10.4N	15 56.8W					
8744 # 2	21/ 2	25 10.4N	15 56.8W	WB 1	0- 75	1625-1631 DAY	A 4 STANDARD DEPTHS	98
		25 10.4N	15 56.8W					
8745 # 1	21/ 2	25 6.9N	15 50.0W	TSD	0- 76	1747-1759 DAY	A 3 CALIB. WB AT 30M.	79
		25 6.9N	15 50.0W					
8745 # 2	21/ 2	25 6.9N	15 50.0W	WB 1	0- 70	1802-1812 DAY	A 3 STANDARD DEPTHS	79
		25 6.9N	15 50.1W					
8746 # 1	21/ 2	25 0.0N	15 40.5W	TSD	0- 62	1941-1953 DUSK	A 2 CALIB. WB AT 62M.	64
		24 59.9N	15 40.5W					
8746 # 2	21/ 2	24 59.9N	15 40.5W	WB 1	0- 50	1958-2003 DUSK	A 2 STANDARD DEPTHS	64
		24 59.9N	15 40.5W					
8747 # 1	21/ 2	24 54.3N	15 31.7W	TSD	0- 39	2117-2126 NIGHT	A 1 CALIB. WB AT 39M.	40
		24 54.2N	15 31.7W					
8747 # 2	21/ 2	24 54.2N	15 31.7W	WB 1	0- 35	2129-2136 NIGHT	A 1 STANDARD DEPTHS	40
		24 54.2N	15 31.7W					
8748 # 1	22/ 2	23 20.8N	17 10.6W		0- 200	0938-0950 DAY	PROTAS	707
		23 20.7N	17 10.7W					
8748 # 2	22/ 2	23 20.5N	17 10.7W		0- 80	1030-1044 DAY	C-METER	710
		23 20.4N	17 10.8W					
8748 # 3	22/ 2	23 20.4N	17 10.8W		0- 100	1049-1100 DAY	B-METER	720
		23 20.3N	17 10.8W					
8748 # 4	22/ 2	23 20.2N	17 10.8W		0- 30	1108-1129 DAY	B-(0) METER	730
		23 20.0N	17 11.0W					

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8748 # 5	22/ 2	23 20.0N 17 11.0W 23 19.9N 17 11.1W		0- 30	1134-1140 DAY	QUANTA METER	740
8748 # 6	22/ 2	23 19.8N 17 11.2W 23 19.8N 17 11.2W		0- 3	1145-1148 DAY	COLOR METER	748
8749 # 1	22/ 2	22 41.4N 16 50.9W 22 41.3N 16 50.9W	TSD	0- 45	1616-1624 DAY	B 1 CALIB. WR AT 45M.	49
8749 # 2	22/ 2	22 41.3N 16 50.8W 22 41.3N 16 50.8W	WB 1	0- 40	1631-1636 DAY	B 1 STANDARD DEPTHS	49
8750 # 1	22/ 2	22 42.2N 16 56.0W 22 42.1N 16 56.0W	TSD	0- 51	1723-1733 DAY	B 2 CALIB. WR AT 51M.	57
8750 # 2	22/ 2	22 42.1N 16 56.0W 22 42.1N 16 56.1W	WB 1	0- 50	1737-1742 DAY	B 2 STANDARD DEPTHS	57
8751 # 1	22/ 2	22 42.7N 17 2.1W 22 42.6N 17 2.1W	TSD	0- 70	1831-1842 DUSK	B 3 CALIB. WR AT 70M.	72
8751 # 2	22/ 2	22 42.6N 17 2.1W 22 42.7N 17 2.1W	WB 1	0- 50	1843-1851 DUSK	R 3 STANDARD DEPTHS	72
8752 # 1	22/ 2	22 44.2N 17 7.8W 22 44.1N 17 7.9W	TSD	0- 88	1955-2011 NIGHT	B 4 CALIB. WR AT 27M.	89
8752 # 2	22/ 2	22 44.1N 17 8.0W 22 44.2N 17 8.0W	WB 1	0- 75	2015-2024 NIGHT	B 4 STANDARD DEPTHS	89
8753 # 1	22/ 2	22 46.2N 17 14.8W 22 46.3N 17 14.9W	TSD	0- 600	2115-2205 NIGHT	B 5 CALIB. WR AT 578M.	724
8753 # 2	22/ 2	22 46.3N 17 14.9W 22 46.5N 17 14.9W	WB 1	0- 500	2206-2236 NIGHT	R 5 STANDARD DEPTHS	724

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8754 # 1	22/ 2	22 48.4N 17 20.6W 22 48.0N 17 20.7W	TSD	0- 600	2328-0012 NIGHT	B 6 CALIB. WB AT 10M.	908
8754 # 2	23/ 2	22 48.0N 17 20.7W 22 47.9N 17 20.8W	WB 1	0- 500	0017-0047 NIGHT	B 6 STANDARD DEPTHS	908
8755 # 1	23/ 2	22 47.8N 17 27.2W 22 47.8N 17 27.3W	TSD	0- 600	0148-0233 NIGHT	B 7 CALIB. WB AT 290M.	1188
8755 # 2	23/ 2	22 47.8N 17 27.3W 22 47.7N 17 27.3W	WB 1	0- 500	0236-0303 NIGHT	B 7 STANDARD DEPTHS	1177
8756 # 1	23/ 2	22 49.9N 17 37.6W 22 49.6N 17 37.9W	TSD	0- 600	0418-0502 NIGHT	B 8 CALIB. WB AT 35M.	1628
8756 # 2	23/ 2	22 49.6N 17 37.9W 22 49.4N 17 38.0W	WB 1	0- 500	0507-0542 NIGHT	B 8 STANDARD DEPTHS	1628
8757 # 1	23/ 2	22 53.7N 17 47.2W 22 53.9N 17 46.9W	TSD	0- 600	0704-0750 DAWN	B 9 CALIB. WB AT 25M.	2033
8757 # 2	23/ 2	22 54.0N 17 46.9W 22 54.1N 17 46.6W	WB 1	0- 500	0754-0836 DAWN	B 9 STANDARD DEPTHS	2018
8758 # 1	23/ 2	22 55.4N 17 57.4W 22 55.5N 17 57.3W	TSD	0- 600	0954-1034 DAY	B10 CALIB. WB AT 9M.	2411
8758 # 2	23/ 2	22 55.5N 17 57.2W 22 55.6N 17 57.2W	WB 1	0- 500	1039-1118 DAY	B10 STANDARD DEPTHS	2404
8759 # 1	23/ 2	22 53.0N 17 48.3W 22 53.0N 17 48.1W		0- 125	1222-1241 DAY	B 9 * C-METER	2062
8759 # 2	23/ 2	22 53.0N 17 48.1W 22 53.0N 17 48.1W		0- 3	1244-1248 DAY	B 9 * COLOUR METER	2062

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8759 # 3	23/ 2	22 53.0N 17 48.1W 22 53.0N 17 48.1W		0- 25	1252-1259 DAY	B 9 * QUANTA METER	2062
8759 # 4	23/ 2	22 53.0N 17 48.1W 22 53.1N 17 48.0W		0- 300	1316-1336 DAY	B 9 * PROTAS	2062
8759 # 5	23/ 2	22 53.0N 17 48.0W 22 53.1N 17 48.0W	TSD	0- 300	1319-1344 DAY	B 9 CALIB. WR AT 22M.	2062
8759 # 6	23/ 2	22 52.1N 17 47.1W 22 51.1N 17 46.4W	RMT 1 RMT 8	180- 250	1425-1455 DAY	B 9 FLOW DIST. 1.97 KM.	1965
8759 # 7	23/ 2	22 50.2N 17 45.6W 22 49.1N 17 44.7W	RMT 1 RMT 8	80- 110	1522-1552 DAY	B 9 FLOW DIST. 2.00 KM.	1965
8760 # 1	23/ 2	22 53.5N 17 47.4W 22 53.6N 17 47.3W		0- 300	1654-1715 DAY	B 9 * PROTAS	2044
8760 # 2	23/ 2	22 53.5N 17 47.3W 22 53.6N 17 47.2W	TSD	0- 300	1701-1723 DAY	B 9	2044
8760 # 3	23/ 2	22 53.5N 17 47.4W 22 53.6N 17 47.3W		0- 100	1700-1712 DAY	B 9 * B-METER	2044
8761 # 1	23/ 2	22 56.0N 17 56.2W 22 56.2N 17 55.8W	WB 1	0-2350	1900-2054 NIGHT	B10 TRACE METALS-STANDARD DEPTHS	2355
8761 # 2	23/ 2	22 56.4N 17 55.6W 22 56.4N 17 55.6W		0- 125	2121-2136 NIGHT	B10 * B-(0) METER	2342
8761 # 3	23/ 2	22 56.4N 17 55.5W 22 56.5N 17 55.5W		0- 130	2146-2159 NIGHT	B10 * B-METER	2337
8761 # 4	23/ 2	22 56.5N 17 55.5W 22 56.6N 17 55.4W	WB 1	0- 200	2202-2219 NIGHT	B10 STANDARD DEPTHS	2337

STN. #	DATE 1975	POSITION		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
		LAT	LONG					
8761 # 5	23/ 2	22 56.9N	17 55.4W	TSD PUMP FL	3- 110	2316-0011 NIGHT	B10 NUTRIENTS AT 10M. INTERVALS	2334
8762 # 1	24/ 2	22 55.0N	17 53.0W	TSD PUMP FL	3- 110	0058-0147 NIGHT	B10-9	2233
8762 # 2	24/ 2	22 54.6N	17 53.0W		0- 175	0152-0212 NIGHT	B10-9 * B-(0) METER	2227
8763 # 1	24/ 2	22 53.4N	17 47.8W	TSD PUMP FL	3- 110	0313-0358 NIGHT	B 9	2042
8763 # 2	24/ 2	22 53.4N	17 47.7W		0- 200	0404-0421 NIGHT	B 9 * B-(0) METER	2044
8764 # 1	24/ 2	22 51.3N	17 42.9W		0- 275	0512-0525 NIGHT	B9-8 * B-(0) METER	1809
8765 # 1	24/ 2	22 53.5N	17 48.5W		0- 300	0636-0659 DAWN	B9 * PRNTAS & TSD	2080
8765 # 2	24/ 2	22 53.5N	17 48.2W		0- 300	0732-0753 DAWN	B9 * PRNTAS & TSD	2066
8765 # 3	24/ 2	22 54.4N	17 48.3W		0- 300	0831-0856 DAY	B9 * PRNTAS & TSD	2070
8765 # 4	24/ 2	22 54.3N	17 47.9W		0- 300	0930-0953 DAY	B9 * PRNTAS & TSD	2056
8765 # 5	24/ 2	22 53.9N	17 48.3W		0- 300	1031-1054 DAY	B9 * PRNTAS & TSD	2074

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8765 # 6	24/ 2	22 53.5N 17 48.2W 22 53.4N 17 48.2W		0- 300	1129-1153 DAY	B9 * PROTAS & TSD O,C-& COLOUR METER	2059
8765 # 7	24/ 2	22 53.9N 17 48.5W 22 53.8N 17 48.7W		0- 300	1231-1254 DAY	B9 * PROTAS & TSD	2078
8765 # 8	24/ 2	22 53.8N 17 48.9W 22 53.6N 17 49.0W		0- 300	1330-1356 DAY	B9 * PROTAS & TSD	2081
8765 # 9	24/ 2	22 53.6N 17 48.8W 22 53.5N 17 48.7W		0- 300	1430-1450 DAY	B9 * PROTAS & TSD	2084
8765 # 10	24/ 2	22 53.4N 17 48.5W 22 53.4N 17 48.5W		0- 300	1530-1556 DAY	B9 * PROTAS & TSD	2082
8765 # 11	24/ 2	22 53.9N 17 48.4W 22 53.9N 17 48.4W		0- 300	1630-1653 DAY	B9 * PROTAS & TSD	2083
8765 # 12	24/ 2	22 53.9N 17 48.3W 22 53.9N 17 48.3W		0- 300	1730-1751 DAY	B9 * PROTAS & TSD	2082
8765 # 13	24/ 2	22 53.9N 17 48.3W 22 54.0N 17 48.4W		0- 300	1830-1853 DAY	B9 * PROTAS & TSD	2078
8765 # 14	24/ 2	22 53.8N 17 48.0W 22 53.7N 17 48.1W		0- 250	1927-1944 DUSK	B9 * B-(0) METER	2062
8765 # 15	24/ 2	22 53.7N 17 48.1W 22 54.0N 17 47.9W	TSD PUMP FL	3- 110	2004-2050 NIGHT	R9	2059
8766 # 1	24/ 2	22 51.0N 17 35.6W 22 51.0N 17 35.5W		0- 325	2236-2253 NIGHT	R8 * B-(0) METER	1472
8766 # 2	24/ 2	22 51.0N 17 35.5W 22 51.0N 17 35.4W	TSD PUMP FL	3- 110	2309-2355 NIGHT	R8 AUTOANALYSER FOR NUTRIENTS	1472

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8767 # 1	25/ 2	22 47.8N 17 27.4W 22 47.8N 17 27.5W		0- 325	0107-0129 NIGHT	B7 * B-(0) METER	1147
8767 # 2	25/ 2	22 47.8N 17 27.5W 22 47.6N 17 27.8W	TSD PUMP FL	3- 110	0139-0224 NIGHT	B7 AUTOANALYSER FOR NUTRIENTS	1147
8768 # 1	25/ 2	22 46.0N 17 21.0W 22 45.5N 17 20.8W		0- 350	0324-0354 NIGHT	B6 * B-(0) METER	912
8768 # 2	25/ 2	22 45.4N 17 20.8W 22 44.7N 17 20.6W	TSD PUMP FL	3- 110	0402-0448 NIGHT	B6 AUTOANALYSER FOR NUTRIENTS	912
8769 # 1	25/ 2	22 44.5N 17 15.1W 22 44.3N 17 15.0W		0- 400	0550-0612 NIGHT	B5 * B-(0) METER	675
8769 # 2	25/ 2	22 44.2N 17 15.0W 22 44.0N 17 14.9W	TSD PUMP FL	3- 110	0622-0712 DAWN	B5 AUTOANALYSER FOR NUTRIENTS	675
8770 # 1	25/ 2	22 43.7N 17 14.9W 22 43.7N 17 14.9W	TSD	0- 300	0750-0812 DAY	B5	680
8770 # 2	25/ 2	22 41.7N 17 15.9W 22 42.8N 17 15.6W	RMT 1 RMT 8	100- 150	0906-0936 DAY	B5 FLOW DIST. 1.45 KM.	682
8770 # 3	25/ 2	22 44.6N 17 15.3W 22 45.5N 17 14.6W	RMT 1 RMT 8	25- 55	1103-1133 DAY	B5 FLOW DIST. 1.87 KM.	684
8770 # 4	25/ 2	22 45.9N 17 14.4W 22 45.8N 17 14.5W		0- 1	1158-1203 DAY	B5 * COLOUR METER	684
8770 # 5	25/ 2	22 45.8N 17 14.5W 22 45.7N 17 14.6W		0- 20	1203-1211 DAY	B5 * QUANTA METER	684

STN. #	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8784 # 1	28/ 2	22 41.9N 16 56.9W		0- 55	2052-2100 NIGHT	R2 * R-METER	55
8784 # 2	28/ 2	22 41.8N 16 56.9W		0- 55	2104-2114 NIGHT	R2 * R-(O) METER	55
8784 # 3	28/ 2	22 41.6N 16 56.9W	TSD PUMP FL	3- 53	2126-2150 NIGHT	R2 AUTOMANALYSER FOR NUTRIENTS	55
8785 # 1	28/ 2	22 40.8N 16 51.5W		0- 51	2245-2254 NIGHT	R1 * R-METER	52
8785 # 2	28/ 2	22 40.8N 16 51.6W		0- 49	2257-2310 NIGHT	R1 * R-(O) METER	52
8785 # 3	28/ 2	22 40.8N 16 51.7W	TSD PUMP FL	3- 49	2326-2347 NIGHT	R1 AUTOMANALYSER FOR NUTRIENTS	52
8785 # 4	1/ 3	22 40.6N 16 51.6W	TSD	0- 51	0008-0018 NIGHT	R1	52
8785 # 5	1/ 3	22 40.5N 16 51.7W	WB 1	0- 50	0024-0033 NIGHT	R1 STANDARD DEPTHS	52
8786 # 1	1/ 3	22 41.7N 16 57.6W	TSD	0- 54	0121-0131 NIGHT	R2	54
8786 # 2	1/ 3	22 41.5N 16 57.7W	WB 1	0- 50	0131-0140 NIGHT	R2 STANDARD DEPTHS	54
8786 # 3	1/ 3	22 41.5N 16 57.8W		0- 54	0143-0154 NIGHT	R2 * R-(O) METER	54
8787 # 1	1/ 3	22 43.5N 17 2.0W	TSD	0- 72	0234-0246 NIGHT	R3 CALIB. WB AT 72M.	72

STN.	DATE	POSITION	GFAR	DEPTH	FISHING TIME	REMARKS	WATER
#	1975	LAT LONG		(M)	GMT		DEPTH
							(M)
8771	25/ 2	22 47.5N 17 15.1W	TSD	3- 110	2237-2317	R5 AUTOANALYSER FOR NUTRIENTS	750
# 5		22 47.8N 17 15.3W	PUMP FL		NIGHT		
8771	25/ 2	22 48.0N 17 15.5W	TSD	29- 29	2347-0348	R5 TURBULENCE EXPT. --AUTOANALYSER	775
# 6		22 47.9N 17 14.1W	PUMP FL		NIGHT		
8771	26/ 2	22 47.8N 17 14.0W	TSD	3- 110	0400-0500	R5 AUTOANALYSER FOR NUTRIENTS	591
# 7		22 47.6N 17 13.3W	PUMP FL		NIGHT		
8771	26/ 2	22 47.6N 17 13.2W		0- 300	0510-0542	R5 * R-(0) METER	510
# 8		22 47.7N 17 12.5W			NIGHT		
8771	26/ 2	22 47.7N 17 12.4W		0- 130	0547-0600	R5 * B-METER	501
# 9		22 47.7N 17 12.2W			DAWN		
8772	26/ 2	22 45.7N 17 14.7W		0- 300	0639-0655	R5 * PRONTAS & TSD	683
# 1		22 45.4N 17 14.8W			DAWN		

STN.	DATE	POSITION	GEAR	DEPTH	FISHING TIME	REMARKS	WATER
#	1975	LAT	LONG	(M)	GMT		DEPTH
							(M)
8772	26/ 2	22 44.8N	17 15.0W	0- 300	0730-0752	R5 * PRNTAS & TSD	679
# 2		22 44.6N	17 14.9W		DAWN		
8772	26/ 2	22 45.6N	17 14.4W	0- 300	0832-0857	R5 * PRNTAS & TSD	675
# 3		22 45.8N	17 14.7W		DAY		
8772	26/ 2	22 45.8N	17 14.7W	0- 300	0931-0955	R5 * PRNTAS & TSD	683
# 4		22 45.9N	17 14.8W		DAY		
8772	26/ 2	22 45.8N	17 13.9W	0- 300	1030-1055	R5 * PRNTAS & TSD	679
# 5		22 46.0N	17 14.6W		DAY		
8772	26/ 2	22 45.9N	17 15.7W	0- 300	1130-1157	R5 * PRNTAS & TSD	688
# 6		22 45.9N	17 16.7W		DAY		
8772	26/ 2	22 46.1N	17 16.4W	0- 300	1235-1252	R5 * TSD ONLY	681
# 7		22 46.2N	17 16.0W		DAY		
8772	26/ 2	22 46.4N	17 16.1W	0- 300	1330-1348	R5 * TSD ONLY	740
# 8		22 46.5N	17 15.9W		DAY		
8772	26/ 2	22 46.0N	17 14.7W	0- 300	1429-1453	R5 * PRNTAS & TSD	683
# 9		22 45.7N	17 14.7W		DAY		
8772	26/ 2	22 45.8N	17 14.6W	0- 300	1531-1600	R5 * PRNTAS & TSD	696
# 10		22 45.8N	17 15.0W		DAY		
8772	26/ 2	22 46.0N	17 15.1W	0- 300	1630-1652	R5 * PRNTAS & TSD	714
# 11		22 45.9N	17 15.3W		DAY		
8772	26/ 2	22 46.0N	17 15.4W	0- 300	1732-1800	R5 * PRNTAS & TSD	722
# 12		22 46.0N	17 15.7W		DAY		
8772	26/ 2	22 45.9N	17 15.9W	0- 300	1831-1854	R5 * PRNTAS & TSD	740
# 13		22 45.9N	17 16.2W		DUSK		

STN. #	DATE 1975	POSITION		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
		LAT	LONG					
8773 # 1	26/ 2	22 44.8N	17 18.1W		0- 225	1948-2003 DUSK	R5 * B-(0) METER	903
8774 # 1	26/ 2	22 44.7N	17 18.2W		0- 300	2059-2118 NIGHT	R6-7 *R-(0) METER	1007
8774 # 2	26/ 2	22 47.5N	17 24.1W	TSD PUMP FL	3- 110	2143-2228 NIGHT	R6-7 AUTOMANALYSER FOR NUTRIENTS	1007
8774 # 3	26/ 2	22 47.6N	17 24.1W	TSD PUMP FL	3- 110	2240-2320 NIGHT	R6-7 AUTOMANALYSER FOR NUTRIENTS	1007
8774 # 4	26/ 2	22 47.8N	17 24.2W	TSD PUMP FL	3- 70	2323-2353 NIGHT	R6-7	1007
8774 # 5	26/ 2	22 48.1N	17 24.3W	TSD PUMP FL	3- 70	2358-0027 NIGHT	R6-7	1007
8774 # 6	27/ 2	22 48.2N	17 24.3W	TSD PUMP FL	3- 70	0030-0058 NIGHT	R6-7	1007
8774 # 7	27/ 2	22 48.3N	17 24.2W	TSD PUMP FL	3- 70	0100-0132 NIGHT	R6-7 AUTOMANALYSER FOR NUTRIENTS	1007
8774 # 8	27/ 2	22 48.3N	17 24.0W	TSD PUMP FL	3- 70	0136-0203 NIGHT	R6-7	1013
8774 # 9	27/ 2	22 48.2N	17 23.9W	TSD PUMP FL	3- 70	0206-0239 NIGHT	R6-7 AUTOMANALYSER FOR NUTRIENTS	1009
8774 # 9	27/ 2	22 48.1N	17 23.7W	TSD PUMP FL	3- 70	0206-0239 NIGHT	R6-7 AUTOMANALYSER FOR NUTRIENTS	1009

STN.	DATE 1975	POSITION		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
		LAT	LONG					
8774 # 10	27/ 2	22 48.1N	17 23.7W	TSD PUMP FL	3- 70	0242-0313 NIGHT	R6-7	1002
8774 # 11	27/ 2	22 47.9N	17 23.3W	TSD PUMP FL	3- 110	0317-0406 NIGHT	R6-7 CALIB. WB AT 110M.-AUTOMANALYSER	979
8774 # 12	27/ 2	22 47.6N	17 23.2W	TSD PUMP FL	0- 300	0420-0448 NIGHT	R6-7 * R-(0) METER	985
8774 # 13	27/ 2	22 47.3N	17 23.6W		0- 100	0456-0506 NIGHT	R6-7 * R-(0) METER	996
8774 # 14	27/ 2	22 47.2N	17 23.7W		0- 100	0512-0518 NIGHT	R6-7 * R-(0) METER	996
8774 # 15	27/ 2	22 47.1N	17 23.9W		0- 300	0525-0538 NIGHT	R6-7 * R-(0) METER	996
8774 # 16	27/ 2	22 47.0N	17 24.2W		0- 275	0614-0630 DAWN	R6-7 * R-(0) METER	996
8774 # 17	27/ 2	22 46.8N	17 24.6W		0- 130	0640-0648 DAWN	R6-7 * R-METER	1037
8774 # 16	27/ 2	22 46.7N	17 24.8W					
8775 # 1	27/ 2	22 46.7N	17 24.9W		0- 300	0712-0736 DAWN	R6-7 * PRONTAS & TSD	1011
8775 # 2	27/ 2	22 46.6N	17 25.0W		0- 300	0712-0736 DAWN	R6-7 * PRONTAS & TSD	1011
8775 # 1	27/ 2	22 46.2N	17 24.1W		0- 300	0712-0736 DAWN	R6-7 * PRONTAS & TSD	1011
8775 # 2	27/ 2	22 46.1N	17 24.3W		0- 300	0712-0736 DAWN	R6-7 * PRONTAS & TSD	1011
8775 # 1	27/ 2	22 46.7N	17 25.9W	RMT 1	100- 150	0835-0905 DAY	R6-7 FLOW DIST. 1.79 KM.	1065
8775 # 2	27/ 2	22 47.2N	17 26.8W	RMT 8	100- 150	0835-0905 DAY	R6-7 FLOW DIST. 1.79 KM.	1065
8775 # 3	27/ 2	22 46.7N	17 28.0W	RMT 1	155- 200	0939-1009 DAY	R6-7 FLOW DIST. 1.65 KM.	1210
8775 # 3	27/ 2	22 48.5N	17 28.8W	RMT 8	155- 200	0939-1009 DAY	R6-7 FLOW DIST. 1.65 KM.	1210
8775 # 4	27/ 2	22 46.5N	17 22.0W	RMT 1	75- 100	1125-1155 DAY	R6-7 FLOW DIST. 1.60 KM.	960
8775 # 4	27/ 2	22 47.2N	17 23.0W	RMT 8	75- 100	1125-1155 DAY	R6-7 FLOW DIST. 1.60 KM.	960

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8775 # 5	27/ 2	22 47.5N 17 22.7W	RMT 1	53- 75	1223-1253 DAY	R6-7 FLOW DIST. 1.85 KM.	720
8775 # 6	27/ 2	22 47.1N 17 20.7W		0- 2	1311- DAY	R6-7 * COLOUR METER	916
8775 # 7	27/ 2	22 47.1N 17 20.6W		0- 50	1314-1327 DAY	R6-7 * QUANTA METER	916
8775 # 8	27/ 2	22 47.1N 17 20.1W		0- 245	1332-1342 DAY	R6-7 * R-(0) METER	918
8775 # 9	27/ 2	22 47.0N 17 19.9W	TSD	0- 300	1346-1409 DAY	R6-7	918
8775 # 10	27/ 2	22 47.0N 17 19.5W	RMT 1	0- 12	1429-1449 DAY	R6-7 FLOW DIST. 0.98 KM.	905
8775 # 11	27/ 2	22 46.9N 17 19.9W	RMT R	13- 50	1513-1543 DAY	R6-7 FLOW DIST. 1.56 KM.	912
8775 # 12	27/ 2	22 47.0N 17 20.7W	RMT 1	200- 250	1610-1640 DAY	R6-7 FLOW DIST. 1.52 KM.	923
8775 # 13	27/ 2	22 47.3N 17 23.4W	RMT R	250- 300	1721-1751 DAY	R6-7 FLOW DIST. 1.89 KM.	990
8775 # 14	27/ 2	22 46.6N 17 23.0W	RMT 1	0- 110	1823-1836 DUSK	R6-7 * C-METER	970
8775 # 15	27/ 2	22 45.7N 17 22.0W	RMT R	0- 110	1838-1855 DUSK	R6-7 * C-METER	970
8775 # 16	27/ 2	22 44.7N 17 21.3W		0- 130	1902-1914 DUSK	R6-7 * R-METER	970

STN. #	DATE 1975	POSITION		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
		LAT	LONG					
8776 # 1	27/ 2	22 44.2N	17 22.2W	RMT 1	505- 600	2004-2037 NIGHT	R6-7 FLOW DIST. 1.65 KM.	912
8776 # 2	27/ 2	22 44.1N	17 23.4W	RMT R				
8776 # 2	27/ 2	22 44.3N	17 24.7W	RMT 1	100- 150	2114-2144 NIGHT	R6-7 FLOW DIST. 1.87 KM.	960
8776 # 3	27/ 2	22 44.3N	17 26.0W	RMT R				
8776 # 3	27/ 2	22 44.4N	17 26.9W	RMT 1	50- 100	2206-2236 NIGHT	R6-7 FLOW DIST. 1.89 KM.	1087
8776 # 4	27/ 2	22 44.6N	17 28.4W	RMT R				
8776 # 4	27/ 2	22 44.8N	17 29.2W	RMT 1	25- 50	2253-2323 NIGHT	R6-7 FLOW DIST. 1.70 KM.	1186
8776 # 5	27/ 2	22 45.0N	17 30.4W	RMT R				
8776 # 5	27/ 2	22 45.2N	17 31.3W	RMT 1	12- 25	2342-2357 NIGHT	R6-7 FLOW DIST. 0.85 KM.	1278
8776 # 5	27/ 2	22 45.4N	17 32.0W	RMT R				
8776 # 6	28/ 2	22 45.8N	17 33.4W		0- 225	0041-0103 NIGHT	R6-7 * R-(0) METER	1337
8776 # 6	28/ 2	22 45.9N	17 33.5W					
8777 # 1	28/ 2	22 47.3N	17 21.3W		0- 225	0228-0248 NIGHT	R6 * R-(0) METER	923
8777 # 1	28/ 2	22 47.4N	17 21.2W					
8777 # 2	28/ 2	22 47.5N	17 21.1W	TSD	3- 110	0304-0352 NIGHT	R6 AUTOANALYSER FOR NUTRIENTS	923
8777 # 2	28/ 2	22 47.5N	17 20.8W	PUMP FL				
8778 # 1	28/ 2	22 46.2N	17 15.6W		0- 225	0446-0505 NIGHT	R5 * R-(0) METER	724
8778 # 1	28/ 2	22 46.2N	17 15.6W					
8778 # 2	28/ 2	22 46.2N	17 15.6W	TSD	3- 110	0505-0604 NIGHT	R5 AUTOANALYSER FOR NUTRIENTS	724
8778 # 2	28/ 2	22 46.2N	17 15.6W	PUMP FL				
8779 # 1	28/ 2	22 50.0N	17 9.6W		0- 80	0732-0740 DAWN	R4 * PRNTAS	215
8779 # 1	28/ 2	22 50.0N	17 9.6W					
8779 # 2	28/ 2	22 51.6N	17 9.7W		0- 60	0836-0841 DAY	R4 * PRNTAS TEST	215
8779 # 2	28/ 2	22 51.6N	17 9.7W					

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8780 # 1	28/ 2	22 41.4N 16 59.1W	RMT 1	30-	45 1043-1111 DAY	R3 FLOW DIST. 1.65 KM.	53
8780 # 2	28/ 2	22 42.4N 16 59.2W	RMT 8	15-	30 1131-1201 DAY	R3 FLOW DIST. 1.92 KM.	59
8780 # 3	28/ 2	22 43.2N 16 59.4W	RMT 1	0-	30 1225-1235 DAY	R3 * C-METER & COLOUR METER AT 0-2M.	59
8780 # 4	28/ 2	22 44.1N 16 59.8W	RMT 8	10-	20 1303-1333 DAY	R3 FLOW DIST. 1.60 KM.	76
8781 # 1	28/ 2	22 44.7N 17 0.0W	RMT 1	0-	2 1444-1447 DAY	R4 * COLOUR METER	105
8781 # 2	28/ 2	22 45.8N 17 0.4W	RMT 8	0-	30 1450-1506 DAY	R4 * B-(0) METER	105
8781 # 3	28/ 2	22 46.3N 17 0.6W	TSD PUMP FL	3-	100 1521-1605 DAY	R4 AUTOANALYSER FOR NUTRIENTS	105
8782 # 1	28/ 2	22 46.3N 17 0.6W	TSD PUMP FL	0-	74 1721-1729 DAY	R3 * B-(0) METER	74
8782 # 2	28/ 2	22 46.3N 17 0.6W	TSD PUMP FL	0-	74 1736-1747 DAY	R3 * B-METER	74
8782 # 3	28/ 2	22 43.9N 17 4.1W	TSD PUMP FL	3-	70 1758-1824 DAY	R3 AUTOANALYSER FOR NUTRIENTS	74
8783 # 1	28/ 2	22 43.9N 17 4.2W	TSD PUMP FL	0-	60 1928-1935 DUSK	R3-2 * R-METER	60
8783 # 2	28/ 2	22 42.0N 16 59.9W	TSD PUMP FL	3-	57 1950-2016 NIGHT	R3-2 AUTOANALYSER FOR NUTRIENTS	60

STN. #	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8784 # 1	28/ 2	22 41.9N 16 56.9W		0- 55	2052-2100 NIGHT	R2 * R-METER	55
8784 # 2	28/ 2	22 41.8N 16 56.9W		0- 55	2104-2114 NIGHT	R2 * R-(O) METER	55
8784 # 3	28/ 2	22 41.6N 16 56.9W	TSD PUMP FL	3- 53	2126-2150 NIGHT	R2 AUTOMANALYSER FOR NUTRIENTS	55
8785 # 1	28/ 2	22 40.8N 16 51.5W		0- 51	2245-2254 NIGHT	R1 * R-METER	52
8785 # 2	28/ 2	22 40.8N 16 51.6W		0- 49	2257-2310 NIGHT	R1 * R-(O) METER	52
8785 # 3	28/ 2	22 40.8N 16 51.7W	TSD PUMP FL	3- 49	2326-2347 NIGHT	R1 AUTOMANALYSER FOR NUTRIENTS	52
8785 # 4	1/ 3	22 40.6N 16 51.6W	TSD	0- 51	0008-0018 NIGHT	R1	52
8785 # 5	1/ 3	22 40.5N 16 51.7W	WB 1	0- 50	0024-0033 NIGHT	R1 STANDARD DEPTHS	52
8786 # 1	1/ 3	22 41.7N 16 57.6W	TSD	0- 54	0121-0131 NIGHT	R2	54
8786 # 2	1/ 3	22 41.5N 16 57.7W	WB 1	0- 50	0131-0140 NIGHT	R2 STANDARD DEPTHS	54
8786 # 3	1/ 3	22 41.5N 16 57.8W		0- 54	0143-0154 NIGHT	R2 * R-(O) METER	54
8787 # 1	1/ 3	22 43.5N 17 2.0W	TSD	0- 72	0234-0246 NIGHT	R3 CALIB. WB AT 72M.	72

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8787 # 2	1/ 3	22 43.4N 17 2.2W	WR 1	0- 65	0252-0300 NIGHT	R3 STANDARD DEPTHS	71
8787 # 3	1/ 3	22 43.4N 17 2.2W		0- 71	0300-0311 NIGHT	R3 * B-(0) METR	71
8788 # 1	1/ 3	22 45.1N 17 15.6W	WR 1	0- 500	0451-0526 NIGHT	R5 STANDARD DEPTHS	783
8788 # 2	1/ 3	22 45.2N 17 15.8W		0- 600	0530-0617 NIGHT	R5 CALIR. WB AT 492 M.	789
8788 # 3	1/ 3	22 44.8N 17 17.4W	TSD	0- 300	0620-0636 DAWN	R5 * B-(0) METR	811
8789 # 1	1/ 3	22 47.2N 17 19.2W	WR 1	0- 500	0809-0842 DAY	B6 STANDARD DEPTHS	892
8789 # 2	1/ 3	22 47.3N 17 18.9W	TSD	0- 600	0844-0930 DAY	R6 CALIR. WB AT 18M.	892
8789 # 3	1/ 3	22 47.1N 17 18.8W		0- 300	0933-0954 DAY	R6 * B-(0) METR	892
8790 # 1	1/ 3	22 47.8N 17 28.0W	WR 1	0- 500	1044-1118 DAY	R7 STANDARD DEPTHS	1141
8790 # 2	1/ 3	22 48.0N 17 28.3W	TSD	0- 600	1120-1200 DAY	R7 CALIR. WB AT 24M.	1141
8790 # 3	1/ 3	22 48.3N 17 28.2W		0- 300	1207-1226 DAY	B7 * B-(0) METR	1141
8791 # 1	1/ 3	22 51.8N 17 36.8W	WR 1	0- 500	1330-1417 DAY	R8 STANDARD DEPTHS	1557

STN.	DATE 1975	POSITION LAT LONG	GFAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8791 # 2	1/ 3	22 52.0N 17 36.9W		0- 300	1419-1440 DAY	R8 * B-(0) METER	1557
8791 # 3	1/ 3	22 52.4N 17 36.9W	TSD	0- 600	1513-1552 DAY	R8 CALIB. WB AT 27M.	1557
8792 # 1	1/ 3	22 52.5N 17 48.8W	WR 1	0- 500	1703-1744 DAY	R9 STANDARD DEPTHS	2059
8792 # 2	1/ 3	22 52.4N 17 49.5W		0- 300	1749-1814 DAY	R9 * B-(0) METER	2059
8792 # 3	1/ 3	22 52.2N 17 48.3W	TSD	0- 603	1818-1852 DAY	R9	2059
8793 # 1	1/ 3	22 54.3N 17 58.0W	WR 1	0- 500	1958-2109 NIGHT	R10 STANDARD DEPTHS	2455
8793 # 2	1/ 3	22 54.2N 17 58.2W	TSD	0- 600	2115-2158 NIGHT	R10	2455
8793 # 3	1/ 3	22 54.0N 17 58.4W		0- 350	2203-2230 NIGHT	R10 * B-(0) METER	2455
8794 # 0	2/ 3	22 25.8N 17 39.9W		0- 350	0204-0231 NIGHT	* B-(0) METER	1984
8795 # 0	2/ 3	22 17.7N 17 34.6W		0- 400	0338-0356 NIGHT	* B-(0) METER	1669
8796 # 0	2/ 3	22 10.8N 17 29.9W		0- 130	0503-0512 NIGHT	* B-METER	1028
8797 # 0	2/ 3	22 6.1N 17 27.4W		0- 130	0647-0655 DAWN	* B-METER	548

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8798 # 0	2/ 3	22 41.3N 16 54.7W 22 41.4N 16 54.7W	TSD	0-	1552-1559 DAY	R1	53
8799 # 0	2/ 3	22 42.0N 16 57.5W 22 42.1N 16 57.7W	TSD	0-	1629-1637 DAY	R1-2	53
8800 # 0	2/ 3	22 42.1N 16 58.0W 22 41.9N 16 58.2W	TSD	0-	1705-1712 DAY	R2	57
8801 # 0	2/ 3	22 41.3N 17 0.3W 22 41.4N 17 0.4W	TSD	0-	1753-1800 DAY	R2-3	65
8802 # 0	2/ 3	22 42.1N 17 1.7W 22 42.0N 17 1.8W	TSD	0-	1825-1834 DAY	R3	72
8803 # 0	2/ 3	22 42.7N 17 5.0W 22 42.6N 17 5.1W	TSD	0-	1902-1912 DUSK	R3-4	76

STN.	DATE 1975	POSITION		GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
		LAT	LONG					
8804 # 0	2/ 3	22 43.2N	17 8.5W	TSD	0- 91	1953-2004 DUSK	R4 D.R. POSITION	91
8805 # 0	2/ 3	22 44.7N	17 10.8W	TSD	0- 160	2051-2113 NIGHT	R4-5, B-0 METER TEST TO 10M. D.R. POS	160
8806 # 1	2/ 3	22 44.3N	17 11.4W	RMT 1	100- 150	2246-2316 NIGHT	R4-5 D.R. POSITION FLOW DIST. 1.85 KM.	219
8806 # 2	2/ 3	22 46.8N	17 10.6W	RMT 1	50- 100	2343-0013 NIGHT	R4-5 D.R. POSITION FLOW DIST. 1.89 KM.	266
8806 # 3	3/ 3	22 44.3N	17 11.3W	RMT 1	150- 200	0123-0153 NIGHT	R4-5 D.R. POSITION FLOW DIST. 1.89 KM.	322
8806 # 4	3/ 3	22 45.6N	17 11.4W	RMT 8	25- 50	0218-0248 NIGHT	R4-5 D.R. POSITION FLOW DIST. 1.85 KM.	323
8806 # 5	3/ 3	22 47.4N	17 10.8W	RMT 1	12- 25	0307-0322 NIGHT	R4-5 FLOW DIST. 0.97 KM.	152
8806 # 6	3/ 3	22 48.4N	17 10.1W	RMT 1	0- 10	0338-0353 NIGHT	R4-5 FLOW DIST. 0.96 KM.	114
8807 # 1	3/ 3	22 47.9N	17 16.0W	RMT 1	20- 95	0521-0621 NIGHT	R5 FLOW DIST. 3.76 KM.	830
8807 # 2	3/ 3	22 52.0N	17 14.6W	RMT 1	300- 500	0730-0800 DAWN	R5 FLOW DIST. 1.71 KM.	632
8808 # 1	3/ 3	22 45.1N	17 11.0W	RMT 1	150- 200	0953-1023 DAY	R4-5 FLOW DIST. 1.89 KM.	232
8808 # 2	3/ 3	22 42.8N	17 12.2W	RMT 1	100- 150	1125-1155 DAY	R4-5 FLOW DIST. 1.71 KM.	369

STN.	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8808 # 3	3/ 3	22 44.6N 17 11.4W 22 45.7N 17 10.9W	RMT 1 RMT 8	50- 100	1218-1248 DAY	R4-5 FLOW DIST. 1.96 KM.	247
8808 # 4	3/ 3	22 46.1N 17 10.8W		0- 2	1310- DAY	R4-5 * COLOUR METER	270
8808 # 5	3/ 3	22 46.0N 17 10.9W 22 46.0N 17 11.0W		0- 35	1314-1326 DAY	R4-5 * QUANTA METER	295
8808 # 6	3/ 3	22 45.9N 17 11.1W 22 45.9N 17 11.3W		0- 100	1339-1352 DAY	R4-5 * C-METER	299
8809 # 1	3/ 3	22 43.5N 17 8.3W	TSD	0- 90	1434-1445 DAY	R4	91
8809 # 2	3/ 3	22 43.5N 17 8.3W 22 43.5N 17 8.3W		0- 91	1446-1458 DAY	R4 * R-(0) METER	91
8810 # 1	3/ 3	22 44.3N 17 11.0W	TSD	0- 160	1605-1624 DAY	R4-5	160
8810 # 2	3/ 3	22 44.5N 17 11.1W 22 44.5N 17 11.2W		0- 162	1626-1641 DAY	R4-5 * R-(0) METER	164
8810 # 3	3/ 3	22 44.5N 17 11.2W 22 44.4N 17 11.3W		0- 80	1650-1657 DAY	R4-5 * PROTAS	175
8810 # 4	3/ 3	22 44.5N 17 11.6W 22 44.5N 17 11.7W		0- 120	1756-1813 DAY	R4-5 * PROTAS & TSD TO 290M.	303
8811 # 1	3/ 3	22 44.5N 17 12.5W 22 44.1N 17 12.3W	TSD	0- 359	1903-1925 DUSK	* R-(0) METER (0-364M.)	352
8811 # 2	3/ 3	22 43.3N 17 11.3W 22 43.2N 17 11.3W	TSD	0- 196	2009-2023 DUSK	* R-(0) METER (0-200M.)	200

STN. #	DATE 1975	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8811 # 3	3/ 3	22 42.6N 17 10.7W 22 42.6N 17 10.8W	TSD	0- 107	2108-2119 NIGHT	* R-(0) METER (0-107M.)	107
8811 # 4	3/ 3	22 40.5N 17 7.0W 22 40.5N 17 7.1W	TSD	0- 74	2213-2223 NIGHT	* R-(0) & R-METER (0-74M.)	74
8812 # 1	3/ 3	22 42.5N 17 11.0W 22 42.7N 17 11.3W	TSD	0- 120	2336-2347 NIGHT	R4-5 * R-METER	129
8812 # 2	4/ 3	22 42.6N 17 10.8W 22 42.5N 17 11.1W	TSD PUMP FL	3- 110	0028-0119 NIGHT	R4-5 AUTOMANALYSER FOR NUTRIENTS	120
8812 # 3	4/ 3	22 42.6N 17 11.1W 22 42.7N 17 11.1W	TSD PUMP FL	3- 110	0151-0241 NIGHT	R4-5 AUTOMANALYSER FOR NUTRIENTS	156
8813 # 1	4/ 3	22 45.6N 17 15.2W 22 45.3N 17 15.4W	TSD PUMP FL	3- 110	0344-0427 NIGHT	R5 AUTOMANALYSER FOR NUTRIENTS	752
8813 # 2	4/ 3	22 45.1N 17 15.5W 22 45.0N 17 15.6W	TSD	0- 375	0440-0502 NIGHT	R5 * R-(0) METER	775
8814 # 1	4/ 3	22 46.1N 17 21.1W 22 45.9N 17 21.3W	TSD	0- 300	0556-0613 NIGHT	R6 * R-(0) METER	921
8814 # 2	4/ 3	22 45.8N 17 21.3W 22 45.8N 17 21.3W	TSD	0- 50	0617-0623 NIGHT	R6 * R-METER	923
8815 # 0	4/ 3	22 48.1N 17 27.6W 22 48.0N 17 28.1W	TSD	0- 350	0739-0759 DAWN	R7 * R-(0) METER	1162
8816 # 1	5/ 3	25 18.7N 16 10.9W 25 18.7N 16 11.0W	TSD PUMP FL	3- 110	2031-2114 NIGHT	A6	467

STN. #	DATE 1975	POSITION LAT LONG	GFAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8816 # 2	5/ 3	25 18.7N 16 11.0W	TSD PUMP FL	3- 110	2119-2205 A6 NIGHT		467
8816 # 3	5/ 3	25 18.7N 16 11.2W	TSD PUMP FL	42- 42	2218-0155 A6 NIGHT	TURBULENCE EXPERIMENT	471
8816 # 4	6/ 3	25 18.6N 16 11.0W	TSD PUMP FL	3- 110	0213-0306 A6 NIGHT		471
8816 # 5	6/ 3	25 18.6N 16 10.9W	TSD PUMP FL	0- 120	0321-0330 A6 * B-METER NIGHT		465
8816 # 6	6/ 3	25 18.7N 16 10.8W		0- 400	0340-0425 A6 * R-(0) METER NIGHT		462
8816 # 7	6/ 3	25 18.6N 16 10.5W		0- 425	0511-0539 A6 * R-(0) METER NIGHT		459
8816 # 8	6/ 3	25 18.6N 16 10.1W		0- 450	0606-0631 A6 * B-(0) METER NIGHT		456
8817 # 0	13/ 3	40 59.9N 13 39.8W	CM	5334-5334	0903- DAY	TOPOGRAPHICAL MOORING	5334
8818 # 1	14/ 3	44 0.7N 12 58.8W	TSD	0-1000	0405-0510 NIGHT	CALIB. WR AT 70M.	
8818 # 2	14/ 3	43 57.9N 12 57.6W	RMT 1	0-1000	0659-0808 DAWN	REPEAT 11 - ORLIQUE FLOW DIST. 7.00 KM.	4667
8818 # 3	14/ 3	43 55.2N 12 57.4W	RMT 8				
8818 # 3	14/ 3	43 51.9N 12 57.0W	RMT 1	500- 600	0931-1131 DAY	REPEAT 11 FLOW DIST. 7.00 KM.	4426
		43 47.3N 12 56.4W	RMT 8				

STN. #	DATE	POSITION LAT LONG	GEAR	DEPTH (M)	FISHING TIME GMT	REMARKS	WATER DEPTH (M)
8818 # 4	14/ 3	43 43.4N 12 56.2W 43 39.3N 12 56.3W	RMT 1 RMT 8	400- 500	1255-1455 DAY	REPEAT 11 FLOW DIST. 7.68 KM.	
8818 # 5	14/ 3	43 39.1N 12 56.8W 43 44.0N 12 57.5W	RMT 1 RMT 8	300- 400	1548-1748 DAY	REPEAT 11 FLOW DIST. 6.96 KM.	
8818 # 6	14/ 3	43 46.0N 12 58.8W 43 51.3N 12 58.6W	RMT 1 RMT 8	500- 600	2000-2200 NIGHT	REPEAT 11 FLOW DIST. 8.29 KM.	
8818 # 7	15/ 3	43 56.7N 12 57.4W 44 1.3N 12 56.1W	RMT 1 RMT 8	400- 500	0004-0205 NIGHT	REPEAT 11 FLOW DIST. 7.08 KM.	
8818 # 8	15/ 3	44 3.5N 12 55.8W 44 8.5N 12 54.7W	RMT 1 RMT 8	300- 400	0255-0455 NIGHT	REPEAT 11 FLOW DIST. 7.60 KM.	
8819 # 0	16/ 3	47 38.2N 9 11.8W 47 39.5N 9 12.3W	RMT 1 RMT 8	100- 150	0936-1016 DAY	DEMONSTRATION HAUL FLOW DIST. 2.05 KM.	3319

Figure 1. Ship's track and station positions between Barry and Canary Is.

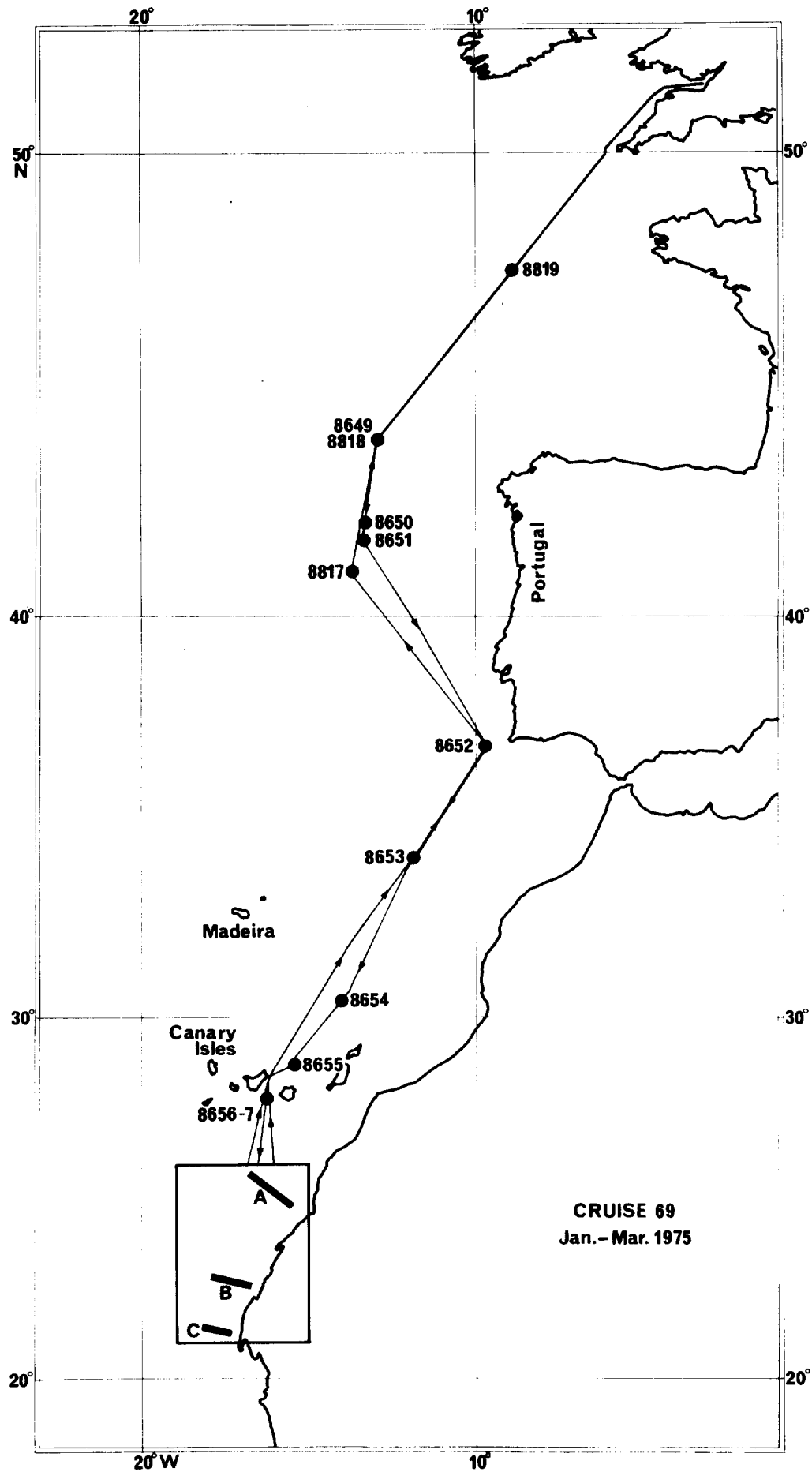


Figure 1

Fig. 2. Working area off NW African coast.

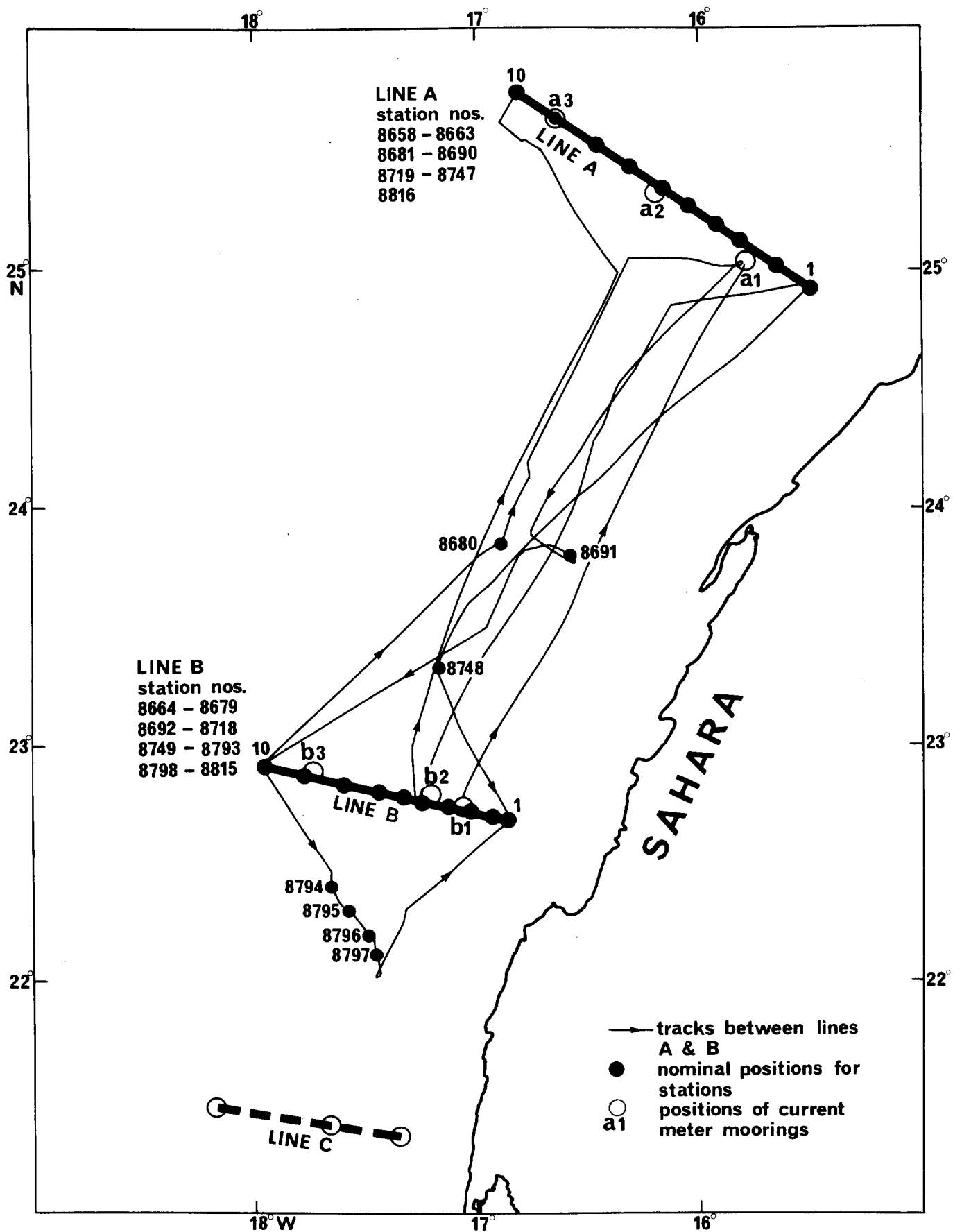


Figure 2

Fig. 3. Smoothed bottom topography (top) and positions of RMT 1+8 hauls (bottom) on Line B.

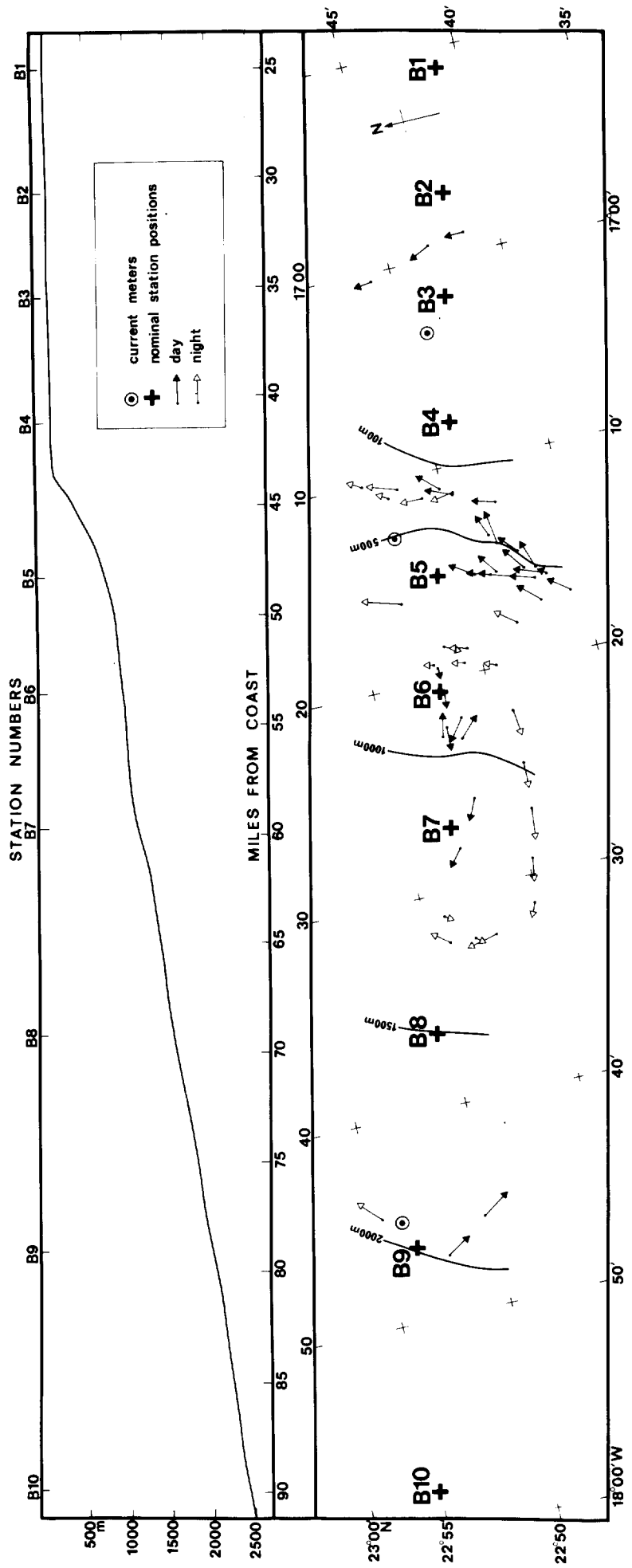


Figure 3

Fig. 4. Progressive vectors of surface currents

Fig. 4 (a). 13h Protas series at B 9, Stn 8765, 24 February

Data

Time	Lat. °N	Long. °W	Vel.	Dir'n
0532	22 51.2	17 42.9	-	-
0812	22 53.7	17 48.0	0.42	077.4
0914	22 54.2	17 48.0	0.60	147.9
0958	22 54.4	17 47.6	0.41	094.7
1058	22 53.7	17 48.1	0.54	148.1
1202	22 53.4	17 48.3	0.48	222.1
1226	22 54.0	17 48.4	0.94	084.8
1352	22 53.7	17 49.1	0.79	234.4
1410	22 53.6	17 48.8	0.55	124.8
1530	22 53.4	17 48.6	0.23	187.2
1854	22 54.0	17 48.5	0.11	250.9
1934	22 53.8	17 48.0	0.19	115.1
2042	22 53.9	17 47.9	0.07	108.2

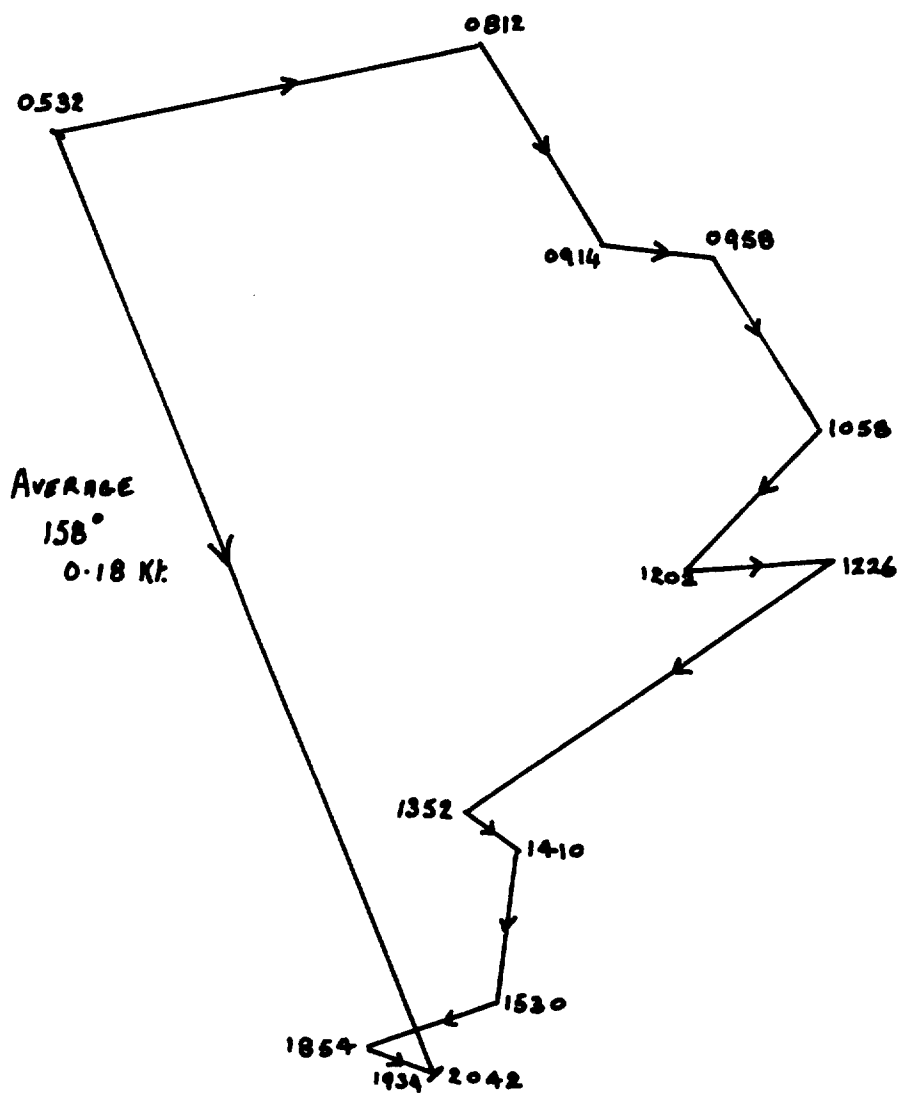


FIG 4(a)

Fig. 4(b). 13h Protas series at B 5, Stn. 8772, 26 February

Data

Time	Lat. °N	Long. °W	Vel.	Dir'n
0556	22 47.8	17 12.2	-	-
0740	22 44.5	17 15.0	1.45	195.4
0818	22 45.1	17 14.3	1.16	146.7
0846	22 45.7	17 14.7	1.24	253.5
1008	22 45.8	17 14.7	0.81	202.8
1030	22 45.8	17 13.9	1.89	114.5
1212	22 46.0	17 16.9	1.93	262.6
1402	22 46.7	17 16.3	0.72	105.8
1526	22 45.8	17 14.6	0.64	187.7
1716	22 46.0	17 15.2	0.59	248.8
1904	22 45.9	17 16.2	0.73	259.3
1942	22 44.8	17 18.1	1.24	107.1

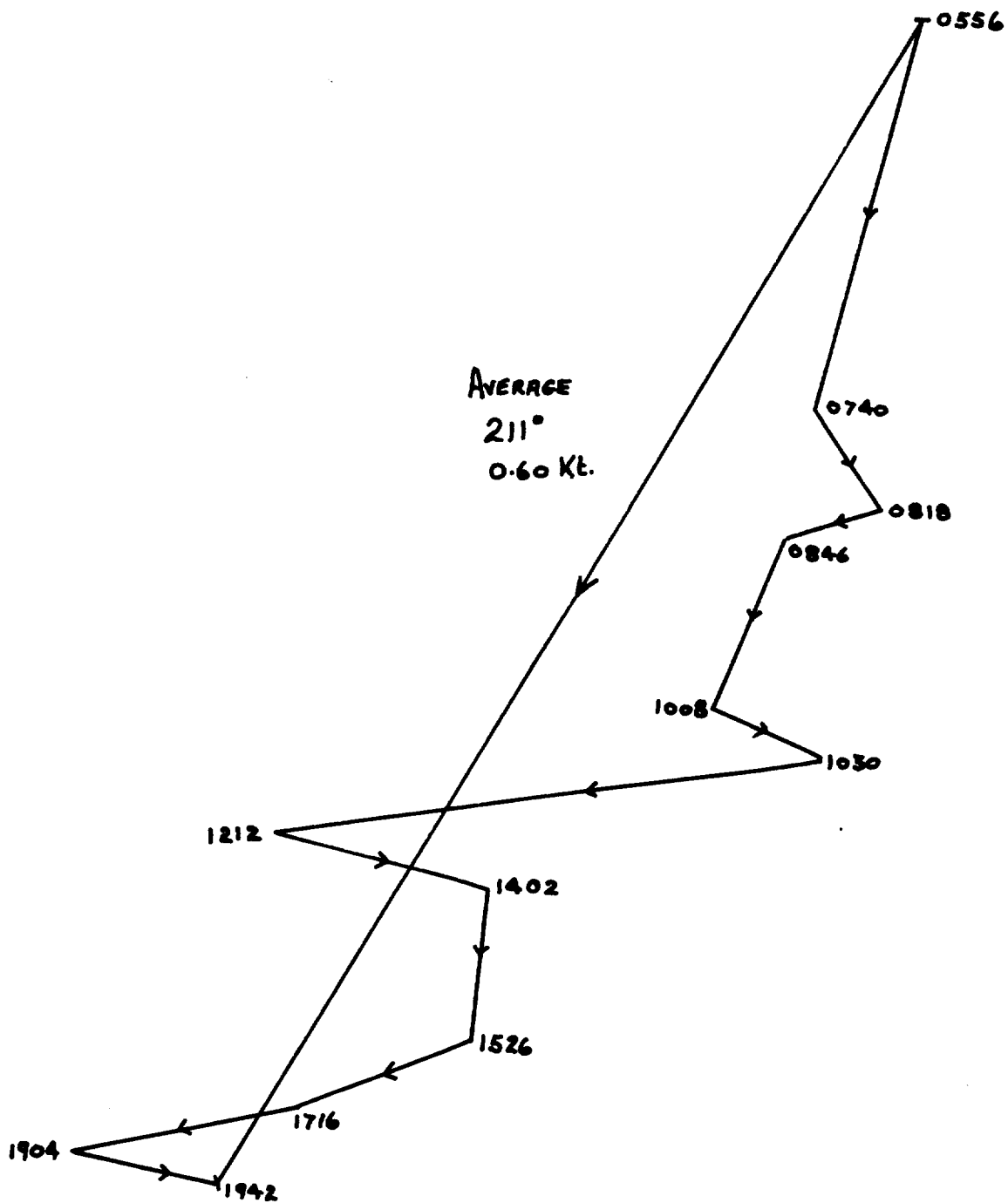


FIG 4(b)

Fig. 4(c). Pump series at B6 - 7, Stn. 8774, 26/27 February

Data

Time	Lat. °N	Long. °W	Vel.	Dir'n
2054	22 47.2	17 24.0	-	-
2126	22 47.5	17 24.1	0.51	007.2
2212	22 47.5	17 24.2	0.20	175.5
2334	22 47.9	17 24.2	0.18	064.9
0000	22 48.1	17 24.4	0.13	308.7
0120	22 48.4	17 24.1	0.22	086.7
0246	22 48.1	17 23.6	0.43	147.6
0320	22 47.8	17 23.3	0.47	131.0
0432	22 47.5	17 23.2	0.79	147.0
0652	22 46.6	17 25.0	0.79	197.8
0732	22 46.1	17 24.2	0.36	200.7

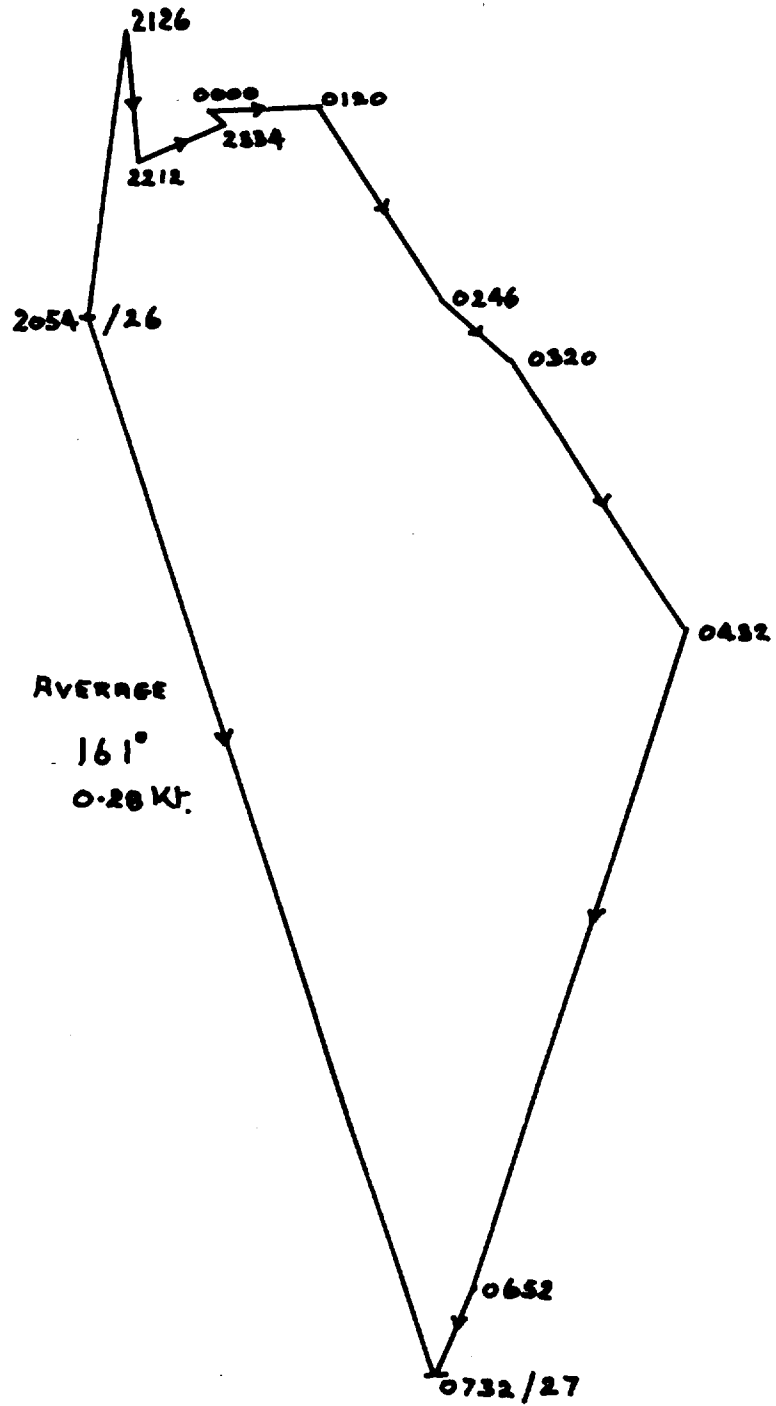


FIG 4(c)

Fig. 4(d). RMT series at B6 - 7, Stns. 877506, 27 February

Data

Time	Lat. °N	Long. °W	Vel.	Dir'n
0842	22 46.8	17 26.1	-	-
1310	22 47.1	17 20.7	0.73	062.7
1434	22 47.1	17 19.6	1.06	078.0
1508	22 46.8	17 20.6	0.90	152.0
1618	22 47.2	17 22.5	0.99	135.7
1816	22 45.2	17 21.3	0.83	177.1
2002	22 44.2	17 22.1	0.98	155.7
2038	22 44.1	17 23.5	1.52	273.3
2106	22 44.3	17 24.3	0.53	127.4
2226	22 44.5	17 27.8	0.76	193.1

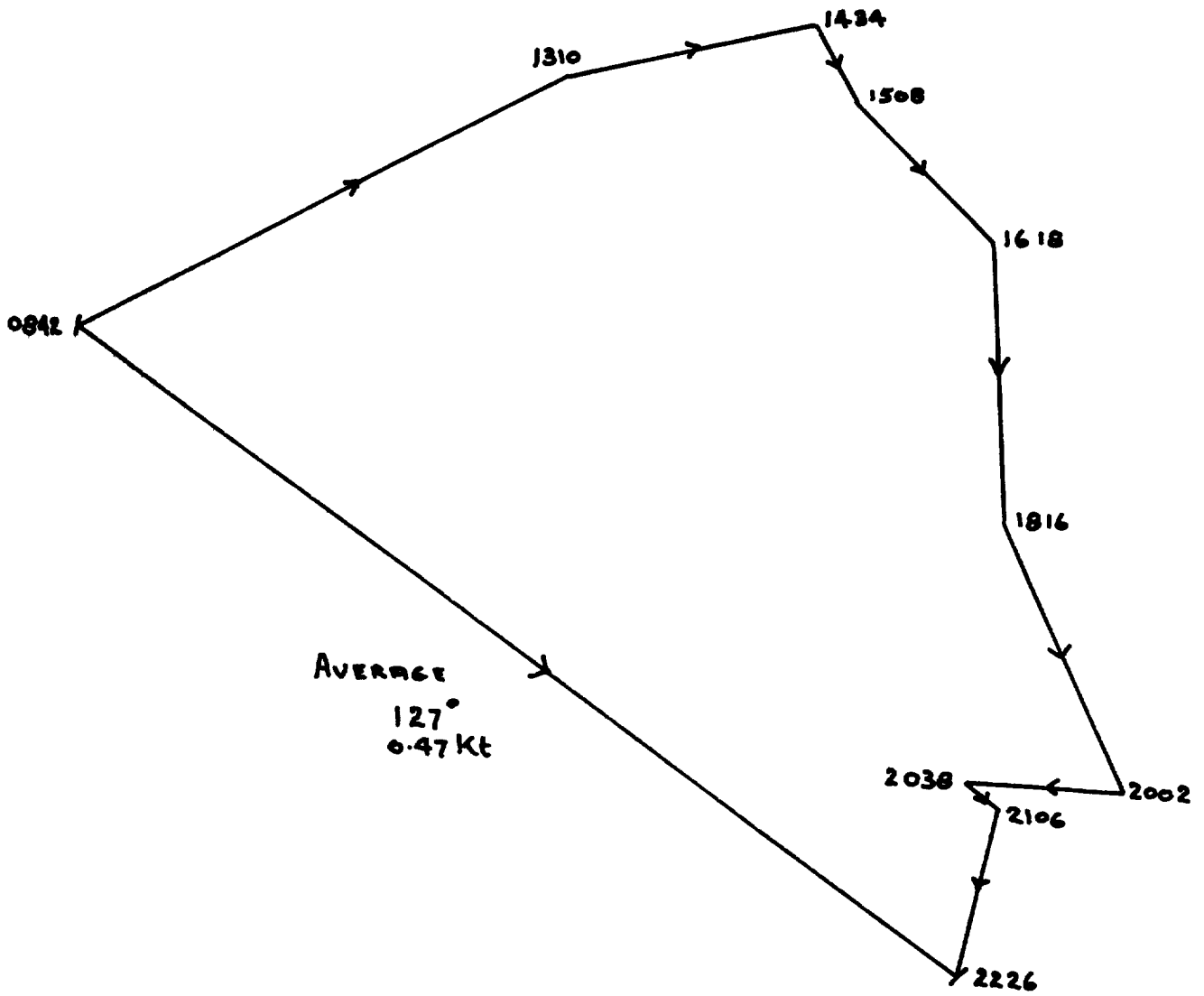


FIG 4(d)

Fig. 4(e). RMT series at 44°N, 13°W, Stn. 8818, 14/15 March

Data

Time	Lat. °N	Long. °W	Vel.	Dir'n
0350	44 00.8	12 58.7	-	-
0454	44 00.5	12 58.7	0.24	264.0
0532	44 00.2	12 58.2	0.66	026.7
0602	43 59.0	12 58.1	0.50	030.3
0640	43 58.4	12 57.8	0.62	044.7
0720	43 57.1	12 57.6	0.19	082.6
0830	43 54.5	12 57.4	0.44	045.5
0934	43 51.8	12 57.0	0.57	088.9
1116	43 47.9	12 56.5	0.36	079.2
1146	43 46.8	12 56.4	0.33	081.1
1300	43 43.2	12 56.2	0.32	077.0
1338	43 42.1	12 56.2	0.37	025.3
1452	43 39.5	12 56.3	0.29	044.0
1508	43 38.7	12 56.3	0.65	166.8
1644	43 41.5	12 57.0	0.20	285.4
1830	43 44.7	12 57.6	0.34	270.0
1854	43 44.6	12 58.0	0.17	254.6
2018	43 46.8	12 58.9	0.42	268.6
2040	43 47.7	12 58.9	0.28	307.7
2108	43 48.9	12 57.8	0.24	040.6
2202	43 51.3	12 58.7	0.26	332.9
2224	43 52.3	12 58.3	0.43	070.0
0008	43 56.8	12 57.4	0.21	077.4
0042	43 58.1	12 57.0	0.28	091.0
0156	44 00.9	12 56.2	0.32	120.3
0356	44 05.9	12 55.4	0.20	159.4
0444	44 08.0	12 55.4	0.17	228.1

Light N to NE winds (6-8 knots)

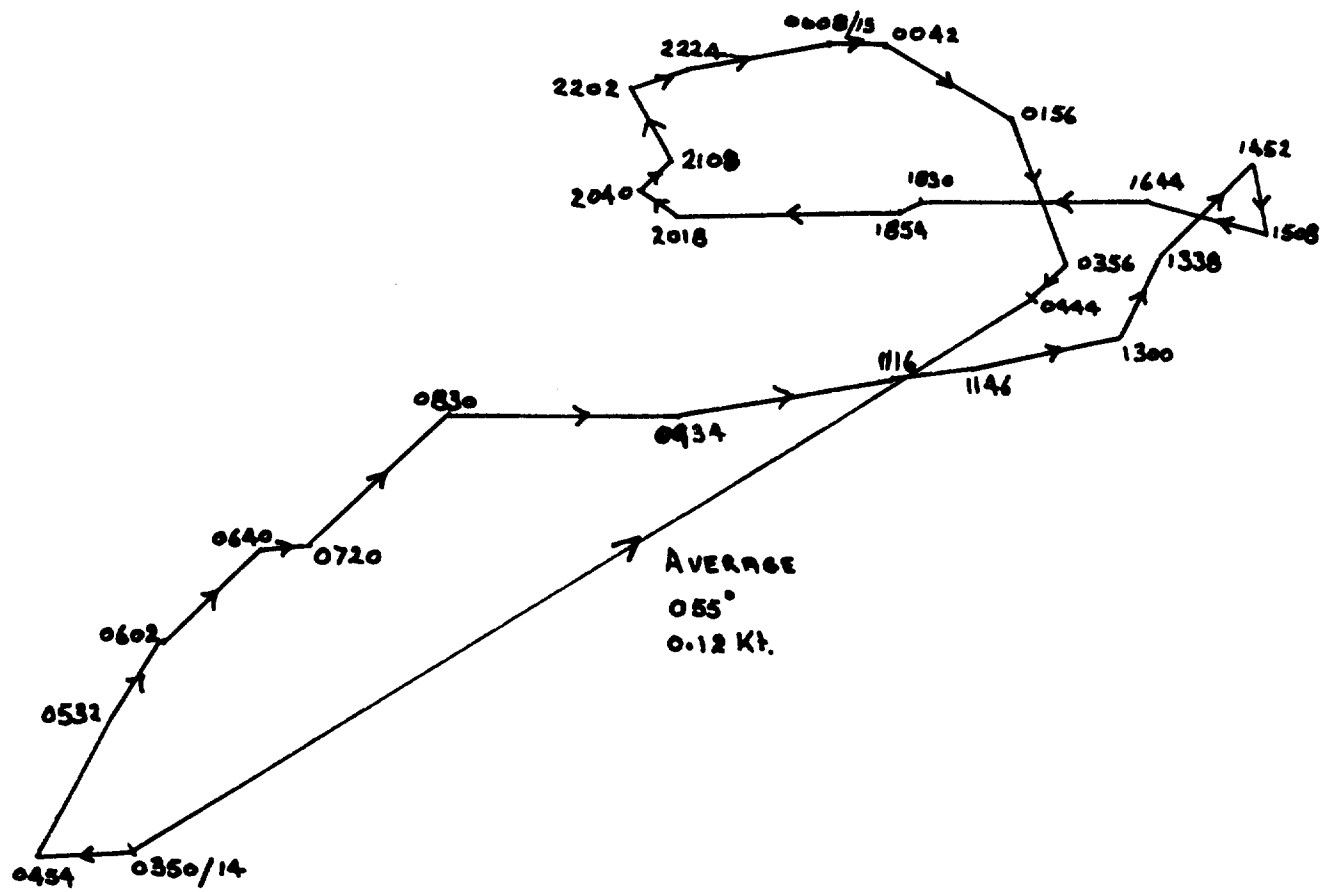


FIG 4(e)

Fig. 5. Surface current vectors on A Line.

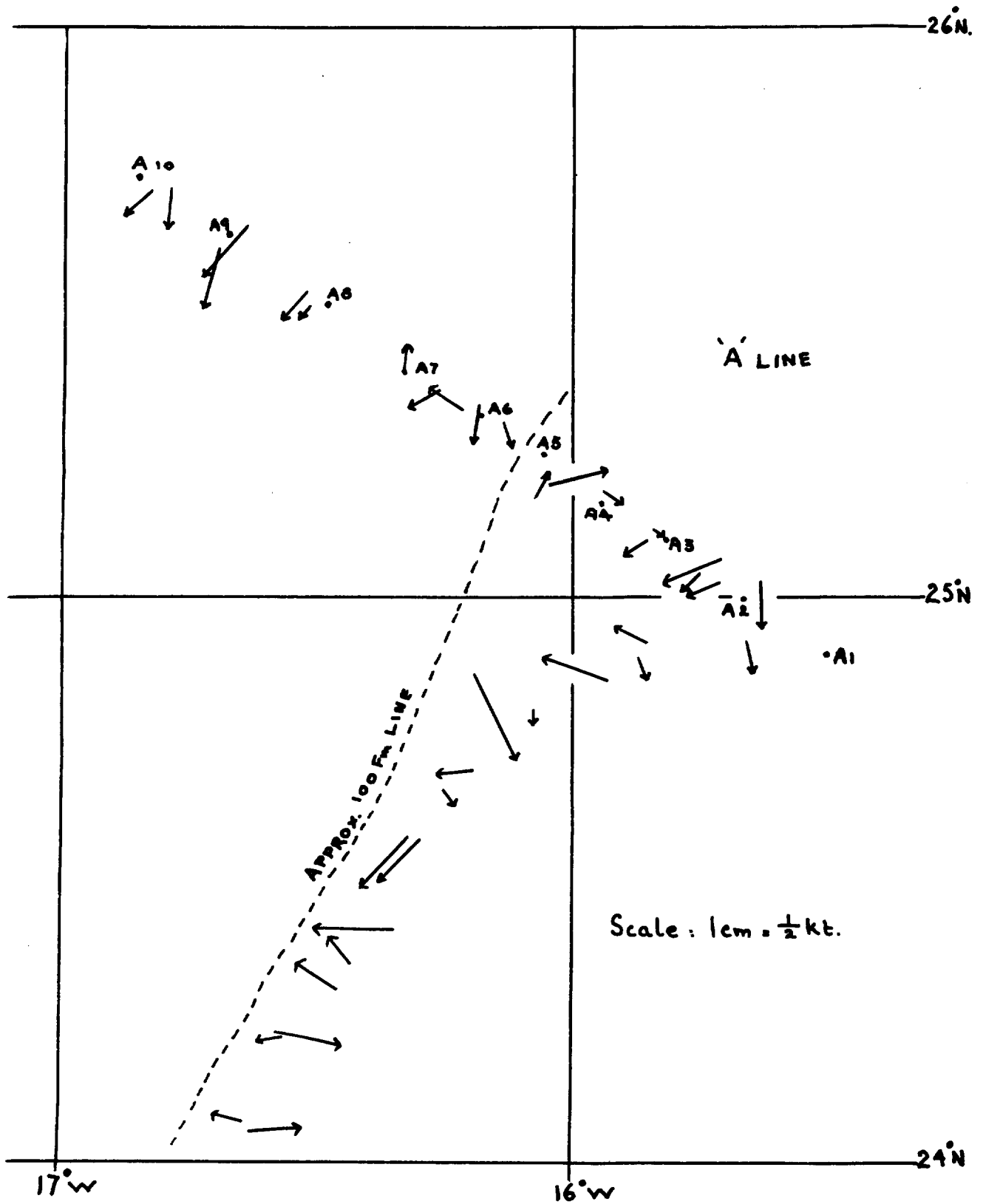


FIG 5

Fig. 6. Surface current vectors on B Line.

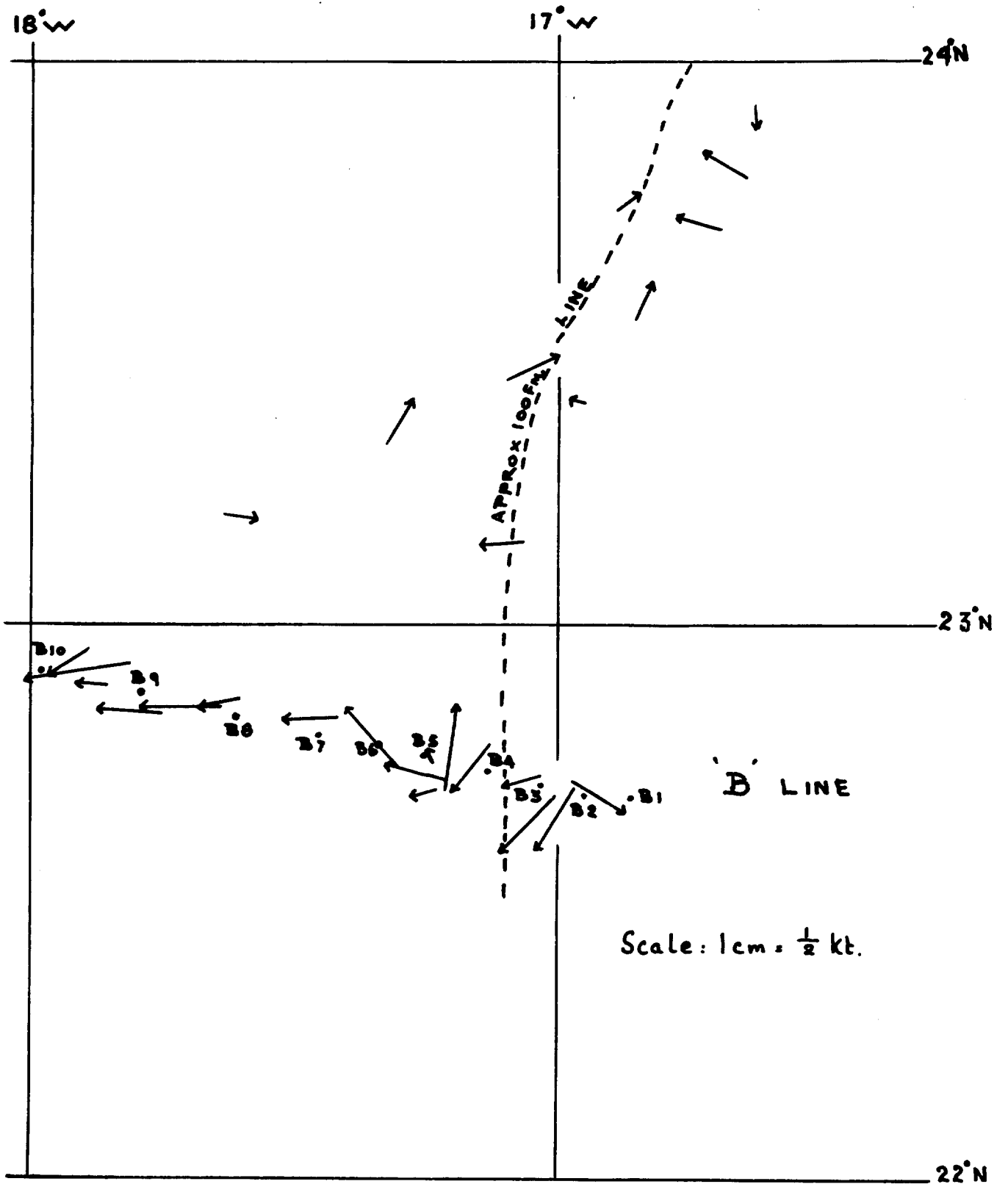


FIG 6

CRUISE REPORTS

CRUISE No. and/or DATE REPORT No.

R.R.S. "CHALLENGER"

August - September 1974 IOS CR 22

R.V. "EDWARD FORBES"

October 1974 IOS CR 15*
January - February 1975 IOS CR 19
April 1975 IOS CR 23
May 1975 IOS CR 32
May - June 1975 IOS CR 28
July 1975 IOS CR 31
July - August 1975 IOS CR 36
August - September 1975 IOS CR 41

R.R.S. "JOHN MURRAY"

April - May 1972 NIO CR 51
September 1973 IOS CR 7
March - April 1974 IOS CR 9
October-November & December
 1974 IOS CR 21
April - May 1975 IOS CR 25
April 1975 IOS CR 39
October - November 1975 IOS CR 40
August - October 1975 IOS CR 42

N.C. "MARCEL BAYARD"

February - April 1971 NIO CR 44

M.V. "RESEARCHER"

August - September 1972 NIO CR 60

R.V. "SARSIA"

May - June 1975 IOS CR 30
August - September 1975 IOS CR

R.R.S. "SHACKLETON"

August - September 1973 IOS CR 3
January - February 1975 IOS CR 18
March - May 1975 IOS CR 24
February - March 1975 IOS CR 29
July - August 1975 IOS CR 37
June - July 1976 IOS CR 45

M.V. "SURVEYOR"

February - April 1971 NIO CR 38
June 1971 NIO CR 39*
August 1971 NIO CR 42*

*not distributed